ESSAYS *on*
A PRIORI KNOWLEDGE
and JUSTIFICATION

ALBERT CASULLO

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For Anna and Lisa

Figlia! A tal nome palpito
Qual se m'aprisse i cieli.
Un mondo d'ineffabili
Letizie a me riveli;

Giuseppe Verdi
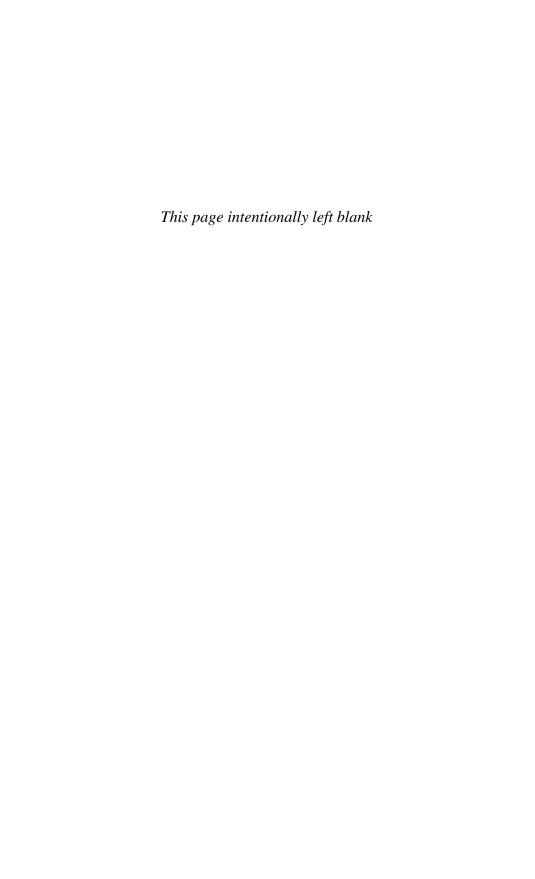*Simon Boccanegra,* Act 1, Scene 1

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PREFACE

These essays have benefitted from the responses and criticisms of many friends, colleagues, and students. I thank them for the time and effort that they expended on my behalf. More specific acknowledgments are to be found at the end of each essay. I would also like to thank the University of Nebraska-Lincoln, the College of Arts and Sciences, and, in particular, the Philosophy Department, its office staff, and its longtime Chair, Joe Mendola, for their generous support of my work. A Faculty Development Leave in Fall 2010 allowed me to complete this project in a timely fashion. Adam Thompson proofed the entire manuscript and helped to construct the index. I am grateful for his generosity and good humor. Finally, Oxford University Press was instrumental in bringing this project to fruition in numerous ways. Peter Ohlin encouraged me to pursue the project and provided sound advice along the way. Two anonymous referees offered valuable suggestions for improving the project. Lucy Randall assisted in the preparation of the manuscript. I thank them all warmly.

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INTRODUCTION

There has been a remarkable resurgence of interest in the topic of a priori knowledge over the past twenty-five years. Discussion of the topic in the 1960s and 1970s was minimal due to the influence of W. V. Quine. Quine's (1963) rejection of the cogency of the analytic–synthetic distinction was widely viewed as a rejection of a priori knowledge. As a consequence, discussions of the a priori were largely limited to discussions of the analytic–synthetic distinction and related semantic issues. Quine's (1969) program of naturalized epistemology raised a second barrier to the a priori, since many of its proponents viewed it as incompatible with the a priori.

Two developments in the 1970s laid the groundwork for renewed interest in the a priori. First, Saul Kripke's (1971, 1980) landmark investigations challenged the prevailing tendency to consider the concepts of a priori knowledge, necessary truth, and analytic truth to be the same or, more minimally, coextensive, which opened the space to reexamine the relationship between the a priori and the analytic. Moreover, it redirected attention to the more traditional Kantian question of the relationship between a priori knowledge and necessary truth. Second, Paul Benacerraf's (1973) seminal essay "Mathematical Truth," which was widely viewed as raising the question whether knowledge of mathematical truths, platonistically construed, could be accommodated within a naturalistic framework, inspired books on mathematical knowledge by Mark Steiner (1975), Philip Kitcher (1983), and Penelope Maddy (1990). The latter two books tied the issue to some broader themes in the theory of knowledge, including some discussion of a priori knowledge. These developments led to more general investigations of the a priori that were not specifically tied to the relationship between the a priori and the necessary or the analytic, or to mathematical knowledge in

particular. A literature began to emerge in the late 1980s and early 1990s devoted to more general questions regarding a priori knowledge. The topics of investigation included the evidential status of intuitions, the nature of logical knowledge, the role of experience in testimonial knowledge, and the epistemological implications of Kripke's metaphysical and semantic views.[1] This new wave of work culminated with the publication of three book-length treatments of the epistemological issues associated with the a priori: Laurence BonJour's *In Defense of Pure Reason* (1998), my *A Priori Justification* (2003), and Christopher Peacocke's *The Realm of Reason* (2004). Work on the a priori continues to flourish and diversify, and now addresses a wide range of new issues such as whether intuitions constitute a priori evidence, the source of modal knowledge, the coherence and significance of the a priori–a posteriori distinction, the methodology of philosophy, and the epistemological significance of the results of experimental philosophy.

The essays in this collection span the entire period of this resurgence of interest in the a priori, document the array of complex issues that bear on the a priori, identify the central epistemological questions, and provide the leading ideas of a unified response to those questions. In order to have a coherent framework for locating the various topics and issues under discussion in these essays, I will first present the framework developed in *A Priori Justification* and then locate each of the essays within that framework.

1

In *A Priori Justification*, I maintain that the contemporary discussion of a priori knowledge revolves around four questions originally posed by Kant in his introduction to the *Critique of Pure Reason*:

1. What is a priori knowledge?
2. Is there a priori knowledge?
3. What is the relationship between a priori knowledge and necessary truth?
4. What is the relationship between a priori knowledge and analytic truth?

I go on to offer a systematic treatment of each of these questions, although my primary focus is on the first two.

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1. See Casullo (1999) for a sample of this literature and a bibliography.

With respect to the concept of a priori knowledge, I favor a reductive analysis, which maintains that S knows a priori that p if and only if S's belief that p is justified a priori and the other conditions on knowledge are satisfied. The focus of my investigation is the concept of a priori justification. I argue that one must distinguish the requirements of the a priori from traditional Cartesian assumptions about the nature of knowledge and justification. Doing so allows us to see that a priori justification does not entail conditions such as certainty, a guarantee of truth, rational unrevisability, or indefeasibility. Moreover, it also allows us to see that there are no interesting conceptual connections between the concept of a priori knowledge and either the concept of analytic truth or the concept of necessary truth. The major issue to be resolved is whether the traditional requirement that a priori justification be independent of experience entails that such justification is indefeasible by experiential evidence. I argue that the answer is negative and conclude that the concept of a priori justification is minimal: it is the concept of non-experiential justification.

With respect to the second question, I canvass the standard arguments both for and against the existence of a priori knowledge. The supporting arguments fall into three broad classes. Those in the first begin with an analysis of the concept of a priori knowledge and maintain that some knowledge satisfies the conditions in the analysis. Those in the second offer criteria, or sufficient conditions, for a priori knowledge and maintain that some knowledge satisfies the conditions. Finally, those in the third maintain that epistemological theories that deny the existence of a priori knowledge are deficient in some respect. I contend that none of the arguments succeeds. The arguments in the first class fail because they employ incorrect analyses of the concept of a priori knowledge. Those in the second fail because either the proposed criterion is not sufficient for a priori knowledge or the knowledge that is alleged to satisfy the criterion does not. Those in the third provide no basis for rejecting theories that deny the existence of a priori knowledge since theories that endorse such knowledge suffer from the same deficiencies.

The opposing arguments fall into three broad classes. Those in the first offer an analysis of the concept of a priori knowledge and maintain that no knowledge satisfies the conditions in the analysis. Those in the second offer empiricist accounts of knowledge of the propositions alleged to be knowable only a priori. Those in the third maintain that a priori knowledge is incompatible with epistemic naturalism. I contend that the arguments fail. The arguments in the first class fail because they are based on incorrect analyses of the concept of a priori knowledge. Those in the second fail to show that the propositions in question are not knowable a priori as well as empirically. With

respect to the arguments in the third class, I distinguish between philosophical and scientific naturalism and argue that neither provides a basis for rejecting a priori knowledge.

   Both proponents and opponents of a priori knowledge rely on a priori arguments to advance their respective positions. Since the arguments fail, the result is an impasse. I go on to contend that the most promising strategy for moving beyond the impasse is for proponents of the a priori to offer empirical support for the claim that there are nonexperiential sources of justification. The strategy consists of two related projects. The first, the Articulation Project, is philosophical in character and involves providing a more precise characterization of alleged nonexperiential sources of knowledge and the range of beliefs they justify. The second, the Empirical Project, provides empirical evidence that underwrites the claim that the nonexperiential sources generate knowledge of the propositions in question and explains how they do so. Two general considerations support the dual strategy. The first is dialectical. A case for the a priori that is based on evidence and methodological principles endorsed by empiricists is one that they must acknowledge by their own lights. The second is strategic. By relying solely on a priori considerations, apriorists place themselves in a needlessly handicapped position when defending their primary contention. In the absence of some principled objection to employing empirical evidence, it is simply a mistake to overlook it.

   My treatment of the final two questions is more cursory. The importance that the tradition places on these questions lies in the assumption that answering them is necessary in order to answer the first two questions. My goal is to reject that assumption. I maintain that the question of the relationship between a priori knowledge and necessary truth takes on particular importance against the background of two views: Kant's claim that necessity is a criterion of the a priori and the rationalist conception of a priori knowledge. Since I offer independent arguments against both views, resolving disputes about the relationship between a priori knowledge and necessary truth is not necessary to answer the first two questions. I also maintain that the question of the relationship between a priori knowledge and analytic truth and the related question of the cogency of the analytic–synthetic distinction take on particular importance against the background of two assumptions: synthetic a priori knowledge poses explanatory problems circumvented by analytic a priori knowledge; and if the analytic–synthetic distinction is not cogent, then the a priori–a posteriori distinction is not cogent. But, once again, I argue that those assumptions are false and that, as a consequence, resolving the issues surrounding the analytic–synthetic distinction and the existence of synthetic a priori knowledge is not necessary in order to answer the first two questions.

2

The first five essays provide the background to a number of the major themes articulated in *A Priori Justification*. Kripke's (1971, 1980) investigations impacted work on a priori knowledge in two divergent ways. By insisting that the concepts of a priori knowledge, necessary truth and analytic truth were not the same and that, as a consequence, the claim that they were coextensive would need to be supported by independent argument, he freed the a priori from its close association with the concept of analytic truth and opened up the conceptual space for examining that concept in its own right. On the other hand, his claim that there is necessary a posteriori knowledge appeared to challenge Kant's contention that necessity is a criterion of a priori knowledge and to undermine a leading argument in support of a priori knowledge. In "Kripke on the A Priori and the Necessary," I argue that Kant's criterion is ambiguous; it fails to distinguish between

> (K1)   If p is necessarily true and S knows that p then S knows a priori that p;

and

> (K2)   If p is necessarily true and S knows that p is a necessary proposition then S knows a priori that p is a necessary proposition.

Moreover, although Kripke's account of our knowledge of necessary a posteriori propositions challenges (K1), it supports (K2). This result laid the groundwork for rejecting Kant's criterial argument for a priori knowledge in "Necessity, Certainty, and the A Priori." It also indicated the need for a more nuanced investigation of the relationship between a priori knowledge and necessary truth, which I offer in "Knowledge and Modality," and further discussion of knowledge of modality, which I offer in "Counterfactuals and Modal Knowledge" and "Conceivability and Modal Knowledge."

"Necessity, Certainty, and the A Priori" provides the first installment of one of the leading ideas in *A Priori Justification*: the failure of a priori arguments to either prove or disprove the existence of a priori knowledge. This essay examines three criterial arguments for the existence of a priori knowledge. Criterial arguments identify a feature of propositions that we purportedly know and maintain that we cannot know a posteriori propositions having that feature. The three arguments under investigation appeal to necessity, certainty, and irrefutability by experiential evidence. In response, I contend either that one can have a posteriori knowledge of propositions having the feature or that the propositions alleged to have the feature do not have it.

"Causality, Reliabilism, and Mathematical Knowledge" extends the idea that a priori arguments are of limited import in arguing for or against the existence of

a priori knowledge by considering Paul Benacerraf's (1973) question whether knowledge of abstract entities can be accommodated within a naturalistic theory of knowledge. Benacerraf's original argument is framed in terms of the causal theory of knowledge, which has been widely rejected in favor of reliabilism. This essay considers the two leading versions of reliabilism, the reliable indicator theory and process reliabilism, and their implications for knowledge of abstract entities. I argue that reliable indicator theories are incompatible with knowledge of abstract entities but that the issue is more complicated with respect to process reliabilism. Although process reliabilism is not incompatible with knowledge of abstract entities, empirical evidence in support of the claim that there cannot be basic psychological processes that generate beliefs about objects that are causally inert would provide defeating evidence for the justification conferred on beliefs by a reliable belief forming process, such as intuition, that produced beliefs about abstract entities.

"Revisability, Reliabilism, and Mathematical Knowledge" addresses the analysis of the concept of a priori knowledge. The target of the essay is the claim of Hilary Putnam (1983) and Philip Kitcher (1983) that the concept of a priori knowledge entails a rational unrevisability condition. Here I distinguish between a strong unrevisability condition, which requires rational unrevisability in light of any evidence, and a weak unrevisability condition, which requires unrevisability in light of experiential evidence. Against the former, I argue that it is implausible to maintain that S's belief that p is justified a posteriori merely in virtue of the fact that it is rationally revisable in light of nonexperiential evidence. Against the latter, I argue that it is motivated by a mistaken view about the relationship between confirming and disconfirming evidence. Since Kitcher's analysis of the concept of a priori knowledge is developed within the framework of reliabilism, I go on to address whether that framework offers any support for his analysis. I maintain that the framework provides reason to reject the analysis since the analysis imposes higher standards on a priori justification than reliabilism requires, but Kitcher does not offer any compelling rationale for the higher standards. The rejection of an unrevisability condition on a priori knowledge plays a central role in both defending the minimalist conception of a priori justification and rejecting what Putnam and Kitcher regard to be the leading argument in Quine's "Two Dogmas" against the existence of a priori knowledge.

"The Coherence of Empiricism" returns to the theme of the failure of a priori arguments to either prove or disprove the existence of a priori knowledge. This essay investigates the charge that empiricist theories of knowledge face serious deficiencies: they lead to skepticism about the external world, they cannot provide a noncircular justification of their basic epistemic principles, and they impose no constraints on epistemic justification. I maintain that the a priori arguments purporting to reveal deficiencies in empiricist epistemological theories fail

to provide support for apriorist epistemological theories because the latter theories are subject to the same deficiencies.

"A Priori Knowledge," which was the final essay to appear prior to *A Priori Justification*, provides an introduction to a number of its main themes: the articulation and defense of the minimal conception of a priori justification, an exposition of the limitations of the traditional arguments both for and against a priori knowledge, and the relevance of empirical investigation to providing supporting evidence for the claim that there are nonexperiential sources of justification.

The four essays published subsequent to *A Priori Justification* explore diverse themes that were introduced in the book but not developed in detail. "Epistemic Overdetermination and A Priori Justification" examines the arguments of J. S. Mill and W. V. Quine against the existence of a priori knowledge and contends that both arguments fall short of their goal because they fail to appreciate the phenomenon of epistemic overdetermination. The central premise in Mill's argument is the Explanatory Simplicity Principle, which I argue should be rejected because it is incompatible with a familiar and uncontroversial form of epistemic overdetermination: epistemic overdetermination by different sources. The case of Quine is more complicated since there is still controversy over the central argument of "Two Dogmas" and how it bears on the existence of the a priori. My focus is on the Putnam-Kitcher reconstruction of the argument, whose central premise is the claim that the concept of a priori knowledge entails that if S knows a priori that p then S's justification for the belief that p is not revisable in light of experiential evidence. Here I argue that this conception of a priori knowledge rules out the possibility of a particular form of epistemic overdetermination: S's belief that p is justified both a priori and by experience. I contend that whether there are beliefs that are justified both a priori and by experience is a substantive epistemological question that should not be settled by an analysis of the concept of a priori knowledge.

"Knowledge and Modality" explores in greater detail the relationship between a priori knowledge and necessary truth. Kripke's contention that there are necessary a posteriori truths and contingent a priori truths challenges the traditional Kantian view:

(K)   All knowledge of necessary truths is a priori and all a priori knowledge is of necessary truths.

I argue that (K) provides a very crude account of the relationship between the a priori and the necessary because it masks two crucial distinctions. I go on to utilize these distinctions to introduce and critically evaluate a number of more nuanced principles articulating that relationship. In conclusion, I identify two

principles that are intuitively plausible, widely accepted, and not open to decisive counterexamples, but maintain that they lack any independent support.

"Analyzing A Priori Knowledge" returns to the topic of the analysis of the concept of a priori knowledge. Here I address Philip Kitcher's (2000) contentions that the minimal conception of a priori knowledge that I favor does not provide a coherent explication of the traditional concept of the a priori and that the important question about mathematical knowledge is not whether it is a priori but whether it is tradition-independent. Kitcher's strategy for showing that the minimal conception of the a priori fails to coherently explicate the traditional conception is to show that the minimal conception, when conjoined with a reliabilist theory of knowledge, has consequences that are at odds with traditional views about the a priori. I maintain that the argument strategy fails because traditional views about the a priori were developed within a Cartesian theory of knowledge, and if the minimal conception is conjoined with a Cartesian theory of knowledge, it does not yield results that are at odds with traditional views about the a priori. Moreover, I maintain that Kitcher's claim that the important question about mathematical knowledge is not whether it is a priori but whether it is tradition-independent conflates two distinct questions. Whether mathematical knowledge is tradition-independent is a question about the general conditions on knowledge, that is, the conditions common to both a priori and a posteriori knowledge. Whether mathematical knowledge is a priori is a question about the role of experience in satisfying those general conditions.

The topic of testimonial knowledge raises two issues with respect to the a priori. The first is whether such knowledge is a priori or a posteriori. The answer to this question bears on a second issue. Proponents of the view that a priori justification entails indefeasibility by experience typically maintain that no beliefs are justified a priori because all justification is defeasible by experience. Testimony is frequently cited as a leading source of such defeaters. But if testimonial justification is a priori, then this argument is blocked. "Testimony and A Priori Knowledge" addresses Tyler Burge's (1993) account of testimony, which allows for the possibility of both testimonial a priori warrant and knowledge. I reject one of Burge's supporting arguments for the claim that perception does not play a warranting role in testimony, but also argue that even if his contentions about the a priori status of testimonial warrants and knowledge are correct, they are too limited to block the arguments of proponents of the indefeasibility condition against the existence of a priori knowledge.

The four previously unpublished essays address issues that have either emerged or taken on more prominence in the literature on the a priori since the publication of *A Priori Justification*. Arguments in support of the existence of a priori knowledge have shifted from the earlier focus on mathematical knowledge to the evidential status of intuitions. "Intuition, Thought Experiments, and the A Priori"

distinguishes two different accounts of the role of intuition in acquiring a priori knowledge: the traditional rationalist account, which involves a direct grasp of the truth (or necessary truth) of general principles, and a more moderate account that emphasizes particular concrete case intuitions and their role in conceptual analysis. My goal is to determine whether the role of intuition in conceptual analysis can be parlayed into a plausible defense of a priori knowledge. The focus of my investigation is George Bealer's attempt to provide such a defense. I argue that his two leading arguments against empiricism fail, and offer an alternative approach to defending the a priori status of intuitions that highlights the role of empirical investigation.

Kripke's examples of necessary a posteriori propositions drew attention to the question of modal knowledge. According to Kripke, if P is the statement that the lectern is not made of ice, a posteriori knowledge that P is necessarily true is based on a priori modal knowledge that if P then P is necessarily true. He does not, however, provide an account of modal knowledge. Christopher Hill and Timothy Williamson attempt to fill this gap. Both maintain that the metaphysical modalities are reducible to the counterfactual conditional and that the reduction provides the key to an account of the epistemology of the metaphysical modalities. Williamson maintains that knowledge of the metaphysical modalities is reducible to knowledge of counterfactuals and offers an account of the latter in terms of the exercise of the imagination. Hill maintains that the reduction of the metaphysical modalities to the counterfactual conditional offers two tests for determining whether a proposition is metaphysically necessary and two tests for determining whether a proposition is metaphysically possible.

"Counterfactuals and Modal Knowledge" addresses Williamson's account of knowledge of counterfactuals and his account of modal knowledge. With respect to the former, I maintain that it is rooted in two unsubstantiated empirical assumptions. With respect to the latter, I maintain that it rests on three errors: conflating logical reduction and epistemological reduction, a misguided appeal to cognitive economy, and incorrectly locating what needs to be explained by an account of modal knowledge. "Conceivability and Modal Knowledge" addresses Hill's account of modal knowledge. Here I argue that neither of Hill's two tests provides an account of modal knowledge that requires the employment of our cognitive mechanisms or procedures for evaluating subjunctive conditionals. Moreover, I maintain that his account of modal knowledge is at odds with his contention that conceivability does not provide epistemic access to metaphysical possibility.

An emerging theme in the literature on the a priori is to challenge the cogency or the significance of the a priori–a posteriori distinction. John Hawthorne, C. S. Jenkins, and Timothy Williamson provide recent examples. My goal in "Articulating the A Priori–A Posteriori Distinction" is to argue, utilizing the framework developed in "Analyzing A Priori Knowledge," that the problems

posed by these authors are a consequence of either the more general epistemological framework in which the distinction is embedded or to a formulation of the distinction that does not cohere well with the general epistemological framework in which it is embedded. I go on to articulate an alternative challenge to the a priori–a posteriori distinction.

The appendix offers a highly selective guide for those seeking an introduction and orientation to the burgeoning research in the area. It is not comprehensive, and there is much excellent work that is not included.

References

Benacerraf, Paul. 1973. "Mathematical Truth." *Journal of Philosophy* 70: 661–679.

BonJour, Laurence. 1998. *In Defense of Pure Reason*. Cambridge: Cambridge University Press.

Burge, Tyler. 1993. "Content Preservation." *Philosophical Review* 102: 457–488.

Casullo, Albert. 1999. *A Priori Knowledge*. Aldershot, England: Dartmouth.

———. 2003. *A Priori Justification*. New York: Oxford University Press.

Kitcher, Philip. 1983. *The Nature of Mathematical Knowledge*. New York: Oxford University Press.

———. 2000. "A Priori Knowledge Revisited." In *New Essays on the A Priori*, ed. P. Boghossian and C. Peacocke. Oxford: Oxford University Press.

Kripke, Saul. 1971. "Identity and Necessity." In *Identity and Individuation*, ed. M. K. Munitz. New York: New York University Press.

———. 1980. *Naming and Necessity*. Cambridge, Mass.: Harvard University Press.

Maddy, Penelope. 1990. *Realism in Mathematics*. Oxford: Oxford University Press.

Peacocke, Christopher. 2004. *The Realm of Reason*. Oxford: Oxford University Press.

Putnam, Hilary. 1983. "'Two Dogmas' Revisited." In *Realism and Reason: Philosophical Papers,* vol. 3. Cambridge: Cambridge University Press.

Quine, W. V. 1963. "Two Dogmas of Empiricism." In *From a Logical Point of View*, 2d ed. rev. New York: Harper and Row.

———. 1969. "Epistemology Naturalized." In *Ontological Relativity and Other Essays*. New York: Columbia University Press.

Steiner, Mark. 1975. *Mathematical Knowledge*. Ithaca: Cornell University Press.

Essays on A Priori Knowledge and Justification

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1

Kripke on the A Priori and the Necessary

Philosophers have traditionally believed that there is a close connection between the categories of a priori propositions and necessary propositions. One widely held thesis about the nature of this connection is that all a priori knowledge is of necessary propositions and that all necessary propositions are knowable a priori.[1] Saul Kripke has recently argued that this traditional account is mistaken. In "Identity and Necessity"[2] he argues that there are necessary a posteriori propositions, while in "Naming and Necessity"[3] he argues, in addition to this, that there

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1. For example, Kant states in the *Critique of Pure Reason,* trans. Norman Kemp Smith (New York: St. Martin's Press, l965), p. 11, that "Any knowledge that professes to hold a priori lays claim to be regarded as absolutely necessary." Leibniz claims in *The Monadology* that "There are also two kinds of *truths,* those of *reasoning* and those *of fact.* Truths of reasoning are necessary and their opposite is impossible, and those of *fact* are contingent and their opposite is possible. When a truth is necessary its reason can be found by analysis, resolving it into more simple ideas and truths until we reach those which are primitive." See *Leibniz: Selections,* ed. P. P. Wiener (New York: Charles Scribner's Sons, 1951), p. 539.

2. Saul A. Kripke, "Identity and Necessity," in *Identity and Individuation*, ed. M. K. Munitz (New York: New York University Press, 1971).

3. Saul A. Kripke, "Naming and Necessity," in *Semantics of Natural Language,* ed. D. Davidson and G. Harman (Dordrecht: D. Reidel Publishing Company, 1972).

are contingent a priori propositions. The primary concern of this paper is to examine Kripke's arguments in order to determine whether he has succeeded in calling the traditional account into question.

I

Kripke's claim that there are necessary a posteriori propositions arises in the context of a discussion of essential properties. He begins with the following consideration:

> Supposing this lectern is in fact made of wood, could this very lectern have been made from the very beginning from ice, say frozen from water in the Thames? One has a considerable feeling that it could *not*, though in fact one certainly could have made a lectern of water from the Thames, frozen it into ice by some process, and put it right there in place of this thing. If one had done so, one would have made, of course, a *different* object.[4]

Therefore, in any counterfactual situation in which this lectern existed, it would not have been made from water from the Thames frozen into ice. Kripke goes on to argue that if the essentialist view is correct, then there are necessary propositions knowable only a posteriori. He summarizes his argument in the following manner:

> In other words, if P is the statement that the lectern is not made of ice, one knows by a priori philosophical analysis, some conditional of the form "if P, then necessarily P." If the table is not made of ice, it is necessarily not made of ice. On the other hand, then, we know by empirical investigation that P, the antecedent of the conditional, is true—that this table is not made of ice. We can conclude by *modus ponens*:

$$P \supset \quad P$$
$$\frac{P}{P}$$

> The conclusion—'$\Box P$'—is that it is necessary that the table not be made of ice, and this conclusion is known a posteriori, since one of the premises on which it is based is a posteriori.[5]

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4. *Identity and Individuation*, p. 152.

5. Ibid., p. 153.

Therefore, since presumably what a certain lectern is made of can be know only a posteriori, the essentialist view can be accommodated only if one rejects the thesis that all necessary propositions are knowable a priori.

The claim that if there are essential properties then there are necessary propositions which are knowable only a posteriori is ambiguous, and two different interpretations of it must be distinguished. In order to see this ambiguity, one must distinguish between knowledge of the truth value of a proposition and knowledge of its general modal status. One has *knowledge of the truth value* of a proposition when one knows whether it is true or false. One has *knowledge of the general modal status* of a proposition when one knows whether it is a necessary proposition or a contingent one. Letting "*Fa*" stand for the proposition "*a* has the property *F*" where *F* is an essential property of *a*, one can now see that the claim that there is only a posteriori knowledge of necessary propositions such as "*Fa*" can be interpreted in either of the following two ways: (1) "*Fa*" is knowable only a posteriori, and "*Fa*" is a necessary proposition, or (2) that "*Fa*" is a necessary proposition is knowable only a posteriori. If there are essential properties, then it would follow that one could have only a posteriori knowledge of the *truth value* of necessary propositions such as "*Fa*." But, even if there are essential properties, it would not follow that there can be, let alone can only be, a posteriori knowledge of the *general modal status* (or necessity) of propositions such as "*Fa*."

The claim that even if there are essential properties, it would not follow that there can be only a posteriori knowledge of the *general modal status* of some necessary propositions, might seem to be in conflict with Kripke's conclusion. For he maintains that if there are such properties, then "□*P*" is knowable only a posteriori. Therefore, we seem to have a case of a posteriori knowledge of the necessity (or general modal status) of a proposition. This is not so, however. One must distinguish between the general modal status and the specific modal status of a proposition. By the *general modal status* of a proposition I mean its being necessary or its being contingent, regardless of whether it is necessarily true or necessarily false, or contingently true or contingently false. By the *specific modal status* of a proposition I mean its being necessarily true, necessarily false, contingently true, or contingently false. One must also recognize that knowledge of the specific modal status of a proposition consists of knowledge of its general modal status together with knowledge of its truth value. Hence, in cases where one's knowledge of *both* the general modal status of a proposition and its truth value is a priori, knowledge of its specific modal status would also be a priori. But in cases where one's knowledge of the truth value of a proposition is a posteriori, knowledge of its specific modal status would be a posteriori, even if knowledge of its general modal status is a priori.

Kripke's claim that "□*P*" is knowable only a posteriori is a claim about knowledge of the specific modal status of a proposition and is based on the fact

that where "*P*" is a proposition about a physical object possessing a property, its truth value is knowable only a posteriori. But Kripke clearly does not deny that knowledge of the general modal status of propositions about essential properties is a priori. (He says that "if *P* is the statement that the lectern is not made of ice, *one knows by* a priori *philosophical analysis*, some conditional of the form 'if *P*, then necessarily P'.")[6] Therefore, the existence of essential properties would entail that there are necessary propositions whose truth value and specific modal status are knowable only a posteriori, but it would not entail that there are necessary propositions whose general modal status is knowable only a posteriori.

The question whether Kripke's claims about knowledge of propositions such as "*Fa*" conflict with the traditional account of the relationship between a priori and necessary propositions is a difficult one to answer, since its proponents did not distinguish between the truth value, specific modal status, and general modal status of a proposition. We can conclude that if there are essential properties like those suggested by Kripke, then it would be incorrect to maintain that the truth value of all necessary propositions can be known a priori. From this it follows that it would also be incorrect to maintain that the *specific* modal status of all necessary propositions can be known a priori. But the existence of such properties would not call into question the claim that the *general* modal status of all necessary propositions can be known a priori.

II

In "Naming and Necessity" Kripke attempts to strengthen his claim that the traditional account of the relationship between a priori and necessary propositions is mistaken by providing an example of a proposition which is contingent but knowable a priori. His discussion begins with a consideration of Wittgenstein's comments about the standard meter. Wittgenstein claimed, "There is *one* thing of which one can say neither that it is one meter long, nor that it is not one meter long, and that is the standard meter in Paris."[7] Kripke disagrees: "If the stick is a stick, for example, 39.37 inches long (I assume we have some different standard for inches), why isn't it one meter long?"[8] He then goes on to raise the question whether the proposition that the standard meter is one meter long at time t_0 is a necessary truth. He argues that the proposition is not necessary even if one grants that by definition the standard meter is one meter long at time t_0 because

6. Ibid. The emphasis is mine.

7. Ludwig Wittgenstein, *Philosophical Investigations*, trans. G. E. M. Anscombe (Oxford: Basil Blackwell, 1968), p. 25.

8. *Semantics of Natural Language*, p. 274.

the 'definition', properly interpreted, does *not* say that the phrase 'one meter' is to be *synonymous* (even when talking about counterfactual situations) with the phrase 'the length of S at t_0' but rather we have *determined the reference* of the phrase 'one meter' by stipulating that 'one meter' is to be a *rigid* designator of the length which is in fact the length of S at t_0. So this does *not* make it a necessary truth that S is one meter long at t_0.[9]

Kripke goes on to claim that for a person who fixes the metric system by reference to stick S at t_0, the proposition "Stick S is one meter long at t_0" is known a priori:

> For if he used stick S to fix the reference of the term 'one meter', then as a result of this kind of 'definition' (which is not abbreviative or synonymous definition), he knows automatically, without further investigation, that S is one meter long.[10]

Therefore, the proposition that stick S is one meter long at t_0 is both contingent and knowable a priori.

In order to evaluate this argument we must distinguish the following two sentences: (1) S is one meter long at t_0; (2) The length of S at t_0 is one meter. A further distinction must also be made between two possible interpretations of the second sentence. We may follow Donnellan by pointing out that the definite description "the length of S at t_0" can be used either attributively or referentially.[11] (I shall not attempt to defend the distinction here.) When a speaker uses the sentence, "The length of S at t_0 is one meter," to introduce the term "one meter," he might be making either of the two following claims: (a) he wishes to introduce "one meter" as the name of the length of S at t_0 *whatever* that length might be; (b) there is a particular length which he has in mind and which he can identify independently of the truth of the proposition that it is the length of S at t_0, and it is *this* length which he wishes to call "one meter." Depending on how the definite description is used to introduce the term "one meter," what is asserted by (2) and, consequently, also what is asserted by (1) will change.

9. Ibid., p. 275.

10. Ibid.

11. See Keith S. Donnellan, "Reference and Definite Descriptions," *The Philosophical Review*, LXXV (1966): 281–304. On page 25 he states,

A person who uses a definite description attributively in an assertion states something about whoever or whatever is the so-and-so. A speaker who uses a definite description referentially in an assertion, on the other hand, uses the description to enable his audience to pick out whom or what he is talking about and states something about that person or thing.

If one uses the definite description attributively in introducing "one meter" by means of sentence (2), then one is using "one meter" as the name of the length of S at t_0 whatever it may be. The term is not being introduced as the name of a particular length which the speaker has singled out but as the name of whatever length happens to satisfy the definite description. This method of introducing the term results in what Kripke calls an "abbreviative definition," for the speaker is using the term "one meter" as an abbreviation for the phrase "the length of S at t_0." As a result of this definition, the proposition expressed by the sentence "The length of S at t_0 is one meter" is a necessary one, true solely in virtue of the terms used in expressing it. Since it is true solely in virtue of the meanings of its terms, it is also knowable a priori. If the term "one meter" is introduced in this manner, the proposition expressed by the sentence "S is one meter long" is also a necessary one. Since "one meter" is an abbreviation for "the length of S at t_0," the proposition expressed by the sentence "S is one meter long" is identical to the one expressed by the sentence "S has at t_0 whatever length it does have at t_0" which is trivially true. Hence, if the term "one meter" is introduced by means of a sentence which uses the definite description attributively, both propositions—that expressed by the sentence "The length of S at t_0 is one meter" and that expressed by the sentence "S is one meter long at t_0"—are necessary and a priori.

The situation is not the same, however, if one uses the definite description referentially in introducing the term "one meter" by means of sentence (2), for the speaker is not introducing "one meter" as the name of whatever length happens to satisfy the definite description "the length of S at t_0." Instead, he is introducing it as the name of a *particular* length to which he tries to call attention by using the definite description. He uses this particular definite description because he believes that S in fact has the length he wishes to name. But if it should happen that due to some peculiar environmental conditions S does not have the length he thought it had, then the speaker would have introduced "one meter" as the name of the length which he thought S had, rather than the one which it in fact had. Therefore, the term "one meter" is not being used as a synonym for "the length of S at t_0" but as the name of a particular length, whether or not it is in fact the length S at t_0.

Since this point might not be clear in the case of lengths, let us consider the case of colors. Suppose someone were to introduce the term "red" using the definite description "the color of S at t_0" referentially. Also, suppose that he is using the definite description to refer to the color red; but, because of some peculiar lighting conditions unknown to the speaker and everyone else in the immediate vicinity of S, although S appears red, it is in fact white. Since the speaker was using the definite description to draw attention to a particular color, and it was that particular color he wished to name "red," he would have introduced "red" as the name of the color red despite the fact that the color satisfying

the definite description "the color of S at t_0" was white. In such a case, a necessary proposition does result in virtue of the definition of "red." This necessary proposition, however, is not satisfactorily expressed by the sentence "The color of S at t_0 is red." It is more accurately captured by the sentence, "*This* color is red," where "this color" refers to the color the speaker singled out using the definite description. This proposition is also knowable a priori, since it can be known solely on the basis of the definition of "red."

Returning to our original example, introducing "one meter" as the name of a particular length to which one calls attention with the definite description "the length of S at t_0" also yields a necessary proposition, which can be best expressed by the sentence "*This* length is one meter," where "this length" refers to the length to which the speaker was calling attention. This proposition is also knowable a priori. But this is not true of the proposition expressed by the sentence "S is one meter long." Since "one meter" has been introduced as the name of a particular length, the proposition expressed by the sentence "S is one meter long" is no longer identical to the one expressed by the sentence "S has whatever length it does have." Instead, what it asserts is more accurately expressed by the compound sentence "S has this length (rather than another), and this length is one meter." As was stated above, the second conjunct is both necessary and knowable a priori. But this is not true of the first conjunct. For, as Kripke correctly points out, it is a contingent fact about S that it has any particular length; had the environmental conditions been different at t_0, S would have had a different length at t_0. We must notice, however, that this conjunct is also knowable only a posteriori. For although one knows a priori that the length one singled out with the definite description "the length of S at t_0" is one meter, one does not know a priori that S *in fact* has that length. One can know this only on the basis of a posteriori considerations, such as the manner in which the object appears and the conditions under which it appears in that way. Therefore, the sentence "S is one meter long at t_0" expresses a contingent and a posteriori proposition when "one meter" is introduced by means of a sentence which uses the definite description "the length of S at t_0" referentially.

Let us consider again our example of the speaker who introduces the term "red" using the definite description "the color of S at t_0" referentially. Although he knows a priori that *this* color is red, he does not know a priori that S is red, for he does not know a priori that S has the color he named "red." If he were to infer that S was red on the basis of the manner in which he introduced the term "red," not only would he be unjustified, but he would also be mistaken in this case, since, by hypothesis, S is in fact white at t_0. He would be justified in believing that S is red at t_0 only if he knew that S appears red and that only red objects appear red under the conditions in which S appears red. But both of these facts can be known only a posteriori. Therefore, his knowledge that S is red is a posteriori. It is based

on his knowledge that S has this particular color (rather than another), which is a posteriori, and his knowledge that this color is red, which is a priori.

It might be argued that there is a third way of introducing the term "one meter" which has not been considered.[12] When a speaker uses the definite description "the length of S at t_0" attributively in introducing "one meter," there are two possibilities: (1) the speaker might be using the definite description to give the meaning of the term, in which case "one meter" is an abbreviation for "the length of S at t_0"; or (2) the speaker might be using the definite description to fix the reference of the term, in which case "one meter" is the name (or rigid designator) of whatever length S happens to have at t_0. Although we have considered the first case, we have neglected the second. The primary reason for neglecting this case is that it does not constitute a genuine possibility. Since, by hypothesis, the description is not used referentially, how can one generate a genuine name from it? How can one, relying solely on the description, provide the term with reference? The appeal to the vague and unexplained notion of "fixing reference" does not by itself provide answers to these questions. If the term is to be a genuine name, rather than merely an abbreviation of the description, there must be criteria for the use of the description. It must be possible, at least in principle, for someone to determine whether the term is used correctly on future occasions without relying on the description. (This, of course, would be possible if the description had been used referentially.) If this is not possible, then it is no longer clear in what sense the term is *not* a mere abbreviation of the description and the distinction between the term's being a name and its being such an abbreviation appears to be of little consequence. Therefore, at the very least, Kripke owes us much further explanation.

The failure to provide a convincing example of a contingent a priori proposition removes the basis of Kripke's second argument against the traditional account of the relationship between the a priori and the necessary. He has not given us any reason to suppose that the traditional philosophers were mistaken in claiming that all a priori knowledge is of necessary propositions.[13]

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12. This point is due to the editor.

13. I am indebted to Professor Panayot Butchvarov for a number of illuminating discussions on several aspects of this paper.

2

Necessity, Certainty, and the A Priori

Empiricist theories of knowledge are attractive for they offer the prospect of a unitary theory of knowledge based on relatively well understood physiological and cognitive processes. Mathematical knowledge, however, has been a traditional stumbling block for such theories. There are three primary features of mathematical knowledge which have led epistemologists to the conclusion that it cannot be accommodated within an empiricist framework: 1) mathematical propositions appear to be immune from empirical disconfirmation; 2) mathematical propositions appear to be known with certainty; and 3) mathematical propositions are necessary. Epistemologists who believe that some nonmathematical propositions, such as logical or ethical propositions, cannot be known a posteriori also typically appeal to the three factors cited above in defending their position. The primary purpose of this paper is to examine whether any of these alleged features of mathematical propositions establishes that knowledge of such propositions cannot be a posteriori.

Empiricist accounts of mathematical knowledge can be divided into two broad categories: inductivist and holistic. The leading idea of theories in the first category is that at least some mathematical propositions can be individually confirmed or disconfirmed and, furthermore, those mathematical propositions which are *epistemically basic* are confirmed on the basis of experience and inductive generalization. The leading idea of theories in the second category is that

mathematical propositions are part of a larger theory and it is only the entire theory, rather than individual propositions, which can be confirmed or disconfirmed by experience. Inductivist theories are typically viewed as the primitive ancestors of the more sophisticated holistic theories. They are also generally regarded as more susceptible to the arguments of apriorists. In fact, one motivation for developing holistic empiricist theories of mathematical knowledge is to avoid such objections. For purposes of this paper, however, I will concentrate on inductivist accounts of mathematical knowledge and attempt to defend them against apriorist objections. If it can be plausibly demonstrated that such primitive empiricist theories are not open to these objections, then it is reasonable to conclude that the more sophisticated theories are also immune from them. One might, however, begin to wonder whether there is any point to preferring the holistic theories over their inductivist ancestors. But this issue goes beyond the scope of the present paper.

I

Let us begin with a general outline of the inductivist approach. Inductivism takes as its starting point the manner in which we originally learn the elementary truths of arithmetic. The relevant experiences take the form of counting the number of objects in a group, breaking down the group into smaller component groups, counting the number of objects in the component groups, and noting the numerical relationships which obtain between the larger group and its component groups. The procedure can also be reversed: one counts the number of objects in each of two distinct groups of objects, combines these objects into a single group, recounts the objects, and then notes the resulting numerical relations between the component groups and the combined group of objects. Proponents of apriorism do not typically deny that such experiences play an important role in the acquisition of mathematical knowledge. Their main contention, however, is that the role is *causal* rather than *evidential*. Although such experiences may be causally necessary for (a) the acquisition of mathematical concepts, and/or (b) the entertaining of the mathematical propositions, once one is in a position to entertain an elementary mathematical proposition experience is no longer necessary for its justification. Holistic empiricism is in agreement with apriorism in that it allows no evidential role to the experiences which are standardly involved in the learning of elementary truths of arithmetic. Instead, *all* mathematical propositions are justified in a manner analogous to the justification of the propositions of a scientific theory. They are to be assessed in terms of their contribution to the overall simplicity and explanatory power of the theory. The primary argument of the inductivist is that appeals to either a

priori sources of justification or holistic considerations are *unnecessary* for the justification of *elementary* mathematical propositions in light of the available inductive support. Furthermore, inductivism provides a *preferable* account of the justification of such propositions. For, on the one hand, one can be justified in believing elementary mathematical propositions in the absence of any justified scientific beliefs of the type holists typically cite as relevant to mathematical knowledge. On the other hand, apriorist accounts unnecessarily complicate epistemological theories by postulating a nonexperiential source of knowledge. Furthermore, the postulated source has little explanatory value since it is typically described in metaphorical terms such as "intellectual apprehension" and little information is provided regarding the cognitive basis of the alleged source of knowledge.

Once it is recognized that what is distinctive about inductivism is its approach to the justification of *elementary* mathematical propositions, the position can be dissociated from some implausible doctrines often ascribed to it. For example, the inductivist need not deny either the role of proof in mathematics stressed by the apriorist or the role of systematic and unifying considerations stressed by the holist. The inductivist can allow that *some* mathematical principles are not directly confirmed by experience but are introduced on the model of abduction in order to unify or explain a body of mathematical propositions. The inductivist need only insist that the statements which provide the confirmation base are inductively justified. Furthermore, the inductivist need not deny that a mathematical theory can be presented as a formal axiomatic system any more than an empiricist philosopher of science would balk at an axiomatization of quantum mechanics. The systematic role of deduction and the power of proof to transmit justification are uncontroversial. The inductivist simply claims that in mathematics, as in science, justification originates in inductive generalization from experience. Finally, the inductivist will acknowledge, and indeed insist upon, the crucial role of background beliefs in inductive justification.

In order to bring out this last point, let us consider what is involved in an inductive justification of

(1)   All mammals have two lungs.

One way of amassing inductive support for (1) is to dissect and examine a number of different kinds of mammals shortly after death. If we have a large enough number of suitably chosen instances of the following form

(2)   This is a mammal and has 2 lungs

then (1) is justified inductively. But, of course, a number of background assumptions play a key role here. First of all, a certain physical operation, dissection, is necessary to ascertain the presence of the lungs. It is taken for granted that this operation does not produce any relevant changes in the animal—i.e., it does not affect the number of lungs present. Furthermore, it is assumed that the objects under consideration are stable. There are no radical changes in the relevant properties of the lungs between the time preceding the death of the animal and the time it is examined. Lungs do not quickly disintegrate or multiply upon death. Finally, it is assumed that these objects do not causally interact with one another in any relevant manner. Lungs do not reproduce new lungs nor do they compete with one another resulting in a decrease in their population. It is the belief that all of the these background assumptions are satisfied that allows us to inductively infer (1) rather than, say,

(1*)   All dead mammals have two lungs

or

(1**)   All mammals which are dissected have two lungs.

Notice, however, that one need not amass evidence for these background assumptions prior to being inductively justified in believing (1). Typically, it is sufficient that there be no reason for suspecting that they are violated. Furthermore, if the justification of these background principles cannot be established inductively but requires holistic theoretical considerations, it does *not* follow that (1) is justified holistically. What justifies me in believing (1) is my justified belief in a number of propositions like (2).

Now if we turn to the case of elementary propositions of arithmetic such as

(3) $2 + 2 = 4$

the inductivist maintains that this proposition can be justified inductively on the basis of observing a number of suitably chosen cases of the following form

(4)   This pair of objects combined with that pair of objects totals four objects.

Note, first of all, that two independent observations are necessary to confirm (4). One first must ascertain—presumably by counting—that there are two distinct groups of objects each containing two members. One must then ascertain—by a second counting—that the resulting combination of objects totals four objects. It

is an open empirical question whether whenever one performs two countings to two, combines the objects, and recounts, the result will be a counting to four. Furthermore, note that certain background assumptions play a role here. It is assumed that the physical operations of counting and combining do not produce any relevant changes in the objects. They do not create or destroy objects. It is also assumed that we are dealing with stable objects—i.e., with objects that do not disintegrate or multiply between the times of the two countings involved. Furthermore, it is assumed that the objects do not causally interact with one another in any relevant manner. For example they do not coalesce or reproduce. If these background assumptions are justified, then the instances support the generalization. Typically, one need not amass evidence in favor of each assumption prior to being justified in accepting the generalization unless there is some reason to believe that they are false. Furthermore, these background assumptions are open to empirical confirmation or disconfirmation. If there are apparent disconfirming instances of (3) such as

(5)   This pair of objects combined with that pair of objects totals three objects

one can always dismiss them as *only apparent* by challenging one of the background assumptions. Nevertheless, such challenges can always be adjudicated by further appeals to experience. Finally, note that it is the fact that the background assumptions are satisfied that allows us to inductively infer from cases of (4) the conclusion (3) rather than

(3*)   If you have two pairs of objects at t' and put them together at t', then you have 4 objects at t'

or

(3**)   If you count a group of objects and get the answer "2" and count a second distinct group and get the answer "2," then if you count the combined group of objects, you will get the answer "4."

Background assumptions play a crucial role in most inductive generalizations.

II

The argument most often cited against inductivist accounts of mathematical knowledge is the *Irrefutability Argument*. In its simplest form, the argument can be stated as follows:

(1)   No experiential evidence can disconfirm mathematical propositions.

(2)   If experiential evidence cannot disconfirm mathematical propositions, then it cannot confirm such propositions.

(3)   Therefore, experiential evidence cannot confirm mathematical propositions.[1]

This argument is clearly valid and the second premise is uncontroversial. If a certain type of evidence is capable of confirming a mathematical proposition, then it must also be capable of disconfirming some other mathematical propositions. For if S's justified belief that he sees T justifies his belief that q then it would also justify his belief that not-r, where r is a proposition incompatible with q, provided that S based his belief that not-r on his belief that he sees T in the appropriate manner. Premise (1), however, is not obviously true. What can the apriorist offer in defense of it?

The standard defense is to portray scenarios in which a mathematical proposition appears to be disconfirmed by experiential evidence and to argue that one would not reject the proposition on the basis of such evidence. Consider, for example, the proposition that $2 + 2 = 4$. Inductivists maintain that experiences such as counting two pairs of shoes and discovering that they number four provide confirming evidence for this proposition. Suppose, however, that the next time I count two pairs of shoes I arrive at the result that they number three. Neither I nor anyone else would seriously regard this as evidence that $2 + 2 \neq 4$.[2]

This defense of premise (1) is not very strong. For it considers only the weakest possible cases of experiential disconfirming evidence. In order to bring out this point more clearly, let us first note two familiar features of inductive practice: 1) our assessments of the degree to which a particular case confirms or disconfirms a generalization is a function of the total available evidence; 2) apparent disconfirming cases of a generalization can always be explained away in a fashion which leaves the original hypothesis unaffected. What is characteristic of apriorist defenses of (1) is that they consider only situations in which there are a small number of apparent disconfirming instances to mathematical propositions. In such a situation, the natural inclination is to discount the disconfirming instances as apparent and to explain them away on whatever empirical grounds are most plausible. This inclination is not unreasonable provided that there is a background

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1. This line of argument was popular among the logical positivists. See, for example, A. J. Ayer, *Language, Truth and Logic* (New York: Dover 1952), chapter 4; and Carl Hempel, "On the Nature of Mathematical Truth," reprinted in P. Benacerraf and H. Putnam, eds., *Philosophy of Mathematics*, (Englewood Cliffs, N.J.: Prentice-Hall 1964). A more recent version of the argument can be found in Hartry Field, *Science Without Numbers* (Princeton: Princeton University Press 1980), chapter 1.

2. Both Ayer and Hempel offer such a defense of premise (1) in the works cited in note 1.

of strong supporting evidence for the generalization and that it is not made completely immune from disconfirmation. It is crucial to recognize, however, that since the apparent disconfirming instances are explained away on *empirical* grounds, these explanations can be assessed independently by empirical investigation. They need not be accepted at face value.

We are now in a position to construct a stronger case of apparent experiential disconfirmation of a mathematical proposition. To do so, the scenario offered by the apriorist must be enriched in two ways: 1) increase the number of disconfirming instances of the proposition so that it is at least equal to the number of confirming instances; 2) add empirical investigations of the hypotheses which are invoked to explain away the apparent disconfirming instances. Let us now suppose that we have experienced a very large number of disconfirming instances of the proposition that 2 + 2 = 4 and, furthermore, that empirical investigations of the hypotheses invoked to explain away these disconfirming instances produce very little, if any, support for the hypotheses. The inductivist maintains that in such a situation, the proposition would be disconfirmed by experiential evidence and, hence, premise (1) is false. And none of the features of inductive practice cited by proponents of the Irrefutability Argument shows that this claim is unreasonable.

Proponents of the argument might retrench at this point and respond that although the preceding considerations might establish that one cannot appeal to features of inductive practice in order to support (1), there are other compelling reasons to accept it. The two most commonly cited reasons are:

(i)   We know, presumably a priori, that there could not be an experience of *correctly* counting 2 pairs of objects and arriving at the answer 3. For we would not call any counting operation which resulted in the answer 3 a *correct* counting of 2 pairs of objects. We would call it a *mis*counting.

(ii)   Even if there could be an experience of correctly counting 2 pairs of objects and arriving at the answer 3, such an experience would not disconfirm the *mathematical* proposition that 2 + 2 = 4 but only an *empirical surrogate* of it such as "Every counting of 2 pairs of objects yields the answer 4." For it is part of the meaning of the term "4" that the number it designates is identical to that designated by "2 + 2."

These two reasons clearly go beyond considerations about inductive practice and raise serious issues in both the philosophy of mathematics and the philosophy of language. Nevertheless, there is a compelling response to both of them.

Let us consider an example of a hypothetical situation of the kind an inductivist would regard as disconfirming the mathematical proposition that 2 + 2 = 4.

Suppose that there are two groups of apples in front of *S*. *S* begins by counting the apples in each group thereby discovering that there are two apples in each group. *S* then combines the groups and recounts. The actual physical recombination of the groups is not necessary. It is sufficient that *S* considers all the apples as members of a single group and recounts all of them. Now suppose that this latter operation of recounting yields only 3 apples.[3] There are two possibilities here: (1) each of the three countings is correct; or (2) at least one of the countings is mistaken. Mistakes in counting can occur in various ways: *S* may have overlooked an object and failed to count it, *S* may have made a mistake in the counting process such as uttering "one, one, two, three" rather than "one, two, three, four," or *S* may have counted one of the objects twice. According to the apriorist, whenever a counting of two groups of objects which were each empirically ascertained to contain two objects occurs and yields a result other than four, a miscounting has occurred. If this claim is not to be true by stipulation and, hence, question-begging, then the apriorist must provide some plausible hypothesis regarding the source of the mistaken counting and this hypothesis must be supported by the available evidence regarding the situation. Now suppose that in the case described above the objects are recounted, safeguards are introduced to insure that no mistakes in counting are made, the results are checked by other counters but no evidence emerges that a mistake has occurred. In the face of such a situation we have two options:

(A)   accept the mathematical theory along with our standard counting procedures but maintain that a mistake in counting occurred despite the fact that the available tests for uncovering such mistakes fail to do so;

(B)   acknowledge that the hypothesis that a miscounting occurred is not empirically supported, accept the results of the counting procedures as correct and reject the mathematical theory.

According to (i), (A) is always the preferred option. The problem with this stance is that it forces us to either (a) accept *inexplicable* failures in our counting procedures to yield results in conformity with our mathematical theory; or (b) introduce ad hoc explanations of why these miscountings occurred—i.e.,

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3. It is important to recognize that the antecedent countings which establish that there are two pairs of objects present are observationally *independent* of the third counting which establishes that there are four objects present. For, as an anonymous referee has correctly stressed, if the truth of the claim that there are two pairs of objects present and the truth of the claim that there are four objects present could not be observationally established independently of one another, then it would be plausible to maintain that it is analytically true that if one pair of objects is added to a second pair of objects then the total number of objects is four.

explanations which are not in conformity with standardly accepted tests for correct counting. If (B) can avoid these consequences, it is the preferable choice. For it yields a simpler overall physical theory. (A) leaves one with a concept of counting which is not well-suited for the scientific applications of mathematics.

A word of caution is in order here. It may appear that our rejection of (i) has forced us to abandon inductive empiricism for holistic empiricism since considerations about overall theoretical simplicity play a central role in our argument. This, however, is *not* the case. The justification for rejecting the proposition that 2 + 2 = 4 in the hypothetical situation presented earlier resides in observations regarding counting and combining objects. There it was argued that the experience of counting 2 pairs of objects and arriving at the answer 3 would disconfirm the mathematical proposition that 2 + 2 = 4. The apriorist countered at this point that such an experience is *not* possible. Theoretical considerations were then introduced to establish the *possibility* of such experiences. It is the experiences themselves, however, which provide inductive disconfirmation of the mathematical proposition. Theoretical considerations play no role whatsoever.

(ii) is faced with a similar problem. For if one attempts to protect mathematical propositions from empirical disconfirmation by sanctioning them as conceptual truths then one runs the risk that these concepts will no longer be applicable to experience.[4] They will no longer be useful for describing and explaining the world as we experience it. But now consider the following question:

(Q1)   What reason do we have for believing that the sentences of a mathematical theory are either true or false; i.e., that they express propositions?

Note that this question is not the same as

(Q2)   What reason do we have for believing of some particular mathematical proposition that it is true?

(Q2) is the focus of debate between apriorists and empiricists. This debate presupposes that mathematical sentences have a truth value and focuses attention on the issue of how we ascertain that truth value. (Q1) raises the prior question of

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4. Hilary Putnam has stressed that there are two different ways in which experience can disconfirm a proposition: (1) it can provide evidence for the negation of the proposition; or (2) it can provide evidence that some of the concepts involved in the proposition should be given up. See, for example, his paper "There Is At Least One A Priori Truth," *Erkenntnis* 13 (1978), 153–170.

how do we know that such sentences are truth-valued (irrespective of how we come to know what the truth value is). The primary reason for regarding mathematical sentences as expressing propositions rather than as sentences without a truth value is the fact that mathematics is indispensable to science.[5] Hence any argument which undercuts the applicability of mathematics also undercuts the primary reason for believing that some mathematical sentences express truths. And, patently, without mathematical truth, there is no knowledge of mathematics, a priori or otherwise.

The apriorist might retreat at this point and maintain that a proponent of the view that mathematical propositions are analytically true need not be committed to the view that such propositions are physically applicable.[6] One can, instead, maintain that the postulates of a mathematical theory implicitly define its primitive terms and, hence, are true by definition. Experience is relevant only to the question of whether there exists anything in the world which satisfies those postulates. This move, however, does not avoid the problem. For as long as a mathematical theory is treated as an uninterpreted formal system, there is no question about the truth of its postulates. They express propositional functions rather than propositions.[7] Hence, there is no knowledge of the postulates. One can only know that the uninterpreted theorems are formal consequences of the uninterpreted postulates. But such knowledge is logical knowledge rather than bona fide mathematical knowledge. One might attempt to avoid this problem by viewing the postulates as disguised conditional propositions. The case of geometry provides a model. Here one can view the postulate that two points determine exactly one straight line as a disguised conditional to the effect that for all x and y, if x and y are points in a Euclidean space, then x and y determine exactly one straight line. The conditional provides an implicit definition for the concept of *Euclidean space* but it is a further empirical question whether physical space is Euclidean—i.e., whether physical points and straight lines satisfy the conditional. But here one runs up against the problem that any scientific theory can be treated in an analogous manner. One can view the postulates of an axiomatization of, say, classical physics, as disguised conditionals which implicitly define the primitive terms of the theory while maintaining that it is an empirical question whether the postulates are satisfied in the

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5. This position has been forcefully defended by Hilary Putnam in "Philosophy of Logic" and "What Is Mathematical Truth?" both which are reprinted in his *Mathematics, Matter and Method: Philosophical Papers*, Vol. 1, 2nd ed. (Cambridge: Cambridge University Press 1979).

6. This response to the argument of the previous paragraph was made by an anonymous referee.

7. This point is stressed by Carl Hempel in "The Nature of Mathematical Truth," and in "Geometry and Empirical Science," reprinted in H. Feigl and W. Sellars, eds., *Readings in Philosophical Analysis* (New York: Appleton-Century-Crofts, Inc. 1949).

physical world.[8] Hence, no significant distinction has been marked between mathematics and the empirical sciences.

III

A second well-known argument against inductivism is the *Argument from Certainty*. In its simplest form, it goes as follows:

(1)   Mathematical propositions are known with certainty.
(2)   If a proposition is known on the basis of inductive generalization then it cannot be known with certainty.
(3)   Therefore, mathematical propositions are not known on the basis of inductive generalization.[9]

The argument is obviously valid. Assessing the truth of the premises is difficult since the key term "certainty" has been used in many different senses by epistemologists. Hence, we are faced with the task of determining whether there is an epistemically important sense of this term which makes both premises true.

Before proceeding to this task, however, there is another problem with the first premise that needs to be addressed. If the import of the premise is that *all* mathematical knowledge is certain, then it appears false on any plausible reading of "certain." For many mathematical propositions are known on the basis of complex proofs and it is not obvious that such propositions are known with certainty even in the case of those who can construct the proof. Not even the skilled mathematician can be certain that there is not an oversight in a complex proof. Some have argued that memory plays an essential role in the justification of the conclusion of a long proof. But since one cannot be certain about propositions about the past, one cannot be certain about the conclusions of complex proofs.[10]

8. This point was first argued by W. V. Quine in his classic paper "Truth by Convention," reprinted in Feigl and Sellars, eds., *Readings in Philosophical Analysis*.

9. The best known statement of this argument is found in Bertrand Russell, *The Problems of Philosophy* (Oxford: Oxford University Press 1971), chapter 7. It has been resurrected recently by Jaegwon Kim in "The Role of Perception in A Priori Knowledge: Some Remarks," *Philosophical Studies* 40 (1981), 339–354. Perhaps Kant had this argument in mind when he claimed that "strict universality" is a mark of the a priori in the Introduction to the *Critique of Pure Reason*, trans. Norman Kemp Smith (New York: St. Martin's Press 1965), section 2.

10. R. M. Chisholm maintains that demonstrative a priori knowledge is not certain. He also maintains that the conclusions of long demonstrations which involve reliance upon memory are not known a priori. See *Theory of Knowledge*, 2nd ed. (Englewood Cliffs, N.J.: Prentice-Hall 1977), 44. Philip Kitcher endorses both of these points in *The Nature of Mathematical Knowledge* (Oxford: Oxford University Press 1983), chapter 2.

In order to avoid these difficulties, let us restrict premise (1) to rather simple and "intuitively obvious" propositions such as that 2 + 2 = 4 in order to give the argument the best run for its money.

The term "certainty" has been used in a bewildering number of ways in recent epistemological literature. In order to proceed systematically in determining whether there is a use of this term which satisfies both premises of our argument, let us adopt Roderick Firth's division of the uses of "certainty" into three classes: (a) truth-evaluating uses; (b) warrant-evaluating uses; and (c) testability-evaluating uses.[11] We will then present a representative definition of "certainty" from each of these classes and see how our premises fare on each.

The classic example of a truth-evaluating use of "certainty" is the notion of incorrigibility. On this use, "*p* is certain for *S*" is to be analyzed as

(A)   Necessarily, if *S* believes that *p* then *p* is true.

(A) is satisfied by familiar Cartesian propositions such as "I exist" and "I believe something" which is a welcome result since they are typically regarded as certain. A number of authors, however, have noted that if one applies (A) to necessary, as well as contingent, propositions, the results are not as satisfactory.[12] For (A) is satisfied by *any* necessary truth. But, as we noted earlier, it is not at all obvious that knowledge of the conclusions of complex proofs is certain. Furthermore, if one were to believe the conclusion of such a proof on the basis of a flimsy reason rather than on the basis of the proof, one's belief would still be sanctioned as certain by (A). These considerations indicate that if *p* is a necessary proposition and *S* believes that *p* with certainty in sense (A) then it does *not* follow that *S* is justified in believing that *p*, much less that *S* knows that *p*. Therefore, (1) has no significant epistemic implications, if "certainty" is understood in sense (A). Furthermore, (2) is false on this reading of "certainty." For if one knows a necessary proposition on the basis of inductive evidence, then if (A) is true, one knows that proposition with certainty. Of course, one might argue that a *necessary* proposition cannot be known on the basis of inductive evidence. But then the Argument from Certainty would collapse into a form of the Argument from Necessity which will be examined in the next section. Hence, we can conclude that (A) is of no avail to proponents of the Argument from Certainty.

11. Roderick Firth, "The Anatomy of Certainty," reprinted in R. M. Chisholm and R. J. Swartz, eds., *Empirical Knowledge* (Englewood Cliffs, N.J.: Prentice-Hall 1973).

12. See George Pappas, "Incorrigibility, Knowledge and Justification," *Philosophical Studies* 25 (1974), 219–225; and Keith Lehrer, *Knowledge* (Oxford: Oxford University Press 1974), chapter 4.

It might be objected that an inductivist must regard mathematical truths as *contingent* truths and, hence, cannot consistently reject (A) on the grounds that it is trivially satisfied by all necessary truths. This objection, however, is without merit. First of all, it is the apriorist who regards mathematical truths as necessary and the point of the inductivist response is to show that one who regards mathematical truths as necessary cannot consistently argue against inductivism employing the Argument from Certainty in the truth-evaluating sense of this term. Second, although all inductivists may have *in fact* regarded mathematical truths as contingent, there is no *logical* inconsistency in maintaining that they are both a posteriori and necessary. This point will be developed in the subsequent section. But, for the sake of completeness, let us suppose that mathematical truths are contingent and see how (A) fares on this assumption.

If we assume that a mathematical truth, such as that 2 + 2 = 4, is only contingently true, then it does not satisfy (A). For, unlike the cases of Cartesian propositions, there is no logical connection between the having of a belief in a true mathematical proposition and the truth of the proposition. If there are possible worlds in which 2 + 2 ≠ 4, there is no incoherence in the supposition that I exist in one of those worlds and believe in it that 2 + 2 = 4. Consequently, the proponent of the Argument from Certainty is faced with a dilemma. Either mathematical truths are necessary or they are not. If they are, then (A) is not significantly applicable to them. If they are not, then (A) is false.

There is, however, a truth-evaluating sense of "certainty," suggested by the recent development of reliability theories of knowledge, which is significantly applicable to necessary propositions. The focus of reliability theories is on belief forming mechanisms. The reliability of a belief forming mechanism is a function of its tendency to produce true beliefs over a range of external conditions. Although it is difficult to provide a general characterization of the notion of reliability, there is a degree of reliability, which I shall call *ultra-reliability*, that can be precisely defined:

> M is an ultra-reliable belief forming mechanism just in case, necessarily, for any belief, p, if p is formed by M then p is true.

The notion of ultra-reliability can now be utilized to define the following reliability sense of "certainty":

> (B) p is certain just in case p is produced by an ultra-reliable belief forming mechanism.[13]

13. This sense of certainty is suggested by both P. Kitcher, *The Nature of Mathematical Knowledge*, chapter 1; and F. Kroon, "Contingency and the A Posteriori," *Australasian Journal of Philosophy* 60 (1982), 40–54.

(B) has the advantage of being both truth-evaluating and significantly applicable to necessary propositions. For example, let us assume that "2 + 2 = 4" is necessarily true and that S believes that 2 + 2 = 4. It does not follow that *S*'s belief is certain in sense (B). In order for the belief to be certain it must also be necessarily true that no other belief produced by the mechanism which produced the belief in question is false. Therefore, it is not a trivial consequence of the fact that p is necessarily true that p is certain in sense (B).

Despite the advantages of (B), it faces some difficulties. First of all, if "certainty" is understood in sense (B) then premise (1) of the Argument from Certainty appears incompatible with two features of mathematical practice: (a) disagreement among mathematicians; and (b) revision of mathematical beliefs. For in both cases we have beliefs whose contents are incompatible. Hence, at least one of the beliefs must be false. A proponent of the argument might reply that these features of mathematical practice are incompatible with (1) only on the assumption that *all* mathematical belief forming mechanisms are ultra-reliable. But, the proponent continues, there are many different mathematical belief forming mechanisms, only some of which are ultra-reliable, and the false beliefs in question are *not* generated by these latter mechanisms. This response, however, still appears at odds with mathematical practice. If we look at the two standard examples of a priori evidence, deductive proof and self-evidence, it is clear that mathematical beliefs based on such evidence have been revised. Everyone commits errors in constructing proofs and adjusts their beliefs when the error is discovered. And there are many cases of principles once regarded as self-evident but which are now either rejected or in dispute. Familiar examples are the parallel postulate of Euclidean geometry and the principle that the whole is greater than any of its proper parts. Of course, a proponent of the argument might still insist that although there exist conflicting beliefs based either on self-evidence or deductive proof, nevertheless the belief forming mechanisms involved in generating each of the conflicting beliefs is different. But, in the absence of explicit criteria for individuating such mechanisms, the response is ad hoc.

The considerations advanced in the preceding discussion point to a second difficulty with premise (1). Can this premise be supported without appealing to the incorrigibility of mathematical beliefs? In order to substantiate the claim that a *particular* belief is certain in sense (B), one must at least substantiate the *general* claim that all beliefs generated by that mechanism are true. As the preceding discussion indicates, this claim does not appear to be supported by inductive evidence from mathematical practice. Furthermore, we don't know enough about the cognitive processes involved in mathematical belief formation to justify it on general theoretical grounds of an empirical nature. The only alternative which remains is to justify it on the basis of the a priori philosophical claim that mathematical beliefs are incorrigible. If mathematical beliefs were incorrigible

then the mechanisms which generated them would be ultra-reliable provided that they generated only mathematical beliefs. But this move brings us back to the problem that (A) is trivially satisfied by all necessary propositions. Consequently, the truth-evaluating uses of "certainty" do not satisfy the premises of the Argument from Certainty.

The warrant-evaluating uses of "certainty" are characterized by the fact that they provide information to the effect that a proposition has a specifiable degree of warrant for a believer which is identified by reference to some logically independent standard. This sense of "certainty" admits of a broad degree of variation. In order to have a particular example for careful scrutiny, let us consider the definition offered by R. M. Chisholm:

(C) h is *certain* for S =Df h is beyond reasonable doubt for S, and there is no i such that accepting i is more reasonable for S than accepting h.[14]

Are simple mathematical propositions certain in this sense of the term? Let h be the proposition that $2 + 2 = 4$ and we will assume that it is beyond reasonable doubt. Let i be the proposition that I exist. Would Chisholm regard it as more reasonable to accept that $2 + 2 = 4$ than to accept that he exists? It is difficult to determine how Chisholm would respond since "more reasonable than" is one of his primitive notions. He does provide some basic principles which he regards as axioms of this notion but they are formal principles which provide limited information about how to assess particular cases.[15] I want to suggest, however, that anyone should regard accepting the proposition that she exists as more reasonable than accepting any mathematical proposition. For, as we saw earlier, the proposition that I exist is incorrigible while no mathematical proposition has this property nontrivially. Anyone who recognizes this fact and reflects upon it should draw the conclusion that it is more reasonable to believe that she exists than to believe any mathematical proposition. Descartes, of course, arrived at this conclusion at the beginning of the Second Meditation. Consequently, (C) is of little assistance to a proponent of the Argument from Certainty. It is worth noting that since Chisholm's definition of "h is known a priori by S" entails that h is certain, he cannot maintain that mathematical knowledge is a priori.[16] Finally, let us look at testability-evaluating uses of "certainty." Consider the following formulation of this sense of "certainty" which is inspired by Norman Malcolm's well-known essay "Knowledge and Belief":

14. Chisholm, *Theory of Knowledge*, 10.

15. Ibid., pp. 12–15.

16. See definitions 3.1 and 3.2 in *Theory of Knowledge*, 42.

(D)   *p* is certain for *S* at *t* iff there is no imaginable event such that if *S* were justified at *t* in believing that it will occur after *t*, *p* would therefore become less warranted for *S* at *t*.[17]

If "certainty" is understood in this sense, then the Argument from Certainty collapses into the Irrefutability Argument. For the burden of the argument rests on the claim that although there are some imaginable future events which would render the conclusion of an inductive generalization less warranted, there are no such events which would render a simple mathematical proposition less warranted. But, if our argument in the previous section against the Irrefutability Argument is correct, then this claim is false. Hence, mathematical propositions do not satisfy (D). This result can be extended to any testability-evaluating use of "certainty." What is common to all testability-evaluating uses of this term is that they say something about the conditions under which a proposition is or is not confirmed or disconfirmed. In order for the Argument from Certainty to work, there must be some difference in the conditions under which mathematical propositions, as opposed to the conclusions of inductive generalizations, are confirmed or disconfirmed. But if the argument of the previous section is correct, this is not the case.

At this point, we have explored a number of different senses of the term "certainty" and have not found any which satisfies both premises of the Argument from Certainty. What, then, is the source of the initial intuitive plausibility of this argument? It comes, I believe, from a consideration of general mathematical propositions such as the Goldbach conjecture. Suppose that we initially verify the Conjecture on the basis of examining a small sampling of even numbers. Encouraged by these confirming instances, we then program a computer to examine a large number of even numbers, say 10^{10}. Finally, on the basis of the fact that the computer does not uncover any disconfirming instances, we infer that the Conjecture is true. Despite our reasonable assurance at this point, we are not absolutely certain that the Conjecture is true. We recognize the logical possibility of a disconfirming instance. On the other hand, if someone were to construct a general proof of the Conjecture, we would feel absolutely certain for the possibility of a disconfirming instance has been removed. Therefore, there is a sense of "certainty" applicable to the conclusion of a mathematical proof which is not applicable to the conclusion of an inductive generalization.

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17. Firth offers this definition in "The Anatomy of Certainty" (*Empirical Knowledge*, 215) as an account of Malcolm's use of the term in "Knowledge and Belief," reprinted in Malcolm's *Knowledge and Certainty* (Englewood Cliffs, N.J.: Prentice-Hall 1963).

The sense of "certainty" involved here is best explicated as follows:

(E)   *p* is certain for *S* just in case there is a set of propositions *q* such that *S* knows (or is justified in believing) each member of *q*, *S*'s belief that *p* is based on *q*, and *q* entails *p*.

Can (E) be parlayed into a rejection of inductivism? It appears doubtful. First of all, note that (E) is applicable only to mathematical propositions which are known on the basis of a proof. Hence, premise (1) of the Argument of Certainty is false on this reading of "certainty." Furthermore, from the fact that *p* satisfies (E), it does *not* follow that *p* is a priori. For if the set of propositions on which *p* is based contains any members that are known a posteriori, then *S*'s knowledge that *p* is also a posteriori. Hence, this sense of "certainty" is compatible with inductivism. The inductivist will no more deny the role of deduction in the mathematics than she would in the case of scientific practice. But the inductivist will insist that in both cases the propositions which form the basis of the deduction are known inductively. Consequently, (E) will be of little avail to the apriorist unless it is supplemented by another sense of "certainty" applicable to those mathematical propositions which form the basis of the proof. But our prior discussion provides strong evidence that such a sense is not available.

At this point a proponent of the Argument from Certainty might concede that it was a mistake to lay such stress on the notion of certainty but still maintain that inductivism provides an implausible account of the epistemic status of beliefs regarding elementary mathematical propositions.[18] Consider the following case. Suppose that June and Jill are identical twins who are introduced to mathematics at an early age in the very same settings. Both are exposed to exercises in counting blocks, breaking groups of blocks into smaller groups and recombining them in order to teach them elementary arithmetical truths. June is quick in these matters and after a small number of instances of counting and combining becomes convinced that 2 + 2 = 4. Jill, on the other hand, requires exposure to a much larger number of instances before becoming convinced that 2 + 2 = 4. Two problems arise for the inductivist here. First of all, can inductivism provide a plausible account of June's degree of conviction that 2 + 2 = 4 since it is based on examining only a small number of confirming instances. Second, inductivism appears committed to the position that Jill's initial belief that 2+2=4 is *more* justified than June's initial belief that 2 + 2 = 4 since the former is based on more confirming instances than the latter. Yet this is implausible.

Let us begin by addressing the second problem. In order for *S* to be justified in believing a generalization *p* on the basis of confirming instances $e_1 \ldots e_n$, it is not

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18. This point was raised by an anonymous referee.

sufficient that *S* merely observe those instances. If those instances are to provide justification for *S*'s belief that *p*, two further conditions must be satisfied: 1) *S* must believe that each of these observed cases are instances of the generalization that *p*; and 2) *S*'s belief must be justified. Presumably, in the case of a slow learner like Jill, the problem resides in the fact that although she manipulates objects and counts them she does not recognize these cases as instances of the generalization that 2 + 2 = 4. Hence, she does not form the belief on these particular occasions that we have two pairs of objects totaling four. Once she begins to recognize these cases as instances of the generalization and forms justified beliefs to this effect, she will also come to believe the generalization itself. The key point to appreciate here is that one cannot assume that each instance of the generalization that 2 + 2 = 4 observed by Jill forms part of her justification for believing the generalization. Once this is acknowledged, one can also see that inductivism is not committed to the view that Jill's belief that 2 + 2 = 4 is more justified than June's belief.

In order to address the first problem, it is essential to distinguish *S*'s degree of *conviction* that p is true from *S*'s degree of *justification* for believing that *p* is true. While it is true June is quickly convinced that 2 + 2 = 4 and believes it with a *conviction* greater than is warranted by the number of confirming instances at hand, it does not follow that her *justification* is greater than that warranted by the confirming instances at hand. Consider an analogous situation. Suppose that elementary thermodynamics is also part of the early education of the twins. In this case, it is Jill who is quick to see that when one squeezes the sides of a balloon, it decreases in size and, as a result, is convinced that the greater the pressure applied to a gas, the smaller its volume. Clearly, the fact that her degree of *conviction* here outstrips her inductive support, does not establish that whatever *justification* she has for the belief is *not* based on induction. Consequently, if the apriorist is to sustain the claim that inductivism does not provide a plausible account of the degree of justification we have for believing elementary mathematical propositions, it must be *shown* that this degree of justification exceeds that which we have for well-established empirical generalizations. What we have established thus far is that appeals to certainty and conviction fail to sustain this claim.

IV

The most famous traditional argument against the view that mathematical knowledge is a posteriori is the *Argument from Necessity*. The argument is typically presented in the following fashion:

(1)   Mathematical propositions are necessary propositions.
(2)   One cannot know a necessary proposition on the basis of experience.

(3)   Therefore, mathematical propositions are not known on the basis of experience.[19]

The first premise is clearly controversial. Quine and his followers reject the notion of necessity and along with it the a priori. Whatever the merits of this position, I propose to grant premise (1) and to focus on the issue of whether the admission that mathematical propositions are necessary is sufficient to establish that mathematical knowledge is a priori.

The phrase "know a necessary proposition" in premise (2) is ambiguous. Hence, let us begin by introducing the following three-fold distinction:

(A) S knows the *general modal status* of p just in case S knows that p is a necessary proposition or S knows that p is a contingent proposition.

(B) S knows the *truth value* of p just in case S knows that p is true or S knows that p is false.

(C) S knows the *specific modal status* of p just in case S knows that p is necessarily true or S knows that p is necessarily false or S knows that p is contingently true or S knows that p is contingently false.

It is important to recognize that (A) and (B) are independent of one another. For example, S might know that p is a mathematical proposition and also know, on general philosophical grounds, that every mathematical proposition is a necessary proposition and yet not know whether p is true or false. On the other hand, if S is philosophically naive, then S might know the truth of many mathematical propositions but have no beliefs whatsoever about whether they are necessary or contingent propositions. (C), however, is not independent of (A) and (B). If S knows the *specific modal status* of p, then S knows both the *general modal status* of p and the *truth value* of p. Furthermore, firsthand knowledge of the specific modal status of p must be inferred from, or based on, knowledge of p's general modal status and truth value. Hence, (A) and (B) are epistemically primary while (C) is derivative.

Utilizing these distinctions, we can now see that the Argument from Necessity breaks down into two distinct arguments. Some philosophers have had the following argument in mind when presenting it:

(1)   Mathematical propositions are necessary propositions.

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19. The locus classicus of this argument is the Introduction to Immanuel Kant's *Critique of Pure Reason*, parts II and V. It is echoed by Russell in chapter 7 of *The Problems of Philosophy* and by Chisholm in chapter 3 of *Theory of Knowledge*. Kim appears to reject the argument in "The Role of Perception in A Priori Knowledge: Some Remarks" but does so by rejecting premise (1).

(2*)   One cannot know the *general modal status* of a necessary proposition
       on the basis of experience.

(3*)   Therefore, one cannot know the *truth value* of mathematical propo-
       sitions on the basis of experience.

Kant appears to argue in this fashion in the Introduction to the *Critique of Pure Reason*. In part II he claims that knowledge of necessary propositions is a priori on the grounds that "Experience teaches us that a thing is so and so, but not that it cannot be otherwise."[20] The most straightforward reading of this claim is that although experience can provide evidence that a proposition is *true*, it cannot provide evidence that it is *necessary*. This is what (2*) asserts. In part V he goes on to argue that "mathematical propositions, strictly so called, are always judgments a priori, not empirical; because they carry with them necessity which cannot be derived from experience."[21] On the basis of this argument, he concludes that the proposition that 7 + 5 = 12 (*not* the proposition that it is necessary that 7 + 5 = 12) is a priori. Hence, his conclusion is the same as (3*).

The Kantian Argument involves the following assumption:

(4)   If the general modal status of *p* is knowable only a priori, then the
       truth value of *p* is knowable only a priori.

Proponents of the argument have not recognized this crucial assumption. So it is not surprising that they have not explicitly argued in support of it. Furthermore, there appear to be counterexamples to (4). If Kripke is correct about identity statements involving rigid designators, then knowledge that such propositions are necessary is a priori but knowledge that they are true or false is a posteriori.[22] The situation is analogous in cases where people come to believe, and apparently know, mathematical propositions on the basis of the testimony of an authority or the results of a computer. Although I believe that these counterexamples show that (4) is dubious, it must be recognized that proponents of the argument have some room to maneuver here. For there is still controversy about the epistemic implications of Kripke's account of identity statements,[23] and it can be argued

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20. Kant, *Critique of Pure Reason*, 43.

21. Ibid., 52.

22. Saul Kripke "Identity and Necessity," in M. K. Munitz, ed., *Identity and Individuation*, (New York: New York University Press 1971) and *Naming and Necessity* (Cambridge, MA: Harvard University Press 1980).

23. See, for example, G. W. Fitch, "Are There Necessary A Posteriori Truths?" *Philosophical Studies* 30 (1976), 243–247 and Alvin Plantinga, *The Nature of Necessity* (Oxford: Oxford University Press 1974), 81–87.

that the degree of justification that testimonial evidence and computer results confer on mathematical propositions is not sufficient for knowledge.[24]

There is, however, a decisive argument against (4). Consider a contingent proposition such as that I am sitting at a desk. If one can know only a priori that a proposition is necessary, then one can know only a priori that a proposition is contingent. For the evidence relevant to determining the latter is the same as that relevant to determining the former. So my knowledge that the proposition that I am sitting at a desk is contingent is a priori. But from this it does not follow that my knowledge that I am sitting at a desk is a priori. On the contrary, it is a posteriori. Hence, (4) must be rejected and, along with it, the Kantian version of the Argument from Necessity.

The second, or Modal, version of the Argument from Necessity proceeds as follows:

(1)   Mathematical propositions are necessary propositions.
(2*)   One cannot know the *general modal status* of a necessary proposition on the basis of experience.
(3**) Therefore, one cannot know the *general modal status* of mathematical propositions on the basis of experience.

Prior to evaluating this argument, it should be noted that its conclusion is *not* incompatible with inductivism. For inductivism is a thesis about knowledge of the *truth value* of mathematical propositions. If the argument were sound, mathematical knowledge would not differ from scientific knowledge. In both cases, knowledge of the truth value of a proposition would be a posteriori while knowledge of its general modal status would be a priori. Nevertheless, since the conclusion of this argument is incompatible with the more general thesis that *all* knowledge is a posteriori, it merits careful scrutiny.

The Modal Argument is clearly valid. But what can be said in support of (2*)? The standard move is to invoke the Kantian claim that experience can teach us only what *is* the case or its Leibnizian counterpart to the effect that experience can provide knowledge of only the *actual* world and not of other possible worlds.[25] If this claim is granted, then (2*) is plausible. But a good deal of our ordinary

24. Chisholm suggests such an approach to testimonial evidence in *Theory of Knowledge*, 47. For a discussion of the epistemic significance of computer results, see T. Tymoczko, "The Four-Color Problem and its Philosophical Significance," *Journal of Philosophy* 76 (1979), 57–83; P. Teller, "Computer Proof," and M. Detlefsen and M. Lukes, "The Four-Color Theorem and Mathematical Proof," both in *Journal of Philosophy* 77 (1980), 797–820.

25. See, for example, R. M. Chisholm, *Theory of Knowledge*, 37; and C. McGinn "*A Priori* and *A Posteriori* Knowledge," *Proceedings of the Aristotelian Society* 76 (1975–76), 195–208.

practical knowledge and the bulk of our scientific knowledge provide clear coun-terexamples to this claim. My knowledge that my pen will fall if I drop it does not provide me with information about what *is* the case for the antecedent is contrary-to-fact. It provides me with information about some possible worlds which are different from the actual world. Scientific laws are not mere descrip-tions of the actual world. They support counterfactual conditionals and, hence, provide information beyond what is true of the actual world. Once this point is recognized (2*) loses its intuitive plausibility and requires further support. Unless such support is forthcoming, the Modal version of the Argument from Necessity should also be rejected.

We are now in a position to draw two general conclusions about mathematical apriorism. The literature on the topic has produced a number of apparently com-pelling arguments in support of the thesis that knowledge of the *truth value* of mathematical propositions is a priori. Among the most prominent of these argu-ments are those based on considerations about irrefutability, certainty, and necessity. Our investigation has shown that such arguments offer no support whatsoever for apriorism with respect to the truth value of such propositions. On the other hand, although the view that knowledge of the *general modal status* of mathematical propositions is a priori is widespread, there are few supporting arguments for this position. The few available arguments employ the implausible and question-begging assumption that all a posteriori knowledge is of only the actual world. So, in the absence of further support, this view is simply an episte-mological dogma. Although our discussion has been restricted to mathematical apriorism, the results are general and can be easily extended to other alleged examples of a priori knowledge such as logical knowledge and moral knowledge. Consequently, a defense of apriorism will require some novel considerations.[26]

3

Revisability, Reliabilism, and A Priori Knowledge

Proponents of a priori knowledge face two formidable tasks: (1) providing an illuminating characterization of the concept of a priori knowledge; and (2) providing cogent reasons for believing that some of our knowledge is indeed a priori. There have been two general approaches to defending the existence of a priori knowledge. Some begin by providing a general characterization of such knowledge and then show that there are plausible examples of knowledge which satisfy the conditions in the characterization.[1] On this approach, the defense of the *existence* of such knowledge depends on the *analysis* of the *concept* of a priori knowledge. The second approach treats these issues independently. In particular, it is argued that certain classes of statements, such as mathematical statements or necessary statements, cannot be known on the basis of experience and, hence, are known a priori *without* any attempt to offer a general characterization of a priori knowledge.[2]

Recent critics of the a priori fall into two similar camps. Some attempt to argue against the *existence* of a priori knowledge without presupposing any particular

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1. See, for example, Panayot Butchvarov, *The Concept of Knowledge* (Evanston, 1970), Part 2; and R. M. Chisholm, *Theory of Knowledge*, 2nd ed. (Englewood Cliffs, 1977), chapter 3.

2. See, for example, John Pollock, *Knowledge and Justification* (Princeton, 1974), chapter 10; Mark Steiner, *Mathematical Knowledge* (Ithaca, 1975), chapter 4; and Jaegwon Kim, "Some Reflections on Perception and *A Priori* Knowledge," *Philosophical Studies* 40 (1981): 355–362.

analysis of the *concept*. Paul Benacerraf, for example, adopts this approach by raising doubts about the existence of the cognitive faculty of intuition which is often invoked by proponents of the a priori as the source of such knowledge.[3] The second prominent line of attack, which has been forcefully developed by Hilary Putnam, begins by analyzing the *concept* of a statement known a priori as one which is rationally unrevisable.[4] Peirce's celebrated thesis of fallibilism is then invoked in support of the claim that no statements are rationally unrevisable. Philip Kitcher has extended this line of argument by incorporating it within the more general framework of reliabilism with devastating results.[5]

The primary focus of this paper is the second line of attack and divides into two parts. The first examines the plausibility of the Putnam-Kitcher thesis that a priori knowledge entails rational unrevisability independently of any general account of knowledge. Two versions of this thesis are distinguished and it is argued that both should be rejected. This result vitiates their general argument against the existence of a priori knowledge. The second part of the paper examines Kitcher's attempt to incorporate the unrevisability thesis within the more general framework of a psychologistic account of knowledge. Since reliabilism is the leading psychologistic account presently available, the implications of reliabilism for issues regarding the a priori are explored. It is argued, first, that reliabilism does not support the thesis that a priori knowledge entails rational unrevisability and, second, that reliabilism does not offer much promise of providing an informative characterization of the *concept* of a priori knowledge. In conclusion, an attempt is made to show that reliabilism offers proponents of the a priori some resources for defending the *existence* of such knowledge.

I. REVISABILITY AND A PRIORI KNOWLEDGE

Our primary concern in this part of the paper is with the following question: Is there any good reason for supposing that a priori knowledge entails rational

3. Paul Benacerraf, "Mathematical Truth," *Journal of Philosophy* 70 (1973): 661–679. For a further discussion of this issue, see Mark Steiner, *Mathematical Knowledge* (Ithaca, 1975), chapter 4; and W. D. Hart "Review of *Mathematical Knowledge*," *Journal of Philosophy* 74 (1977): 118–129.

4. For a lucid summary of his anti-apriorism position, see Putnam's "'Two Dogmas' Revisited." Putnam has more recently expressed some misgivings about his earlier position. These are to be found in "There Is At Least One A Priori Truth," and "Analyticity and A Priority: Beyond Quine and Wittgenstein." All three papers are reprinted in Putnam's *Philosophical Papers, Vol. 3: Realism and Reason* (Cambridge, 1983).

5. Philip Kitcher, *The Nature of Mathematical Knowledge* (Oxford, 1983). His analysis of the concept of a priori knowledge originally appeared in "A Priori Knowledge," *Philosophical Review* 89 (1980): 3–23.

unrevisability? In order to bring out this issue more clearly, let us begin by assuming that

(1)   If S knows that *p*, then the statement that *p* is rationally unrevisable[6]

is false. For if (1) were true, then

(2)   If S knows that *p* a priori, then the statement that *p* is rationally unrevisable

would not be a distinctive thesis regarding the a priori but rather a trivial consequence of the general concept of knowledge. Furthermore, the conjunction of (1) with the doctrine of fallibilism entails the skeptical conclusion that there is *no* knowledge. But proponents of the second line of argument have wanted to maintain both (i) that science is our paradigm of knowledge; and (ii) that it is an essential feature of the scientific enterprise that all statements are subject to rational revision in light of future evidence. Hence, the leading premise of the second line of attack, the Unrevisability Thesis, is better cast as

(UT)   If S is justified in believing that *p* a priori, then the statement that *p* is rationally unrevisable

where "justified" is understood to designate a degree of justification sufficient for knowledge.

(UT) is a puzzling claim. Proponents of the a priori maintain that a *certain type of justification exists* which is intuitively characterized as non-experiential. Since they also maintain that there is a priori *knowledge*, they are committed to a thesis about the *strength* of such justification. Proponents of the a priori are committed to thesis that such justification is sufficient for knowledge. (UT) also entails a thesis about the strength of such justification. It entails, very roughly, that such justification is strong enough to resist any potential future disconfirmation. The latter thesis is *stronger* than the former thesis for according to (1) justification sufficient for knowledge does *not* entail rational unrevisability. Hence, what is puzzling is how the proponent of (UT) moves from the uncontroversial premise that a priori justification is sufficient for knowledge to the stronger conclusion that such justification is unrevisable.

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6. Following Putnam, I shall interpret the notion of unrevisability *epistemically*: "an unrevisable statement is one we would never be *rational* to give up …" (*Realism and Reason*, p. 98). Hence, "the statement that *p* is rationally unrevisable" is shorthand for the more cumbersome "S would never be justified in rejecting the statement that *p*."

The problem can be succinctly captured by considering the following set of statements:

(3)   A priori justification is nonexperiential justification.
(4)   The existence of a priori knowledge entails that there is nonexperiential justification sufficient for knowledge.
(5)   The general concept of knowledge does not require that justification sufficient for knowledge entail rational unrevisability.
(6)   It is not the case that if S is justified in believing that *p* a priori then the statement that *p* is rationally unrevisable.

(3), (4) and (5) are uncontroversial. (6), which is the negation of (UT), is consistent with {(3), (4), (5)}. This establishes that (UT) is *not* a consequence of uncontroversial premises regarding a priori justification and the degree of justification sufficient for knowledge. Therefore, additional support is necessary to establish that the concept of a priori knowledge entails (UT).

The primary conclusion of Part I is that no additional support is forthcoming and, hence, (UT) must be rejected. This conclusion will be supported in two ways. First, it will be argued that adoption of (UT) leads to some unwanted consequences. Second, it will be shown that the primary motivation for adopting (UT) rests on an untenable principle regarding epistemic justification. But before we proceed to our more detailed examination of (UT), we need to distinguish between a strong and weak version of the thesis:

(SUT)   If S is justified in believing that *p* a priori then the statement that *p* is rationally unrevisable in light of *any* future evidence.
(WUT)   If S is justified in believing that *p* a priori then the statement that *p* is rationally unrevisable in light of any future *experiential* evidence.

Clearly, (WUT) is more plausible than (SUT). For suppose that S's belief that *p* is justified on the basis of nonexperiential evidence and it is acknowledged that *p* might be rationally revised in light of further *nonexperiential* evidence. In such a case it does not appear plausible to maintain that S's justification is *not* a priori. (WUT) is more promising since one can argue that if S's belief that *p* is revised in light of *experiential* evidence then that belief is not independent of experience in the requisite sense.

IA

Let us begin by examining (SUT) in more detail in order to bring out explicitly its consequences. Suppose that Mary is a college student who has had some

training in logic. As a result, she is able to discriminate reliably between valid and invalid elementary inferences on the basis of reflective thought. Today Mary wonders whether "$p \supset q$" entails "$\sim p \supset \sim q$." She reflects upon the statements in question and on the basis of this reflection concludes that the former does indeed entail the latter. After she assents to this conclusion, a counterexample occurs to her. The occurrence of the counterexample results in her rejecting her former conclusion and coming to believe that "$p \supset q$" entails "$\sim q \supset \sim p$." The salient features of the example are as follows: (a) Mary's initial belief is based on a nonexperiential process which is reliable but not infallible; (b) a process of the *same type* leads Mary to conclude that the initial belief is mistaken and to arrive at the correct conclusion; and (c) Mary's conclusions as stated in (b) are justified beliefs. Now for some more controversial claims: (d) Mary's original belief that "$p \supset q$" entails "$\sim q \supset \sim p$" is also a *justified* belief; and (e) Mary's original belief is *justified* a priori despite having been revised.

What can be said in favor of (d) and (e)? (d) appears to be similar in all relevant respects to the following case. Mary sees a sheet of paper on the table and on that basis forms the belief that it is square. A second closer visual examination reveals that two of the sides are slightly longer than the other two. On this basis, Mary rejects her former belief about the shape of the paper and comes to believe that it is rectangular. Since the circumstances under which Mary perceived the page were normal and Mary is a reliable discriminator of shapes, her initial belief is justified. The fact that our discriminatory powers sometimes fail us does not entail that beliefs based on shape perception are not justified. Furthermore, if such beliefs are typically justified, we don't single out particular cases as unjustified *merely* in virtue of the fact that they are false. Some other relevant difference must be cited such as that the perceiver was impaired or the environment was gerrymandered. Hence, the routine failure of Mary's otherwise reliable shape discriminating ability does not entail that her belief that the paper is square is unjustified despite the fact that it is false. Similarly, the routine failure of Mary's otherwise reliable ability to discriminate valid inferences does not entail that her belief that "$p \supset q$" entails "$\sim p \supset \sim q$" is unjustified despite the fact that it is false.

The only question which remains at this point is whether Mary's original belief is justified a priori or a posteriori. Note that a proponent of (SUT) must maintain that the belief is justified a posteriori *merely* in virtue of the fact that it was revised. This point can be brought out more clearly by introducing the notion of a "self-correcting process":

(SCP)   A process Φ is self-correcting for S just in case, for any false statement p, if Φ produces in S the belief that p, then S has available from Φ other beliefs which would justify S in believing that p is false.

(SUT) entails

(7)   If a process Φ is self-correcting for S and there is a false belief that *p*
        which Φ justifies for S then Φ does not justify for S the belief that *p*
        a priori.

But this is an implausible restriction on the notion of a priori justification. For the
intuitive basis of the distinction between a priori and a posteriori justification lies
in the distinction between experiential and nonexperiential evidence. (7), how-
ever, is completely insensitive to the central question of whether the justificatory
process in question is experiential or nonexperiential. Hence, to endorse (7) is to
divorce the notion of a priori justification from the notion of independence from
experiential evidence. It is more plausible to reject (7) on the grounds that both
Mary's original belief as well as the belief which led her to revise the original
belief were based on nonexperiential evidence. Since experiential evidence plays
no role either in the original justification or in the subsequent revision of Mary's
belief, if it is justified, it is justified a priori. Once we reject (7), (SUT) must also
be rejected.

Our rejection of (SUT) has been based on a single case. This case may appear
questionable since it involves the controversial claim that there can be a priori
justification for a false belief. In order to reinforce our conclusion, let us consider
a second example which does not involve this claim. Suppose Charlie believes
that *p* entails *q* on the basis of a valid proof P_1. Since the proof is the result of a
process of reflective thought, Charlie's belief is justified nonexperientially. But
now let us suppose that (a) there exists a pseudo-proof, P_2, from *p* to ~*q*; and (b)
if this pseudo-proof were brought to Charlie's attention, he would not be able to
detect any flaws in it or to discount it in any other fashion. Given that the pseudo-
proof never comes to Charlie's attention his belief remains justified despite the
fact that *were* it to be brought to his attention his justification *would* be defeated.
(SUT) entails that Charlie's belief is not justified a priori despite the fact that (i)
it is justified; (ii) it is based on nonexperiential evidence; and (iii) the potential
defeating evidence, if it were to become available to Charlie, would also be based
on a process of reflective thought. Given that (SUT) entails that Charlie's belief
is *not* justified a priori despite the fact that experiential evidence plays no role in
either the original justification for Charlie's belief or its possible subsequent
defeat, it is evident that (SUT) divorces the notion of a priori justification from
the notion of nonexperiential justification. Instead, (SUT) bases its claim that
Charlie's belief is not justified a priori solely on the following consideration:

(8)   The justification conferred on Charlie's belief by the process of reflec-
        tive thought is defeasible

which is clearly a thesis about the *strength* of the justification conferred on the belief by the process of reflective thought. But (8) is not a sufficient reason for maintaining that Charlie's belief is not justified a priori. For it fails to take into account whether the beliefs which are the potential defeaters for Charlie's justified belief are experiential or nonexperiential. Hence, (SUT) must be rejected.[7]

(SUT) is implausible because it overlooks the fact that revision can take place on the basis of a priori considerations. Hence, one cannot argue that the justification conferred on a belief by a process is not a priori simply on the basis of the fact that the process is self-correcting or that the justification which it provides is defeasible. A similar observation is germane to evaluating the claim of Hilary Putnam that the presence of quasi-empirical methods in mathematics shows that mathematics is not a priori.[8] By "quasi-empirical" methods, Putnam has in mind

> methods that are analogous to the methods of the physical sciences except that the singular statements which are 'generalized by induction', used to test 'theories', etc., are themselves the product of proof or calculation rather than being 'observation reports' in the usual sense.[9]

Among the numerous examples of the use of quasi-empirical methods in mathematics Putnam discusses, Zermelo's introduction of the axiom of choice is the most striking. For Zermelo is quite explicit in maintaining that his justification for this move is "intuitive self evidence" and "necessity for science."[10] By necessity for science, Zermelo has in mind the indispensability of the axiom for proving certain theorems. So, in effect, the justification is akin to the use of the hypothetico-deductive method in scientific reasoning. What are the implications of Zermelo's justification for the issue of the alleged apriority of mathematics?

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7. It is worth noting that two recent proponents of the a priori, John Pollock and Mark Steiner, acknowledge that beliefs based on intuition are defeasible but, nevertheless, maintain that such beliefs are justified a priori. See Pollock's discussion of "prima facie reasons" in chapter 10 of *Knowledge and Justification* and Steiner's discussion of "checking procedures" in chapter 4 of *Mathematical Knowledge.* Hence, (SUT) rules out *by stipulation* a feature which some proponents of the a priori have attempted to build into their accounts.

8. Hilary Putnam, "What Is Mathematical Truth?" in *Philosophical Papers, Vol. 1: Mathematics, Matter and Method,* 2nd ed. (Cambridge, 1979).

9. Ibid., p. 62.

10. E. Zermelo, "A New Proof of the Possibility of a Well Ordering," reprinted in J. van Heijenoort (ed.), *From Frege to Gödel* (Cambridge, 1967) and quoted in H. Putnam, "What Is Mathematical Truth?"

Suppose that T is a mathematical theory and that $\{p_1, \ldots, p_n\}$ is a set of statements belonging to T each of whose members is accepted on the basis of nonexperiential evidence—i.e., either intuitive self-evidence or deductive proof. Suppose that we now introduce p_{n+1} which we recognize to be neither self-evident nor formally derivable from T. But from p_{n+1} we can derive $\{p_1, \ldots, p_n\}$ and, in addition, some other principles which are neither self-evident nor provable from T but which prove fruitful in furthering research in this area of mathematics. Putnam regards two features of the example as salient: (1) no formal proof exists for p_{n+1} and (2) theoretical considerations might lead to a rejection of p_{n+1}. (1), however, is of little independent significance. It appears that Putnam stresses (1) because he assumes that if there exists a formal proof of p_{n+1}, then p_{n+1} is rationally unrevisable. But this assumption overlooks the possibility of misleading evidence. As we saw in our earlier example, the fact that Charlie's belief that p entails q was based on a valid formal proof did not preclude the rational revisability of the belief. Once we recognize that formal proof does not preclude revisability, (2) does not appear to introduce any novel considerations with respect to the apriority of mathematics. For the set of statements $\{p_1, \ldots, p_n\}$ is known independently of experience. When one confirms p_{n+1}, one derives formally the members of the set $\{p_1, \ldots, p_n\}$. Additional confirmation comes from the fact that other statements, $\{p_{n+2}, \ldots, p_{n+i}\}$, are derivable from p_{n+1} taken in conjunction with T which are both fruitful and not derivable from T alone. Hence, the only mode of justification involved is formal proof. Consequently, no novel form of justification has been introduced at this point. What about the circumstances which would lead to a rejection of p_{n+1}? Given the fruitfulness of p_{n+1} there seem to be only two circumstances in which it would be rejected: (a) if it is shown that although T is consistent, (T & p_{n+1}) is inconsistent; or (b) (T & p_{n+1}) but not T alone entails some p_i and $\sim p_i$ is independently well-supported. But, in either case, the only mode of justification involved is formal proof. Consequently, the use of hypothetico-deductive reasoning in mathematics has no tendency to show that mathematical knowledge is not a priori.[11] It would do so only if (a) the method of proof itself is not a priori; or (b) the members of the set $\{p_1, \ldots, p_n\}$ which form the confirmation base for p_{n+1} are justified experientially.

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11. This argument can be extended to the cases of inductive justification that Polya has brought to our attention such as Euler's discovery that the sum of the series $1/n^2$ is $\pi^2/6$. See G. Polya, *Induction and Analogy in Mathematics* (Princeton, 1954). Since the statements which confirm the inductive generalization are known nonexperientially, there is no reason to suppose that the generalization is not known a priori. The epistemological significance of inductive procedures in mathematics is stressed by both Putnam in "What is Mathematical Truth?" and Steiner in *Mathematical Knowledge*, chapter 3.

IB

At this point let us turn our attention to (WUT). (WUT) avoids the primary problem with (SUT).[12] It distinguishes between revisions based on experiential evidence as opposed to revisions based on nonexperiential evidence and maintains that it is only revision based on experiential evidence that is incompatible with a priori justification. Despite the initial plausibility of this claim, I believe that it is mistaken. In support of this contention, we will examine a prominent argument in support of (WUT). This examination will bring to light the principle regarding justification which motivates (WUT). An argument against this principle will be presented followed by two counterexamples to (WUT).

The most prominent recent proponent of (WUT) has been Philip Kitcher. In support of the thesis he argues

> We can say that a proposition is unrevisable for a person at a time just in case there is no possible continuation of that person's experience after that time which would make it reasonable for her to change her attitude to the proposition. The explication makes it apparent why one might think that propositions which a person knows a priori are unrevisable for that person. If you have a priori knowledge that *p*, then you have an a priori warrant for a belief that *p*. Assuming that the warrant is available independently of time, then, given any continuation of your experience, you would have available to you a warrant which would continue to support belief. Hence, it would never be reasonable for you to abandon *p* in favor of its negation. Whatever trickery your experience may devise for you, you will always be able to undergo a process which will sustain the belief.[13]

The strength of Kitcher's argument in support of (WUT) is that it is based on an uncontroversial feature of alleged a priori warrants, their availability independently of time. Thus, if this feature entails (WUT) the argument is unassailable. In order to assess it more carefully, let us first reconstruct it:

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12. Aron Edidin has argued, in "*A Priori* Knowledge for Fallibilists," *Philosophical Studies* 46 (1984): 189–197, that (WUT) entails (SUT). If this were the case, then no additional argument would be required in order to reject (WUT). I have argued, however, in "A Note on Fallibilism and A Priori Knowledge" (manuscript), that Edidin's argument in support of this claim involves a premise which is not available to all proponents of a priori knowledge. Hence, those who cannot accept this premise will require further argument to reject (WUT).

13. P. Kitcher, "How Kant Almost Wrote 'Two Dogmas of Empiricism' And Why He Didn't," *Philosophical Topics* 12 (1981), p. 222.

(1)   If you have a priori knowledge that p, then you have an a priori warrant for the belief that p.

(2)   If you have an a priori warrant for the belief that p, then the warrant is available independently of time.

(3)   Therefore, if you have an a priori warrant for the belief that p, then given any continuation of your experience, you would have available to you a warrant which would continue to support the belief that p.

(4)   Therefore, if you have a priori knowledge that p, then there is no possible continuation of your experience which would make it reasonable to abandon the belief that p.

It is crucial to recognize that the phrase "the warrant is available independently of time" is ambiguous since it can be read in either of the following ways:

(a)   the *process* which warrants the belief that p at t is available given any continuation of S's experiences;

(b)   the *warrant* which the process confers on the belief that p at t is available given any continuation of S's experiences.

If the phrase is taken in sense (b) then (3) follows from (2) but premise (2) is question-begging. If (3) is to be derived from some *independent* feature of a priori warrants, the phrase must be taken in sense (a). But when premise (2) is taken in this sense, the argument is no longer valid. For if we add the following additional premise which is consistent with (2):

(5)   Given some continuations of S's experience, there are *other* warrants available to S which either defeat or override the original warrant S had for the belief that p

the expanded set of premises entails the negation of (3). So we can*not* conclude from the fact that there exists a process which warrants a belief p at t_1 and is available at another time t_2 that it will also warrant p at t_2.

One might respond at this point that our argument against Kitcher is of little consolation to the apriorist. For in granting that the warrant conferred on a belief that p can be defeated or overridden by experience we have, *ipso facto*, conceded that the belief is based at least in part on an experiential warrant. This intuition provides the strongest motivation for endorsing (WUT). Let us begin by noting that this intuition presupposes the following symmetry between confirming evidence and disconfirming evidence:

(ST)   If evidence of kind A can defeat or override the warrant conferred on S's belief that *p* by evidence of kind B, then the belief that *p* is based on evidence of kind A.

For suppose we begin with the idea that a priori justification is nonexperiential justification and consider S's belief that *p* which is justified by nonexperiential evidence at t_1. Let us also grant that the warrant conferred on *p* by this nonexperiential evidence can be either defeated or overridden by experiential evidence at some later time t_2. The conclusion that S's belief that *p* is based in part on experiential evidence and, hence, is not justified a priori at t_1 can be reached only if (ST) is assumed.

(ST), however, is not very plausible. Consider, for example, our knowledge of our own bodily sensations such as pains and itches. *At present* such knowledge is based on introspection. Traditionally, it was maintained that introspective knowledge is indubitable. One *could not* have any rational grounds for doubting the truth of an introspective belief about one's bodily sensations. This claim has been challenged by the so-called EEG argument.[14] The basic idea is that although introspection provides *at present* our only evidence for bodily sensations, neurophysiology may evolve to the point where electroencephalograph readings will provide an alternative source of evidence. Furthermore, in suitably chosen circumstances, the EEG readings may override introspective evidence. Our purpose here is not to evaluate the argument. Suppose we grant

(6)   Neurophysiological evidence can defeat or override the warrant conferred on a belief about one's bodily sensations by introspection.

Clearly, it does not follow that my present justified belief that I have a mild headache is based on neurophysiological evidence. Consequently, (ST) must be rejected.

One might object that the intuition which motivates (WUT) does not depend on (ST) and offer the following argument in support of this contention.[15] Suppose that S believes that *p* on the basis of nonexperiential evidence and that the warrant which the nonexperiential evidence confers on *p* can be defeated by some experiential evidence. It follows that the nonexperiential evidence can warrant S's belief that *p* only in the *absence* of the potential defeating evidence. Hence, in order for S to be justified in believing that *p*, S must be justified in believing that the defeating evidence does not obtain. But such justification can come only from experience. This line of argument presupposes a thesis analogous to (ST):

14. See for example, D. M. Armstrong, "Is Introspective Knowledge Incorrigible?," *Philosophical Review* 72 (1963): 417–432; and K. Parsons, "Mistaking Sensations," *Philosophical Review* 79 (1970): 201–213.

15. This objection is due to an anonymous referee.

(ST*)　　If evidence e_1 can defeat or override the warrant conferred on S's belief that p by e_2, then e_2 does not justify S's belief that p unless S is justified in believing that ~e_1.

(ST*) runs up against a problem similar to that faced by (ST). Suppose that we grant that (6) is true. It does not follow that my present introspective belief that I have a mild headache is justified only if I have some justified beliefs about my present neurophysiological state. Consequently, (ST*) must also be rejected.

Once (ST) is rejected, however, plausible counterexamples to (WUT) can be offered. Before providing the cases, a word of caution is in order. The issue of whether those beliefs traditionally alleged to be justified a priori, such as mathematical and logical beliefs, are rationally revisable in light of experiential evidence is controversial. Although I believe that the cases to be presented support the claim that such beliefs are revisable in light of experiential evidence, the truth of this claim is not necessary for our present concerns. For our purpose here is to argue that even *if* it is granted that such beliefs are open to experiential disconfirmation, it does not follow that they are *not* justified a priori.

Suppose that Phil is a working logician who regularly and consistently arrives at interesting results. Phil, however, is bothered by the fact that although he is a *reliable* producer of interesting proofs, he is not an *infallible* producer of such proofs. As it turns out, he has a colleague, Maria, who has done pioneering work in the neurophysiological basis of cognitive processes. As a radical means to self-improvement, Phil asks Maria to conduct a study of his efforts at constructing proofs in order to see if she can uncover some, hopefully reversible, neurophysiological cause for his infrequent erroneous proofs. The investigation reveals that (a) a particular interference pattern is present in Phil's brain when and only when he constructs an erroneous proof; (b) whenever Phil constructs a proof under the influence of this pattern and the pattern is subsequently eradicated by neurophysiological intervention, he is able to see the flaw in the original proof and go on to correct it. Finally, there is an accepted body of neurophysiological theory available which supports the hypothesis that such a pattern should cause cognitive lapses. Now suppose that Phil believes that p entails q on the basis of constructing a proof which he carefully scrutinizes and finds acceptable. Despite his careful scrutiny, the proof is flawed. He later discovers in a subsequent meeting with Maria that (a) she had been monitoring his brain activity at the time the proof was constructed with a remote sensor; (b) the sensor indicated that the interference pattern was present; and (c) standard tests indicated that all of the equipment was functioning properly. Phil is still unable to uncover the flaw in the proof on his own but nevertheless concludes, on the basis of Maria's empirical findings, that there is a flaw in his proof that p entails q.

The salient features of the example are: (a) Phil's belief that p entails q was based on a process of reflective thought which is, *prima facie*, a source of a priori justification; (b) Phil's belief is justified since this process regularly and reliably produces correct proofs; and (c) the justification which the process of reflective thought conferred on the belief was subsequently defeated by the empirical evidence indicating that the interference pattern was present. (a) is uncontroversial. (b) is more controversial since it involves the claim that there can be a priori justification for a false belief. This claim was defended earlier when we discussed the Mary example. Finally, we propose to grant (c) for purposes of assessing (WUT). Hence, the only remaining question is whether it follows from (a), (b), and (c) that (d) Phil's belief that p entails q is not justified a priori. Note that the belief is justified and the process which produced it is a nonexperiential process. This appears sufficient to establish that the belief in question is justified a priori. A proponent of (WUT) can resist this conclusion only by insisting that since experiential evidence defeated the justification conferred on the belief by the process of reflective thought, the belief is based on experiential evidence. But this move involves embracing (ST) which we rejected earlier. There is no more plausibility in maintaining that Phil's belief that p entails q is based on neurophysiological evidence than there is in maintaining that his present belief that he has a headache is based on such evidence.

One might balk at this example since, like the Mary example of the previous section, it involves the claim that there can be a priori justification for a false belief. But this feature can easily be eliminated, as in the Charlie example, by introducing misleading evidence. Let us suppose that Phil's proof that p entails q is in fact correct but that Maria's sensor has malfunctioned, erroneously indicating the presence of the interference pattern. The standard tests, however, fail to detect the malfunction. Finally, let us suppose that *were* Phil to become aware that (a) the sensor had indicated the presence of the interference pattern, and (b) the standard tests indicated that the sensor was functioning correctly, he *would* conclude that his proof that p entails q is erroneous. Nevertheless, since Maria never reveals to Phil her observations, his belief remains justified. (WUT) entails that Phil's belief is not justified a priori despite the fact that (i) it is justified; and (ii) it is based on a process of reflective thought. Clearly, in order to substantiate the claim that Phil's belief is based on experiential evidence, the proponent of (WUT) must again appeal to (ST). Since (WUT) cannot be defended without appeal to (ST), it should be rejected.

It has been argued that neither (SUT) nor (WUT) is plausible. Hence, the concept of a priori justification is not tied to the concept of rational unrevisability. The most important consequence of this result is that it establishes that a very widespread line of argument against the a priori is unfounded. One cannot simply adopt Peirce's doctrine of fallibilism as an easy stepping stone to rejecting the a

priori. Instead, attention must be focused on the crucial notion of nonexperiential evidence. The traditional problem of providing a general characterization of such evidence still remains. Our investigation raises two additional salient questions which need to be addressed: a) the strength of a priori justifications; and b) the relationship between a priori and a posteriori justifications for the same belief. Further investigation of these issues is more likely to clarify our understanding of the a priori than further investigation of the notion of rational unrevisability.

II. RELIABILISM AND A PRIORI KNOWLEDGE

We have found reason to be sceptical about the alleged connection between the a priori and the rationally unrevisable. Our considerations, however, have proceeded at a very general level. We have considered the concept of a priori knowledge apart from any particular general account of knowledge. This raises the possibility that a specific theory of knowledge might provide some support for (UT) that has not emerged in our earlier discussion. Our primary purpose here is to examine whether (UT) is any more plausible when embedded in a reliabilist theory of knowledge. It will be argued that the framework of reliabilism actually provides independent reason for rejecting (UT) but offers little help in providing a positive characterization of a priori knowledge. We shall conclude by briefly outlining how reliabilism provides some resources for defending the existence of a priori knowledge.

IIA

Philip Kitcher's recent work attempts to characterize a priori knowledge within the more general framework of a *psychologistic* analysis of knowledge. The leading idea of such an analysis is that what differentiates mere true belief from knowledge is the *causal ancestry* of the belief in question. So we have

(1)　　X knows that *p* if and only if *p* and X's belief that *p* was produced by a process which is a warrant for it

where "warrant" refers to those processes which produce beliefs in a manner suitable to justify them.[16] In order to complete this account, some further information must be provided about what types of processes warrant the beliefs they produce. Although Kitcher proposes to remain neutral on this issue, it is difficult, if not impossible, to assess his account of a priori warrant without some general characterization of warrant conferring processes. Since Alvin Goldman's version of process reliabilism is the most articulated psychologistic account presently available,

16. Kitcher, *The Nature of Mathematical Knowledge*, p. 17.

and Kitcher endorses it as the best available account, we shall adopt it in our critical evaluation of Kitcher's analysis of a priori warrant.

Kitcher approaches the problem of analyzing the notion of an a priori warrant by attempting to isolate the general characteristics of belief forming processes which have led to their being classified as a priori. In order to produce knowledge which is independent of experience, a process must satisfy three conditions: (i) it must be *available* independently of experience; (ii) it must produce *warranted* belief independently of experience; and (iii) it must produce *true* belief independently of experience. These general ideas are spelled out more precisely in the following account of a priori knowledge:

(2)   X knows a priori that p if and only if X knows that p and X's belief that p was produced by a process which is an a priori warrant for it.

(3) α is an a priori warrant for X's belief that p if and only if α is a process such that, given any life e, sufficient for X for p,

    (a)   some process of the same type could produce in X a belief that p

    (b)   if a process of the same type were to produce in X a belief that p, then it would warrant X in believing that p

    (c)   if a process of the same type were to produce in X a belief that p, then p.[17]

Kitcher goes on to discuss in more detail the modal and conditional notions he employs as well as making some interesting observations about the classification of types of processes. Since these issues are not germane to our concerns, we can forego the details.

Let us proceed by examining individually each condition in Kitcher's account. Condition (a) is intended to capture the intuitive idea that a priori warrants are available independently of experience. The intuitive idea appears uncontroversial. When we turn to Kitcher's technical formulation of the idea, however, some difficult questions arise. In order to address them directly, let us begin with a statement of the condition

(3a)   If α is an a priori warrant for X's belief that p then α is a process such that, given any life e, sufficient for X for p, some process of the same type could produce in X a belief that p.

A life is sufficient for X for p just in case X could have had that life and gained sufficient understanding to believe that p.[18] But what is involved in gaining sufficient understanding to believe a proposition?

17. Ibid., p. 24.

18. Ibid., p. 22.

Kitcher's informal discussion of the Kantian process of pure intuition as an example of an alleged a priori warrant provides some clarification:

> According to the Kantian story, if our life were to enable us to acquire the appropriate concepts…then the appropriate kind of pure intuition would be available to us. We could represent a triangle to ourselves, inspect it, and so reach the same beliefs.[19]

It appears that gaining sufficient understanding to believe that *p* consists in acquiring the concepts involved in *p*. Once one has acquired the requisite concepts, one can engage in the further process of constructing and inspecting the triangle which results in the belief that *p*.

The first condition appears to be too strong. Consider a belief forming process such as perception. This process consists of a complex series of events internal to the believer which is initiated by a retinal stimulation and results in a belief. The realization of such a process is nomologically dependent upon a large array of neurophysiological features of the believer. For example, such a process is not available to a person with a severed optic nerve or badly damaged retinas. Let us call the complex neurophysiological state of a person which is nomologically necessary for a process to produce beliefs in that person the *standing condition* for that process. (3a) implausibly requires that a priori processes be independent of their standing conditions.

In order to see this consider the following example. Suppose that in the actual world S forms the belief that no two sides of a triangle are parallel through a process of pure intuition. Let us also suppose that there is a single neural condition, N, of S's brain which is nomically necessary in order for S to form and inspect a mental representation of a triangle. Now consider a different world, W*, whose nomological structure down to the neurophysiological level is identical to that of the actual world. Let us also suppose that in W* N is *not* a necessary condition for acquiring the concepts involved in the belief that no two sides of a triangle are parallel. Finally, suppose that in W* S acquires these concepts but lacks N. Hence, in W* S has a life sufficient for the belief that no two sides of a triangle are parallel yet the process of pure intuition is *not* available to S. Nevertheless, it seems implausible to maintain, solely on the basis of this fact, that the process of pure intuition does not provide an a priori warrant in the actual world for S's belief that no two sides of a triangle are parallel.

The source of Kitcher's difficulty with condition (3a) is that he tries to explicate the manner in which a priori processes are available *independently* of experience in terms of the manner in which they *depend* on experience. The key

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19. Ibid., p. 23.

idea involved in the notion of a process being available independently of experience is

(4)   No experiences other than those *necessary* to acquire the concepts are *necessary* for the process to be available.

Kitcher analyzes this idea along the following lines:

(5)   A life which includes experiences *sufficient* to acquire the concepts is *sufficient* for the process to be available.

But (5) is clearly stronger than (4) since the latter is compatible with *other* conditions, such as neurophysiological conditions, being necessary for the availability of the process while (5) is not. Hence, (3a) needs to be revised along the following lines

(3a*)   If α is an a priori warrant for X's belief that *p* then α is a process such that, given any life *e*, sufficient for X for *p*, no further experiences are necessary for some process of the same type to produce in X a belief that *p*.

(3a*) is not open to the problem faced by (3a) since it allows that some *non-experiential* conditions might be necessary for the belief in question to be produced.

Let us now turn to Kitcher's second condition on a priori warrants. He claims that such processes must produce warranted beliefs independently of experience. This claim can be put as follows

(3b)   If α is an a priori warrant for X's belief that *p* then α is a process such that, given any life *e*, sufficient for X for *p*, if a process of the same type were to produce in X a belief that *p*, then it would warrant X in believing that *p*.

(3b), in effect, places a very strong defeasibility condition on a priori warrants. It entails that

(DC)   If α is an a priori warrant for X's belief that *p* then the warrant which α confers on *p* cannot be defeated by any experiences compatible with S's acquiring the concepts involved in *p*.

(DC) is, in effect, a close relative of (WUT).

This condition should have little plausibility for anyone who subscribes to a reliabilist account of warrant. For it follows from very general requirements of the reliability theory that *no* process can satisfy this condition. Let us begin by noting that there are two different ways in which the warrant a process α confers on a belief that *p* can be defeated by experience:

(a)   experience may provide reason to believe that *α* is not a reliable belief forming process;

(b)   experience may provide reason to believe that *p* is false.

I shall refer to experiences of the first sort as *indirect* defeaters and to experiences of the second sort as *direct* defeaters.[20] It is important to recognize that the experiences which are indirect defeaters for a belief that *p* are *not* typically also direct defeaters for that belief and vice-versa. Suppose, for example, that I form the belief that there is a cup on the desk via perception and the results of a neurological examination show that I am prone to hallucinations. Although the exam results defeat the warrant conferred on *my* belief by the process of perception, they do not provide evidence that there is not a cup on the desk. This is shown by the fact that no one else would be less warranted in believing that there is a cup on the desk were they to become aware of the results of my neurological examination.

If we now return to (DC), we can see that there is some plausibility to this principle if we consider only *direct* defeaters. For it can be plausibly argued that if one has constructed a valid proof for a particular theorem then the warrant conferred on the theorem by the process of constructing the proof cannot be defeated by experiences such as the testimony of authorities or the results of a computer program. If one has a proof in hand then one is warranted in being suspect about the sincerity or competence of the alleged authorities and computer programmers. But when we turn to *indirect* defeaters the situation changes radically. First of all, it is generally granted by proponents of reliabilism that the warrant which a reliable process confers on S's belief that *p* is defeated if S has reason to believe that the process is *not* a reliable one.[21] Secondly, the reliability of any cognitive

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20. This distinction is analogous to John Pollock's distinction between type I and type II defeaters. See his *Knowledge and Justification*, pp. 42–43.

21. This point was recognized very early by Alvin Goldman in "What Is Justified Belief?" in G. Pappas (ed.), *Justification and Knowledge* (Dordrecht, 1979). It led him to move from the following straightforward formulation of a base-clause principle for justified belief:

(1)   If S's believing *p* at *t* results from a reliable cognitive belief-forming process (or set of processes), then S's belief in *p* at *t* is justified

to the more complicated

process is a matter which is open to empirical investigation. Hence, there is some set of *possible* experiences which would justify us in believing that it is unreliable. Here it is crucial to recognize that even if a belief forming process is in fact reliable, it does not follow that the *available* evidence will warrant us in believing that the process is reliable. We may lack the technical sophistication to uncover the evidence which would establish the reliability of the process and the evidence which we have uncovered may point in the other direction. Furthermore, it is always possible that our experiences include *misleading* evidence. Such evidence, despite being misleading, would nevertheless defeat the warrant conferred on a belief by a reliable process.[22] Hence, (DC) requires that for a reliable belief forming process α to confer an a priori warrant on S's belief that *p*, there be *no* possible worlds in which S acquires the concepts involved in *p* and also has evidence, perhaps misleading, that α is *not* a reliable process. But, on the face of it, there appears to be no inconsistency in the supposition that such worlds exist. Therefore, no process can satisfy (DC). Since no process can satisfy (DC) and condition (3b) entails (DC), (3b) should also be rejected.

Even though we have argued that (3b) should be rejected, it does appear to be a plausible principle. Furthermore, it is widely accepted. Indeed, since (3b) is a variant of (WUT), it would be accepted by any proponent of (UT). I want to suggest, however, that (3b) and (WUT) derive whatever plausibility they have from confusing two different issues:

(a)   the *existence* of a priori warrants

and

(b)   the *strength* of a priori warrants.

(2)   If S's belief in *p* at *t* results from a reliable cognitive process, and there is no reliable or conditionally reliable process available to S which, had it been used by S in addition to the process actually used, would have resulted in S's not believing *p* at *t*, then S's belief in *p* at *t* is justified.

Note that (2) makes the justification of a belief depend not only on the process which actually produced the belief but also on processes that could and should be employed. The basic idea is that the proper use of evidence is a conditionally reliable process. So one who has evidence that a belief forming process is unreliable and uses that evidence will not place credence in beliefs produced by that process. Goldman offers a different way of handling this problem in *Epistemology and Cognition* (Cambridge, 1986), p. 63. I have argued in "Causality, Reliability, and Mathematical Knowledge" (manuscript) that the new account cannot handle the problem and must be replaced with an account in the spirit of (2).

22. Laurence BonJour has stressed this point in his criticism of reliability theories. See, for example, *The Structure of Empirical Knowledge* (Cambridge, 1985), chapter 3.

In order to substantiate this claim, let us consider an analogous situation in the case of a posteriori warrants. It is generally granted that introspection is the primary source of knowledge of one's psychological states. Yet it is also recognized that behavioral evidence warrants beliefs about psychological states. It follows that the process of observing one's own behavior also warrants beliefs about one's own psychological states. Nevertheless, one rarely utilizes perceptual warrants since introspection alone can warrant such beliefs. Hence, it is widely held that

(6)   Introspection produces warranted beliefs independently of perception.

Some, however, have maintained that the beliefs formed by introspection have a special epistemic status. Such beliefs are indubitable. Let us put this claim as follows

(7)   If S's belief that *p* is formed by a process of introspection, then there is no future event such that if S were to become justified in believing that it occurred, then S would be less warranted in believing that *p*.

On the other hand, it has been argued in the recent literature that if neurophysiology were to advance to the point where there is (a) a well supported theory correlating neurophysiological states with psychological states and (b) a means of reliably ascertaining the state of person's central nervous system, then perceptual evidence could provide grounds for rejecting one's introspective beliefs.[23] If one grants that the scenario described is possible, it follows that

(8)   The warrant conferred on a belief by introspection can be defeated by perception.

(8) is clearly incompatible with (7). If (8) were correct, it would follow that the *strength* of the warrant claimed for introspection is exaggerated. But is (8) also incompatible with (6)? No. For (6) only claims that introspection can warrant a belief in the *absence* of perceptual evidence. (8) does not deny this. It tells us that (a) perceptual, *as well as* introspective, evidence is relevant to the justification of beliefs about one's experiential states; and (b) the warrant conferred on such beliefs by introspection is not strong enough to override all conflicting perceptual evidence. These points can be made more explicit by analyzing (6) as follows

23. See the papers cited in footnote 14.

(6*)   If S's belief that p is produced by introspection and S has no beliefs produced by any perceptual processes regarding either the subject matter of p or the process which produced p then S's belief that p is warranted by introspection.

(6*) has the virtue of preserving the central idea that introspection, unaided by perception, can warrant beliefs without appearing to imply that such beliefs are completely immune from perceptual disconfirmation.

The upshot of this discussion is that the intuitive idea that

(9)   A priori processes produce warranted beliefs independently of experience

should be analyzed in the same fashion as (6) was analyzed. (6*) suggests that (3b) be revised as follows

(3b*)   If α is an a priori warrant for X's belief that p then α is a process such that, given any life e, sufficient for X for p and in which S has no beliefs produced by any experiential processes regarding either the subject matter of p or the process which produced p, if a process of the same type were to produce in X a belief that p, then it would warrant X in believing that p.

(3b*) implies that a priori processes can warrant beliefs in the absence of experiential processes without implying that such warrants cannot be defeated by experience.

Let us conclude by considering Kitcher's third condition on a priori warrants:

(3c)   If α is an a priori warrant for X's belief that p then α is a process such that, given any life e, sufficient for X for p, if a process of the same type were to produce in X a belief that p, then p.

(3c) requires of a priori warrants that they have the highest degree of reliability. They must not produce any false beliefs. Kitcher motivates this strong condition by the following consideration:

> to generate *knowledge* independently of experience, a priori warrants must produce warranted true belief in counterfactual situations where experiences are different.[24]

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24. Kitcher, *The Nature of Mathematical Knowledge,* p. 24.

This claim, however, is puzzling. It is uncontroversial that knowledge entails truth. But since Kitcher is providing an account of a priori *warrant* rather than a priori *knowledge*, it is not clear why he is at all concerned with the requirement of truth. On the face of it, the mere fact that a process generates some false beliefs does not entail that it does not warrant the beliefs that it produces. There are two possibilities here. Perhaps the reliabilist account of *warrant* requires a strong connection with truth. On the other hand, perhaps it is the notion of an a priori warrant which necessitates the connection. Let us explore each of these alternatives.

Does the reliabilist account of warrant require that warrant conferring processes never produce false beliefs? It appears not. Consider, for example, Goldman's account:

> A J-rule system R is right if and only if R permits certain (basic) psychological processes, and the instantiation of these processes would result in a truth ratio of beliefs that meets some specific high threshold (greater than .50).[25]

Goldman does not fix the threshold value and is content to leave his account with this degree of vagueness since he maintains that the ordinary concept of justification is similarly vague. Hence, reliabilism does not *in general* require that belief forming processes be maximally reliable in order to produce warranted beliefs.

If it is granted that reliabilism does not *in general* require that a belief forming process be maximally reliable in order to warrant beliefs produced by it, is there any reason to suppose that a priori processes be maximally reliable? Kitcher does not explicitly argue in support of this claim but he does endorse an intuition which supports it:

> if a person is entitled to ignore empirical information about the type of world she inhabits then that must be because she has at her disposal a method of arriving at belief which guarantees *true* belief. (This intuition can be defended by pointing out that if a method which could produce false belief were allowed to override experience, then we might be blocked from obtaining knowledge which we might have otherwise gained.) In my analysis, the intuition appears as (3c).[26]

This intuition rests on very shaky grounds. The *existence* of a priori warrants does not entitle a person to ignore empirical information about the world. For such processes may warrant beliefs only in the absence of conflicting evidence derived

25. Alvin Goldman, *Epistemology and Cognition* (Cambridge MA, 1986), p. 106.

26. Kitcher, *The Nature of Mathematical Knowledge*, p. 30.

from empirical sources. In order to be entitled to ignore empirical information about the world, one would have to be committed not only to the view that a priori warrants *exist* but also to the following thesis regarding the *strength* of such warrants:

(10)   The warrant conferred on a belief by an a priori process can neither be defeated nor overridden by experience.

But, as we argued earlier, (10) should be rejected. Once (10) is rejected then we are in a position to recognize that rather than *blocking* a person from obtaining knowledge she might have otherwise had via experience, a priori warrants which do *not* guarantee truth provide a person with an *additional* way of obtaining knowledge. Hence, we can conclude that (3c) should be revised along the following lines:

(3c*)   If α is an a priori warrant for X's belief that p then α is a process such that, given any life e, sufficient for X for p, if a process of the same type were to produce beliefs in X, then a preponderance of those beliefs would be true.

Although (3c*) does not indicate what constitutes a "preponderance" of true beliefs in a life, it does make clear that a priori warrants need *not* guarantee truth.

We are now in a position to summarize our conclusions and to draw out their more general implications. Condition (3a) was rejected because it required that a priori processes be independent of their standing conditions. (3b) and (3c), on the other hand, conflated the *existence* of a priori warrants with the *strength* of such warrants. Revised necessary conditions were proposed to remedy these shortcomings. But are our revised necessary conditions jointly sufficient for analyzing the notion of an a priori warrant? (3c) provides a sufficient condition for a process to be a warrant. The burden of distinguishing between a priori and a posteriori warrants falls on (3a*) and (3b*). (3a*) tells us that in the case of a priori warrants, the only experiences necessary for producing a belief are those necessary for acquiring the requisite concepts. Hence (3a*) provides information about the *availability* of warrants but does not provide information about the *nature* of such warrants. This key role is left to (3b*). Unfortunately, (3b*) does not appear to be adequate for the role. For it simply states in reliabilist jargon the traditional idea that a priori warrants produce warranted beliefs independently of experience. It provides *no* account of what *differentiates* experiential warrants from nonexperiential warrants. But, of course, this is the chief obstacle to providing an *illuminating* characterization of a priori knowledge. For example, it is uncontroversial

that knowledge based on either memory or perception is not a priori. But intro-spection has proved to be controversial. Some have maintained that there is introspective a priori knowledge of one's psychological states while others have denied this. On the other hand, proponents of the view that intuition is an a priori source of mathematical knowledge often maintain that it is a faculty akin to sense perception. What remains unclear, however, is the basis for maintaining that knowledge based on the former but not the latter is a priori. (3b*) is of little use in resolving these problems. So, in the end, the route through reliabilism has made little progress in demarcating the a priori.

IIB

It has been argued that reliabilism provides little help in elucidating the notion of a priori knowledge. In particular, it does not offer much illumination regarding the central notion of nonexperiential warrant. Despite this shortcoming, reliabi-lism can be of significant value to a proponent of the a priori. For the account allows one to address what have been come to be regarded as "standard" objec-tions to the existence of a priori knowledge. These objections fall into three broad categories: 1) a priori knowledge is incompatible with fallibilism; 2) a priori knowledge is at odds with the requirements of epistemology naturalized; and 3) proponents of the a priori cannot offer plausible answers to questions about sec-ond level justification.

The doctrine of fallibilism has been presented in various different forms. For our purposes let us understand fallibilism as the view that we should hold every belief, no matter how strongly it is supported, in an open minded spirit which acknowledges the possibility that future evidence may require us to abandon it. A priori knowledge is incompatible with the doctrine of fallibilism only if one adopts an analysis of the concept of the a priori which entails that such knowledge is rationally unrevisable. Such an analysis, however, should have little attraction for a reliabilist. For, as our discussion of Kitcher's principle (3b) indicates, ratio-nally unrevisable beliefs are not even *possible* within a reliabilist framework. In order for a belief to be rationally unrevisable it must satisfy a strong defeasibility constraint such as (DC). The process which warrants the belief must be such that no *possible* future evidence could defeat the warrant which that process confers on the belief in question. But, as we argued above, there always exists the possi-bility of evidence, even if it is only misleading evidence, which would justify one in believing that a belief forming process is unreliable. Such evidence would defeat the warrant which the process confers on the beliefs that it produces. Once this point is appreciated, it becomes evident that a reliabilist who analyzes the *concept* of a priori knowledge in terms of rational unrevisability cannot address the issue of the *existence* of such knowledge in a nontrivial fashion. The issue is

settled by stipulation. Hence, any reliabilist who wishes to address nontrivially the issue of the existence of a priori knowledge *cannot* adopt an account of such knowledge which is at odds with the doctrine of fallibilism.

The classical formulation of the tension between the alleged existence of a priori knowledge and epistemology naturalized is due to Paul Benacerraf.[27] The question he poses is how processes such as mathematical intuition can provide knowledge of mathematical entities if such entities are causally inert? Although a number of authors have attempted to respond to the question by arguing that abstract entities are *not* causally inert,[28] a reliabilist need not make this move. For reliabilism reduces the issue from the level of a *conceptual* problem to a *factual* issue. Reliabilism requires of a warranted belief that it be produced by a process that is *in fact* reliable. Although processes such as perception, which involve a causal relation between the believer and the objects of belief, are our present paradigms of reliable belief forming processes, it remains a *contingent* matter whether other sorts of belief forming processes are reliable. Since warrant requires reliability rather than causal connection, the alleged causal inertness of the objects of the beliefs formed by the process of mathematical intuition is not a conceptual bar to such beliefs being warranted.[29] Hence, if mathematical intuition is in fact a reliable belief forming process then the mathematical beliefs produced by this process are warranted (provided, of course, that the warrant conferred on those beliefs is not defeated or overridden by warrants from other processes).

Finally, let us turn to those problems which we have classified under the category of second-level justification. It is a distinctive feature of reliabilism that in order for a reliable process to warrant a belief which it produces in a cognizer, the cognizer need not be aware that the belief was produced by a particular process, let alone that the process is a reliable one. So, in order for the process of mathematical intuition to warrant one's belief that $2 + 2 = 4$, it is not necessary that one be aware of the source of the belief. It is this feature of reliabilism which is rejected by internalists. For example, Laurence BonJour maintains that "For a belief to be epistemically justified for a particular person requires that this person be himself in cognitive possession of such a reason."[30] But it is precisely this

27. Paul Benacerraf, "Mathematical Truth," pp. 671–675.

28. Penelope Maddy, "Perception and Mathematical Intuition," *Philosophical Review* 89 (1980): 163–196; and Jaegwon Kim, "Some Reflections on Perception and *A Priori* Knowledge."

29. Penelope Maddy makes a similar point in "Mathematical Epistemology: What is the Question?," *Monist* 67 (1984): 46–55. This issue, however, is more complex than her paper suggests. Some of these complexities are discussed in detail in my "Causality, Reliability, and Mathematical Knowledge."

30. BonJour, *The Structure of Empirical Knowledge*, p. 32. R. M. Chisholm endorses a similar position in *Theory of Knowledge*, 2nd ed., p. 17.

requirement of internalist accounts that leads to the problems of second-level justification. Suppose that one comes to believe that 2 + 2 = 4 on the basis of intuiting that 2 + 2 = 4. According to the internalist, the mere fact that the belief is produced by the reliable process of intuition is not sufficient to warrant the belief. One must stand in some cognitive relation to the intuition. Presumably, one must justifiably believe that one intuits that 2 + 2 = 4. Now, of course, the appeal to further justificatory beliefs must stop at some point if an infinite regress of justification is to be avoided. So the question which naturally arises is whether the belief that one intuits that 2 + 2 = 4 is an appropriate point for justification to come to an end. The problem we face in addressing this question is that proponents of intuitionism diverge on their views regarding our knowledge of the existence of intuitions.[31] Some, like Gödel, seem to view the faculty of intuition as something which must be *posited* on theoretical grounds in order to explain mathematical knowledge.[32] On this view one's justification for believing that there are mathematical intuitions is *indirect*. Others, like Pollock, seem to think that the existence of such intuitions is uncontroversial.[33] On this view, one can be *directly* justified in believing that there are mathematical intuitions. But now the internalist is faced with a dilemma. If one's knowledge that one is intuiting that 2 + 2 = 4 is *indirect*, then the justification of mathematical beliefs cannot rest solely on intuition. Some account must be provided of how one is justified in believing that one is having the requisite intuition. And it begins to appear as though only those versed in the epistemology of mathematics will be in a position to provide an answer. Hence, the account severely restricts the scope of mathematical knowledge. But suppose the internalist claims, instead, that one can be *directly* justified in believing that there are mathematical intuitions. It then becomes difficult to explain why other proponents of intuitionism do not have this direct access to their intuitions. Given that they are favorably disposed toward intuitionism, why do they believe that the existence of intuitions can be justified only indirectly? Reliabilism, however, avoids the dilemma. Since cognitive access to the process which forms a belief is not a requirement for justification, the reliabilist is not forced to embrace either option. For if the belief in question is formed by the process of intuition and the process is a reliable one, it matters not whether the subject of the belief recognizes, or can justify the belief, that intuition is the operative faculty.

We have tried to indicate some ways in which the resources of reliabilism can be of use to a proponent of the a priori. The advantages offered by reliabilism,

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31. Kitcher discusses this issue in chapter 3 of *The Nature of Mathematical Knowledge*.

32. Kurt Gödel, "What is Cantor's Continuum Problem?," reprinted in P. Benacerraf and H. Putnam (eds.) *Philosophy of Mathematics*, 2nd ed. (Cambridge, 1983), pp. 483–485.

33. Pollock, *Knowledge and Justification*, pp. 318–320.

however, are realized at the level of defending the *existence* of a priori knowledge rather than at the level of *characterizing* such knowledge. In some ways, this result is not surprising. For although reliabilism offers the promise of advancing epistemology by incorporating advances in cognitive science and other relevant empirical disciplines, work in these areas is still at a sufficiently rudimentary stage that the conceptual scheme of folk psychology remains in place. Consequently, there is no theoretically informed replacement available for our intuitive distinction between experiential and nonexperiential belief forming processes. On the other hand, the introduction of reliability theories was to a large extent motivated by traditional epistemological problems such as the regress of justification and the failure of causal theories to solve the Gettier problem. These general epistemological problems, however, also arise within the more restricted domain of the a priori. Consequently, to the extent that reliabilism is successful in dealing with these general issues, it will be of use to a proponent of the a priori.[34]

4

Causality, Reliabilism, and Mathematical Knowledge

The traditional account of the a priori involves two distinct claims which mutually reinforce one another.[1] There is, on the one hand, the *metaphysical* claim that there exist abstract entities which have properties and stand in relations to one another. On the other hand, there is the *epistemological* claim that there is a source of knowledge distinct from sense experience in its various forms. The epistemological claim supports the metaphysical claim in that scepticism with respect to knowledge of elementary mathematical statements is quite implausible. But if some mathematical statements are known then they must be true. Yet it does not appear to be possible to provide an account of the truth conditions of such statements without invoking abstract entities of some kind. The metaphysical claim supports the epistemological claim in that statements describing relations among abstract entities are necessarily true. And it has traditionally been thought that sense experience cannot provide knowledge of necessary truths. Necessity is a hallmark of the a priori.[2]

1. Such an account is offered By Panayot Butchvarov in *The Concept of Knowledge* (Evanston, 1970), Part 2; and by R. M. Chisholm in *Theory of Knowledge*, 2nd ed. (Englewood Cliffs, 1977), Chapter 3.

2. Saul Kripke has offered some powerful arguments against the traditional account of the relationship between the a priori and the necessary. See, for example, his *Naming and Necessity* (Cambridge, 1980). These arguments are discussed in my "Kripke on the A Priori and the Necessary," *Analysis* 37 (1977): 152–159; and "Actuality and the A Priori," *Australasian Journal of Philosophy* 66 (1988): 390–402.

Paul Benacerraf, in his well known paper "Mathematical Truth,"[3] challenged the traditional account by arguing that, rather than reinforcing one another, its metaphysical and epistemological claims are actually incompatible. In its starkest form, the argument goes as follows:

(1)   Our best account of mathematical truth provides truth conditions for mathematical sentences in terms of abstract entities.
(2)   Our best account of knowledge requires that in order for S to know that *p*, S must stand in some causal relation to the entities given by the truth conditions of *p*.
(3)   Abstract entities are causally inert.
(4)   Therefore, mathematical knowledge is impossible.

Although Benacerraf focuses exclusively on the case of mathematical knowledge, his argument can be extended to knowledge of any statement whose truth conditions involve abstract entities. So the general problem faced by proponents of the a priori is to reconcile plausible causal constraints on a priori knowledge with the fact that such knowledge is of causally inert entities.

A proponent of the traditional account has only two options: either reject (2) or reject (3). Some recent writers have exercised the second option.[4] They argue that the only reason for maintaining that abstract entities, such as sets, cannot stand in causal relations is that they are not located in space and time. They then go on to maintain that if all the members of a set have spatio-temporal location then the set itself also has spatio-temporal location—namely, that of its members. But this claim has the implausible consequence that there are infinitely many objects at the same place at the same time. For if the set S has a spatio-temporal location so does the set which has S as its only member; and so on. Furthermore, even if this claim were acceptable, two additional problems would remain. In the absence of an account of the causal powers of sets, it is impossible to evaluate the claim that sets stand in the causal relations to cognizers appropriate for generating knowledge.[5] Moreover, a different account would have to be

3. Paul Benacerraf, "Mathematical Truth," *Journal of Philosophy* 70 (1973): 661–679.

4. See, for example, Penelope Maddy, "Perception and Mathematical Intuition," *Philosophical Review* 89 (1980): 163–196; and Jaegwon Kim, "Some Reflections on Perception and *A Priori* Knowledge," *Philosophical Studies* 40 (1981): 355–362.

5. The problem here is that infinitely many sets occupy any spatio-temporal region containing at least one concrete object. Consequently, one needs some principled account of *which set* among these various candidate sets generates particular numerical beliefs in a cognizer. Suppose, for example, I have a box containing one ball, a stone and an envelope and form the belief upon looking into the box under normal conditions that there are three objects in the box. In order to know that there are three objects in the box it is necessary that a three-membered set located in the box cause

provided for knowledge of statements about the null set or the set of real numbers. Consequently, exercising the second option leaves one facing formidable obstacles.[6]

The remaining option is to reject (2). There are two different ways in which one might reject (2). (2) endorses a version of the causal theory of knowledge. One might accept the causal theory and go on to argue that once the causal constraints imposed by the theory are correctly understood they do not exclude knowledge of causally inert entities. The alternative approach is to argue that the causal theory is inadequate and that a more adequate account of knowledge does not involve the causal constraints in (2). Mark Steiner has adopted the first strategy thus attempting to reconcile platonism with the causal theory of knowledge.[7] Penelope Maddy, on the other hand, has opted for the second route by rejecting the causal theory in favor of reliabilism and arguing that reliabilism imposes no causal constraints on knowledge which are antithetical to platonism.[8]

My primary purpose in this paper is to argue that neither approach succeeds. Since the causal theory of knowledge has fallen into disfavor in recent years, our discussion of it will be cursory. The discussion will provide the basis for introducing a distinction between two different ways in which causal considerations can play a role in an epistemic theory. The bulk of the paper will be devoted to an examination of reliabilism and its implications for the traditional account of the a priori. Two forms of reliabilism will be distinguished: (a) reliable indicator theories, and (b) process reliabilism. It will be argued that the former theories cannot accommodate knowledge of abstract entities since they involve causal

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that belief rather than a five-membered set. But on what grounds can one determine *which* of those sets caused the belief in question. The problem can be stated more generally. It is a consequence of the supposition that if the members of a set have spatio-temporal location then the set itself has the same spatio-temporal location as it members that (a) *any* belief I form to the effect that there are n objects in the box (where n > 0) is *true*; and (b) there is an n-membered set of objects in the box which can be cited as the *cause* of my belief. Does it then follow that *any* belief I form about the number of objects in the box constitutes a case of knowledge? If the causal approach is to avoid this consequence, some further conditions which specify the *differences* in causal powers of the *different* sets located at the same place must be provided.

6. For additional criticism of Maddy's position, see Charles S. Chihara, "A Gödelian Thesis Regarding Mathematical Objects: Do They Exist? And Can We Perceive Them?," *Philosophical Review* 91 (1982); 211–228.

7. Mark Steiner, "Platonism and the Causal Theory of Knowledge," *Journal of Philosophy* 70 (1973): 57–66, and *Mathematical Knowledge* (Ithaca, 1975), Chapter 4. Bob Hale, in *Abstract Objects* (Basil Blackwell, 1987), Chapter 4, discusses the alleged incompatibility between causal theories of knowledge and knowledge of abstract entities as well as Steiner's defense of their compatibility.

8. Penelope Maddy, "Mathematical Epistemology: What is the Question?," *Monist* 67 (1984): 46–55.

constraints similar to those required by the causal theory. The case with respect to process reliabilism is more complicated. I begin by arguing that although some versions of process reliabilism are compatible with knowledge of abstract entities, they are too weak to provide plausible constraints on knowledge. A stronger version of the theory is proposed and defended. Finally, it is argued that on this improved version of process reliabilism causal considerations become relevant to knowledge in a surprising new way which is not hospitable to proponents of the a priori.

I

Let us begin with the classic formulation of the causal theory of knowledge due to Alvin Goldman:

> (G)   S knows that *p* if and only if the fact that *p* is causally connected in an "appropriate" way with S's believing that *p*.[9]

For our purposes we need not discuss what constitutes an "appropriate" causal process. Steiner balks at this formulation of the causal theory on the grounds that facts are abstract entities and, thus, cannot stand in causal relations. He argues, however, that the causal theorist can remedy this shortcoming by talking about causal *explanations* rather than causal *relations*. Thus, (G) might be reformulated as follows:

> (S)   One cannot know that a sentence S is true, unless S must be used in a causal explanation of one's knowing (or believing) that S is true.[10]

Steiner goes on to argue that although (S) provides the most plausible formulation of the causal theory it is not incompatible with platonism. The argument proceeds as follows:

> (1)   Suppose that S believes one of the axioms of analysis or number theory.
> (2)   There exists a theory which can causally explain S's belief.
> (3)   This theory, like all others, will contain the axioms of number theory and analysis.

9. Alvin Goldman, "A Causal Theory of Knowing," reprinted in G. Pappas and M. Swain (eds.), *Essays on Knowledge and Justification* (Ithaca, 1978), p. 82.

10. Steiner, "Platonism and the Causal Theory of Knowledge," p. 60.

(4)   In order to provide an explanation a sentence must be true.

(5)   The Tarski interpretation is the only known interpretation to guarantee the truth of these axioms.

(6)   Therefore, these axioms—interpreted platonistically—will be used in any causal explanation of our beliefs in the axioms.

The leading idea of Steiner's reconciliation is that sentences which refer to abstract entities can figure in a causal *explanation* even if the entities to which they refer cannot stand in causal *relations*. Thus, he rejects the thesis that the causal theory precludes knowledge of abstract entities without rejecting the metaphysical principle that abstract entities are causally inert.

Steiner's position is difficult to evaluate since (S) provides a necessary but not sufficient condition for knowledge. Nevertheless, there is good reason to doubt its adequacy. Presumably, the point of introducing a causal condition into the analysis of knowledge is either (a) to distinguish between justified and unjustified beliefs or (b) to distinguish between knowledge and justified true belief. But (S) is too liberal to accomplish either of these objectives. For *any* belief in the axioms of analysis or number theory, however fortuitously acquired, will satisfy this condition. This is a direct consequence of (6) which states that these axioms will be used in *any* causal explanation of our beliefs in the axioms.

Suppose, for example, that Jill is driven by a compulsion to trick people into believing false propositions by deceptive means. She happens to overhear in a party conversation someone claiming that T is *not* an axiom of number theory. Jill knows very little mathematics but, nevertheless, adopts the belief that T is not an axiom of number theory solely on the basis of overhearing the remark in the conversation. She then proceeds to trick Mark into believing that she is a mathematics professor in order to convince him that T is an axiom of number theory. As usual, she is successful but it turns out that T *is* in fact an axiom of number theory. So Mark's belief is true and T figures as part of the causal explanation of his belief that T is an axiom of number theory. But clearly his belief has very little epistemic merit despite satisfying the causal condition in (S).[11] Therefore, we can conclude that Steiner has failed in his attempt to reconcile Platonism with the

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11. Peter Klein has offered a similar criticism of Steiner in "Knowledge, Causality, and Defeasibility," *Journal of Philosophy* 73 (1976): 792–812. It is important to note that T plays *two* different roles in the explanation of Mark's belief. Jill's utterance of T is the initiating cause of the chain of events which results in Mark's belief that T. But, according to Steiner's (3), any theory explaining how Mark's belief that T is caused by Jill's utterance will contain T since T is an axiom of number theory. Hence, the counterexample cannot be rejected on the grounds that the *truth* of Jill's utterance of T does not figure in the causal explanation of Mark's belief that T. For, according to Steiner's (4), the truth of T is required if it is to be part of the explanation of how Jill's utterance caused Mark's belief.

causal theory of knowledge. Nevertheless, he has made the important point that causal constraints can be formulated in an epistemic theory in two different ways: (1) in terms of causal *relations*; or (2) in terms of causal *explanations*. The alleged inertness of abstract entities is incompatible with (1) but not (2). Hence, it is crucial that this distinction remain prominent in our subsequent examination of the causal constraints within reliabilist theories.[12]

II

Given recent developments in epistemology, it is tempting to think that the tension between the causal theory of knowledge and knowledge of abstract entities is a moot point. Penelope Maddy, for example, has argued that once the causal theory of knowledge gives way to the reliability theory, the requirements of general epistemology are no longer incompatible with platonism. This optimistic assessment is based on the observation that reliabilism does not overtly place any causal conditions on knowledge. It does not require that in order for S to know that *p* there be a causal connection between S's belief that *p* and the objects which make the belief true. Some processes, such as perception, which are knowledge-producing do involve a causal connection between beliefs and the objects which make them true. But such processes produce knowledge by virtue of their *reliability* rather than by virtue of the causal connection. Conversely, if a belief forming process, such as wishful thinking, which does not involve a causal connection between the belief and that which makes it true were reliable, it would produce knowledge.

Although the prospect for providing an account of knowledge of abstract entities within the framework of reliabilism is certainly more promising than providing such an account within the framework of the causal theory, the issue goes deeper than Maddy suspects. She fails to recognize this for two reasons: (1) she considers only a single form of reliabilism—process reliabilism; and (2) her formulation of process reliabilism is oversimplified and inadequate. Consequently, we will now proceed to examine a range of reliabilist accounts of knowledge in order to determine how well each accommodates knowledge of abstract entities.

A. Reliable Indicator Theories

The reliable indicator account is typically modeled on the operation of measuring instruments such as thermometers or barometers. D. M. Armstrong, for example, introduces his account in the following manner:

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12. Interestingly, Benacerraf vacillates between these two formulations of the causal constraint in "Mathematical Truth," p. 671.

Suppose, on a certain occasion, a thermometer is reliably registering 'T°'. There must be some property of the instrument and/or its circumstances such that, if anything has this property, and registers 'T°', it must be the case, as a matter of natural law, that the temperature *is* T°[13]

Applying this characterization to the case of knowledge, we get

A's non-inferential belief that c is a J is a case of non-inferential *knowledge* if, and only if:

   (i)   Jc
   (ii)   ($\exists$H) [Ha & there is a law-like connection in nature (x)(y) {if Hx,
           then (if BxJy, then Jy)}].[14]

In order to complete the account, we need to specify the range of the variables involved as well as what constitutes a law-like connection in nature. H is a predicate variable which ranges over conditions and/or circumstances of cognizers while x ranges over beings capable of cognition. Since the account is limited to "beliefs concerning things at particular times and places…,"[15] y ranges over particulars which can figure in such beliefs. Armstrong does not offer a general characterization of law-like connections but instead highlights three features: (1) they are the sort of connection which can in principle be investigated by scientific method; (2) the law-like generalizations which record the existence of such connections yield counterfactual or, more generally, subjunctive conditionals, and (3) the connection between the belief and state of affairs is an ontological connection but *not* a causal one.

The obvious question which arises at this point is how knowledge of mathematical propositions can be accommodated on this account. In order to answer the question, we must first address the *semantic* issue of how mathematical propositions are to be analyzed. If we consider the case of a simple mathematical proposition such as "2 + 3 = 5," Armstrong contends that it can be analyzed as the conjunction of two *general* propositions:

   (1)   For all x and y, *if* x is a set having two and only two members, and y is
         a wholly distinct set having three and only three members, *then* the
         union of x and y has only five members;

13. D. M. Armstrong, *Belief, Truth and Knowledge* (Cambridge, 1973), p. 162.

14. Ibid., p. 170.

15. Ibid., p. 5.

(2)   For all z, *if* z is a set having five and only five members, *then* there exist
        wholly distinct subsets of z, v and w, such that v has two members and
        w has three members.

Hence, to believe that $2 + 3 = 5$ is to believe the conjunction of two general
propositions.

But what is it to believe a general proposition? Armstrong proposes to analyze
belief in a general proposition as a disposition to create and/or causally sustain
certain further beliefs about particular matters of fact given certain other beliefs
about particular matters of fact. More formally, we have

> A believes that (x)(if Fx, then Gx) if, and only if:
> A is so *disposed* that, for all x, if A believes that Fx, then this belief-state will
> both create (if necessary) and weakly causally sustain within A's mind the
> belief that Gx is true.[16]

Consequently, in order to fully articulate Armstrong's treatment of belief in
mathematical propositions, we need to know what sorts of particular beliefs are dis-
positionally connected when one believes a general proposition such as (1) or (2).

For the sake of simplicity, let us focus exclusively on (1). Suppose that S believes
that (1). S then holds a general belief which, according to Armstrong, is to be ana-
lyzed in terms of a disposition to create and/or causally sustain certain further
beliefs about particular matters of fact given certain other beliefs about particular
matters of fact. The beliefs about particular matters of fact which are disposition-
ally connected by the belief that (1) are illustrated by the following example:

> An instance of an appropriate antecedent belief might be the conjunctive
> belief that there are two and only two apples in this bowl *and* that there are
> three and only three apples in that other bowl. This belief might then create
> and sustain the belief that there are five and only five apples in the two bowls
> taken together.[17]

Hence, S's belief that 2 + 3 = 5 is analyzed ultimately in terms of S's beliefs about
aggregates of physical objects such as apples and causal connections among these
beliefs.

Given this account of what it is to *believe* a general proposition, Armstrong is
now in a position to offer the following account of *knowledge* of mathematical
propositions as well as other general propositions:

16. Ibid., p. 201.

17. Ibid., p. 101.

A *knows* that (x)(if Fx, then Gx) if, and only if:

(i)   A believes that (x)(if Fx, then Gx)
(ii)   If this disposition (this general belief) is *manifested* then (x)(if A *knows* that Fx, then A *knows* that Gx).[18]

This account analyzes knowledge of *general* propositions in terms of knowledge of *particular* matters of fact. The account is especially attractive when applied to the case of mathematical knowledge since it analyzes such knowledge in terms of the transmission of knowledge from some antecedent beliefs about *aggregates of physical objects* to further beliefs about *aggregates of physical objects*. Since aggregates of physical objects can stand in appropriate law-like connections with belief states, Benacerraf's problem is apparently avoided.

For purposes of evaluating Armstrong's proposal, let us grant (a) his account of belief in general propositions; as well as (b) his account of knowledge of such propositions; and focus exclusively on (c) the beliefs about particular matters of fact which are invoked in his analysis of *believing* mathematical propositions; together with (d) his analysis of mathematical *propositions*. An immediate problem arises. If we consider his analysis of the mathematical *proposition* that 2 + 3 = 5, Armstrong explicitly treats *number* as a property of *sets*. Furthermore, he goes on to endorse explicitly the view that *number* and other mathematical notions such as *primeness* are properties of *sets*. However, when we turn to his account of the *belief* that 2 + 3 = 5 and, in particular, focus on the particular beliefs in terms of which the general belief is analyzed, there is *no* mention of *sets* of apples. Instead, there is only mention of the *apples* in the bowls. This is not merely an oversight on Armstrong's part. For he points out in the sentences immediately following the discussion of the apples quoted above that

> Not all substitutions for the variables in the antecedents and consequents of propositions (1) and (2) will yield propositions about spatio-temporally limited, matters of fact. Some may be further mathematical propositions. But if these propositions are believed, they can be treated as further cases of general beliefs, and analyzed accordingly.[19]

The leading idea of the account is clear and inescapable. It requires that there be at least some substitution instances of propositions (1) and (2) that yield propositions about spatio-temporally limited matters of fact. For if a substitution instance of (1) or (2) yields a proposition about, say, sets or other non-spatio-temporal

18. Ibid., p. 201.

19. Ibid., p. 102.

entities, then it must be treated as a general proposition. Belief in the resulting general proposition must then be analyzed in terms of beliefs in propositions which are substitution instances of the general proposition *and* about particular matters of fact. To put the point succinctly, all belief in mathematical propositions must ultimately be analyzed in terms of beliefs about spatio-temporal particulars such as apples or *aggregates* of apples.

This vacillation points to a fundamental and irresolvable tension in Armstrong's account which parallels Benacerraf's problem. If we turn to the *epistemic* requirements of Armstrong's account, he is explicit in maintaining that it is only spatio-temporal particulars which stand in law-like connections to beliefs. Non-inferential knowledge is limited to knowledge of particular matters of fact. Hence, from the epistemic point of view, it is essential that *number* be a property of *aggregates of spatio-temporal particulars* such as apples. On the other hand, when we turn to the *semantic* requirements of a plausible analysis of mathematical propositions, number must be treated as a property of *sets*. Armstrong attempts to finesse this problem by observing that some sets have spatio-temporal particulars as their only members. Although the observation is correct, it is beside the point. For it does not follow from the fact that a set has only spatio-temporal particulars as *members*, that the *set itself* is a spatio-temporal particular. Indeed, we offered a powerful reason for resisting this conclusion in our opening discussion. Consequently, Armstrong is mistaken in thinking that some substitution instances for the variables in mathematical propositions such as (1) and (2) yield propositions about particular matters of fact. Aggregates of apples are *not* sets. But it is only terms designating sets which can serve as substitution instances of these variables. Therefore, we can conclude that the *semantic* and *epistemic* requirements of Armstrong's account are irreconcilable.[20]

The source of the tension in Armstrong's account is the requirement that only spatio-temporal particulars can stand in law-like connections with belief states. The natural question which then arises is whether the account can be broadened to allow that *abstract* as well as spatio-temporal particulars can stand in such relations. The difficulty in answering this question is that Armstrong does not provide a sufficiently detailed account of the notion of a law-like connection. If we view law-like connections as *causal* connections then we are faced again with Benacerraf's problem. Abstract particulars cannot stand in *causal relations*.

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20. In a recent paper, "The Nature of Number," *Philosophical Papers* 16 (1987): 165–186, Peter Forrest and David Armstrong offer an account of number as an internal relation that obtains between structural properties of aggregates and particularizing properties. They then go on to suggest that classes be identified with complex states of affairs. But states of affairs, like classes, are abstract entities. So this suggestion will not enable Armstrong to bring the semantic requirements of his account into line with the epistemic requirements.

Armstrong, however, is explicit in maintaining that law-like connections need *not* be causal:

> It is also worth noticing that in the case of a properly set, wound-up reliable watch the time of day is not the *cause* of the watch registering the time of the day correctly. In this, it is unlike the reliable thermometer. Yet, like the reliable thermometer, a reliable watch is a useful model for non-inferential knowledge.[21]

How are we to understand the relationship between the time of day and the watch registering the time of day correctly? One is strongly tempted to say that in the case of a properly set watch the correct time of day must figure in an *explanation* of the watch's correctly registering the time of day. If the correct time does *not* figure in such an explanation, then it is only by accident that it registers the correct time of day. But a watch which only accidentally registers the correct time of day is not a useful model for non-inferential knowledge. Now if we broaden the notion of a law-like connection to include causal *explanations* as well as causal *relations*, we are back to Steiner's position together with the problem we raised at that juncture. Some mathematical statements will figure in any explanation of the acquisition of any belief. Hence, if someone believes one of these mathematical statements, even by chance or for flimsy reasons, it will be sanctioned as a case of knowledge.

There is a second obstacle to allowing that abstract entities such as sets can stand in law-like connections. Armstrong requires that law-like generalizations support counterfactual conditionals. In the case of non-inferential knowledge these counterfactuals are of the form

(13)   If Jc had not been the case, then it would not have been the case that A believed that Jc.

Suppose we allow that sets can stand in law-like connections with mathematical beliefs. Let "c" designate the set of apples in the bowl from Armstrong's earlier example and let "J" designate the property of being five-membered. Is (13) true or false? Consider the antecedent of (13). Could a set consisting of five apples have had a different membership and yet be the very same set? It appears not. It is a contingent fact, of course, that there are five apples in the bowl and if there had been only four apples in the bowl, then "c" would have designated a different set than the one it in fact designates. But from this it does not follow that the set it does in fact designate could have had only four apples as its members. Sets have

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21. Armstrong, p. 175.

their members essentially.[22] Hence, the antecedent of (13) describes an impossible state of affairs. But at present there is no available account which provides truth conditions for counterfactual conditionals with impossible antecedents. This should lead us to wonder whether sentences such as (13) have a determinate sense.[23] So, in the end, Armstrong's version of reliabilism is faced with exactly the same problems as the causal theory.

Armstrong's account failed because of the requirements of law-like connections. Marshall Swain, however, has attempted to develop a version of the reliable indicator theory which does not invoke this notion. Following Armstrong, he begins with the instrument analogy:

> People, like barometers, are so constituted that they are causally sensitive to the aspects of the world around them. A barometer registers changes in atmospheric pressure by coming to be in correlative states as a result (causal) of those changes. People register changes around them by coming to be in various perceptual states, sensation states, and belief states as a result (causal) of those changes.[24]

Clearly, causal connections between internal states of the believer and aspects of their external environment play an essential role in the intuitive formulation of the account. However, as Swain develops the account more formally, this aspect appears to drop out. For he goes on to provide a characterization of reliability which does not invoke causal notions. He argues that

> S's believing that h on the basis of the set of reasons R is a reliable indication that h is true at t if and only if: there is some maximal set of relevant characteristics C such that
>
> (1)   S has C at t (that is, each member of C is a characteristic of S at t); and

22. For a defense of this point, see Graeme Forbes, *The Metaphysics of Modality* (Oxford, 1985), Chapter 5.

23. Colin McGinn, in "The Concept of Knowledge," *Midwest Studies in Philosophy* 9 (1984): 529–554, has suggested that it may be a deficiency of current accounts of counterfactual conditionals that they provide no truth conditions for contrapossible conditionals. For these are examples of such conditionals which appear to be true such as "If 16 were not divisible by 2, it would not be divisible by 4." He then goes on to argue that the problem with counterfactuals such as (13) is that they do not state clear truths.

24. Marshall Swain, "Justification and Reliable Belief," *Philosophical Studies* 40 (1981), pp. 394–395. For a critical discussion of Swain's position, see Frederick Schmitt, "Justification as Reliable Indication or Reliable Process," *Philosophical Studies* 40 (1981): 409–417.

(2)   the probability that *h* is true, given that S has *C* and that S believes that *h* on the basis of *R* is greater than the probability that *q* is true, for every *q* which is an epistemic competitor of *h*, given those same facts about S.[25]

Swain's account differs from Armstrong's in a second respect. Rather than utilizing the notion of a reliable indicator to provide an account of *knowledge*, Swain utilizes it to provide an account of epistemic *justification*:

S's believing that *h* on the basis of *R* is epistemically justified at *t* if and only if: S's believing that *h* on the basis of *R* is a reliable indication that *h* at *t*.[26]

Our primary concern at this point is to assess whether an account of reliable indication which makes no reference to either causal or law-like connections is adequate for epistemic purposes. I shall argue that it is too weak.

Consider two examples introduced by Swain. Suppose that Sally has a headache which causes her to believe that she is in pain. Furthermore, suppose that she is a normal individual who in ordinary circumstances is able to discriminate between pain states and other sensation states. Mary, on the other hand, has a problem. Unlike Sally, she cannot discriminate well between her pain states and other mental states. Now suppose that, on this particular occasion, she has a headache resulting in a severe pain. Furthermore, suppose that her state of being in pain causes her to believe that she is in pain. It seems that Sally's belief is justified while Mary's is not. How does Swain's theory handle these cases?

In the example involving Sally, we still get the result that Sally's belief that she is in pain is epistemically reliable, for the probability that she is in pain given (only) that she believes that she is *and* given that she has the relevant characteristics *C* is, I submit, greater than the probability of any epistemic competitor, given only those same facts, However, in the example involving Mary, the mere fact that she believes that she is in pain makes it no more probable than not that she is in pain, given her relevant characteristics.[27]

Swain's account is consistent with our intuition that Sally's belief is justified while Mary's is not. The question which needs to be addressed, however, is whether it adequately captures the underlying basis of the intuition—i.e., that Sally is a reliable discriminator of pain while Mary is not.

25. Swain, pp. 396–397.

26. Ibid., p. 396.

27. Ibid., p. 402.

Let us begin by noting that Swain's explication of the notion of a reliable indicator is weaker than Armstrong's. For Armstrong's account in terms of law-like connections has counterfactual implications. Conditional probability statements, on the other hand, are statements about the actual world. So, if there exists a law-like connection between something's being F and something's being G, then we would expect that the probability of something's being G given that it is F is high. The converse, however, does not hold. For if the statement "$(x)(Fx \to Gx)$" expresses a true accidental generalization then the probability that something is G given that it is F will be high yet there is no law-like connection between them. Hence it is not surprising that reliable discriminators will satisfy Swain's conditions. The interesting question, however, is whether we can construct cases where someone satisfies Swain's conditions but is *not* a reliable discriminator.

Consider the following modification of Swain's example. Suppose that Sally is a victim of an underground neurophysiological experiment. The point of the experiment is to take reliable discriminators of pain states and to undermine this capacity. The experiment proceeds by introducing two devices called randomizers into Sally's brain. The function of the randomizers is to interfere with her normal belief forming capacities. Randomizer 1 is triggered whenever the subject is in pain and randomly selects one of two outputs: A causes the subject to form the belief that she is in pain while B causes the subject to form the belief that she is dizzy. Randomizer 2 is triggered whenever the subject is dizzy and randomly selects one of two outputs: A causes the subject to believe that he is dizzy while B causes the subject to believe that he is in pain. Thousands of these devices have been implanted and they have worked like a charm. Furthermore, they are regularly examined by the experimenters to ensure that they are functioning properly. So the few that malfunction are quickly repaired or replaced. As it turns out, both of the randomizers in Sally's brain malfunction and, as a result, both always select output A. Despite repeated inspections, the experimenters never detect the malfunctions. As a consequence, whenever Sally is in pain she correctly forms the belief that she is in pain. Furthermore, the experimenters have insulated Sally's belief forming processes in such a manner that only outputs from either Randomizer 1 or Randomizer 2 produce in her the belief that she is in pain. Now consider her belief that she is in pain. Given that the set of relevant characteristics C includes the malfunctioning randomizers, the probability that she is in pain given that she believes that she is in pain is greater than the probability of any other competing statements. For it is virtually certain that she is in pain given that she believes that she is in pain.

Despite the fact that Sally's belief that she is in pain satisfies Swain's constraints, it does not appear that Sally is a reliable discriminator of pains. It is only through a series of coincidences that Sally's belief that she is in pain has the high

degree of conditional probability that it does. First of all, the probability of the randomizers malfunctioning was very low to start with. Had they functioned correctly, there would have been a purely random connection between her pain states and pain beliefs. Furthermore, it was a matter of coincidence that the malfunctions locked them in the A position rather than the B position. Had they frozen in the B position, the probability that she was in pain given the belief that she was would have fallen to virtually zero. Finally, it was a matter of luck, that the malfunctions were not detected. Had they been detected, the randomizers would have been repaired or replaced. So one is inclined to feel that Sally's success rate is too closely tied to features of the actual world. In close possible worlds, the probability that Sally is in pain given her belief that she is in pain together with the presence of the randomizers is not very high. But it is precisely this sort of coincidental connection that the requirement of a law-like connection in Armstrong's account is intended to preclude. So we have once again failed to find a form of reliabilism which is both strong enough to distinguish between justified and unjustified beliefs as well as free of causal constraints antithetical to platonism.

Although we have focused exclusively on two versions of the reliable indicator theory, our results have more general application. Reliable indicator theories are examples of *local reliability* theories.[28] The distinctive feature of such theories is that they attempt to analyze S's knowledge (or justified belief) that *p* in terms of some relationship between S's belief that *p* and the proposition that *p*. Reliability is limited to reliability with respect to a *single* proposition. Different versions of the reliable indicator theory differ in their specification of the relationship between S's belief that *p* and the proposition that *p*. Our investigation establishes that *none* of the standard candidates for specifying this relationship is adequate in cases where *p*'s truth conditions make reference to abstract entities. If the account invokes a *causal relationship* between S and the entities specified by the truth conditions of the proposition believed, then we are again faced with the problem that abstract entities cannot stand in causal relations. If one attempts to retain the causal component but weaken it to require only that the proposition that *p* figure in a *causal explanation* of S's belief that *p*, then the account is too weak to be of any epistemic interest. If one were to revert to an analysis which does not overtly invoke causal notions but employs, instead, a *counterfactual conditional* such as "If *p* were not true then S would not believe that *p*,"[29] then one would have to face the

28. The distinction between local and global reliability theories is discussed by McGinn in "The Concept of Knowledge," and by Alvin Goldman, *Epistemology and Cognition* (Cambridge, 1986), Chapter 3.

29. For an example of such an analysis see Robert Nozick, *Philosophical Explanations* (Cambridge, 1981), Chapter 3.

problem of providing truth conditions for counterfactuals with impossible antecedents. Finally, if one were to introduce a relation, such as conditional probability, which has *no counterfactual implications*, the resulting analysis would be too weak for either knowledge or justified belief. Hence, our results provide strong evidence that *no* local reliability theory is compatible with knowledge of abstract entities.

B. Process Reliabilism

Process reliabilism is not immediately open to the objections raised against reliable indicator theories. For those objections depend essentially on the assumption that S's knowledge (or justified belief) that *p* must consist in part on a relationship between S's belief that *p* and the unique proposition that *p*. Process reliabilism, however, is an example of a *global* reliability theory. Such theories focus on the *process* which produces the belief that *p* and its propensity to produce true beliefs in a *range* of distinct propositions in providing an analysis of S's knowledge (or justified belief) that *p*. Hence, it is not saddled with the problem of specifying some specific relationship between S's belief that *p* and the proposition that *p*. Nevertheless, it is faced with a different problem. It must specify *under what conditions* reliable processes produce knowledge (or justified beliefs).

In order to see the relevance of this problem, let us consider the position of Penelope Maddy who endorses a version of process reliabilism which she claims offers a viable solution to Benacerraf's problem. Maddy offers the following formulation of a base clause for process reliabilism:

(M)   S's belief that *p* is (noninferentially) justified if it results immediately from a reliable process.[30]

This account is congenial to the platonist for two reasons. First of all, it does not require that the objects which make a justified belief true play any role in the generation of the belief. Hence, the fact that abstract entities are causally inert is *not* a bar to our having justified beliefs about them. Furthermore, (M) does not require that S have any justified beliefs regarding either the source of her beliefs or the reliability of that source. Hence, if there exists a faculty of intuition, as many proponents of the a priori allege, and if this faculty does *in fact* reliably produce true beliefs, then the beliefs produced by that faculty are justified. So neither (a) the fact that abstract entities are causally inert nor (b) the fact that operation of the faculty of intuition remains mysterious tells

30. Maddy, p. 48.

against the claim that there is a priori knowledge of propositions involving abstract entities.

Unfortunately, (M) is an inadequate formulation of process reliabilism. There are at least 3 related types of difficulty with it. Suppose that R is a reliable process and that *p* is a true belief produced in S by R. Let us also suppose that one of the following three conditions also obtains:

(1)   S has good reason from another source to believe that *p* is false;
(2)   S bases her belief that *p* on the belief that *p* is produced by R but also has good reason to believe that R produces a preponderance of false beliefs in her case;
(3)   S bases her belief that *p* on the belief that *p* is produced by R but also has good reason to believe that there could not exist a cognitive process such as R.

Each of these conditions is consistent with R's being in fact reliable and *p*'s being true. But if any one of them obtained then S's belief that *p* is *not* justified despite satisfying the antecedent of (M).[31]

Alvin Goldman is sensitive to these problems and, as a result, presents a more sophisticated account:

(G)   S's believing *p* at *t* is justified if and only if
(a)   S's believing *p* at *t* is permitted by a right system of J-rules, and
(b)   this permission is not undermined by S's cognitive state at *t*.[32]

Clause (b) is specifically introduced to handle cases like the three outlined above. In each case, although (a) is satisfied (b) is not. More explicitly, for Goldman, a right system of J-rules is one which permits basic reliable psychological processes. Hence, a belief satisfies (a) if it is produced by a reliable cognitive process. On the other hand, this permission can be undermined by other beliefs that S possesses. (1)—(3) provide examples of undermining evidence and, hence, (G) provides the intuitively plausible result that S's belief that *p* is not justified in these cases.

At this point, the relevance of clause (b) to the issue of a priori knowledge is not apparent. For one might argue that (1) if intuition is a reliable belief forming process then beliefs formed by that process will satisfy condition (a) in (G); and (2) the problem of undermining evidence is, on the face of it, no more or less a

31. Laurence BonJour has forcefully presented these problems in *The Structure of Empirical Knowledge* (Cambridge, MA, 1985), Chapter 3.

32. Alvin Goldman, *Epistemology and Cognition*, p. 63.

problem for intuition than any other belief forming process. In particular, there is no reason to suspect that since a belief formed by the process of intuition is not caused by the entities which make it true, it is more likely to be undermined than a belief formed by any other process. In order to see the connection, we need to explore the implications of (b) more fully.

Let us begin by considering a case involving a belief formed by the process of clairvoyance. This process resembles intuition in four relevant respects: (1) there is controversy over whether such a process exists; (2) even if its existence is granted, there is controversy over how reliable it is; (3) the underlying causal mechanism of the process is unknown; and (4) it is also unknown whether the objects of belief play a role in the generation of the belief. The case we shall consider is due to BonJour:

> Norman, under certain conditions which usually obtain, is a completely reliable clairvoyant with respect to certain kinds of subject matter. He possesses no evidence or reasons of any kind for or against the general possibility of such a cognitive power or for or against the thesis that he possesses it. One day Norman comes to believe that the President is in New York City, though he has no evidence either for or against this belief. In fact the belief is true and results from his clairvoyant power under circumstances in which it is completely reliable.[33]

BonJour maintains that in this case both (a) and (b) are satisfied but Norman's belief is not justified. (b) is satisfied because Norman does not possess any undermining evidence for his belief that the President is in New York City. BonJour's contention that this belief is not justified is based on the claim that Norman has no reason for believing that he has clairvoyant power. Hence, if his belief that the President is in New York is based on his belief that he has clairvoyant power, it is unjustified since the belief on which it is based is unjustified. On the other hand, if his belief that the President is in New York is not based on his belief that he is clairvoyant then it is not clear why Norman should continue to hold the belief rather than rejecting it as an unfounded hunch.

Goldman attempts to reject the counterexample as only apparent by arguing that it does not satisfy (b):

> BonJour describes this case as one in which Norman possesses no evidence or reasons of any kind for or against the general possibility of clairvoyance, or for or against the thesis that he possesses it. But it is hard to envisage this

33. BonJour, p. 41.

description holding. Norman ought to reason along the following lines: 'If I had a clairvoyant power, I would surely find some evidence for this. I would find myself believing things in otherwise inexplicable ways, and when these things were checked by other reliable processes, they would usually check out positively. Since I lack any such signs, I apparently do not possess reliable clairvoyant processes.' Since Norman ought to reason this way, he is *ex ante* justified in believing that he does not possess reliable clairvoyant processes. This undermines his belief in N.[34]

Hence, Goldman concludes that when clause (b) is correctly understood, it is not satisfied by Norman.

How are we to understand Goldman's response in more general terms? In particular, does reliabilism require that a cognizer have any beliefs about the process which generates a belief that *p* in order to be justified in believing that *p*? (G) suggests that such beliefs are not necessary unless S has some other beliefs which raise some question about either the possibility or the reliability of the process in question. This reading yields a form of reliabilism, I shall refer to as *weak reliabilism*:

(WR)   In the absence of undermining evidence, the mere fact that R is a reliable process and produces in S a belief that *p* is sufficient to justify S in believing that *p*.

(WR) is especially plausible in the case of perception since it allows one to have directly justified beliefs about the external world. One can have the justified perceptual belief that there is a cup on the desk in the absence of the introspective belief that one sees the cup. This does not entail that one can have the justified perceptual belief about the cup in the absence of the perceptual experiences of the cup. It only entails that one need not have any beliefs about one's perceptual experiences of the cup. This result seems to accord well with our ordinary ascriptions of justification. Goldman's handling of the Norman case, however, represents an abandonment of (WR) in favor of *strong reliabilism*:

(SR)   In order for S to be justified in believing that *p*, where *p* is produced by some process R, S must be justified in believing that *p* is produced by R.

Norman's belief is unjustified because it is based on the belief that he has clairvoyant powers and it is this latter belief which is undermined. Just what (SR)

34. Goldman, p. 112.

requires in detail is difficult to discern from this one case. But the response as presented requires a cognizer to (1) have some understanding of the type of process which generates the belief; (2) construct some hypotheses about the consequences of having such a belief forming process; and (3) attempt to verify these consequences. For our purposes, however, it is not the details of (SR) that are of primary concern. What is of primary significance is that in order to avoid BonJour's counterexample *weak* reliabilism must be abandoned in favor of *strong* reliabilism.

The next issue we must address is whether this move is *sufficient* to block the counterexample. I shall now argue that it is *not*. In addition, the reliabilist must also adopt a crucial change in condition (b) of (G). (b) restricts undermining evidence for a belief at time t to the cognitive state of the cognizer at t. (SR) expands the scope of undermining evidence to beliefs that the cognizer does *not* have at t. Goldman attempts to minimize this expansion by restricting it to beliefs that *would* be justified by the *present* state of the cognizer or *could* be justified by the *present* state of the cognizer if the cognizer were to make the appropriate inferential connections. This idea is captured in the notion of *ex ante* justification:

(EJ)   S is justified *ex ante* at t in believing that p iff S does not believe that p at t but would (or could) be justified in believing p at t given his cognitive state at t.[35]

I want to suggest, however, that a more radical modification of (b) is necessary to make the account plausible.

Let us consider the case of Norman in more detail. He is supposed to reason that if he had clairvoyant powers then he would surely find some evidence for this. But notice that in order to do this Norman must have some definite ideas about the manner in which this process produces beliefs. In particular, he needs to know under what *conditions* the process produces beliefs and what *sorts* of beliefs the process produces. Unless Norman has this information he will not be able to determine which beliefs he would have if he were clairvoyant. Now consider the following proposition regarding clairvoyant powers:

(CP)   If S has clairvoyant powers then S forms beliefs of kind K under circumstances C.

What reason is there for believing that the belief that (CP) is justified by Norman's cognitive state at t? The causal mechanisms underlying this process might be

35. Ibid.

quite complex and even the experts might not be in a position to spell (CP) out in detail. But even if the information is available, Norman may not actually possess it. He might be uninterested in such matters. Furthermore, even if we assume that Norman is *ex ante* justified in believing (CP), it does not follow that he has the requisite beliefs to justify him in accepting the truth of its consequent. Suppose, for example, that this is the first time that Norman has found himself in circumstances C. Furthermore, it might be the case that the conditions necessary for the process to produce beliefs rarely obtain and, even when they do obtain, few beliefs are produced. In such circumstances, Norman would not have sufficient information to either confirm or disconfirm the belief that he has clairvoyant powers. So we must conclude that there is no guarantee that the justification which the process of clairvoyance confers on Norman's belief is undermined either by Norman's *actual* beliefs at *t* or by any beliefs that he is *ex ante* justified in having at *t*.

Must we also conclude that Norman's case provides a cogent counterexample to reliabilism? No. For the discussion to this point has been based on a crucial assumption—namely, that only evidence *one possesses* is relevant to the justification of one's beliefs. The *social* dimension of justification has been entirely ignored. Yet it is widely accepted that one cannot ignore evidence which is generally available in one's epistemic community and that such evidence, even if ignored, can be relevant to the justification of one's beliefs. Suppose that I carefully select only evidence which supports a belief that I want to hold for personal reasons. My belief is *not* justified despite the supporting evidence if there exists sufficient readily available evidence to the contrary. For example, if I believe that I am a good teacher on the basis of comments made to me personally by a few students but refuse to examine end of the semester teaching evaluations which contain ample evidence to the contrary then my belief is not justified. Evidence which one does not possess can be relevant to justification in a different way. If I base my belief on evidence which is generally known to be misleading then my belief is not justified despite the supporting evidence. For example, if I believe that the sun moves around the earth on the basis of my perception of its apparent motion, my belief is not justified. Note that the reason why it is not justified is *not* merely because the evidence is misleading. People who lived 500 years ago and held the same belief for the same reason *were* justified. Nevertheless, I am not justified in holding that belief. The reason is that it is generally known in my epistemic community that the perceived motion is only apparent and that information is available to me as well. Hence, any plausible account of undermining evidence must include evidence that one does *not actually possess* but is *available* within one's epistemic community. Goldman's (b) must be replaced by

(b*)   this permission is not undermined by S's cognitive state at *t* or other evidence available within S's epistemic community at *t*.[36]

Returning now to Norman, we are faced with two possibilities: either (1) there is available within his epistemic community evidence in support of (CP) together with evidence that appropriate kinds of beliefs are not formed under the conditions specified in (CP); or (2) there is no such evidence available. If (1) then Norman's belief fails to satisfy (b*) and, hence, is unjustified. If (2) then it is hard to see on what basis it can be denied that Norman's belief is justified. One might maintain that Norman has no reason to believe that beliefs formed by clairvoyance are likely to be true. Hence, his beliefs formed by this process are not justified. This contention appears untenable for we don't ordinarily require for the justification of one's perceptual beliefs that one be justified in believing that one's

36. The notion of "available" evidence is admittedly vague. But this should not be construed as a shortcoming of reliabilism per se since any plausible account of justification must utilize it. We will not regard S's belief that *p* as justified, even if it is *justified relative* to S's other beliefs, if the other beliefs were acquired in an epistemically unacceptable manner. For example, if S discards beliefs solely on the basis that they conflict with a belief that *p* which S wants to hold or intentionally restricts information gathering in order to avoid conflict with the belief that *p*, we don't regard *p* as justified for S. The natural explanation for why we don't regard the belief as justified is that S has ignored available evidence. Clearly, we need to circumscribe the range of relevant alternative evidence so that it does not include, for example, a radically new scientific theory which is discovered 350 years from now. The reference to one's epistemic community in (b*) was introduced to acknowledge this point. The need to take account of available evidence has been stressed by Gilbert Harman in *Thought* (Princeton, 1973), Chapter 9, and *Change in View* (Cambridge, 1986), Chapter 5.

It should be noted that Goldman did acknowledge the relevance of available belief forming processes in an earlier account of undermining evidence which he offered in "What is Justified Belief?" in George S. Pappas (ed.), *Justification and Knowledge* (Dordrecht, 1979), p. 20. This account of undermining evidence, however, is too restrictive to handle either the case of Norman or the case of Maude which I present in the subsequent paragraph of the main text since Goldman explicitly rules out gathering new evidence from the scope of available processes. Frederick Schmitt also invokes available belief forming processes in his account of undermining evidence in "Reliability, Objectivity and the Background of Justification," *Australasian Journal of Philosophy* 62 (1984): 1–15. Although Schmitt's account is not as restrictive as Goldman's, it does not appear to be broad enough to handle the case of Maude. He claims that "A process R' is available to S on occasion O just in case the amount x of cognitive energy S would expend in exercising R' on O could not be spent exercising processes with significantly greater total reliability than the reliability of R'" (p. 11). In Maude's case, it might take quite a bit of cognitive energy to both acquire and appreciate the evidence available in her community regarding clairvoyance since she has to overcome the effects of her prior training within the cult as well as master information of a novel sort. On the other hand, were she to devote that time to merely scanning her immediate environment continually and forming perceptual beliefs she would be exercising a process with greater total reliability as well as one which produced far more true beliefs and fewer false ones than the process she would exercise in acquiring the evidence regarding clairvoyance. Hence, on Schmitt's account, the latter process would not be available to Maude and her clairvoyant belief remains justified.

perceptual beliefs are likely to be true. Given that there is no evidence to the contrary, perceptual beliefs formed in normal circumstances are regarded as justified without further question.[37] Why should clairvoyance be treated differently?

Our proposed modification of (b) can be supported independently by considering a second case based on an example presented by BonJour. Suppose that Maude belongs to a cult which believes on quite flimsy grounds that clairvoyance is a special source of knowledge. Furthermore, suppose that extensive empirical work has been done investigating this phenomenon, that the results have been negative, and that this information is generally available in Maude's community. The cult leaders are aware of the negative evidence and encourage their followers to ignore "pagan" learning regarding the existence of clairvoyance. Maude succeeds in forming very few beliefs regarding clairvoyance other than those promulgated within the cult. But suppose that she is in fact clairvoyant, this process is a reliable one, and Maude forms the true belief that p via this process. Clearly, Maude's belief is not justified yet it satisfies both (a) and (b) in (G). (b) is satisfied because Maude is *not ex ante* justified in believing that she is not clairvoyant. *Her* belief system is simply too impoverished to justify this belief despite the availability of evidence which would support it. The only option for the reliabilist at this point is to maintain that since Maude is ignoring generally available evidence she is not fulfilling her epistemic obligations. Hence, the justification conferred on her belief by the reliable process of clairvoyance is undermined by this *available* evidence.

What are the implications of this revision of (b) in favor of (b*) for our original question of a priori justification? Maddy's optimism was based on the observation that if intuition is a reliable process then it produces justified beliefs irrespective of whether the objects of belief played any causal role in the generation of the belief. Goldman's more sophisticated version of the theory made us cognizant of the role of *undermining evidence* within S's cognitive state at t. Our final revision introduced undermining evidence *available* to S at t. Three significant consequences emerge from this discussion:

(1) Even if we grant that intuition is a reliable belief forming process and S's belief that p is produced by this process it does not follow that S's belief that p is justified.

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37. One might respond at this point that we should reject the intuition that perceptual beliefs formed in normal circumstances are noninferentially justified. For if this intuition is rejected then we can also reject the claim that Norman's clairvoyant beliefs formed in normal circumstances are noninferentially justified. This move, however, is not open to BonJour. For his only support for the claim that Norman's belief that the President is in New York is unjustified is an appeal to intuition. So he cannot consistently appeal to intuition in constructing arguments against reliabilism while rejecting such appeals when they appear in the context of a reliabilist response unless he can offer some compelling reason for the differential treatment.

(2)   In order for a reliable process R to justify a belief that *p* which it pro-
        duces in S, S must have a justified belief to the effect that R produced
        the belief that *p*.

(3)   The information available within S's epistemic community regarding
        both the reliability of a belief forming process as well as the possi-
        bility of its existence is relevant to whether that process justifies the
        beliefs that it produces in S.

Hence, in order to determine whether intuition yields justified mathematical
beliefs, we must address two issues: (1) can we have justified beliefs to the effect
that some of our mathematical beliefs are generated by the process of intuition;
and (2) will this belief survive undermining evidence available within our epi-
stemic community.

Consider Norma who reliably forms mathematical beliefs about elementary
arithmetical propositions by the process of intuition. Norma is not philosophi-
cally sophisticated. She has never considered the issue of the justification of her
mathematical beliefs or the possibility that she possesses a distinctive belief form-
ing process which generates mathematical beliefs. As a result, she possesses no
evidence for or against the possibility that there is a faculty of mathematical intu-
ition or the more specific thesis that she possesses it. In short, Norma's epistemic
position with respect to her ability to form mathematical beliefs via intuition par-
allels Norman's epistemic position with respect to his ability to form beliefs via
clairvoyance. Hence, according to (SR), Norma's mathematical beliefs are *not*
justified despite being reliably produced.

Are there any more general implications we can draw from this example?
I want to suggest that Norma's situation represents in all relevant respects the
actual situation of most individuals with respect to their belief in elementary
mathematical propositions. They have never considered questions regarding the
justification of these beliefs or the process which produces them and, as a result,
have no justified beliefs relevant to these matters. One might object at this point
that there is an important disanalogy between our two cases. Norma and others
like her can quickly be brought to recognize that their noninferential mathematical
beliefs are not generated by perceptual processes. Instead, one comes to believe
them simply by reflecting on them and thereby "seeing" their truth. This experi-
ence is "phenomenologically unique . . . a kind of experience a person can be
quickly taught to recognize and label."[38] Two observations are in order here. First,
from the fact that one's coming to believe a mathematical proposition is accom-
panied by a phenomenologically unique experience, it does not follow that one is
justified in believing that one's belief is generated by a process of intuiting abstract

38. John Pollock, *Knowledge and Justification* (Princeton, 1974), p. 321.

objects. The situation is analogous to that of religious experience. From the fact that there is a distinct phenomenological experience that is labeled "seeing God," it does not follow that beliefs formed on the basis of this experience are generated by a process which involves cognitive contact with God. Furthermore, BonJour's description of Norman can easily be modified to remove the apparent disanalogy. We simply need to add to his original description of the case that Norman's belief that the President is in New York City is accompanied by a phenomenologically unique experience. This addition does not in the least alter our original intuition that Norman's belief is unjustified. Consequently, it shouldn't make any difference in the intuition case either. So the conclusion to be drawn is that the unreflective intuitionist, i.e. one who forms mathematical beliefs by the process of intuition but who has never critically reflected on the question of which process generates those beliefs, does not have justified mathematical beliefs.

This result does not entail mathematical scepticism. For it is still open to Norma to become more reflective and reason to the conclusion that her mathematical beliefs are generated by a process of mathematical intuition. She might, for example, reason as follows: "I believe that 2 + 2 = 4. This belief is not based on any of the familiar experiential processes such as perception, introspection, or memory. Hence, it must be based on a different process, call it intuition, which enables me to 'see' that 2 + 2 = 4."[39] Unlike the unreflective Norma, the new Norma bases her mathematical belief that 2 + 2 = 4 on the further belief that the process of intuition generates that belief. But is Norma now justified is believing that 2 + 2 = 4? Note that Norman might have reasoned in a similar fashion: "I believe that the President is in New York City. This belief is not based on any of the familiar experiential processes. Hence, it must be based on a different process, call it clairvoyance, which enables me to 'see' that the President is in New York City." But, as Goldman's discussion indicated, this is not sufficient to justify Norman's belief about the President. It is also necessary that Norman's belief that he has clairvoyant powers be *justified*. This requires that he come to justifiably believe (CP) and to verify its consequent in his own case. Consequently, the same requirements apply to Norma. In order for her mathematical beliefs to be justified she must have a justified belief to the effect that she possesses the faculty of intuition. This requires that she be in a position to form the following justified belief:

(I)   If S has the faculty of intuition then S forms beliefs of kind K under circumstances C

and to verify in her own case the consequent of (I).

39. For a critical review of some alternative lines of reasoning, see my "Necessity, Certainty, and the A Priori," *Canadian Journal of Philosophy* 18 (1988): 43–66.

Now that we have fully articulated the requirements of process reliabilism for justified mathematical beliefs based on intuition, we are in a position to assess the prospects for such an account. An initial difficulty is that proponents of mathematical intuition have provided very little information about the manner in which this faculty produces beliefs. And where they have provided such information there is significant divergence of opinion on very basic points. There is, for example, divergence over what *sorts* of beliefs are produced by this faculty. Mark Steiner cites the case of the Indian mathematician A. K. Ramanujan, who "had the ability to conjecture the most complicated formulas in the theory of elliptic functions, many of which were later proved."[40] Kurt Gödel, on the other hand, maintains that it is the axioms of set theory that "force themselves upon us as being true."[41] There is, of course, no incompatibility between those two claims but they point to radically different places to look for beliefs generated by intuition. Steiner points us to propositions that would *not* be regarded as appropriate candidates for axioms while Gödel points us towards the axioms. There is also divergence over the *conditions* under which such beliefs are produced. The Kantian tradition emphasizes the construction and apprehension of mental representations of mathematical structures.[42] Steiner, however, introduces the process of "abstraction" from perceived or imagined collections of objects as being essential to mathematical intuition.[43] Maddy views intuitive mathematical beliefs as prelinguistic beliefs which accompany the acquistion of mathematical concepts.[44] Finally, Pollock holds that intuition involves a direct apprehension or "seeing that" of relations among abstract entities.[45] Until these issues are settled, it does not appear that Norma, or anyone else, is in a position to justifiably believe (I).

This problem, however, does not involve causal considerations of the type raised by Benacerraf. In order to see their relevance for process reliabilism, let us suppose that Norma has available to her evidence in support of (I) as well as evidence that she has formed the relevant kinds of beliefs in the appropriate

40. Steiner, *Mathematical Knowledge*, p. 136.

41. Kurt Gödel, "What Is Cantor's Continuum Problem?" reprinted in P. Benacerraf and H. Putnam (eds.), *Philosophy of Mathematics*, 2nd ed. (Cambridge, 1983), pp. 484.

42. Such a position is articulated by Charles Parsons in "Mathematical Intuition," *Proceedings of the Aristotelian Society* 80 (1979–80): 145–168; and by Philip Kitcher in *The Nature of Mathematical Knowledge* (Oxford, 1983), Chapter 3. Kitcher goes on to argue that mathematical beliefs generated by the process of intuition are not justified a priori. But his argument depends on a conception of a priori justification which I regard as too restrictive. For a discussion of this issue, see my "Revisability, Reliabilism, and A Priori Knowledge," *Philosophy and Phenomenological Research* 49 (1988): 187–213.

43. Steiner, *Mathematical Knowledge*, pp. 134–135.

44. Maddy, "Perception and Mathematical Intuition," pp. 184–186.

45. Pollock, *Knowledge and Justification*, pp. 318–321.

circumstances. It does not follow that beliefs produced in her by the faculty of intuition are justified. Her beliefs must also satisfy (b*). There must not be available evidence which undermines the justification conferred on her beliefs by the process of intuition. It is at this point that causal considerations become relevant. Clearly, our paradigm of a reliable basic (i.e., noninferential) belief forming process is perception. If the causal theory of perception is correct then it is a necessary truth that perception involves a causal relation between a perceiver and the object of perception. Even if the causal theory is rejected, it is a well established scientific principle that perception involves such a causal relation. The only other noncontroversial example of a basic reliable belief forming process about whose operation we have some information is memory. It has been plausibly argued that in order to have a genuine memorial belief about an object the object remembered must play some causal role in the generation of the belief.[46] Introspection is more controversial since there is no generally accepted account. However, if we accept the idea that introspection is the ability to scan one's own inner states then introspective awareness is to be modeled on perceptual awareness.[47] On the other hand, there are examples of belief forming processes in which the object of belief need not play any causal role in the generation of the belief. Among these processes are astrology, wishful thinking, and dreaming. But none of these processes are currently believed to be reliable. So there exists at present inductive support for the claim that

(A)   All basic reliable belief forming processes involve the object of belief as a cause of the belief.

There is a second problem which the causal inertness of abstract entities poses for a plausible theory of knowledge. The issue of epistemology naturalized has received much attention in the recent literature. Proponents of the position have maintained that there is a close connection between epistemological investigations and empirical investigations into the manner in which we acquire knowledge. Some maintain that the investigations are identical while others hold the weaker position that empirical investigation must inform epistemological investigations to a significant degree.[48] But even if one rejects the enterprise of epistemology

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46. This condition is applicable only in cases of *direct* memory—i.e., remembering something one has previously experienced. For a defense of this position, see C. B. Martin and M. Deutscher "Remembering," *Philosophical Review* 75 (1966): 161–196.

47. For such an account of introspection, see D. M. Armstrong *A Materialist Theory of Mind* (London, 1968), Chapter 6.

48. For a review of differing conceptions of naturalistic epistemology, see Hilary Kornblith's "Introduction: What is Naturalistic Epistemology?" in his *Naturalizing Epistemology* (Cambridge, 1985).

naturalized, there is a minimal relationship between epistemology and psychology which is noncontroversial. The processes postulated by an epistemological theory must be *compatible* with generally accepted empirical results regarding the acquisition of knowledge. But it has been argued that there exists empirical evidence in support of the claim that

    (B)   There cannot exist basic psychological processes which generate beliefs about objects which are causally inert.

W. D. Hart, for example, argues that

> scientific knowledge (which includes mathematics) is a natural phenomenon that must be accounted for by science. Granted just conservation of energy, then, whatever your views on the mind-body problem, you must not deny that when you learn something about an object, there is a change in you. Granted conservation of energy, such a change can be accounted for only by some sort of transmission of energy from, ultimately, your environment to, at least proximately, your brain. And I do not see how what you learned about that object can be about that object (rather than some other) unless at least part of the energy that changed your state came from that object.[49]

If it is granted that there is evidence in support of either (A) or (B) and furthermore, that this information is generally available then it is difficult to see how a belief formed by the process of intuition could satisfy clause (b*) in the reliabilist account of justification. For even if one were justified in believing (I), that justification would be undermined by either (A) or (B).

Our general conclusion is that the requirements of a plausible version of process reliabilism together with the metaphysical thesis that abstract entities are causally inert lead to the conclusion that intuition does not provide us with knowledge of such entities. This conclusion is weaker than Benacerraf's. He argued that if the causal theory of knowledge is correct and abstract entities are causally inert, then knowledge of such entities is *impossible*. Process reliabilism

49. W. D. Hart, Review of Mark Steiner's *Mathematical Knowledge*, *Journal of Philosophy* 74 (1977), p. 125. In "Mathematics, Explanation, and Scientific Knowledge," *Nous* 12 (1978): 17–28, Mark Steiner rejects Hart's position on the grounds that it rests on an oversimplified view of scientific knowledge. In particular it ignores the fact that there are plausible cases of *inferential* scientific knowledge about entities which do not stand in causal relations to cognizers of the sort envisaged by Hart. This claim, however, is of little consequence for the proponent of intuition since intuition is alleged to be a source of *noninferential* knowledge of mathematical entities. Principle (B), which is restricted to basic (i.e., noninferential) belief forming processes, is also unaffected by Steiner's claim.

does *not* preclude the *possibility* of such knowledge. What would be necessary for intuition to produce justified beliefs (in addition to its being a reliable process) is sufficient evidence to accept (I) and to reject both (A) and (B). So, at present, there is little reason to be sanguine about the prospects of rehabilitating intuitionism within the framework of process reliabilism.[50]

5

The Coherence of Empiricism

1. INTRODUCTION

The debate over a priori knowledge often proceeds in negative terms. For example, in the first half of the twentieth century, it was common to maintain that all a priori knowledge is analytic on the grounds that there is no plausible explanation of how we acquire synthetic a priori knowledge. Whatever the merits of this argument *against* the synthetic a priori, many now recognize that it cannot be parlayed into an argument in *support* of the analytic a priori.[1] For we have *no better* explanation of how we acquire such knowledge.

In recent years empiricism has come under attack. Some argue that the view is incoherent and conclude, on that basis, that some knowledge is a priori.[2] We need to recall here the lesson of history. Whatever the merits of such arguments *against* empiricism, they cannot be parlayed into an argument in *support* of the a priori unless the latter is not open to those arguments.

My primary contention is that the a priori *is* open to the arguments offered against empiricism. Hence, they do not advance the case for the a priori. I go on to offer an alternative strategy. The leading idea is that, instead of offering a priori arguments *against* empiricism, rationalists should marshal *empirical support* for their position.

2. EMPIRICISM REJECTED

Laurence BonJour's excellent book, *In Defense of Pure Reason*, provides an interesting case study. His charge against empiricism is that it leads to scepticism.[3] The supporting argument, called *the sceptical argument,* is deceptively straightforward. Assume that some beliefs are directly justified solely by experience. Such beliefs are "particular rather than general in their content and are confined to situations observable at specific and fairly narrowly delineated places and times."[4] Either some beliefs whose content goes beyond direct experience are justified or scepticism is true. The justification of beliefs whose content goes beyond direct experience requires inference from the directly justified beliefs. But inference involves principles that are justified a priori:

> For if the conclusions of the inferences genuinely go beyond the content of direct experience, then it is impossible that those inferences could be entirely justified by appeal to that same experience.[5]

Hence, either empiricism is false or scepticism is true.

The sceptical argument, however, proves too much. For the very same argument can be employed in defense of empiricism! Assume that some beliefs are directly justified by rational insight. Either some beliefs whose content goes beyond direct rational insight are justified or scepticism is true. The justification of beliefs whose content goes beyond direct rational insight requires principles of inference that are justified *empirically*:

> For if the conclusions of the inferences genuinely go beyond the content of direct rational insight, then it is impossible that those inferences could be entirely justified by appeal to that same insight.

Hence, either principles of inference are justified *empirically* or scepticism is true.[6]

No rationalist would take this argument seriously. The obvious reply is that a belief directly justified by some rational insight R, in conjunction with a belief in a principle of inference directly justified by some other rational insight R*, can indirectly justify a belief whose content goes beyond that of the directly justified beliefs. The same response, however, is open to empiricists. They can maintain that a belief directly justified by some experience E, in conjunction with a belief in a principle of inference directly justified by some other experience E*, can indirectly justify a belief whose content goes beyond that of the directly justified beliefs. Hence, for the sceptical argument

to succeed, BonJour must show that experience cannot directly justify principles of inference.

Although he is not explicit on this point, the underlying argument appears to turn on three claims. The first is a thesis about the nature of experience: it is limited to *particular* objects in close spatio-temporal proximity. The second is an epistemic thesis: no experience can directly justify a belief whose content goes beyond that of the experience. The third is a thesis about principles of inference: they are *general* in character.[7] Putting these claims together yields the following argument, called *the generality argument*:

(1)   Experience is limited to *particular* objects.
(2)   No experience can directly justify a belief whose content goes beyond that of the experience.
(3)   Principles of inference are *general*.
(4)   Therefore, experience cannot directly justify principles of inference.

We are now faced with two questions. Is rationalism open to the generality argument? This issue is addressed in Section 3. Can empiricism avoid scepticism? BonJour's sceptical argument involves two assumptions about epistemic justification: foundationalism and internalism. Coherentism rejects the dichotomy between directly and indirectly justified beliefs and maintains that one's beliefs are justified collectively rather than individually. Externalism denies that justified belief in a general principle requires having a reason for thinking that it is likely to be true. Coherentist empiricism is addressed in Sections 4 and 5. Internalist and externalist versions of foundationalist empiricism are explored in Section 6.

3. GENERALITY

The question before us is whether rationalism is open to the generality argument. The second premise of the argument appears to be a consequence of a more general epistemic principle:

(2*)   No cognitive state can directly justify a belief whose content goes beyond that of the state.

The third premise is also general. Indirect a priori justification, as well as indirect empirical justification, requires *general* principles of inference. Hence, if rational insight is limited to particular objects, scepticism is a consequence of rationalism.

Rationalists, however, claim that there is a fundamental difference between experience and thought. Although we experience only particular objects, we apprehend properties of objects. Furthermore, it is our apprehension of properties that directly justifies general beliefs.[8] Hence, rationalism can avoid scepticism only if it can sustain the claim that we apprehend abstract entities such as properties.

Empiricists find the claim puzzling. One source of perplexity is that rationalists do not offer a non-metaphorical characterization of this alleged cognitive capacity. Terms such as "apprehend" and "insight" suggest an analogy to perception. Perception, however, requires causal contact with the object perceived and properties cannot stand in causal relations. Rationalists maintain that the perceptual metaphor is misleading. But, in the absence of a non-metaphorical characterization, they are not in a position to state, let alone defend, the claim that we apprehend general features of objects.

BonJour maintains that the apprehension of properties involved in a priori justification is the same as that involved in thought in general. His goal is to explain the apprehension of properties in terms of a more general theory of how a thought can be about, or have as its content, some particular property. If the more general theory is to successfully underwrite the contention that the apprehension of properties does not involve a quasi-perceptual relation to those properties, it must explain, without appeal to such relations, how a thought can have as its content some particular property. BonJour proposes that a thought has as its content some particular property in virtue of its *intrinsic* character rather than in virtue of some *relation*, quasi-perceptual or otherwise, to that property. More specifically, he maintains:

> In order for the intrinsic character of the thought to specify precisely *that* particular property to the exclusion of anything else, the property in question must *itself* somehow be metaphysically involved in that character.[9]

Clearly, however, a thought about, for example, the property triangularity does not literally instantiate that property since the thought is not itself triangular. BonJour suggests that such a thought instantiates a complex universal which involves triangularity as a component:

> The key claim of such a view would be that it is a necessary, quasi-logical fact that a thought instantiating a complex universal involving the universal triangularity in the appropriate way … is about triangular *things*.[10]

If, for example, a cognizer's thought that nothing can be both red and green all over instantiates a complex universal of which redness and greenness are constit-

uents, then there is no need to introduce a quasi-perceptual relation between cognizer and properties to account for the content of that thought. Consequently, there is no need to introduce such a relation to account for the cognizer's apprehension of those properties.

Let us take stock. The generality argument maintains that experience cannot justify general principles since the content of experience is particular. Although we experience red *objects* and green *objects*, we don't experience the properties of redness and greenness *themselves*. We experience only *instances* of these properties. Experience of *instances* of properties, however, is not sufficient to justify *general* beliefs. Rationalism can avoid the sceptical consequence of the generality argument only if it can sustain the claim that we can apprehend not only *instances* of properties but also the properties *themselves*.[11] Rationalism can sustain the latter claim only if it can provide a non-metaphorical account of the apprehension of properties themselves that does not involve some kind of quasi-perceptual relation to those properties. BonJour proposes to explain the apprehension of a property itself in terms of an account of how a thought can have as its content that property. Although he sets out to offer an account of how a thought can have as its content some particular *property*, such as triangularity, he does *not* provide such an account. Instead, he provides only the bare outline of an account of how a thought can have as its content *particular* triangular *objects* or *instances* of triangularity.[12] Since he does not provide an account of how a thought can have as its content triangularity *itself*, he fails to provide *any* account, let alone a *non-relational* account, of the apprehension of properties. Hence, BonJour's account reinforces, rather than resolves, the empiricist's perplexity.

Rationalists are faced with a dilemma. On the one hand, they can endorse the view that a thought instantiating a complex universal of which redness and greenness are constituents is sufficient to directly justify the general belief that nothing is both red and green all over. Since such a thought is about, or has as its content, *particular* red and *particular* green *objects*, this endorsement represents a denial of (2*). But if rationalists concede that the apprehension of *particular objects* instantiating properties, rather than the apprehension of the *properties themselves*, directly justifies general principles, they cannot maintain, without further argument, that the experience of particular objects instantiating properties cannot directly justify general principles. Hence, on the first option, premise (2) of the generality argument must be rejected as ad hoc.

On the other hand, rationalists can insist that only the apprehension of the *properties themselves* can directly justify general principles. Such rationalists would deny that a thought instantiating a complex universal of which redness and greenness are constituents is sufficient to directly justify a general belief. They would insist that although BonJour has taken an important first step toward providing an account of the apprehension of properties, the account is incomplete.[13] On

this option, rationalists concede that they have not offered a non-metaphorical account of the apprehension of properties. In the absence of such an account, rationalism cannot underwrite the key claim that the content of thought is not limited to particular objects and, as a consequence, is open to the generality argument. Therefore, on either option, rationalism fares *no better* than empiricism with respect to the generality argument.

4. META-REASONS

We argued that empiricism is no more vulnerable than rationalism to the generality argument. This result, however, is not sufficient to establish that empiricism can offer a plausible account of knowledge of general principles. The most prominent theory, due to W. V. Quine, rejects foundationalism. BonJour alleges that coherentist empiricism (c-empiricism, for short) faces two serious objections.[14] My goal, in Sections 4 and 5, is to argue that rationalism faces the same objections.

The first maintains that in order for a person to be justified in believing that p the person must be in possession of a reason for thinking that p is likely to be true. According to c-empiricism, a system of beliefs satisfying standards such as simplicity, scope, fecundity, explanatory adequacy and conservatism is justified. But, asks BonJour,

> What reason can be offered for thinking that a system of beliefs which is simpler, more conservative, explanatorily more adequate, etc., is thereby more likely to be true, that following such standards is at least somewhat conducive to finding the truth?[15]

C-empiricists are faced with a dilemma. Either they offer an a priori or an empirical argument in support of the truth-conduciveness of the standards. The former is incompatible with empiricism. The latter is question-begging since it must ultimately appeal to some of the standards it is attempting to justify.

This objection turns on the claim that being epistemically justified in believing that p requires having a reason for thinking that p is likely to be true. The expression "having a reason to think that p is likely to be true" is ambiguous. Let us distinguish two senses:

(B)   S has a *basic* reason R to believe that p if and only if S has R and R makes it likely that p is true;

(M)   S has a *meta*-reason R to believe that p if and only if S has R and S has reason to believe that R makes it likely that p is true.

Let Φ be the set of conditions that, according to c-empiricism, constitute coherence. Assume that belonging to a system of beliefs satisfying Φ makes it likely that p is true. If S cognitively grasps the fact that p belongs to such a system, then S has a *basic* reason to believe that p. BonJour's charge is that c-empiricists cannot offer an argument to show that such reasons are truth-conducive. Hence, the problem pertains to having a *meta*-reason to believe that p.

Does rationalism fare any better on this score? Assume that having an apparent rational insight that p makes it likely that p is true. Hence, if S has an apparent rational insight that p, then S has a *basic* reason to believe that p. Rationalists are now faced with the question:

> What reason can be offered for thinking that a belief based on apparent rational insight is thereby more likely to be true?

An a priori argument is circular since it is based on rational insight and an empirical argument undercuts the a priori status of justification based on rational insight.[16]

BonJour recognizes the problem. His response is to argue that a priori justification does *not* require a meta-reason. The requirement is question-begging because rationalism maintains that apparent rational insight is an excellent reason, in its own right, for accepting a belief:

> [It] amounts simply and obviously to a refusal to take rational insight seriously as a basis for justification: a refusal for which the present objection can offer no further rationale, and which is thus question-begging.[17]

Therefore, a priori justified belief that p only requires having a basic reason for that belief.

C-empiricists, however, can offer a similar response. According to c-empiricism, p's belonging to a system satisfying Φ is a basic reason to believe that p. BonJour does not dispute this claim. Instead, he moves directly to a demand for a meta-reason. But such a demand presupposes that belonging to a system of beliefs satisfying Φ is not an excellent reason, in its own right, for accepting a belief, which begs the question against c-empiricism.[18] Hence, c-empiricism fares *no worse* than rationalism with respect to the demand for meta-reasons.[19]

5. REVISABILITY

BonJour's second objection to c-empiricism is that its standards for belief revision do not impose any constraints on epistemic justification:

After all, any such standard, since it cannot on Quinean grounds be justified or shown to be epistemically relevant independently of considerations of adjustment to experience, is itself merely one more strand (or node?) in the web, and thus equally open to revision.[20]

Hence, whenever those standards appear to dictate that some belief should be revised, such revision can be avoided by revising the standards themselves. The response that such revision is not reasonable or justified cannot be sustained:

To appeal to the very standards themselves, for example, to the principle of conservatism in order to defend the reluctance to revise the principle of conservatism, is obviously circular; while any further standard, even a meta-standard having to do with the revision of first-level standards, will itself be equally open to revision.[21]

Therefore, c-empiricists lack a rationale for not revising the principles of coherence in the face of recalcitrant experience as opposed to giving up some other belief in the system.

BonJour's objection rests on two principles:

(P1)   Beliefs justified by experience are revisable; and
(P2)   The standards for revising beliefs justified by experience are themselves justified by experience.

From these two principles it follows that

(P3)   The standards for revising beliefs justified by experience are themselves revisable.

But moderate rationalism endorses analogues of these two principles:

(P1*)   Beliefs justified by apparent rational insight are revisable; and
(P2*)   The standards for revising beliefs justified by apparent rational insight are themselves justified by apparent rational insight.[22]

Hence, moderate rationalism is committed to

(P3*)   The standards for revising beliefs justified by apparent rational insight are themselves revisable.

The remainder of BonJour's argument applies with equal force to moderate rationalism and c-empiricism. Any attempt to block revision of the standards for belief revision either appeals to the standards themselves, which is circular, or invokes some further standard, which is itself revisable. Hence, once again, rationalism fares *no better* than empiricism.

An examination of BonJour's account confirms this conclusion. He offers two procedures for a priori belief revision: (1) reflection on the state or process that led to the belief in question; and (2) coherence among a priori justified beliefs.[23] Consider the second. Let Φ = the principles that underlie coherence. Assume that S has an a priori justified belief that p, an a priori justified belief that q, an a priori justified belief that Φ, and an a priori justified belief that $\sim\Phi(p, q)$. In the face of such incoherence, S can retain both the belief that p and the belief that q by revising the principles that underlie coherence. BonJour blocks this move by maintaining that

> The prima facie justification of the fundamental premises or principles that underlie the conception of coherence in question must be stronger than that of the other claims whose justification is being assessed, so that there is a priori justification for thinking that in a case of incoherence, it is some among those other claims, rather than the fundamental premises or principles of coherence themselves, that are mistaken.[24]

If S's a priori justification for the belief that Φ is greater than S's justification for either the belief that p or the belief that q, then the expedient of rejecting Φ is blocked.

Can this strategy be sustained? Consider S's belief that

(5)   My justification for the belief that Φ is greater than my justification for either the belief that p or the belief that q.

This belief is itself justified a priori and subject to revision. Hence, S can preserve both the belief that p and the belief that q by revising (5). The rationalist will surely respond that such a revision is unjustified or unreasonable. But the response cannot be defended. To claim that S's justification for the belief that (5) is greater than S's justification for either the belief that p or the belief that q is circular. It appeals to a belief about the strength of a priori justification to defend the reluctance to revise a belief about the strength of a priori justification. If one introduces some further standard having to do with the revision of justified beliefs about one's degree of a priori justification, that standard itself is open to revision. The only remaining option is to maintain that beliefs about the degree of one's a

priori justification are so fundamental that they cannot be independently justified.

Rationalists can constrain a priori belief revision by claiming that a priori justification comes in degrees and that beliefs about the degree of one's a priori justification are not subject to independent justification. But, surely, the same strategy is open to c-empiricists. They can also maintain that not all beliefs within a coherent system are justified to the same degree and that beliefs about the degree of one's empirical justification are not subject to independent justification. Hence, belief revision is *no more* a problem for empiricism than for rationalism.

6. FOUNDATIONALISM

We have arrived at the conclusion that c-empiricism fares no worse than rationalism with respect to BonJour's criticisms. What are the prospects for a foundationalist version of empiricism (f-empiricism, for short)? The only argument against f-empiricism is the generality argument. If f-empiricism cannot offer an account of the justification of general principles, as BonJour alleges, then it is committed to a version of scepticism: the *only* justified beliefs are those directly justified by experience. The generality argument, however, involves an important internalist constraint on epistemic justification: S is justified in believing that p only if S has some reason to believe that p is likely to be true. The basic claim of the generality argument is that experience alone cannot provide a reason for believing that a general principle is likely to be true. There are two options for the f-empiricist. The first is to endorse internalism and address the generality argument. The second is to reject internalism in favor of externalism.

Internalist f-empiricism is open to the generality argument. But, as we argued in Section 3, rationalism is also open to the argument. Hence, rationalists are faced with a dilemma: either accept or reject (2^*). If (2^*) is accepted, then internalist foundationalism is not a viable option for *either* rationalists or empiricists. Both the rationalist and empiricist varieties of internalist foundationalism lead to scepticism. If (2^*) is rejected, however, internalist foundationalism is a viable option for *both* rationalism and empiricism.

Rationalists who reject (2^*) maintain that some apprehensions of particular objects instantiating properties directly justify general beliefs. A fully articulated rationalist theory of this sort will include a basic epistemic principle stating conditions under which such apprehensions directly justify general principles. This option, however, is also open to empiricists. They can maintain that some experiences of particular objects instantiating properties directly justify general principles. A fully articulated empiricist theory of this sort will include a basic epistemic

principle stating conditions under which such experiences directly justify general principles. Rationalists may balk at such a principle. But, unless they can offer some reason for preferring their epistemic principle over that of the empiricist, the claim is ad hoc. Although BonJour does not explicitly address the question of criteria for the acceptability of epistemic principles, he suggests, in the context of his discussion of c-empiricism, that one such criterion is truth-conduciveness. But, since he also concedes that rationalists cannot provide a reason to believe that apparent rational insight is truth-conducive, they are not in a position to maintain that this criterion provides a basis for preferring rationalism over empiricism. Hence, internalist f-empiricism is *no more* problematic than internalist rationalism.

BonJour briefly considers the possibility that empiricists might reject internalism in favor of externalism.[25] More specifically, the empiricist might deny the claim that S's justified belief that p requires having a reason to believe that p is likely to be true. As we saw in Section 4, the locution "having a reason for thinking that p is likely to be true" is ambiguous. Hence, we must distinguish two versions of internalism. According to *basic* internalism,

(BI)   S's belief that p is justified only if S has a *basic* reason to believe that p.

According to *meta*-internalism,

(MI)   S's belief that p is justified only if S has a *meta*-reason to believe that p.

Analogously, there are two versions of externalism. Basic externalism denies that basic reasons are necessary for justification, while meta-externalism denies that meta-reasons are necessary.

BonJour offers only one argument against externalism:

[W]hatever account externalists may offer for concepts like knowledge or justification, there is still a plain and undeniable sense in which if externalism is the final story, we have no reason to think that any of our beliefs are true; and this result obviously amounts by itself to a very strong and intuitively implausible version of skepticism.[26]

Although he is not explicit in this context about what is required to avoid scepticism, he maintains elsewhere that "the fundamental sceptical move is to challenge the adequacy of our reasons for accepting our beliefs...."[27] Clearly, (BI) is not sufficient to meet this challenge. Although (BI) requires that one possess some

reason R in order to be justified in believing that p, it does not require that one have a reason for thinking that R is truth-conducive. But, to address the charge that R is not an adequate reason to believe that p, one must offer some reason to believe that R is truth-conducive. (MI), on the other hand, does address the sceptical challenge. Since (MI) requires, for being justified in believing that p, both that one possess some reason R for believing that p and some reason for believing that R is truth-conducive, one who satisfies these conditions is in a position to offer some reason for thinking that one's reasons are adequate. As we saw in Section 4, however, BonJour acknowledges that rationalism cannot meet the demand for meta-reasons. Hence, (MI), which addresses the sceptic's challenge, is not an option for rationalists and (BI), which is an option for rationalists, does not address the sceptic's challenge. Since the only version of internalism available to rationalism cannot meet the sceptical challenge, internalist rationalism fares *no better* than externalism with respect to scepticism.[28] Therefore, we conclude that neither internalist nor externalist f-empiricism is *worse off* than rationalism.

7. RATIONALISM REVISITED

The strategy of arguing against empiricism fails to advance the case for rationalism. Is there a more promising alternative available to rationalists? My suggestion is that they exploit two related strategies. Both involve enlisting *empirical support* for rationalism rather than offering a priori *objections* to empiricism. The first is to enlist empirical support for the truth-conduciveness of rational insight. Rationalism enjoys a distinct advantage with respect to the issue of truth-conduciveness. Empiricism maintains that experience is the *only* source of justification. Consequently, it cannot offer a non-circular justification for the truth-conduciveness of experience. Since rationalism recognizes two distinct sources of justification, it can offer a non-circular justification for the truth-conduciveness of one of them. Moreover, in the context of its dispute with empiricism, the truth-conduciveness of experience is not in question. Hence, rationalism can exploit this point of agreement to offer a justification of the truth-conduciveness of rational insight that meets empiricist standards. The second is to offer an explanation of the truth-conduciveness of rational insight. Rationalists generally agree that the truth-conduciveness of rational insight cannot be explained in terms of causal-perceptual models. Hence, if rationalism is to provide some explanation of our alleged capacity for a priori justification, it must offer an alternative model of how such justification is possible. Furthermore, if the model is to be regarded as a plausible explanation of *our* capacity for a priori justification, rationalism must offer empirical evidence showing that the model is realized in human cognition. I conclude by outlining two projects

based on these strategies which, if successfully completed, would advance the case for rationalism.[29]

In order to enlist empirical support for the truth-conduciveness of the alleged source of a priori justification, rationalism must be more fully articulated. In particular, rationalists must provide a generally accepted description of the cognitive state that directly justifies beliefs a priori, the type of beliefs it justifies, and the conditions under which it justifies the beliefs in question. Opponents of rationalism often claim that they find cognitive states such as rational insight puzzling or even mysterious. Rationalists typically bridle at the claim and respond with remarks such as "What could be more familiar?" followed by a phenomenological description of the state. Yet, if one surveys these descriptions, one finds enormous variation:

1. A direct insight into the nature of properties;
2. The unthinkability of the falsehood of the proposition;[30]
3. Finding yourself utterly convinced that the proposition is not only true but could not have been false;[31]
4. It intellectually seems to you that the proposition is true;[32]
5. An inclination to believe the proposition that is rooted in understanding.[33]

Rationalists are faced with a dilemma. Either we have direct introspective access to the cognitive states that provide direct a priori justification or we do not. If we do, sympathetic and sophisticated proponents of the position should be able to arrive at some consensus over the correct description of those states. If we do not, then some alternative rationale must be offered to support the claim that there are such states. The lack of consensus among rationalists lends support to the claim that something more needs to be said here.

There is also wide variation among rationalists over the scope of beliefs justified a priori. These differences often do not manifest themselves within epistemological contexts since the focus is on stock examples such as elementary logical or mathematical propositions, simple analytic truths, and a few familiar cases of alleged synthetic a priori truths. An exclusive focus on these cases, however, does not allow the rationalist to address the question of whether the cognitive states that are alleged to justify these beliefs are truth-conducive. To address this question, two factors are essential. First, the full range of beliefs alleged to be justified by the state must be provided, including the controversial and discredited cases. Second, the different types of beliefs, including metaphysical, methodological, logical, mathematical, modal, scientific and moral, must be taken into account. For one key question is whether truth-conduciveness

varies across these different categories. In the absence of a more complete artic-
ulation of the scope of the a priori, the crucial issue of truth-conduciveness will
remain a subject of speculation, supported or rejected by bits of anecdotal
evidence.

Finally, the conditions under which beliefs are justified a priori must be
addressed. There are two distinct sets of issues here. The first is a specifica-
tion of the conditions under which beliefs are prima facie justified by
rational insight (or whatever other cognitive state is proposed as the source
of a priori justification). BonJour maintains that there are certain background
conditions that must be satisfied in order for an apparent rational insight to
have its justificatory force: the proposition must be considered with reason-
able care, the person must have an approximate grasp of the concept of
necessity, and one's reason must not be clouded by dogmatism or bias.[34]
Two questions emerge. Is the list complete? Do the conditions introduce
concepts that require further articulation? For example, one condition is
that the cognizer have an *adequate grasp* of the concept of necessity. But in
the absence of a non-metaphorical characterization of the relation in
question and some means of determining when a grasp of a concept is ade-
quate, one cannot determine whether the condition is satisfied. The second
is a specification of the conditions under which prima facie a priori justifi-
cation is defeasible. Defeaters fall into two broad categories: overriding
defeaters and undermining defeaters.[35] There are two primary questions in
the case of overriding defeaters. First, under what conditions, if any, do con-
flicts of rational insight undermine justification based on such insight?
Second, can there be empirically justified overriding defeaters for beliefs
justified a priori? Parallel questions arise in the case of undermining defeat-
ers. Does a track record of conflicting beliefs or errors based on rational
insight undermine justification based on such insight? Can a priori justified
beliefs be defeated by empirically justified beliefs regarding the neuro-phys-
ical processes that underlie rational insight?

The second project is to show that the cognitive states identified at the phe-
nomenological level are associated with a single type of process or a unified group
of processes that play a role in producing or sustaining the beliefs they allegedly
justify and in explaining how they justify the beliefs in question. This project
serves three purposes. The first is to show the bearing of the philosophical theory
to *human* knowledge. If the cognitive processes involved in the theory play no
role in producing or sustaining the beliefs that they are alleged to justify, then the
theory provides no explanation of the justification of our *actual* beliefs. Moreover,
if those processes *cannot* produce or sustain the beliefs in question, then the
theory does not even explain how we *can* justify our beliefs. The other purposes

are more theoretical. The distinctive claim of a rationalist epistemology is that there are two basic types of justification: experiential and non-experiential. Initially, this difference is marked at the phenomenological level. If the cognitive processes associated with these phenomenological markers manifest no significant differences in their features or the manner in which they produce beliefs, then there will be legitimate questions about the significance of the experiential/non-experiential distinction. If they do, then these differences may deepen our understanding of this distinction. Finally, there is the prospect of understanding how the states in question justify the beliefs they produce. In particular, a better understanding of the underlying processes may help us understand how the cognitive states identified at the phenomenological level produce true beliefs about the subject matter in question. This understanding, in turn, is the key to providing a non-causal-perceptual account of rational insight and explaining why such insight is truth-conducive.

8. RESIDUAL PROBLEMS

Two residual problems remain. I have argued that rationalists should offer empirical support for the truth-conduciveness of rational insight. As we saw in Section 4, BonJour maintains that such a strategy undermines the a priori status of beliefs justified by rational insight. This claim, however, rests on an incorrect view of the epistemic function of such empirical support. Consider his response to the challenge that rationalists offer some reason for believing that rational insight is truth-conducive:

> The implicit suggestion is that one who accepts a claim on the basis of such insight must be appealing, at least tacitly, to a premise of this sort as an essential part of the alleged justifying reason in order for a justification that is genuinely epistemic in character to even putatively result.[36]

Hence, he concludes that offering empirical support for the truth-conduciveness of apparent rational insight undercuts its a priori status.

It is important, however, to distinguish two different rationales for such a demand. The first is the demand of a meta-internalist who maintains that having a meta-reason for believing that p is a necessary condition for being justified in believing that p. The second is the demand of an empiricist for a reason to accept the rationalist's epistemic theory or, more specifically, the rationalist's account of a priori justification. Here the critic is not maintaining that in order for S to be a priori justified in believing that p, S must have some reason to believe that rational insight is truth-conducive. Instead, the

critic is arguing that, since epistemic justification requires an essential connection with truth, reasonable acceptance of the rationalist's central contention—that rational insight is a source of epistemic justification— requires reasonable belief that rational insight is truth-conducive. The first strategy proposed in Section 7 provides rationalism with a response to such an empiricist critic.

One might still maintain that the strategy is hopelessly circular. For BonJour has argued that experience cannot justify general principles. Since the claim that rational insight is truth-conducive is general, the rationalist must admit that, if it is justified, its justification involves an a priori element. Two points are relevant here. First, my primary negative thesis is that it is a mistake in strategy to support rationalism by arguing that empiricism leads to scepticism. For, as was shown in Section 3, rationalism is also open to the argument. Therefore, the rationalist should give up the sceptical argument. Second, we must distinguish two distinct epistemic issues. The first is defending the claim that general principles are known (or justifiably believed) against *sceptical* challenges. What is at issue here is the *existence* of knowledge of (or justification for believing) such principles. The second is defending the claim that general principles are known (or justifiably believed) a priori against *empiricist* challenges. Empiricists are not sceptics. They maintain that many general principles, including logical and mathematical principles, *are* justified. Their disagreement with rationalists is *not* over the *existence* of knowledge of (or justification for believing) general principles but over the *source* of that knowledge (or justification). Hence, rationalists can successfully resolve their dispute with empiricists by offering empirical support for the general claim that rational insight is truth-conducive. If their supporting case involves only general principles that empiricists regard as justified and the evidence meets the standards that empiricists regard as adequate for justification, then reasonable empiricists must concede that there are cogent grounds for endorsing rationalism.

9. CONCLUSION

Rationalists have not fully exploited the available resources for advancing their case. They have focused their efforts on offering a priori arguments against empiricism. I argue that this strategy ultimately fails since rationalism is also open to those arguments. On the positive side, I suggest that a more fruitful approach for rationalists is to offer a fuller articulation of their position and to utilize the articulation to offer empirical evidence that supports the central claim that rational insight is truth-conducive and provides some explanation of this fact.[37]

Notes

1. Laurence BonJour, *In Defense of Pure Reason* (Cambridge: Cambridge University Press, 1998), Chapter 2; Panayot Butchvarov, *The Concept of Knowledge* (Evanston: Northwestern University Press, 1970), Part 2; Albert Casullo, "Analyticity and the A Priori," *Canadian Journal of Philosophy*, Supp. Vol. 18 (1993): 113–150.

2. George Bealer, "The Incoherence of Empiricism," *Proceedings of the Aristotelian Society*, Supp. Vol. 66 (1992): 99–138; and Laurence BonJour, op. cit.

3. I use "empiricism" to refer to the position that denies the existence of a priori justification. BonJour uses it to refer to the position that denies that the mind has the capacity to apprehend necessary features about the structure of reality and uses "radical empiricism" to refer to the former position. Nothing of significance turns on this difference.

4. Ibid., p. 4.

5. Ibid.

6. BonJour (pp. 4–5) offers a second argument, which he regards as a generalized version of the argument in the text, in support of the claim that empiricism leads to scepticism. This argument also proves too much since it can be employed in defense of empiricism.

7. BonJour (p. 5, n. 4) maintains that empirical principles cannot justify beliefs that go beyond what we directly experience because "the full justification of any inference that relies on such an empirical principle would presuppose an a priori justification for the transition (presumably inductive in character …) from observations proper to the empirical principle in question. …" Induction is necessary to justify empirical principles only if such principles are *general*.

8. BonJour (p. 162) articulates the view as follows: "A person apprehends or grasps, for example, the properties redness and greenness, and supposedly 'sees' on the basis of this apprehension that they cannot be jointly instantiated. Such a picture clearly seems to presuppose that as a result of this apprehension or grasping, the properties of redness and greenness are themselves before the mind in a way that allows their natures and mutual incompatibility to be apparent."

9. Ibid., p. 182.

10. Ibid., p. 184. The emphasis is mine.

11. Although I am stressing here the requirements of the generality argument, one should keep in mind that the intuitive picture of rational insight also requires that properties *themselves* are apprehended. See the passage quoted in note 8.

12. One might suggest that to provide an account of how a thought can have as its content triangular *objects* is to provide an account of how a thought can have as its content triangularity *itself*, since a thought cannot be about triangular objects unless its content involves triangularity. An analogous point, however, can be made with respect to experience. An experience cannot have as its content triangular objects unless its content involves triangularity. In order to generate an asymmetry between thought and experience, the rationalist must maintain that (a) for a cognitive state to have a property *itself* as content it is not sufficient that it have *objects* instantiating that property as content; and (b) thought, but not experience, can satisfy the additional requirements.

13. BonJour (p. 185) appears to endorse this position: "it is clear that the distinction between thinking about an instance of a property and thinking about the property itself, between thinking about a triangular thing and thinking about triangularity, would have to be somehow accounted for."

14. BonJour offers a third argument against the naturalized version of c-empiricism. I don't consider this argument since, as he acknowledges, c-empiricism and naturalism are independent positions.

15. Ibid., p. 91.

16. BonJour's contention that an empirical argument undercuts the a priori status of justification based on rational insight is addressed in Section 8.

17. Ibid., p. 145.

18. BonJour (p. 43, n. 9), maintains that a priori and empirical knowledge are sufficiently different that what holds for one need not hold for the other. But he is not explicit about the relevant differences.

19. BonJour (p. 148, n. 12) concludes that apparent rational insight is so fundamental that it does not admit of independent justification but contends that coherence does not have this status since it "depends essentially on principles, such as the principle of non-contradiction and others, that must be justified in some other way." The latter claim is clearly question-begging since it simply denies that the principles that define coherence do not admit of independent justification.

20. Ibid., p. 92.

21. Ibid.

22. Rationalists cannot avoid the problem by rejecting (P2*) in favor of

     (P2**)   The standards for revising beliefs justified by apparent rational insight are themselves justified by experience.

     For (P1) and (P2**) entail (P3*).

23. Ibid., pp. 116–118.

24. Ibid., p. 118.

25. BonJour presents this option in the context of his discussion of c-empiricism. If my subsequent argument is sound, externalism is a viable option for both foundationalist and coherentist empiricism.

26. Ibid., p. 96.

27. Ibid., p. 87.

28. BonJour may think that conceptual considerations also tell against externalism. Such a claim requires independent consideration. I take it that BonJour's claim here is externalism should be rejected even if those considerations fail.

29. These projects are more fully developed in Albert Casullo, "A Priori Knowledge Appraised," in Albert Casullo (ed.) A Priori *Knowledge*, The International Research Library of Philosophy (Aldershot: Dartmouth Publishing Company, 1999).

30. Butchvarov, pp. 94–95.

31. Alvin Plantinga, *Warrant and Proper Function* (New York: Oxford University Press, 1993), p. 105.

32. George Bealer, "A Priori Knowledge and the Scope of Philosophy," *Philosophical Studies* 81 (1996): 163–174.

33. Ernest Sosa, "Rational Intuition: Bealer on its Nature and Epistemic Status," *Philosophical Studies* 81(1996): 151–162.

34. BonJour, pp. 133–137. He offers two different descriptions of what occurs when a cognizer fails to satisfy a background condition for justification by an apparent rational insight: (1) the cognizer fails to have even an apparent rational insight; and

(2) the justificatory force of the apparent rational insight is defeated. See also Tyler Burge, "Content Preservation," *Philosophical Review* 102 (1993): 457–488.

35. S's justified belief that not-p is an overriding defeater for S's justified belief that p. S's justified belief that some circumstance exists which makes it unlikely S's belief that p is true given S's justification is an undermining defeater for S's justified belief that p.

36. BonJour, p. 143.

37. Thanks to Panayot Butchvarov, Robin Jeshion, and Peter Murphy for helpful comments on earlier versions of this paper.

A Priori Knowledge

1. INTRODUCTION

The prominence of the a priori within traditional epistemology is largely due to the influence of Immanuel Kant. In the Introduction to the *Critique of Pure Reason*,[1] he introduces a conceptual framework that involves three distinctions: (1) the *epistemic* distinction between a priori and empirical knowledge; (2) the *metaphysical* distinction between necessary and contingent propositions; and (3) the *semantic* distinction between analytic and synthetic propositions. Within this framework, Kant poses four questions:

1. What is a priori knowledge?
2. Is there a priori knowledge?
3. What is the relationship between the a priori and the necessary?
4. Is there synthetic a priori knowledge?

These questions remain at the center of the contemporary debate.

Kant maintains that a priori knowledge is "absolutely independent of all experience."[2] This characterization is not fully perspicuous since he allows that such knowledge can depend on experience in *some* respects. For example, according to Kant, we know a priori that every alteration has its cause despite

the fact that the concept of alteration is derived from experience. Yet he is not explicit about the respect in which such knowledge must be independent of experience.

Since Kant does not offer a fully articulated analysis of the concept of a priori knowledge, he is not in a position to argue *directly* for its existence by showing that some knowledge satisfies the conditions in his analysis. Instead, he approaches the second question *indirectly* by seeking *criteria* of the a priori. Criteria provide sufficient conditions for a priori knowledge that are not included in the analysis of the concept. Kant offers two such criteria, necessity and strict universality, which he claims are inseparable from one another. Kant's primary arguments for the a priori appeal to the first. For example, he argues that since mathematical propositions are necessary and we know some mathematical propositions, it follows that we have a priori knowledge.

Kant's claim that necessity is a criterion of the a priori commits him to the following thesis about the relationship between the a priori and the necessary:

(K1)   All knowledge of necessary propositions is a priori.

He also appears to endorse

(K2)   All propositions known a priori are necessary.

Although Kant is often portrayed as holding that the categories of the a priori and the necessary are coextensive, the conjunction of (K1) and (K2) does not support that attribution, since it does not entail that all necessary propositions are known or knowable a priori. (K1) connects the third question with the second since it provides the key premise of Kant's only argument for the existence of a priori knowledge. Neither (K1) nor (K2) bears directly on the first question, since Kant does not claim that necessity is a constituent of the concept of a priori knowledge.

Kant maintains that all propositions of the form "All A are B" are either analytic or synthetic: analytic if the predicate is contained in the subject, synthetic if it is not. Utilizing this distinction, he argues that

(A1)   All knowledge of analytic propositions is a priori, and
(A2)   Some propositions known a priori are synthetic.

In support of (A2), Kant once again appeals to mathematics, arguing that the predicate terms of "7 + 5 = 12" and "The straight line between two points is the shortest" are not covertly contained in their respective subjects. Neither (A1) nor (A2) has a direct bearing on the first two questions since Kant does not claim

that analyticity is a constituent of the concept of a priori knowledge and does not invoke either as a premise in his arguments for the existence of a priori knowledge. Kant regards (A2) as significant because it sets the stage for his primary epistemic project, which is to explain how such knowledge is possible. The project, however, presupposes that a priori knowledge of analytic propositions and a priori knowledge of synthetic propositions are fundamentally different, a presupposition Kant does not explicitly defend.

The contemporary discussion of the a priori revolves around Kant's four questions. Philip Kitcher offers an articulation of Kant's characterization of a priori knowledge.[3] He maintains that a belief is justified independently of experience only if it is indefeasible by experiential evidence. Building on the work of W. V. Quine[4] and Hilary Putnam,[5] who argue that no belief is immune to revision in light of recalcitrant experience, Kitcher concludes that mathematical knowledge is not a priori. In response, a number of theorists reject Kitcher's claim that the concept of a priori knowledge involves an indefeasibility condition and offer alternative proposals.[6]

Paul Benacerraf challenges Kant's strategy for arguing that there is a priori knowledge.[7] Benacerraf maintains that one knows a statement only if one is causally related to the entities referred to by its truth conditions and that the truth conditions of mathematical statements make reference to abstract entities. Since abstract entities cannot stand in causal relations, one cannot know mathematical statements. The tradition, however, maintains that the truth conditions of all necessary truths make reference to abstract entities.[8] Hence, Benacerraf's argument, if cogent, establishes that knowledge of necessary truths is not possible. The argument sparked a series of investigations into the general question of knowledge of abstract entities and the more specific question of the proper role of causal conditions in a plausible theory of knowledge.[9]

Saul Kripke's metaphysical and semantic results have renewed interest in Kant's account of the relationship between the a priori and the necessary.[10] Kripke forcefully argues that the concept of a priori knowledge is epistemic but the concept of necessary truth is metaphysical and, hence, one cannot assume without argument that they are coextensive. Furthermore, he maintains that there are necessary propositions known a posteriori and contingent propositions known a priori. Kripke's contentions generated a large literature addressing his particular examples as well as the more general question of the relationship between the a priori and the necessary.[11]

Kant's claim that there is synthetic a priori knowledge dominated discussion of the a priori over the past fifty years. The controversy is fueled by two related reactions to (A2). The first is due to proponents of logical empiricism who argue that only analytic propositions are knowable a priori.[12] The second is due to W. V. Quine who rejects this central tenet of logical empiricism by denying the cogency

of the analytic-synthetic distinction.[13] Although Quine's conclusion is semantic, it is widely regarded as having broader implications for the existence of a priori knowledge. Theorists are reassessing both the cogency of Quine's arguments against the distinction and, more importantly, the bearing, if any, of Quine's rejection of the distinction on the question of whether there is a priori knowledge.[14]

The range of issues raised by Kant's four questions is enormous, covering most of the central areas of contemporary philosophical investigation. The focus of this essay is more limited. My goal is to address the question of whether a priori knowledge exists. Since one cannot determine whether such knowledge exists without knowing what such knowledge is, I begin by providing an analysis of the concept a priori knowledge. I utilize that analysis to show that the traditional arguments, both for and against, the a priori are not convincing. I conclude by offering an alternative strategy for defending the existence of a priori knowledge. Although the questions about the relationship between the a priori and the nonepistemic concepts of necessity and analyticity are not my primary targets, I address them insofar as they are relevant to analyzing the concept of a priori knowledge or to determining whether such knowledge exists.

2. THE CONCEPT OF A PRIORI KNOWLEDGE

There are two approaches to analyzing the concept of a priori knowledge. The first, which is *reductive*, analyzes it in terms of the concept of a priori justification. According to this approach, S knows a priori that p just in case (a) S's belief that p is justified a priori and (b) the other conditions for knowledge are satisfied. The primary target of analysis is the concept of a priori *justification*. The second, which is *nonreductive*, provides an analysis of the concept that does not include conditions involving the concept of the a priori. The primary target of analysis is the concept of a priori *knowledge.*

The conditions on a priori knowledge proposed by contemporary epistemologists draw their inspiration from Kant. They fall into two broad categories: *epistemic* and *nonepistemic*. There are three types of epistemic conditions. The first imposes conditions regarding the *source* of justification, the second imposes conditions regarding the *defeasibility* of justification, and the third appeals to the *strength* of justification. Source and defeasibility conditions are inspired by Kant's characterization of a priori knowledge as independent of all experience. Strength conditions derive from Kant's frequent association of *certainty* with the a priori.[15] Two nonepistemic conditions have played a prominent role in analyses of the a priori. Some theorists include *necessity*, which Kant endorsed as a criterion of a priori knowledge, in the analysis of the concept. Others, reacting against Kant,

deny that synthetic a priori knowledge is possible, and include *analyticity* in the analysis of the concept.

Analyses of the concept of a priori knowledge fall into three categories. Pure epistemic analyses include only epistemic conditions. Impure epistemic analyses include, in addition, some nonepistemic condition. Nonepistemic analyses consist of only nonepistemic conditions. We turn first to nonepistemic analyses.[16]

2.1. Nonepistemic Analyses

Nonepistemic analyses maintain that either necessity or analyticity provides both necessary and sufficient conditions for a priori knowledge. There is a general reason for regarding them with suspicion. The analysandum in question is epistemic. It is a type of justification. An informative analysis, however, should highlight what is distinctive about such justification. An analysis in terms of necessity or analyticity highlights what is distinctive about the propositions so justified rather than the justification itself. Hence, it will fail to be informative.

Nonepistemic analyses typically involve the expression "a priori truth" or "a priori proposition." This introduces a complication since these expressions do not have a fixed meaning. Many writers introduce them as shorthand for "truth (proposition) that can be known a priori."[17] On this usage "a priori" remains an epistemic predicate, one whose primary application is to knowledge or justification rather than truth. Some, however, use the expression to apply primarily to truths. So, for example, Anthony Quinton maintains that

> *'A priori'* means either, widely, 'non-empirical' or, narrowly, following Kant, 'necessary'.[18]

Quinton's use of the term "non-empirical" suggests that, on his view, the primary application of "a priori" is epistemic since "empirical" is typically an epistemic predicate, one whose primary application is to items of knowledge or justification. But Quinton's use of "non-empirical" is also misleading. He explicitly maintains that it is *not* an epistemic predicate:

> The idea of the empirical is a development of the contingent. It aims to explain how a statement can owe its truth to something else, what conditions the something else must satisfy if it is to confer truth on a statement.[19]

For Quinton, "empirical" has its primary application to truth conditions or the source of truth. Although he characterizes his initial goal as a defense of the

thesis that all a priori statements are analytic, he goes on to maintain that "the essential content of the thesis is that all *necessary* truths are analytic."[20] For Quinton, the narrow sense of "a priori," "necessary," and "analytic" are identical in meaning.

The upshot is that the term "a priori" is ambiguous. It is a predicate whose primary application is to either types of justification or grounds of truth. Hence, a nonepistemic analysis of the a priori can have either as its target. If its target is the latter, then the analysis is not open to my initial argument because it is not directed toward the epistemic concept. It is directed toward a metaphysical concept pertaining to truth conditions. Our concern, however, is with the analysis of the epistemic concept.

Are there nonepistemic analyses of the epistemic concept? R. G. Swinburne defends both of the following theses:

(S1)   A proposition is a priori if and only if it is necessary and can be known to be necessary.

(S2)   A proposition is a priori if and only if it is analytic and can be known to be analytic.[21]

Unlike Quinton, Swinburne maintains that the term "a priori" has its primary application to knowledge. An a priori proposition is one that can be known a priori. Hence, it appears that he is proposing nonepistemic analyses for an epistemic concept.

Closer examination reveals that Swinburne is not proposing either (S1) or (S2) as an analysis of the concept of a priori knowledge. Instead, he endorses Kant's analysis of a priori knowledge as absolutely independent of all experience, maintaining that Kant meant by this "knowledge which comes to us through experience but is not contributed by experience."[22] Swinburne's concern, however, is with the question of how we *recognize* such knowledge. He proposes (S1) as capturing Kant's answer to this question.

The upshot here is that not every biconditional of the form:

(AP)   A proposition is a priori if and only if...,

where "a priori" is an epistemic predicate, is an analysis of the epistemic concept designated by that term. Biconditionals of this form may be proposed in response to different questions. Swinburne's question

(Q1)   How do we identify the items satisfying some analysis of a priori knowledge?

is different from the question

(Q2)   What is the analysis of a priori knowledge?

An answer to (Q1) presupposes, rather than provides, an answer to (Q2).

Apparent nonepistemic analyses of the a priori must be scrutinized along two dimensions. What is the target of the analysis? What question is being asked of the target? My target is the concept of a priori justification as opposed to the concept of a priori truth. My contention is that a nonepistemic analysis of the former cannot succeed. Since the concept is fundamentally epistemic, any satisfactory analysis must identify the salient *epistemic* feature of such justification. This contention does not entail that there are no nonepistemic features common to all and only propositions justifiable a priori. It only entails that it is not by virtue of having those features that such propositions are justifiable a priori.

The contention that an adequate analysis of the concept of a priori justification must include an epistemic condition leaves open the possibility that it also includes some nonepistemic condition. We now turn to the question of whether some nonepistemic condition is necessary for a priori justification. My focus is on conditions involving the concept of necessity since they are the most common.

2.2. Impure Epistemic Analyses

Analyses of the concept of a priori justification that include the concept of necessity fall into two categories. Some include necessity as a component of an epistemic condition. Others include it as an independent condition. Laurence BonJour offers the following version of the traditional rationalist conception of the a priori:

> a proposition is justified *a priori* when and only when the believer is able, either directly or via some series of individually evident steps, to intuitively "see" or apprehend that its truth is an invariant feature of all possible worlds, that there is no possible world in which it is false.[23]

The conception consists of a single condition with two components: the source of a priori justification, intuitive apprehension, and the content of such apprehensions, necessary truths.

Assessing the implications of the analysis is tricky since it involves a metaphorical use of the term "see." Taken literally, the locution "S sees that p" (for example, that there is a rabbit in the garden) entails "S believes that p."[24] Assuming that the metaphorical use of "see" preserves the logical features of the literal, "S intuitively

'sees' that p is true in all possible worlds" entails "S believes that p is true in all possible worlds." Hence, on the traditional rationalist conception, "S's belief that p is justified a priori" entails "S believes that necessarily p."

The conception faces three objections. The first is due to *conceptual deficiency*. Many, including some mathematicians, are not conversant with the metaphysical distinction between necessary and contingent propositions. Consider a mathematician, S, who believes a theorem T on the basis of a generally accepted proof. S's belief that T is justified. Suppose that S lacks the concept of necessity and, as a consequence, does not believe that necessarily T. It is implausible to maintain that S's belief that T is not justified a priori merely because S lacks a concept that is not even a constituent of the content of S's belief.

The first objection can be avoided by weakening the conception to require that S believe that necessarily p *provided that* S possesses the concept of necessity. Two objections remain. The first is due to *modal scepticism*. Among philosophers conversant with the concept of necessary truth, some deny (let us suppose, erroneously) its cogency. As a consequence, they avoid modal beliefs, such as that necessarily 2 + 2 = 4. But it is implausible to maintain that none of their mathematical beliefs are justified a priori solely on the grounds that they have an erroneous metaphysical belief. Second, the conception is open to a *regress*. Suppose that S believes that necessarily p. Must S's belief that necessarily p be justified or not? If not, then it is hard to see why it is a necessary condition for the a priori justification of S's belief that p. If so, then presumably its justification must be a priori. But, in order for its justification to be a priori, S must see that necessarily p is true in all possible worlds which, in turn, requires believing that necessarily necessarily p. But now a regress threatens since we can once again ask the question: Must S's belief that necessarily necessarily p be justified or not?

R. M. Chisholm provides an analysis of the a priori in which necessity is offered as an independent necessary condition. Consider the following definitions:

D1 h is an axiom = Df   h is necessarily such [that] (i) it is true and
    (ii) for every S, if S accepts h, then h is certain for S.[25]
D2 h is *axiomatic* for S = Df   (i) h is an axiom and (ii) S accepts h.[26]
D3 *h* is known *a priori* by S = Df   There is an *e* such that (i) *e* is axiomatic for
    S, (ii) the proposition, *e* implies *h*, is axiomatic for S, and (iii) S accepts *h*.[27]

A priori knowledge is restricted to axioms and their axiomatic consequences. In order to be an axiom, a proposition must satisfy two *independent* conditions: it must be necessarily true and certain for everyone who accepts it. These conditions are independent for neither entails the other. Since axioms are necessary truths and axiomatic consequences of axioms follow necessarily from axioms, all a priori knowledge is of necessary truths.

What support does Chisholm offer for his analysis? He opens his discussion of the a priori with the following remarks:

> There are propositions that are necessarily true and such that, once one understands them, one *sees* that they are true. Such propositions have traditionally been called *a priori*. Leibniz remarks, "You will find a hundred places in which the scholastic philosophers have said that these propositions are evident, from their terms, as soon as they are understood."[28]

This passage involves two claims: (1) some propositions have both the metaphysical property of being necessarily true and the epistemic property of being such that if one understands them, then one *sees* that they are true; and (2) such propositions have traditionally been called a priori. The key question, however, is not addressed. In virtue of which feature are they a priori? The quote from Leibniz, which invokes the authority of the scholastics, mentions only the second. There is no mention of the metaphysical property. Hence, if Chisholm's case is based on historical precedent, his analysis should be in terms of the epistemic property alone.

Chisholm's inclusion of the metaphysical condition in the analysis is not only unmotivated but also has undesirable consequences. First, either the analysis is incomplete or precludes the possibility of *false* a priori justified beliefs. D3 provides an analysis of a priori knowledge. If Chisholm's conditions on a priori *knowledge* are also conditions on a priori *justification*, then a priori justification guarantees truth. If they are not, then his account of the a priori is incomplete. Second, the analysis rules out by stipulation the possibility of a priori knowledge of contingent truths. Yet Kripke and Kitcher maintain that there is such knowledge.[29] Third, the analysis precludes the possibility of a posteriori knowledge of axioms. Suppose that S accepts axiom A on the basis of testimony. Either A is certain for S or it is not. If it is, then A is axiomatic for S and S knows a priori that A. If it is not, then A is not an axiom for it fails to satisfy condition (ii) in D1.

Chisholm's analysis of axiomatic, or noninferential, a priori knowledge also includes an epistemic condition: certainty.[30] This condition leads to the implausible consequence that it is impossible that (1) S know axiomatically that $1 + 1 = 2$; (2) S know axiomatically that $7 + 5 = 12$; and (3) the former belief is *more* justified than the latter. Yet Chisholm offers no rationale for excluding the possibility of differing degrees of noninferential a priori justification. Moreover, it also entails that if S knows axiomatically that p and S knows a posteriori that q, then the former belief is *more* justified than the latter. It is not obvious, however, that one's belief that $7 + 5 = 12$ is more justified than one's belief that one exists.

2.3. Pure Epistemic Analyses

The most common pure epistemic analyses of a priori justification are in terms of the *source* of justification. The major divide is between negative and positive analyses. The former specify sources *incompatible* with a priori justification, the latter specify sources which *provide* such justification. The most familiar negative analysis is

(N1)   S's belief that p is justified a priori if and only if S's justification for the belief that p does not depend on experience.

Critics of negative analyses maintain that they are not sufficiently informative.[31] At best, they specify what a priori justification is *not* rather than what it *is*. The problem can be circumvented by opting for a positive analysis having the form

(P1)   S's belief that p is justified a priori if and only if S's belief that p is justified by Φ,

where "Φ" designates some specific source of justification. For example, according to Panayot Butchvarov, it designates finding the falsehood of a belief unthinkable in any circumstances.[32] But, according to Laurence BonJour, it designates apparent rational insight into the necessary features of reality.[33]

An analysis of the concept of a priori justification that enumerates the sources of such justification is too theory dependent. One cannot reject the *source* of a priori justification proffered by such an analysis without rejecting the *existence* of a priori justification. For example, given Butchvarov's analysis, one cannot reject (as BonJour does) the claim that finding the falsehood of a belief unthinkable in any circumstances is the source of a priori justification without rejecting the existence of the a priori. On this analysis, a priori justification *is* justification based on such findings. It should, however, be possible for proponents of the a priori to disagree over the source of a priori justification without thereby disagreeing over the existence of such justification. Moreover, even if some particular version of the positive analysis is extensionally adequate, the analysis is uninformative. It tells us that Φ *is* an a priori source of justification but gives no indication of *why* Φ is an a priori source. It does not highlight the features by virtue of which Φ qualifies as an a priori source.

There is a *general* positive analysis of the a priori that avoids the problem of theory dependence:

(P2)   *S's* belief that p is justified a priori if and only if S's belief that p is justified by *some* nonexperiential source.

(P2)allows proponents of the a priori to agree that there is a priori justification despite disagreeing about its source. Furthermore, it identifies the feature of sources of justification by virtue of which they qualify as a priori.

There are also two versions of the negative analysis. (N1) conceals a critical ambiguity. The condition

(C1)   S's justification for the belief that p does not depend on experience

does not specify the *respect* in which S's justification must be independent of experience. There are, however, two possibilities: the source of *justification* for S's belief that p and the source of potential *defeaters* for S's justification. Some maintain that (C1) is equivalent to

(C2)   S's belief that p is nonexperientially justified.

Others maintain that it is equivalent to the conjunction of (C2) and

(C3)   S's justified belief that p cannot be defeated by experience.

Patently, if S's belief that p is experientially justified then S's justification depends on experience. What can be said on behalf of (C3)? Philip Kitcher argues that

> if alternative experiences could undermine one's knowledge then there are features of one's current experience which are relevant to the knowledge, namely those features whose *absence* would change the current experience into the subversive experience.[34]

According to Kitcher, if experiential evidence can defeat S's justification for the belief that p, then S's justification depends on the *absence* of that experiential evidence.

Kitcher's contention that a priori justification is incompatible with potential experiential defeaters should be distinguished from the closely related, but stronger, condition espoused by Hilary Putnam:

> Are there *a priori* truths? In other words, are there true statements which (1) it is rational to accept…, and (2) which it would never subsequently be rational to reject no matter how the world turns out (epistemically) to be? More simply, are there statements whose truth we would not be justified in denying in any *epistemically* possible world?[35]

According to Putnam, S's belief that p is justified a priori only if

(C4)   S's belief that p cannot be defeated by *any* evidence.

(C4), however, is not a plausible condition on a priori justification since it
entails that if S's belief that p is defeasible solely by *nonexperiential* evidence then
it is *not* justified a priori. Yet, if S's belief that p is justified solely by nonexperien-
tial evidence and is defeasible solely by nonexperiential evidence then it does
not in any way depend on experience. Hence, (C4) divorces the concept of a
priori justification from the core idea that such justification is independent of
experience.

Since Kitcher ties (C3) to (C1), it cannot be dismissed as readily as (C4).
Instead, we must distinguish two different versions of the negative analysis:

(N2)   S's belief that p is justified a priori if and only if S's belief that p is
           nonexperientially justified; and

(N3)   S's belief that p is justified a priori if and only if S's belief that p is
           nonexperientially justified and cannot be defeated by experience.[36]

Since (C2) is equivalent to

(C5)   S's belief that p is justified by *some* nonexperiential source,

(N2) and (P2) are equivalent. Therefore, we are left with two analyses of a priori
justification. My final goal is to argue that (N2) is the superior analysis.

2.4. An Argument For (N2)

(N3), but not (N2), is incompatible with a widely endorsed criterion of ade-
quacy. Saul Kripke puts the point as follows:

> Something may belong in the realm of such statements that *can* be known *a
> priori* but still may be known by particular people on the basis of
> experience.[37]

Kitcher, echoing this point, maintains that

> A clearheaded apriorist should admit that people can have empirical
> knowledge of propositions which can be known a priori.[38]

According to the criterion of adequacy, an analysis of the concept of a priori jus-
tification should allow for the following possibility:

(CA)   S knows empirically that p and S can know a priori that p.

(N3), however, precludes this possibility.

Prior to presenting the argument, one point needs to be stressed. (N3) does *not* involve a strength condition. It does not require of a priori knowledge a degree of justification greater than that minimally required for knowledge in general. Another way of putting the same point is that (N3) does not require of a priori knowledge a degree of justification greater than that required for a posteriori knowledge. Let us state this point explicitly as the *Equality of Strength Thesis*:

(ES)   The degree of justification minimally sufficient for a priori knowledge equals the degree of justification minimally sufficient for knowledge in general.

In order to keep the point explicit in the course of the argument, let us call a belief justified to the degree minimally sufficient for knowledge, a *justified*$_k$ belief.

We now turn to the argument. Let us begin by assuming

(A)   S knows empirically some mathematical proposition that p and S can know a priori that p.

From the left conjunct of (A), it follows that

(1)   S's belief that p is justified$_k$ empirically.

A number of empirical sources have been alleged to justify mathematical propositions: (a) counting collections of objects, (b) reading textbooks, (c) consulting mathematicians, and (d) computer results. Let us grant that each can justify S's mathematical belief that p. Each of these sources is fallible in an important respect. The justification each confers on a belief that p is defeasible by an empirically justified *overriding* defeater: that is, by an empirically justified belief that not-p. Suppose that S's belief that p is justified by counting a collection of objects and arriving at a particular result. It is possible that S recounts the collection and arrives at a different result. If S were to do so, S's original justification would be defeated by an empirically justified overriding defeater. Suppose that S's belief that p is justified by a textbook (mathematician, computer result) that states that p. It is possible that S encounters a different textbook (mathematician, computer result) that states that not-p. In each case, if S were to do so, S's original justification would be defeated by an empirically

justified overriding defeater. Hence, given the fallible character of empirical justification, it follows that

(2)   S's empirical justification$_k$ for the belief that p is defeasible by an empirically justified belief that not-p,

where "justification$_k$" abbreviates "justification to the degree minimally sufficient for knowledge."

A difficult question arises at this juncture. What are the conditions under which S's justified belief that p is defeated by S's justified belief that not-p? For our present purposes, it is sufficient to note that the conditions under which S's justified belief that not-p defeats S's justification for the belief that p is a function of the relative degree of justification each enjoys. We need not adjudicate between competing accounts of the minimal degree of justification that S's belief that not-p must enjoy in order to defeat S's justified$_k$ belief that p. Let us introduce "d" to stand for that degree of justification, whatever it is, and call a belief justified to degree d, a *justified$_d$* belief. We can now introduce the neutral principle:

(D*)   S's justified belief that not-p defeats (can defeat) S's justified$_k$ belief that p if and only if S's belief that not-p is at least justified$_d$ (justifiable$_d$),

where "justified$_d$" and "justifiable$_d$" abbreviate, respectively, "justified to degree d" and "justifiable to degree d."

Returning now to the argument, the conjunction of (D*) and (2) entails

(3)   S's belief that not-p is at least justifiable$_d$ empirically.

Furthermore, the conjunction of (N3) and the right conjunct of (A) entails

(4)   It is not the case that S's nonexperiential justification$_k$ for the belief that p is defeasible by S's empirically justified belief that not-p.[39]

The conjunction of (4) and (D*) entails

(5)   It is not the case that S's belief that not-p is at least justifiable$_d$ empirically.

The conjunction of (3) and (5) is a contradiction. Hence, (N3) does not satisfy the proposed criterion of adequacy. (N2), on the other hand, does satisfy the cri-

terion since it does not preclude the possibility of defeaters of any kind. I conclude that (N2) provides the superior analysis.

My argument against (N3) highlights an important difference between overriding and undermining defeaters.[40] It is not in general true that if S's justified belief that q defeats the justification conferred on S's belief that p by source A, it also defeats the justification conferred on S's belief that p by source B. For example, although S's justified belief that he suffers from double vision defeats the justification conferred on his belief that $2 + 2 = 4$ by the process of counting objects, it does not affect the justification conferred on that belief by intuition or testimony. More generally, undermining defeaters for S's justified belief that p are *source-sensitive*. Overriding defeaters, however, are *source-neutral*. If S's justified$_d$ belief that not-p defeats the justification$_k$ conferred on S's belief that p by source A, then it also defeats the justification$_k$ conferred on S's belief that p by *any other* source. For example, suppose that S's belief that the shopping list is on the coffee table is justified$_k$ by memory but a subsequent perceptual experience, which justifies$_d$ her belief that the list is not on the coffee table, defeats her original justification. Had S's belief that the shopping list is on the coffee table been originally justified$_k$ by testimony, S's perceptually justified$_d$ belief that it is not on the coffee table would still have defeated her original justification.

3. ARGUMENTS SUPPORTING THE EXISTENCE OF A PRIORI KNOWLEDGE

There are three approaches to arguing in support of the a priori. The first is to offer an analysis of the concept of a priori knowledge and to argue that some knowledge satisfies the conditions in the analysis. The second is to identify criteria of the a priori and to show that some knowledge satisfies the criteria. The third is to argue that radical empiricist theories of knowledge are deficient in some respect and that the only remedy for the deficiency is to embrace the a priori.[41]

3.1. Conceptual Arguments

Hilary Putnam adopts the first strategy. He endorses a conception of a priori justification that involves an indefeasibility condition. We argued in Section 2.3 that neither (C3) nor (C4) is *necessary* for a priori justification. Nevertheless, if his proposed condition is *sufficient* for such justification, it can be utilized in defense of the existence of the a priori. Hence, two questions must be addressed. Does the conception provide a set of conditions sufficient for a priori justification? Do any beliefs satisfy the proposed conditions? My primary concern is with the first question.

Putnam maintains that an a priori statement is one "we would never be *rational* to give up."[42] He goes on to argue that the Minimal Principle of Contradiction (MPC): Not every statement is both true and false, is rationally unrevisable. His argument is directed against his own earlier contentions that no statements are rationally unrevisable.[43] According to his earlier view, traditional proponents of the a priori confused the property of being a priori with the related, but different, property of being *contextually* a priori. The source of the confusion is a failure to recognize two types of grounds for rational revision. *Direct* grounds for rationally revising some belief that p consist in some observation whose content justifies the belief that not-p. *Theoretical* grounds consist in a set of observations that is better explained by a theory that does not contain the statement that p than by any theory that does contain the statement that p. A statement is contextually a priori just in case it is rationally unrevisable on direct grounds but rationally revisable on theoretical grounds. A statement is a priori just in case it is rationally unrevisable on any grounds. Traditional proponents of the a priori identified statements that are not rationally revisable on direct grounds and believed that they are not rationally revisable on any grounds. Putnam, however, argues that the purported a priori statements are rationally revisable on theoretical grounds.

The crux of his present argument is that there are no possible theoretical grounds for rationally revising MPC. How can we rule out the possibility that some future physical theory, perhaps one that we cannot now conceive, might imply the denial of MPC but nevertheless be accepted because it explains a diverse range of phenomena, yields surprising predictions that are subsequently verified, and enhances our understanding of the world? We can do so, according to Putnam, because we know at present that such a theory will have to consist of every statement and its negation. But a theory that excludes nothing is no theory at all. Hence, there are no circumstances under which it would be rational to accept it.

Putnam's proposal is unclear in one crucial respect. He is not explicit on the question of whether a priori justified belief in logical principles, such as MPC, requires supporting evidence and, if so, the nature of that evidence. There are at least three possible readings of his proposed condition on a priori justification:

(A)   p is rationally unrevisable and S believes that p;
(B)   p is rationally unrevisable and S is justified in believing that p;
(C)   p is rationally unrevisable and S is justified in believing that p is rationally unrevisable.

(A) is not sufficient for a priori justification; it is compatible with S's having *no* justification for the belief that p. According to (A), anyone who believed that MPC for whatever reason, however whimsical, would thereby be a priori justified in believing that p (assuming that MPC is indeed rationally unrevisable). But, as

we argued earlier, a priori justification for the belief that p requires nonexperiential justification for that belief.

(B) is also insufficient for a priori justification since it is compatible with S's having *experiential* justification for the belief that p. For example, suppose that Hilary looks at his hand, notes the number of fingers and, on that basis, comes to believe that the statement "My hand has five fingers" is true and that the statement is not false. Hilary is justified, on a posteriori grounds, in believing that some statement is not both true and false.

Putnam, however, rejects this contention on the following grounds:

> It might turn out that there are not five fingers on my hand. For example, my hand may have been amputated and what I'm looking at may be a plastic substitute.... But even if it turned out that I don't have a hand, or that my hand has only four fingers, or seven fingers, or whatever, discovering that I was wrong about the observation report would not at all shake my faith in my belief that that observation report is not both true and false.[44]

This argument is not germane. Suppose, for example, that Hilary believes on the basis of looking at his hand that the statement "My hand has five fingers" is true but, when he looks again, he discovers that his hand has only four fingers. The subsequent observation that his hand has only four fingers justifies him in believing that the statement "My hand has five fingers" is false and that the statement is not true. Hence, his faith in the belief that the original observation report is not both true and false should remain unshaken since the subsequent observation also justifies that belief. Putnam's point here may be that his recognition that no epistemically possible situation would shake his faith that MPC is true justifies his belief that MPC is true. This reading of his argument leads to (C).

(C) is not sufficient for S's belief that p to be justified a priori since (C) is compatible with S's having *experiential* justification for believing that p is rationally unrevisable. For example, a student may believe that MPC is rationally unrevisable solely on the testimony of a philosophy instructor. But, if the student's justification for believing that MPC is true is based on the justified belief that MPC is rationally unrevisable then, if the latter belief is justified a posteriori, the former is also justified a posteriori. Moreover, even if S believes that MPC is rationally unrevisable on the basis of determining the consequences of denying MPC and finding some of those consequences unacceptable, it still does not follow that S's belief that MPC is rationally unrevisable is justified a priori. There are two related problems. First, in determining the consequences of denying MPC one must employ *other* principles of logic. But, in order to be justified a priori in believing that MPC is rationally unrevisable, one must be justified a priori in believing the logical principles one utilizes in deriving the

consequences of denying MPC. Putnam, however, cannot appeal to (C) to establish that the logical principles used to derive the consequences of denying MPC are themselves a priori. Such an appeal invites a regress since one must consider the consequences of denying those principles, which will require further principles of logic. Second, in order to be justified a priori in believing that MPC is rationally unrevisable, one must be justified a priori in believing a theory that excludes nothing is not a genuine theory. Putnam, however, does not address whether *methodological*, as opposed to logical, principles are justified a priori.

3.2. Criterial Arguments: Necessity

Criterial arguments have a common structure. They identify some feature of propositions that we purportedly know and allege that we cannot know a posteriori propositions having that feature, from which it follows that knowledge of such propositions must be a priori. Criterial arguments differ from conceptual arguments since they do not claim that the feature alleged to be sufficient for a priori knowledge is included in the analysis of the concept of a priori knowledge.

Kant provides the best known and most influential criterial argument. He maintains that necessity is a *criterion* of the a priori: "if we have a proposition which in being thought is thought as *necessary*, it is an a priori judgment."[45] This claim is based on the observation that "Experience teaches us that a thing is so and so, but not that it cannot be otherwise."[46] Kant goes on to argue that "mathematical propositions, strictly so called, are always judgments a priori, not empirical; because they carry with them necessity, which cannot be derived from experience."[47] Hence, he concludes, knowledge of mathematical propositions is a priori.

Kant's argument, the *Argument from Necessity*, can be presented as follows:

(1)   Mathematical propositions are necessary.
(2)   One cannot know a necessary proposition on the basis of experience.
(3)   Therefore, one cannot know mathematical propositions on the basis of experience.

The first premise is controversial. Some question the cogency of the concept of necessary truth. Others maintain that modal sentences do not express truths or falsehoods. For our purposes, I propose to grant that (1) expresses a truth in order to address the epistemic issues that it raises.

The phrase "know a necessary proposition" in (2) is ambiguous. Let us introduce the following distinctions:

(A)   S knows the *general modal status* of p just in case S knows that p is a necessary proposition or S knows that p is a contingent proposition.

(B)   S knows the *truth value* of p just in case S knows that p is true or S knows that p is false.

(C)   S knows the *specific modal status* of p just in case S knows that p is necessarily true or S knows that p is necessarily false or S knows that p is contingently true or S knows that p is contingently false.

(A) and (B) are logically independent. One can know that p is a mathematical proposition and that all mathematical propositions are necessary but not know whether p is true or false. Goldbach's Conjecture provides an example. Alternatively, one can know that some mathematical proposition is true but not know whether it is a necessary or contingent truth. (C), however, is not independent of (A) and (B). One cannot know the specific modal status of a proposition unless one knows both its general modal status and its truth value.

Utilizing these distinctions, we can now see that the Argument from Necessity breaks down into two distinct arguments. The first, the *Kantian Argument*, goes as follows:

(1)   Mathematical propositions are necessary.

(2*)   One cannot know the *general modal status* of a necessary proposition on the basis of experience.

(3*)   Therefore, one cannot know the *truth value* of mathematical propositions on the basis of experience.

Kant argues in this fashion. He admits that experience can provide evidence that a thing *is* so and so, or, more perspicuously, that it is the case. What he denies is that experience can provide evidence that something *must* be the case, or, more perspicuously, that it is necessary. (2*) articulates this reading. Kant concludes, on this basis, that knowledge that 7 + 5 = 12 (*not* knowledge that "7 + 5 = 12" is *necessary*) is a priori.

The Kantian Argument involves the following assumption:

(4)   If the general modal status of p is knowable only a priori, then the truth value of p is knowable only a priori.

(4), however, is false. Consider a contingent proposition such as that this cup is white. If one can know only a priori that a proposition is necessary, then one can know only a priori that a proposition is contingent. The evidence relevant to determining the latter is the same as that relevant to determining the former. For

example, if I determine that "2 + 2 = 4" is necessary by trying to conceive of its falsehood and failing, I determine that "This cup is white" is contingent by trying to conceive of its falsehood and succeeding. But if my knowledge that "This cup is white" is contingent is a priori, it does not follow that my knowledge that this cup is white is a priori. On the contrary, it is a posteriori. Hence, (4) must be rejected.

Proponents of the argument might retreat at this point to a weaker version of (4):

(4*)   If p is a necessary proposition and if the general modal status of p is knowable only a priori, then the truth value of p is knowable only a priori.

There are, however, plausible counterexamples to (4*). If Kripke is correct about the semantics of proper names, then true identity statements involving different proper names are necessary truths.[48] Knowledge that such propositions are necessary is based on thought experiments: the inability to conceive that some object is different from itself. But knowledge that they are true is based on experience, astronomical observations in the case of Hesperus and Phosphorus. Another familiar example arises when one comes to believe, and apparently know, mathematical propositions on the basis of the testimony of a teacher or the authority of a textbook.[49]

The second version of the Argument from Necessity, the *Modal Argument*, proceeds as follows:

(1)   Mathematical propositions are necessary.
(2*)   One cannot know the *general modal status* of a necessary proposition on the basis of experience.
(3**)   Therefore, one cannot know the *general modal status* of mathematical propositions on the basis of experience.

The Modal Argument is less ambitious than the Kantian Argument and, as a consequence, is not open to the objections raised against the latter. On the other hand, it is too weak to establish that mathematical knowledge differs from scientific knowledge. If sound, it establishes that knowledge of the general modal status of both mathematical and scientific propositions is a priori and is compatible with the view that knowledge of the truth value of both is a posteriori.

Nevertheless, since it is incompatible with the more general thesis that *all* knowledge is a posteriori, the Modal Argument merits careful scrutiny. What can

be said in support of (2*)? The standard move is to invoke the Kantian claim that experience can teach us only what *is* the case or its Leibnizian counterpart to the effect that experience can provide knowledge of only the *actual* world but not of other possible worlds.[50] If this claim is granted, then (2*) is plausible. But a good deal of our ordinary practical knowledge and the bulk of our scientific knowledge provide clear counterexamples to the claim. My knowledge that my pen will fall if I drop it does not provide me with information about what *is* the case, for the antecedent is contrary-to-fact. It provides me with information about some possible worlds other than the actual world. Scientific laws are not mere descriptions of the actual world. They support counterfactual conditionals and, hence, provide information beyond what is true of the actual world. In the absence of further support for premise (2*), the Modal Argument should also be rejected.

3.3. Criterial Arguments: Irrefutability

In defending the existence of a priori knowledge, Kant draws attention to the alleged necessity of mathematical propositions. Proponents of logical empiricism, who were reacting against John Stuart Mill's contention that we know mathematical propositions, such as that 3 + 2 = 5, on the basis of inductive generalization from observed cases, draw attention to a different feature of mathematical propositions: their alleged irrefutability by experience. Carl Hempel puts the point as follows:

> consider now a simple "hypothesis" from arithmetic: 3 + 2 = 5. If this is actually an empirical generalization of past experiences, then it must be possible to state what kind of evidence would oblige us to concede the hypothesis was not generally true after all. If any disconfirming evidence for the given proposition can be thought of, the following illustration might well be typical of it: We place some microbes on a slide, putting down first three of them and then another two. Afterwards we count all the microbes to test whether in this instance 3 and 2 actually added up to 5. Suppose now that we counted 6 microbes altogether. Would we consider this as an empirical disconfirmation of the given proposition, or at least as a proof that it does not apply to microbes? Clearly not; rather, we would assume we had made a mistake in counting or that one of the microbes had split in two between the first and the second count.[51]

Since Hempel maintains that we would not regard any experiential evidence as disconfirming a mathematical proposition, he concludes that such propositions are not confirmed by experience.

Hempel's argument, the *Irrefutability Argument*, can be stated as follows:

(1)   No experiential evidence can disconfirm mathematical propositions.
(2)   If experiential evidence cannot disconfirm mathematical proposi-
       tions, then it cannot confirm such propositions.
(3)   Therefore, experiential evidence cannot confirm mathematical
       propositions.

This argument is valid and the second premise is uncontroversial. Premise (1),
however, is not obviously true. Moreover, Hempel's defense of (1) is not very
strong. He considers only the weakest possible case of potential experiential dis-
confirming evidence.

In order to bring out this point more clearly, let us first note two familiar fea-
tures of inductive practice: (a) our assessments of the degree to which a particular
case confirms or disconfirms a generalization is a function of the total available
evidence; and (b) apparent disconfirming cases of a generalization can always be
explained away in a fashion which leaves the original hypothesis unaffected.
Hempel's defense of (1) is weak in several respects. First, it does not take into
account the number of apparent confirming instances of the proposition in
question. Second, it involves only a single disconfirming instance of the proposi-
tion. Third, the hypotheses which are invoked to explain away the apparent dis-
confirming instance are not subjected to independent empirical test. In such a
situation, given a background of supporting evidence for the generalization, it is
reasonable to discount the disconfirming instances as apparent and to explain
them away on whatever empirical grounds are most plausible.

The case against premise (1) can be considerably strengthened by revising
Hempel's scenario as follows: (a) the number of disconfirming instances of the
proposition is increased so that it is large relative to the number of confirming
instances; and (b) the hypotheses invoked to explain away the apparent discon-
firming instances are subjected to independent investigation and found to be
unsupported. Let us now suppose that we have experienced a very large number
of apparent disconfirming instances of the proposition that $3 + 2 = 5$ and, further-
more, that empirical investigations of the hypotheses invoked to explain away
these disconfirming instances produce very little, if any, support for the
hypotheses. Given these revisions, the proponent of the Irrefutability Argument
can continue to endorse premise (1) only at the expense of either divorcing
mathematics from its empirical applications or holding empirical beliefs which
are at odds with the available evidence.

This point can be brought out more clearly by considering the following set of
propositions:

(a)   The mathematical proposition that $3 + 2 = 5$ is applicable to
       microbes;

(b)   The empirical procedure of counting microbes provides *only apparent* disconfirming evidence for the proposition that 3 + 2 = 5;

(c)   The results of independent empirical investigation do not support the auxiliary hypotheses introduced to explain away the disconfirming evidence as only apparent.

Although (c) does not entail not-(b), it does provide strong grounds for rejecting (b). Clearly, the proponent of the Irrefutability Argument cannot simply assert (b), for to simply assert (b) without independent support is to beg the question against the radical empiricist. But (c) establishes that the independent reasons offered in support of (b) are unfounded. Hence, (b) must be rejected. The proponent of the Irrefutability Argument, however, cannot accept both (a) and not-(b). If the disconfirming evidence provided by the procedure of counting microbes is *not* merely apparent then it is genuine. So only two alternatives remain: either (i) reject (a) and hold that mathematics is not applicable to microbes, or (ii) continue to hold (b) despite (c). Neither alternative is palatable since (i) effectively divorces mathematics from its empirical applications, while (ii) puts one in a position of holding a belief which is counter to one's available evidence. The most plausible alternative is to accept (a) and reject (b). But to reject (b) is to reject premise (1) of the Irrefutability Argument. Hence, the argument falls short of its mark.

3.4. Deficiency Arguments

Laurence BonJour offers three arguments that purport to expose deficiencies in radical empiricism. The first alleges that radical empiricism leads to scepticism. Assume that some beliefs are directly justified solely by experience. Such beliefs are "particular rather than general in their content and are confined to situations observable at specific and fairly narrowly delineated places and times."[52] Either some beliefs whose content goes beyond direct experience are justified or scepticism is true. The justification of beliefs whose content goes beyond direct experience requires inference from the directly justified beliefs. Since principles of inference are *general*, they cannot be directly justified by experience.

The next two arguments are directed toward W. V. Quine's radical empiricism. The first maintains that in order for a person to be justified in believing that p the person must be in possession of a reason for thinking that p is likely to be true. According to Quine, a system of beliefs satisfying standards such as simplicity, scope, fecundity, explanatory adequacy and conservatism is justified. But, asks BonJour,

What reason can be offered for thinking that a system of beliefs which is simpler, more conservative, explanatorily more adequate, etc., is thereby more likely to be true, that following such standards is at least somewhat conducive to finding the truth?[53]

There are two options. Either such a reason is a priori or it is empirical. The former is incompatible with radical empiricism. The latter is question-begging since it must ultimately appeal to some of the standards it is attempting to justify.

The final objection alleges that Quine's standards for belief revision do not impose any constraints on epistemic justification:

After all, any such standard, since it cannot on Quinean grounds be justified or shown to be epistemically relevant independently of considerations of adjustment to experience, is itself merely one more strand (or node?) in the web, and thus equally open to revision.[54]

Hence, whenever those standards appear to dictate that some belief should be revised, such revision can be avoided by revising the standards themselves. Quine cannot respond that such revision is not justified since such a response is based either on the standards themselves, which is circular, or on some further standard, which is itself revisable.

BonJour's arguments provide a basis for preferring his moderate rationalism over its radical empiricist competitors only if the former avoids the deficiencies alleged to plague the latter. Since, as I shall now show, moderate rationalism suffers from the same deficiencies, his arguments provide no basis for preferring it over radical empiricism. The first objection alleges that since the content of experience is *particular*, experience cannot directly justify *general* principles. Moderate rationalism is open to the same objection unless it can show that the content of rational insight is not limited to particular objects. BonJour maintains that although we experience only particular objects, we apprehend properties of objects.[55] The term "apprehend" suggests an analogy to perception, which requires causal contact with the object perceived. Properties, however, cannot stand in causal relations. BonJour maintains that the perceptual metaphor is misleading. Hence, in order to underwrite the claim that we apprehend general features of objects, he must provide a nonmetaphorical account of this alleged cognitive capacity.

BonJour proposes to explain the apprehension of properties in terms of a more general theory of how a thought can be about, or have as its content, some particular property. A thought has as its content some particular property in

virtue of its *intrinsic* character rather than in virtue of some *relation*, quasi-percep-tual or otherwise, to that property. For a thought to be about a particular prop-erty, say triangularity, that property must be a constituent of its intrinsic character:

> The key claim of such a view would be that it is a necessary, quasi-logical fact that a thought instantiating a complex universal involving the universal triangularity in the appropriate way...is about triangular *things*.[56]

BonJour's explanation falls short of its goal. His goal is to explain how a thought can have as its content some particular *property*, such as triangularity. He pro-vides, instead, only the bare outline of an explanation of how a thought can have as its content *particular* triangular *objects*. Since he does not provide an explana-tion of how a thought can have as its content some *property*, he fails to provide an explanation of the apprehension of properties. Hence, moderate rationalism is open to BonJour's first objection.

The second objection turns on the claim that being epistemically justified in believing that p requires having a reason for thinking that p is likely to be true. The expression "having a reason to think that p is likely to be true" is ambiguous. Let us distinguish two senses:

(B) S has a *basic* reason R to believe that p if and only if S has R and R makes it likely that p is true;

(M) S has a *meta*-reason R to believe that p if and only if S has R and S has reason to believe that R makes it likely that p is true.

Let Φ be the set of conditions that Quine maintains is sufficient for justifica-tion. Assume that belonging to a system of beliefs satisfying Φ makes it likely that p is true. If S cognitively grasps the fact that p belongs to such a system, then S has a *basic* reason to believe that p. BonJour's charge is that radical empiricism cannot offer an argument to show that such reasons are truth-conducive. Hence, the problem pertains to having a *meta*-reason to believe that p.

Does moderate rationalism fare any better on this score? Assume that having an apparent rational insight that p makes it likely that p is true. Hence, if S has an apparent rational insight that p, then S has a *basic* reason to believe that p. BonJour is now faced with the question:

> What reason can be offered for thinking that a belief based on apparent rational insight is thereby more likely to be true?

His response is that the demand for a meta-reason is question-begging because, on his account, apparent rational insight is an excellent reason, in its own right, for accepting a belief:

> [It] amounts simply and obviously to a refusal to take rational insight seriously as a basis for justification: a refusal for which the present objection can offer no further rationale, and which is thus question-begging.[57]

Radical empiricists, however, can offer a similar response to BonJour's second objection. They can maintain that his demand for a meta-reason is question-begging since it refuses to take seriously that belonging to a system of beliefs satisfying Φ is an excellent reason, in its own right, for accepting a belief. Hence, radical empiricism fares *no worse* than moderate rationalism with respect to the demand for meta-reasons.

BonJour's third objection rests on two principles:

(P1)   Beliefs justified by experience are revisable; and
(P2)   The standards for revising beliefs justified by experience are themselves justified by experience.

From these two principles it follows that

(P3)   The standards for revising beliefs justified by experience are themselves revisable.

But moderate rationalism endorses analogues of these two principles:

(P1*)   Beliefs justified by apparent rational insight are revisable; and
(P2*)   The standards for revising beliefs justified by apparent rational insight are themselves justified by apparent rational insight.

Hence, moderate rationalism is committed to

(P3*)   The standards for revising beliefs justified by apparent rational insight are themselves revisable.

The remainder of BonJour's argument applies with equal force to moderate rationalism and radical empiricism. Any attempt to block revision of the standards for belief revision either appeals to the standards themselves, which is circular, or invokes some further standard, which is itself revisable. Hence, once again, moderate rationalism fares *no better* than radical empiricism.

4. ARGUMENTS OPPOSING THE EXISTENCE OF A PRIORI KNOWLEDGE

Arguments against the existence of a priori knowledge fall into three broad categories. Those in the first offer an analysis of the concept of a priori knowledge and allege that no cases of knowledge satisfy the conditions in the analysis. Those in the second offer radical empiricist accounts of knowledge of propositions alleged to be knowable only a priori. Arguments in the third category maintain that a priori knowledge is incompatible with plausible constraints on an adequate theory of knowledge.

4.1. Conceptual Arguments

Hilary Putnam and Philip Kitcher provide clear examples of the first approach. Both hold that the concept of a priori justification includes an indefeasibility condition. According to Putnam, an a priori statement is one "we would never be *rational* to give up."[58] Kitcher maintains that for a process to justify beliefs a priori, it must be able to "warrant those beliefs against the background of a suitably recalcitrant experience."[59] They go on to argue that beliefs traditionally alleged to be justified a priori fail to meet the requisite indefeasibility condition. We argued that the concept of a priori justification does not include an indefeasibility condition. Hence, the fact that a belief fails to satisfy an indefeasibility condition does not *immediately* entail that it is not justified a priori. There remains, however, the possibility of a more *mediate* connection.

Let us call the general thesis that a priori justification entails rational unrevisability the *Unrevisability Thesis* (UT), and distinguish between a strong and weak version of it:

(SUT)　　Necessarily, if S's belief that p is justified a priori then S's belief that p is rationally unrevisable in light of *any* evidence; and

(WUT)　　Necessarily, if S's belief that p is justified a priori then S's belief that p is rationally unrevisable in light of any *experiential* evidence.

My goal is to argue that both (SUT) and (WUT) should be rejected.

We begin by considering an example that draws out more explicitly the consequences of (SUT). Suppose that Mary is a college student who has had some training in logic. As a result, she is able to discriminate reliably between valid and invalid elementary inferences on the basis of reflective thought. Today Mary wonders whether "p ⊃ q" entails "~p ⊃ ~q." She reflects upon the statements in question and on the basis of this reflection concludes that the former does indeed entail the latter. After she assents to this conclusion, a counterexample occurs to her. The occurrence of the counterexample results

in her rejecting her former conclusion and coming to believe that "p ⊃ q" entails "~q ⊃ ~p." The salient features of the example are as follows: (a) Mary's initial belief is based on a nonexperiential process that is reliable but not infallible; (b) a process of the *same type* leads Mary to conclude that the initial belief is mistaken and to arrive at the correct conclusion; and (c) Mary's conclusions as stated in (b) are justified beliefs. Now for some more controversial claims: (d) Mary's original belief that "p ⊃ q" entails "~p ⊃ ~q" is also *justified*; and (e) Mary's original belief is justified a priori despite the subsequent revision.

What can be said in favor of (d) and (e)? (d) appears to be similar in all relevant respects to the following case. Mary sees a sheet of paper on the table and on that basis forms the belief that it is square. A second closer visual examination reveals that two of the sides are slightly longer than the other two. On this basis, Mary rejects her former belief about the shape of the paper and comes to believe that it is rectangular. Since the circumstances under which Mary perceived the page were normal and Mary is a reliable discriminator of shapes, her initial belief is justified. The fact that our discriminatory powers sometimes fail us does not entail that beliefs based on shape perception are not justified. Furthermore, if such beliefs are typically justified, we don't single out particular cases as unjustified *merely* in virtue of the fact that they are false. Some other relevant difference must be cited such as that the perceiver was impaired or the environment was gerrymandered. Hence, the routine failure of Mary's otherwise reliable shape discriminating ability does not entail that her belief that the paper is square is unjustified despite the fact that it is false. Similarly, the routine failure of Mary's otherwise reliable ability to discriminate valid inferences does not entail that her belief that "p ⊃ q" entails "~p ⊃ ~q" is unjustified despite the fact that it is false.

The only remaining question is whether Mary's original belief is justified a priori or a posteriori. A proponent of (SUT) must maintain that the belief is justified a posteriori *merely* in virtue of the fact that it was revised. This point can be brought out more clearly by introducing the notion of a *self-correcting process*:

> (SCP)   A process Φ is self-correcting for S just in case, for any false belief that p, produced in S by Φ, Φ can also justify for S the belief that not-p.[60]

(SUT) entails

> (1)   If a process Φ is self-correcting and justifies for S some false belief that p then Φ does not justify a priori S's belief that p.

(1) is implausible. It is insensitive to the central question of whether the justificatory process in question is experiential or nonexperiential. Hence, to endorse (1) is to divorce the notion of a priori justification from the notion of independence from experiential evidence. It is more plausible to reject (1) on the grounds that Mary's original belief as well as the belief that led her to revise the original belief are based on nonexperiential evidence. Once we reject (1), (SUT) must also be rejected.

(WUT) avoids the primary problem with (SUT). It distinguishes between revisions based on experiential evidence as opposed to revisions based on nonexperiential evidence and maintains that only the former are incompatible with a priori justification. Nevertheless, (WUT) is also open to objection.

We again begin by considering an example. Suppose that Pat is a working logician who regularly and consistently arrives at interesting results. Pat, however, is bothered by the fact that although he is a *reliable* producer of interesting proofs, he is not an *infallible* producer of such proofs. As it turns out, he has a colleague, May, who has done pioneering work in the neurophysiological basis of cognitive processes. As a radical means to self-improvement, Pat asks May to conduct a study of his efforts at constructing proofs in order to see if she can uncover some, hopefully reversible, neurophysiological cause for his infrequent erroneous proofs. The investigation reveals that (a) a particular interference pattern is present in Pat's brain when and only when he constructs an erroneous proof; and (b) whenever Pat constructs a proof under the influence of this pattern and the pattern is subsequently eradicated by neurophysiological intervention, he is able to see the flaw in the original proof and go on to correct it. Finally, there is an accepted neurophysiological theory available which supports the hypothesis that such a pattern should cause cognitive lapses. Now suppose that Pat believes that p entails q on the basis of constructing a proof which he carefully scrutinizes and finds acceptable. Despite his careful scrutiny, the proof is flawed. He later discovers in a subsequent meeting with May that (a) she had been monitoring his brain activity at the time the proof was constructed with a remote sensor; (b) the sensor indicated that the interference pattern was present; and (c) standard tests indicated that all of the equipment was functioning properly. Pat is still unable to uncover the flaw in his proof but nevertheless concludes, on the basis of May's empirical findings, that his proof is flawed and withholds the belief that p entails q.

The salient features of the example are: (a) Pat's initial belief that p entails q is based on a process of reflective thought that is reliable but not infallible; (b) Pat's initial belief that p entails q is justified by the nonexperiential process of reflective thought; and (c) the justification which the process of reflective thought confers on his belief is subsequently defeated by the empirical evidence indicating that the interference pattern is present. (a) is uncontroversial. (b) is

more controversial since it involves the claim that false beliefs can be justified a priori. This claim was defended earlier in the discussion of the Mary example. We propose to grant (c) for purposes of assessing (WUT). Finally, consider (d) Pat's initial belief that p entails q is justified a priori despite the later revision in light of experiential evidence. (d) appears to be a straightforward consequence of (b). Since Pat's belief is justified by a nonexperiential process, it is justified a priori. A proponent of (WUT) can resist this conclusion only by insisting that since experiential evidence defeated the justification conferred on the belief by the nonexperiential process, the belief is justified, at least in part, by experiential evidence.

The proposed defense of (WUT) invokes the following symmetry between justifying evidence and defeating evidence:

(ST)   If evidence of kind A can defeat the justification conferred on S's belief that p by evidence of kind B, then S's belief that p is justified by evidence of kind A.

(ST), however, is not very plausible. Consider, for example, introspective knowledge of one's bodily sensations such as pains and itches. Some maintain that introspective knowledge is indubitable. There are no possible grounds for doubting the truth of an introspective belief about one's bodily sensations. This claim has been challenged by the so-called EEG argument.[61] The basic idea is that although introspection presently provides our only evidence for the presence of bodily sensations, it is possible that neurophysiology will evolve to the point where electroencephalograph readings also provide such evidence. Furthermore, in suitably chosen circumstances, the EEG readings may override our introspective evidence in support of a belief regarding the presence of a bodily sensation. Our purpose here is not to evaluate the argument. Suppose we grant

(N)   Neurophysiological evidence can defeat the justification conferred on a belief about one's bodily sensations by introspection.

Clearly, it does not follow that my present justified belief that I have a mild headache is based, even in part, on neurophysiological evidence. Consequently, (ST) must be rejected. Once we reject (ST), (WUT) must also be rejected.

4.2. Empiricist Accounts

One common strategy of arguing against the existence of a priori knowledge is to consider the most prominent examples of propositions alleged to be knowable only a priori and to argue that such propositions are known empirically.

Let us focus on mathematical knowledge since it has received the most attention. Empiricist accounts of mathematical knowledge can be divided into two broad categories: inductive and holistic. The leading idea of inductive theories is that *epistemically basic* mathematical propositions are directly justified by observation and inductive generalization. Nonbasic mathematical propositions are indirectly justified by virtue of their logical and explanatory relationships to the basic mathematical propositions. Holistic empiricism denies that some mathematical propositions are directly justified by observation and inductive generalization. All mathematical propositions are part of a larger explanatory theory, which includes scientific and methodological principles. Only entire theories, rather than individual propositions, are confirmed or disconfirmed by experience.

John Stuart Mill is the most prominent proponent of inductivism. In the case of mathematics, his primary concern is with the first principles, the axioms and definitions, of arithmetic and geometry. His view, succinctly stated, is that these principles are justified inductively on the basis of observation. The view faces formidable obstacles. For example, definitions do not appear to require empirical justification. Moreover, the properties connoted by some mathematical terms do not appear to be exemplified by the objects of experience. Mill maintains, however, that definitions of mathematical terms assert the existence of objects exemplifying the properties connoted by the terms in the definitions and that mathematical definitions are only approximately true of the objects of experience.[62]

Very few find Mill's account to be plausible. My goal here is not to defend it. Instead, I propose to grant its cogency in order to determine whether it can be parlayed into an argument against the a priori. If Mill is correct, it follows that all epistemically basic mathematical propositions are justified on the basis of observation and inductive generalization. Moreover, all other mathematical propositions justified on the basis of these propositions are also justified on the basis of experience. Nevertheless, the success of the account does not establish that there is no a priori knowledge of those mathematical propositions. To draw such a conclusion is to overlook the possibility of *epistemic overdetermination*: the possibility that mathematical propositions are (or can be) justified both experientially and nonexperientially.

Mill is aware of this gap in his argument and appeals to a version of the principle of simplicity:

> Where then is the necessity for assuming that our recognition of these truths has a different origin from the rest of our knowledge, when its existence is perfectly accounted for by supposing its origin to be the same?

when the causes which produce belief in all other instances, exist in this in-
stance, and in a degree of strength as much superior to what exists in other
cases, as the intensity of the belief itself is superior?[63]

Mill maintains that there is no need to hypothesize that there is a priori knowledge
to account for our knowledge of mathematics. But the appeal to simplicity is mis-
guided. The goal of an epistemological theory is not to offer the *simplest* account
of our knowledge of some target set of propositions. The goal is to offer an *accu-
rate* account of our knowledge: one that provides a complete picture of our
cognitive resources with respect to the domain of truths in question. It is an open
question whether, given our cognitive resources, we have more than a single
source of justification for beliefs within a given domain. The assumption that, for
any given domain of human knowledge, there is only a single source of justifica-
tion is without foundation. The principle of simplicity rules out overdetermina-
tion of justification. Hence, Mill's empiricism, even if cogent, cannot be parlayed
into an argument against the a priori in the absence of an argument against epi-
stemic overdetermination.

Holistic empiricism faces a related difficulty. The classic presentation of the
position is provided by W. V. Quine.[64] There are (at least) two ways of reading
his argument. The traditional reading is that he is providing a unitary argument
against the cogency of the analytic-synthetic distinction, which proceeds by
examining a variety of alternative proposals for marking the distinction. The
second, due to Hilary Putnam, is that Quine is providing two distinct argu-
ments in "Two Dogmas": an (unsuccessful) argument in the first four sections,
targeting the analytic-synthetic distinction, and a (successful) argument in
the concluding two sections, targeting the existence of a priori knowledge.[65]

On Putnam's reading, when Quine argues that no statement is immune to revi-
sion in light of recalcitrant experience, he is targeting a priori knowledge. The
target of the attack is the view that there are some statements confirmed no matter
what. Putnam's claim is that the concept of a statement confirmed no matter what
is not a concept of analyticity but a concept of apriority. Quine was misled into
thinking that it was a concept of analyticity because of positivist assumptions
about meaning. Hence, according to Putnam, if Quine's argument is sound, it
establishes that there is no a priori knowledge.

My purpose here is not exegetical. I propose to grant Putnam's reading of the
structure of Quine's argument. Moreover, I propose to grant that Quine has suc-
cessfully established that no statement is immune to revision. My concern is
whether Quine's conclusion can be parlayed into an argument against the
existence of a priori knowledge, as Putnam alleges. Clearly, that conclusion, taken
by itself, is not sufficient to do so. The additional premise that a priori justifica-

tion entails rational unrevisability is also necessary. But, despite Putnam's claim to the contrary, the additional premise is false.

Let us now turn to the more traditional reading of Quine's argument and, once again, concede that Quine has successfully shown that the analytic-synthetic distinction is not cogent. Does this result provide the empiricist with the resources necessary to argue that there is no a priori knowledge? Once again, this premise alone does not suffice. We argued in section 2.1 that the analysis of the concept of a priori justification does not include the concept of analyticity. Hence, there is no immediate or obvious connection between the two concepts. The possibility remains that there is some more mediate connection. But, if there is such a connection, some supporting argument must be offered to show this.

4.3. Incompatibility Arguments

Paul Benacerraf provides the classic example of an argument falling into the third category.[66] He maintains that our best theory of truth provides truth conditions for mathematical statements that refer to abstract entities and our best account of knowledge requires a causal relation between knowers and the entities referred to by the truth conditions of the statements that they know. Given that abstract entities cannot stand in causal relations, there is a tension between our best account of mathematical truth and our best account of mathematical knowledge. Since it is widely held that most, if not all, a priori knowledge is of necessary truths and that the truth conditions for such statements refer to abstract entities, Benacerraf's argument raises a more general question about the possibility of a priori knowledge.

Some dismiss the argument on the grounds that its epistemic premise, which endorses a causal condition on knowledge, rests on the generally rejected causal theory of knowledge. Benacerraf's argument, however, has proved to be more resilient than the causal theory of knowledge. Proponents of the argument maintain that the causal condition endorsed by the epistemic premise of the argument draws its support from the requirements of a naturalized epistemology rather than the causal theory of knowledge.[67]

Assessing the claim that naturalism is incompatible with knowledge of abstract entities is complicated since there are many competing versions of the view. At the risk of oversimplifying, let us identify two general varieties. The first, *scientific* naturalism, is due to W. V. Quine who rejects the traditional epistemological project of providing an a priori, philosophical, justification of scientific knowledge and offers, in its place, a vision of epistemology as a branch of science.[68] The second, *philosophical* naturalism, advocates placing naturalistic constraints on traditional philosophical projects. In the case of conceptual analysis, for example, it requires that the analysans of a concept include only naturalistically respectable

concepts. We are now faced with two questions. Does either philosophical or scientific naturalism preclude the possibility of knowledge of abstract entities?

4.4. Philosophical Naturalism

If philosophical naturalism precludes knowledge of abstract entities, it is in virtue of the requirements of a more promising naturalized descendent of the causal theory. The most promising is process reliabilism. Alvin Goldman maintains that

(G)   S's believing p at t is justified if and only if
    (a)   S's believing p at t is permitted by a right system of J-rules, and
    (b)   this permission is not undermined by S's cognitive state at t.[69]

According to (G), any belief produced by a basic reliable psychological process satisfies (a). Such a belief is justified provided that S does not possess defeating evidence such as that the belief is false or that it is produced by an unreliable process. (G) also appears to be compatible with the possibility of justified beliefs about abstract entities since neither (a) nor (b) involves any causal conditions. (G), however, is open to objection.

    Suppose that Maud belongs to an organization whose leaders believe, on flimsy grounds, that clairvoyance is a reliable source of knowledge.[70] Furthermore, suppose that extensive empirical work has been done investigating this phenomenon, the results have been negative, and this information is *present* in Maud's epistemic community. Others are aware of the information. Newspapers, magazines, books and television widely report the information. Moreover, Maud has *ready access* to this information. Others with whom she interacts have this information and would share it if asked. The newspapers and magazines that she sometimes reads report the information. Books and periodicals owned by the library that she frequently visits document the information. Television programs broadcast on channels that she views present the information. The leaders of the organization are aware of the negative evidence, the fact that it is widely publicized, and the fact that many of their followers have ready access to the information. As a consequence, they continually urge their followers to ignore information from outside sources on the subject. Maud adheres to their wishes and succeeds in forming very few beliefs regarding clairvoyance other than those promulgated within the organization. Now suppose that she is in fact clairvoyant, the process is reliable, and Maud forms the true belief that p via this process. Maud's belief is not justified since the evidence she has in support of the reliability of clairvoyance is flimsy and she chooses to ignore copious evidence to the contrary. Yet her belief satisfies both

(a) and (b) in (G). (b) is satisfied because Maud is not justified in believing that clairvoyance is not a reliable belief forming process. Her belief system is too impoverished to justify that belief despite the fact that she has ready access to evidence that would support it.

(G) is vulnerable to the case of Maud because it assumes that only evidence *one possesses* is relevant to the justification of one's beliefs. It does not take into account the *social* dimension of justification. Yet, as the case of Maud indicates, one cannot ignore readily available evidence and such evidence, even if ignored, can be relevant to the justification of one's beliefs. Hence, any plausible account of undermining evidence must take into account evidence that one does *not actually possess* but which is *present* within one's epistemic community and to which one has *ready access*. Goldman's (b) must be replaced by

(b*)   this permission is not undermined by S's cognitive state at t or evidence present within S's epistemic community to which S has ready access at t.[71]

(b*) yields the correct result that Maud's justification is undermined by the readily accessible evidence present in her epistemic community regarding the unreliability of clairvoyance. The primary consequence of (b*) is that information within S's epistemic community regarding both the possibility and the reliability of a belief forming process is relevant to whether that process justifies the beliefs that it produces in S. Hence, the question we must address is whether the causal inertness of abstract entities provides any basis for questioning the possibility or reliability of the processes alleged to produce beliefs about such entities.

Proponents of the a priori maintain that they have cognitive access to abstract entities via a nonexperiential process, call it *intuition*, and that the process justifies beliefs about those entities. Associated with the process are cognitive states with a unique phenomenology that its proponents recognize. The experience of such phenomenologically distinct states provides them with some reason to believe that they have cognitive access to abstract entities. But there is also contrary evidence of two kinds. First, there is controversy over the existence and reliability of intuition. Some maintain that they do not have the cognitive states in question, while others acknowledge having such states but deny that they provide cognitive access to abstract entities. Moreover, there are others who question the reliability of beliefs based upon intuition and there have been movements within the fields of mathematics and philosophy to dispel such appeals. In the face of evidence that others do not have such experiences, proponents of the a priori must believe either that they have unique cognitive equipment, or that the others have the same equipment but that it is malfunctioning, or that the others are less reliable reporters of the facts of their cognitive lives. There is little evi-

dence to support any of the alternatives. In the face of alleged instances of intuitive error, proponents can provide only anecdotal evidence to support the contention that the instances cited are anomalous and that the process is generally reliable.

Second, these problems are reinforced by the fact that little is known about the neurophysiological mechanisms by which intuition produces beliefs. Since we take for granted that all cognitive processes have a neurophysiological basis, the absence of supporting neurophysiological evidence heightens suspicions about the existence of the process. Moreover, the causal inertness of abstract entities ensures that they play no role in generating beliefs about them. Hence, if intuition is a reliable process, its reliability cannot be explained along the same lines as the reliability of our best understood cognitive processes. But, given that the underlying causal processes are unknown, we are not in a position to offer an alternative explanation. The belief that intuition is a reliable process introduces an explanatory gap, which reinforces the concerns about the reliability of the process.

The question before us is whether the causal inertness of abstract entities poses an obstacle to satisfaction of (b^*) in (G) by processes, such as intuition, that produce beliefs whose truth conditions refer to abstract entities. Beliefs produced by intuition satisfy (b^*) only if there is no readily accessible evidence present within one's epistemic community that calls into question the possibility or reliability of intuition. I have argued that there is such evidence. Reaching a final determination on the matter, however, requires a more detailed investigation of two issues: the scope and quality of the evidence; and how strongly a potential defeater must be supported in order to defeat the justification conferred on a belief by virtue of its being reliably produced. This more detailed investigation goes beyond the scope of the present discussion. My primary conclusion is that, within the framework of process reliabilism, the causal inertness of abstract entities poses a *threat* to a priori justification. Although process reliabilism does not rule out the *possibility* that processes such as intuition justify beliefs whose truth conditions refer to abstract entities, the absence of an explanation of how those processes can reliably produce such beliefs generates potential defeaters for such justification.

4.5. Scientific Naturalism

The final issue that we must address is whether scientific naturalism precludes knowledge of abstract entities. Penelope Maddy provides the most articulate attempt to show that the causal inertness of such entities poses a genuine problem regarding mathematical knowledge from a Quinean naturalized perspective. The problem is not conceptual but explanatory. When mathematicians, such as R. M. Solovay, form opinions on mathematical matters, they are usually correct. Hence,

> Even if reliabilism turns out not to be the correct analysis of knowledge and justification, indeed, even if knowledge and justification themselves turn out to be dispensable notions, there will remain the problem of explaining the undeniable fact of our expert's reliability. In particular, even from a completely naturalized perspective, the Platonist still owes us an explanation of how and why Solovay's beliefs about sets are reliable indicators of the truth about sets.[72]

The causal inertness of abstract entities, alleges Maddy, is a bar to explaining the reliability of Solovay's mathematical beliefs.

From a completely naturalized perspective, science is an autonomous discipline that is not subject to philosophical demands from without. Hence, if the bar to an explanation of Solovay's reliability arises from within a completely naturalized perspective, it must arise from within science. Maddy offers the following reason for thinking that the causal inertness of mathematical entities poses an obstacle to providing a scientifically acceptable answer:

> Obviously, what we are up against here is another, less specific, version of the same vague conviction that makes the causal theory of knowledge so persuasive: in order to be dependable, the process by which I come to believe claims about xs must ultimately be responsive in some appropriate way to actual xs.[73]

The alleged bar to explaining Solovay's reliability is a causal condition on reliable belief formation:

(M)   The process by which S comes to have beliefs about xs is reliable (dependable) only if that process is appropriately responsive to xs.

If the alleged bar arises from within science, there must be evidence from some relevant branch of science that supports (M). Maddy offers three supporting considerations:

(a)   the mathematics/science analogy;
(b)   the belief that all explanations are ultimately causal;
(c)   a strong form of physicalism.

All three considerations appear to be philosophical in character. Moreover, Maddy does not attempt to dispel the appearances by offering some evidence that commitment to either (a), (b), or (c) arises from within science. She does, however, maintain that there is support for (a) from within mathematics.

According to the mathematics/science analogy, mathematics resembles natural science in two important respects:

(a1)   Some mathematical beliefs are basic and noninferential;
(a2)   Basic mathematical beliefs are produced by a "perception-like" mechanism, which is most likely casual.[74]

The support Maddy offers for the analogy from within mathematics is that

> mathematicians are not apt to think that the justification for their claims waits on the activities in the physics labs. Rather, mathematicians have a whole range of justificatory practices of their own, ranging from proofs and intuitive evidence, to plausibility arguments and defences in terms of consequences.[75]

Maddy's description of mathematical practice, if taken at face value, supports (a1); it supports a conception of mathematics as an autonomous discipline with its own justificatory procedures, some of which are noninferential. The primary epistemic consequence of the description is that it undercuts Quine's holistic account of mathematical knowledge. Nothing in the description supports (a2). The only support that Maddy offers for (a2) is the opinion of one, albeit significant, mathematician: Kurt Gödel. But from the fact that one mathematician endorses (a2), it does not follow that it is supported by *mathematical practice*. Mathematicians can have opinions about issues that don't arise from within mathematics and not all issues about mathematics arise from within mathematics. Some arise from within traditional epistemology. What needs to be shown is that Gödel is addressing a question that arises from within the practice of mathematics and that his answer is generally accepted mathematical practice.

In conclusion, scientific naturalists must provide evidence from within science that indicates that knowledge of abstract entities is problematic. Our examination of Maddy's position reveals that the supporting evidence she offers is philosophical rather than scientific. Hence, she has not provided a reason to believe that scientific naturalism cannot accommodate such knowledge.

5. TOWARD A RESOLUTION

The results of sections 3 and 4 are inconclusive. Neither proponents nor opponents of the a priori offer convincing arguments for their position. Moreover, their strategy is typically negative: each argues, primarily on a priori grounds, that the opposing position is deficient in some respect. The result is an impasse.

Advancing the debate beyond this impasse requires offering supporting evidence for one of the positions that is compelling to both parties. The most promising strategy for advancing the case for the a priori is to enlist empirical support for the claim that there are nonexperiential sources of justification.[76]

This strategy recommends itself on two grounds. The first is dialectical. A case for the a priori that is based on evidence and methodological principles endorsed by radical empiricists is one that they must acknowledge by their own lights. This dialectical advantage persists even if there is some competing, noncircular, a priori argument in the wings. The second is strategic. By limiting themselves to a priori arguments, proponents of the a priori place themselves in a needlessly handicapped position. They acknowledge that we have both a priori and a posteriori justified beliefs, yet don't employ the latter when supporting their position. In the absence of some principled objection to employing a posteriori support, it is simply a mistake to overlook it.

What empirical evidence is relevant to establishing that there are nonexperiential sources of justification? Before proponents of the a priori can enlist empirical support for this claim, it must be more fully articulated. Let us call this the *Articulation Project* (AP):

> Provide (a) a generally accepted description, at least at the phenomenological level, of the cognitive states that noninferentially justify beliefs a priori; (b) the type of beliefs they justify; and (c) the conditions under which they justify the beliefs in question.[77]

We now briefly canvass the three components of (AP).

Much of the controversy over the a priori focuses on the cognitive states alleged to justify a priori. Radical empiricists claim that they find these states puzzling or even mysterious. Proponents respond that they are familiar and offer phenomenological descriptions. Yet, if one surveys these descriptions, one finds enormous variation.

Alvin Plantinga appeals to an analogy with perception to characterize the source of a priori knowledge: "*one* way to believe *p* a priori is to see that it is true."[78] Furthermore, he alleges that

> [This 'seeing'] consists, first (I suggest), in your finding yourself utterly convinced that the proposition in question is *true*. It consists second, however, in finding yourself utterly convinced that this proposition is not only true, but *could not have been false*.[79]

According to Plantinga, the perceptual analogy can be articulated in terms of some more familiar cognitive state. Phenomenological reflection reveals that the

"seeing" that underlies a priori justification is not at all mysterious. It consists in being convinced that p is necessarily true.

Plantinga is not alone in resorting to a perceptual analogy to characterize the source of a priori justification. Laurence BonJour also appeals to such an analogy in articulating his account of a priori justification. He offers the following description of rational insight, the alleged source of such justification:

> when I carefully and reflectively consider the proposition (or inference) in question, I am able simply to see or grasp or apprehend that the proposition is *necessary*, that it must be true in any possible world or situation (or alternatively that the conclusion of the inference must be true if the premises are true).[80]

Although he endorses the perceptual analogy, BonJour disagrees with Plantinga in a fundamental respect. He insists that a priori insights are apparently *irreducible*: "they are apparently incapable of being reduced to or constituted out of some constellation of discursive steps or simpler cognitive elements of some other kind."[81] The perceptual metaphor cannot be articulated in terms of some more familiar cognitive state. Plantinga, alleges BonJour, simply misrepresents the phenomenological facts.[82]

Despite their differences, BonJour and Plantinga seem to agree on one point: the cognitive state that justifies a priori the belief that p includes the belief that p. George Bealer, however, disagrees even with this point. According to Bealer, a priori justification is rooted in a priori *intuition*:

> We do not mean [by intuition] a magical power or inner voice or anything of the sort. For you to have an intuition that A is just for it to *seem* to you that A. Here 'seems' is understood, not as a cautionary or "hedging" term, but in its use as a term for a genuine kind of conscious episode. … Of course, this kind of seeming is *intellectual*, not sensory or introspective (or imaginative). The subject here is *a priori* (or rational) intuition.[83]

An intellectual seeming that p must be distinguished from a belief that p. For example, it may seem to one that the naive comprehension axiom of set theory is true although one does not believe that it is true. Conversely, there are mathematical theorems that one believes on the basis of having constructed a proof but that don't seem to be either true or false.

Ernest Sosa agrees with Bealer that an intuition that p need not involve the belief that p or, for that matter, any belief at all. Nevertheless, he suggests that such seemings might be analyzable in terms of what one *would* believe in certain circumstances:

Seemings then, whether sensory or intellectual, might be viewed as inclina-
tions to believe on the basis of direct experience (sensory) or understanding
(intellectual) and regardless of any collateral reasoning, memory, or intro-
spection – where the objects of *intellectual* seeming also present themselves
as necessary.[84]

Sosa and Bealer differ in two significant respects. First, they offer different
phenomenological descriptions of seemings. Sosa maintains that an intellec-
tual seeming that p is an inclination to believe that p based on understanding
that p. Bealer insists that "intuition is a *sui generis*, irreducible, natural
propositional attitude which occurs episodically."[85] Hence, Bealer agrees with
BonJour that the cognitive state that justifies a priori is irreducible but dis-
agrees with him over the character of the state. Sosa, on the other hand, agrees
with Plantinga that the state is reducible to a more familiar cognitive state but
disagrees with him over the character of the reducing state. Second, although
both agree that there are sensory and intellectual seemings, they disagree over
how those seemings differ.[86] Bealer maintains that sensory seemings and intel-
lectual seemings are phenomenologically distinct conscious states. According
to Sosa, they do not differ phenomenologically. Both involve an inclination to
believe that p, but they differ in the basis of the inclination: sensory seemings
are based on direct experience, while intellectual seemings are based on
understanding.

Proponents of the a priori are faced with a dilemma. Either we have direct
introspective access to the cognitive states that provide noninferential a priori
justification or we do not. If we do, sympathetic proponents of the position
should be able to agree on the correct description of those states. If we do not,
then some alternative rationale must be offered to support the claim that there
are such states. The lack of consensus among proponents lends support to the
claim of radical empiricists that more needs to be said here.

Turning to the second component of (AP), there is also wide variation among
proponents over the scope of beliefs justified a priori. These differences are not
typically manifest within epistemological contexts since the focus is on stock
examples such as elementary logical or mathematical propositions, simple
analytic truths, and some familiar cases of alleged synthetic a priori truths. Few
proponents, however, maintain that a priori knowledge is limited to those cases.
Consequently, they cannot effectively address the issue of the truth-conduciveness
of the cognitive states that are alleged to justify a priori by focusing exclusively on
the noncontroversial cases. Instead, they must provide a more complete specifi-
cation of the range of beliefs alleged to be justified by such states. In the absence
of a more complete articulation of the scope of the a priori, the crucial issue of

truth-conduciveness will remain a subject of speculation, supported or rejected by bits of anecdotal evidence.

There is one issue regarding the scope of a priori justification that requires particular attention. The examples of a priori knowledge typically cited by proponents are necessary truths. But, as we stressed in section 3, we must be careful to distinguish between knowledge of the *truth value* of a necessary proposition as opposed to knowledge of its *general modal status*. A critical question arises here. What is the target of a priori justification: the general modal status of a proposition, its truth value, or both? If a priori justification extends to the truth value of propositions, two further questions arise. Are beliefs regarding the truth value of necessary propositions and beliefs regarding their general modal status justified by a single cognitive state or different cognitive states? Can one have an a priori justified belief that a contingent proposition is true?

The third component of (AP) concerns the conditions under which beliefs are justified a priori. There are two distinct sets of issues here. The first is a specification of the conditions under which beliefs are prima facie justified by the cognitive state proposed as the source of a priori justification. BonJour, for example, maintains that there are certain background conditions that must be satisfied in order for an apparent rational insight to have its justificatory force: the proposition must be considered with reasonable care, the person must have an approximate grasp of the concept of necessity, and one's reason must not be clouded by dogmatism or bias.[87] Two questions emerge. Is the list complete? Are the conditions sufficiently articulated so that it can be determined whether they are satisfied? One condition is that the cognizer have an *adequate grasp* of the concept of necessity. Does such a grasp require familiarity with the basic principles of modal logic? Does a modal sceptic lack all a priori knowledge?

The second is a specification of the conditions under which prima facie a priori justification is defeasible. Defeaters fall into two broad categories: overriding defeaters and undermining defeaters. There are two primary questions in the case of overriding defeaters. First, under what conditions, if any, do conflicts of rational insight undermine justification based on such insight? Second, can there be empirically justified overriding defeaters for beliefs justified a priori? Parallel questions arise in the case of undermining defeaters. Does a track record of conflicting beliefs or errors based on rational insight undermine justification based on such insight? Can a priori justified beliefs be defeated by empirically justified beliefs regarding the cognitive processes that underlie rational insight?

Once the main pieces of the Articulation Project are in place, the project of offering empirical supporting evidence for the a priori can be implemented. Let us call this the *Empirical Project* (EP):

Provide (a) evidence that the cognitive states identified at the phenomeno-logical level are associated with processes of a single type or relevantly sim-ilar types; (b) evidence that the associated processes play a role in producing or sustaining the beliefs they are alleged to justify; (c) evidence that the associated processes are truth-conducive; and (d) an explanation of how the associated processes produce the beliefs they are alleged to justify.

We now briefly canvass the four areas of investigation highlighted by (EP).[88]

The leading claim of proponents of the a priori is that sources of justification are of two significantly different types: experiential and nonexperiential. Initially, this difference is marked at the phenomenological level. Proponents identify certain phenomenologically distinct states as the source of a priori justification. The fact that the states are phenomenologically distinct, however, does not ensure either that they are produced exclusively by processes of a single type or, if they are, that those processes differ significantly from experiential processes. Yet the character of the processes that produce the state is relevant to whether the state justifies a priori.

For example, suppose that intellectual seemings have a distinctive and readily identifiable phenomenological character. Moreover, suppose that a tutor teaches a child to "see" that 4 x 4 = 16 by utilizing techniques like those employed in the *Meno* and also teaches the child that balls roll down inclined planes by having the child perform experiments with balls and planes. Finally, suppose that the child later forgets the tutor's lessons but, as a result of them, both propositions, when considered, appear to the child to be true. It is implausible to maintain that both beliefs are justified a priori for the child. The first is justified a priori since it is based on a "rational" or nonexperiential process, but the second is justified a pos-teriori since it is based on a perceptual or experiential process. Hence, the fact that some cognitive states have a distinctive phenomenology, one different from those associated with familiar experiential processes such as perception, memory or introspection, does not ensure either that those states are produced by a single type of process or that the process producing them is nonexperiential.

The second area of investigation assesses the claim that beliefs alleged to be jus-tified a priori are produced and/or sustained by processes involving the cognitive state alleged to provide such justification. If an epistemic theory is to provide an account of how our beliefs are *in fact* justified, then the processes to which the theory appeals must actually play some role in acquiring or sustaining the beliefs in question. Empirical investigation can offer support for this claim. Although a proponent of the a priori might rest content with the weaker claim that the processes in question *can* justify beliefs a priori, empirical considerations remain relevant in three ways. First, if the weaker claim involves more than an assertion of mere logical possibility, evidence is necessary to show that the cognitive process in

question can, in some more robust sense, play a role in producing or sustaining the beliefs in question. Second, the epistemic status of our *actual* beliefs regarding the subject matter in question must be addressed. Do the processes that actually produce the beliefs in question also justify those beliefs? Are our actual beliefs epistemically overdetermined or unjustified? Third, some explanation of why the nonexperiential process is not employed by cognizers is in order. Is it because the process can be employed only by experts? Is it because the process is cognitively dispensable? Answers to these questions are necessary to provide an accurate picture of the role of such processes in our cognitive economy.

The third area of investigation addresses the issue of truth-conduciveness. The issue plays a dual role. If truth-conduciveness is a necessary condition for epistemic justification, as many proponents of the a priori allege,[89] or, if it is a necessary condition for a priori justification, as others allege,[90] then if one is to offer evidence in support of the claim that a particular cognitive process is a source of a priori justification, one must offer evidence in support of the claim that beliefs based on that process are likely to be true. Even those who deny that truth-conduciveness is a necessary condition for epistemic justification concede that evidence to the effect that a particular source of beliefs is error-conducive defeats the justification such a source confers on the beliefs that it produces. If one is to offer evidence in support of the claim that a particular process is a source of a priori justification, one must offer evidence in support of the claim that defeating evidence is not available that undermines the capacity of that source to justify any beliefs. The claim that a process is truth-conducive or, more minimally, that it is not error- conducive is a contingent general claim that can only be supported by empirical investigation.

Empirical investigation can play a second important role in assessing the credentials of a cognitive process. In order to assess the truth-conduciveness of a belief forming process, one must have some approximation of the full range of beliefs that can be produced and/or sustained by the process in question. The a priori is typically introduced and defended using a narrow range of examples. Radical empiricists often attack the a priori by arguing that some of the examples, such as the principles of Euclidean geometry, have turned out to be false. Merely settling these disputes cannot either convincingly support or refute the a priori since the range of cases under consideration is so limited. Historical and psychological investigations, however, can provide a fuller picture of the range of beliefs produced by such processes.

The fourth area of empirical investigation, which focuses on explanatory considerations, offers the prospect of advancing the case for the a priori along several different fronts. First, if such investigation reveals that the cognitive processes associated with states alleged to justify a priori are of a single type or

of relevantly similar types, then identification of the distinctive features of those processes might provide the basis for articulating the experiential/non-experiential distinction. The net result would be a deeper understanding of the concept of a priori justification. Second, such investigations may provide a better understanding of how the processes in question produce true beliefs about their subject matter. This understanding, in turn, is the key to providing a noncausal-perceptual explanation of how the states in question provide cognitive access to the subject matter of the beliefs they produce and why they are truth-conducive. Third, as we achieve a better understanding of these processes, our epistemological and psychological theories become more integrated. The fact that our epistemological theory coheres well with psychological theories for which we have independent support increases the overall support for the former theory.

6. CONCLUSION

I have argued for three primary conclusions. The first is a minimal conception of a priori justification: a priori justification is nonexperiential justification. Second, the traditional arguments, based largely on a priori considerations, both for and against the existence of a priori knowledge are inconclusive. Finally, the most promising strategy for advancing the case for the a priori is to offer empirical supporting evidence for the claim that there are nonempirical sources of justification.[91]

NOTES

1. Immanuel Kant, *Critique of Pure Reason*, trans. N. K. Smith (New York: St Martin's Press, 1965).
2. Ibid., 43.
3. Philip Kitcher, *The Nature of Mathematical Knowledge* (New York: Oxford University Press, 1983), chap. 1.
4. W. V. Quine, "Two Dogmas of Empiricism," in *From A Logical Point of View*, 2d rev. ed. (New York: Harper and Row, 1963).
5. Hilary Putnam, "'Two Dogmas' Revisited," in *Realism and Reason: Philosophical Papers*, vol. 3 (Cambridge: Cambridge University Press, 1983).
6. See, for example, Albert Casullo, "Revisability, Reliabilism, and A Priori Knowledge," *Philosophy and Phenomenological Research* 49 (1988): 187–213; Aron Edidin, "A Priori Knowledge for Fallibilists," *Philosophical Studies* 46 (1984): 189–197; Bob Hale, *Abstract Objects* (Oxford: Basil Blackwell, 1987), chap. 6; and Donna Summerfield, "Modest A Priori Knowledge," *Philosophy and Phenomenological Research* 51 (1991): 39–66. The articles by Casullo, Edidin and Summerfield are reprinted in *A Priori Knowledge*, ed. Albert Casullo (Aldershot: Dartmouth Publishing Company, 1999). For more comprehensive bibliographies on the a priori, see Albert

Casullo, "A Priori Knowledge Appraised," in *A Priori Knowledge*, ed. Casullo; and *A Priori Knowledge*, ed. Paul K. Moser (Oxford: Oxford University Press, 1987).

7. Paul Benacerraf, "Mathematical Truth," *Journal of Philosophy* 70 (1973): 661–679.

8. R. M. Chisholm, *Theory of Knowledge*, 3d ed. (Englewood Cliffs: Prentice Hall, 1989), 26–28, provides a cogent account of the traditional view.

9. See, for example, Albert Casullo, "Causality, Reliabilism, and Mathematical Knowledge," *Philosophy and Phenomenological Research* 52 (1992): 557–584; Hartry Field, *Realism, Mathematics and Modality* (Oxford: Blackwell, 1989); Bob Hale, "Is Platonism Epistemologically Bankrupt?," *Philosophical Review* 103 (1994): 299–324; Jerrold J. Katz, "What Mathematical Knowledge Could Be," *Mind* 104 (1995): 491–522; and Penelope Maddy, "Mathematical Epistemology: What is the Question?," *Monist* 67 (1984): 46–55. The four articles are reprinted in *A Priori Knowledge*, ed. Casullo.

10. Saul Kripke, "Identity and Necessity," in *Identity and Individuation*, ed. M. K. Munitz (New York: New York University Press, 1971); and *Naming and Necessity* (Cambridge: Harvard University Press, 1980).

11. See, for example, C. Anthony Anderson, "Toward a Logic of A Priori Knowledge," *Philosophical Topics* 21 (1993): 1–20; Albert Casullo, "Kripke on the A Priori and the Necessary," *Analysis* 37 (1977): 152–159; Keith S. Donnellan, "The Contingent A Priori and Rigid Designators," in *Contemporary Perspectives on the Philosophy of Language*, ed. P. French et al. (Minneapolis: University of Minnesota Press, 1979); Gareth Evans, "Reference and Contingency," *Monist* 62 (1979): 161–189; Philip Kitcher, "Apriority and Necessity," *Australasian Journal of Philosophy* 58 (1980): 89–101; and R. G. Swinburne, "Analyticity, Necessity, and Apriority," *Mind* 84 (1975): 225–243. The articles by Casullo, Kitcher and Swinburne are reprinted in *A Priori Knowledge*, ed. Moser. The article by Anderson is reprinted in *A Priori Knowledge*, ed. Casullo.

12. See, for example, Carl Hempel, "On the Nature of Mathematical Truth," in *Necessary Truth*, ed. R. C. Sleigh (Englewood Cliffs: Prentice-Hall, 1972); and A. J. Ayer, *Language, Truth and Logic* (New York: Dover, 1952).

13. Quine, "Two Dogmas."

14. See, for example, Paul A. Boghossian, "Analyticity Reconsidered," *Nous* 30 (1996): 360–391; Laurence BonJour, "A Rationalist Manifesto," *Canadian Journal of Philosophy*, supp. vol. 18 (1992): 53–88; M. Giaquinto, "Non-Analytic Conceptual Knowledge," *Mind* 105 (1996): 249–268; Gilbert Harman, "Analyticity Regained?," *Nous* 30 (1996): 392–400; and Putnam, " 'Two Dogmas' Revisited." The first four articles are reprinted in *A Priori Knowledge*, ed. Casullo.

15. Kant, *Critique of Pure Reason*, 42, states that "Such universal modes of knowledge, which at the same time possess the character of inner necessity, must in themselves, independently of experience, be clear and certain. They are therefore entitled knowledge a priori; ... "

16. For a more comprehensive discussion of analyses of the concept of a priori knowledge, see chaps. 1–3 of Albert Casullo, *A Priori Justification* (New York: Oxford University Press, 2003).

17. See, for example, Kitcher, *The Nature of Mathematical Knowledge*, and Swinburne.

18. Anthony Quinton, "The A Priori and the Analytic," in *Necessary Truth*, ed. Sleigh, 90.

19. Ibid., 92.

20. Ibid., 93. The emphasis is Quinton's.

21. Swinburne, in A Priori *Knowledge*, ed. Moser, 186–187.

22. Ibid., 186.

23. Laurence BonJour, *The Structure of Empirical Knowledge* (Cambridge: Harvard University Press, 1985), 192. BonJour no longer endorses this conception.

24. See, for example, Chisholm, 41.

25. Ibid., 28.

26. Ibid.

27. Ibid., 29.

28. Ibid., 26. The quoted passage is from G. W. Leibniz, *New Essays Concerning Human Understanding*, trans. and ed. Peter Remnant and Jonathan Bennett (New York: Cambridge University Press, 1982), book IV, chap. 7.

29. Kripke, *Naming and Necessity*; and Kitcher "Apriority and Necessity."

30. Chisholm, *Theory of Knowledge*, 2d ed., 12, states that "p is certain for S = Df For every q, believing p is more justified for S than withholding q, and believing p is at least as justified for S as believing q."

31. See Panayot Butchvarov, *The Concept of Knowledge* (Evanston: Northwestern University Press, 1970), part 1, section 9; and John L. Pollock, *Knowledge and Justification* (Princeton: Princeton University Press, 1974), chap. 10.

32. Butchvarov, *Concept of Knowledge*, 93.

33. Laurence BonJour, *In Defense of Pure Reason* (Cambridge: Cambridge University Press, 1998), 106–110.

34. Kitcher, *The Nature of Mathematical Knowledge*, 89.

35. Hilary Putnam, "Analyticity and Apriority: Beyond Wittgenstein and Quine," in *Realism and Reason: Philosophical Papers*, vol. 3 (Cambridge: Cambridge University Press, 1983), 127.

36. It is commonplace to distinguish between those a priori justified beliefs that are *directly* justified and those that are *indirectly* justified by nonexperiential sources. Those that are justified indirectly are justified exclusively by other beliefs that are either directly justified by nonexperiential sources or justified exclusively by other beliefs that are directly justified by nonexperiential sources. For ease of exposition, I do not introduce the distinction into my formulations. The reader should regard it as implicit in these and subsequent formulations.

37. Kripke, *Naming and Necessity*, 35.

38. Kitcher, *The Nature of Mathematical Knowledge*, 22. The plausibility of Kitcher's criterion derives from the observation that the following argument is intuitively invalid: S knows that p. It is possible that S knows a priori that p. Therefore, S knows a priori that p.

39. I follow Kitcher, *The Nature of Mathematical Knowledge*, 22, here in assuming that the modalities collapse.

40. S's justified belief that not-p is an *overriding* defeater for S's justified belief that p. S's justified belief that S's justification for the belief that p is inadequate or defective is an *undermining* defeater for S's justified belief that p.

41.   There are versions of each of these three types of argument stated in terms of *justi-fication* rather than *knowledge*. For ease of exposition, when offering general charac-terizations, I offer only the version stated in terms of *knowledge*. I use the term "radical empiricism" to designate the view that *denies* the existence of a priori knowledge, and the term "apriorism" to designate the view that *affirms* the existence of such knowledge. Similarly, I use "radical empiricist" to designate a person or theory endorsing radical empiricism, and "apriorist" to designate a person or theory endorsing apriorism. For a more comprehensive discussion of the supporting argu-ments, see Casullo, *A Priori Justification*, chapter 4.

42.   Hilary Putnam, "There Is at Least One A Priori Truth," in *Realism and Reason: Philosophical Papers*, vol. 3 (Cambridge: Cambridge University Press, 1983), 98.

43.   See, for example, Hilary Putnam, "The Analytic and The Synthetic," in *Mind, Language and Reality: Philosophical Papers*, vol. 2 (Cambridge: Cambridge University Press, 1975).

44.   Putnam, "There Is at Least One A Priori Truth," 106.

45.   Kant, 43. Kant's claim is echoed by Bertrand Russell, *The Problems of Philosophy* (Oxford: Oxford University Press, 1971), chap. 7; and by Roderick Chisholm, *Theory of Knowledge*, 2d ed. (Englewood Cliffs: Prentice-Hall, 1977), chap. 3.

46.   Ibid.

47.   Ibid., 52.

48.   Saul Kripke, "Identity and Necessity," and *Naming and Necessity*.

49.   Tyler Burge, "Content Preservation," *Philosophical Review* 102 (1993): 457–488, disputes this claim. Burge's article is reprinted in *A Priori Knowledge*, ed. Casullo.

50.   See, for example R. M. Chisholm, *Theory of Knowledge*, 2d ed., 37; and C. McGinn "*A Priori* and *A Posteriori* Knowledge," *Proceedings of the Aristotelian Society* 76 (1975–76), 204. Philip Kitcher, "Apriority and Necessity," 100–101, also maintains that the plausibility of the Modal version of the Argument from Necessity depends on this claim. He goes on to reject the argument for reasons different from mine.

51.   Carl Hempel, "On the Nature of Mathematical Truth," 36. A. J. Ayer, *Language, Truth and Logic*, 75–76, offers a similar argument.

52.   Laurence BonJour, *In Defense of Pure Reason*, 4. For a more comprehensive discussion of BonJour's position, see Albert Casullo, "The Coherence of Empiricism," *Pacific Philosophical Quarterly* 81 (2000): 31–48.

53.   Ibid., 91.

54.   Ibid., 92.

55.   BonJour, ibid., 162, articulates the view as follows:
      A person apprehends or grasps, for example, the properties redness and greenness, and supposedly "sees" on the basis of this apprehension that they cannot be jointly instantiated. Such a picture clearly seems to presuppose that as a result of this apprehension or grasping, the properties of redness and greenness are themselves before the mind in a way that allows their natures and mutual incompatibility to be apparent.

56.   Ibid., 184. The emphasis is mine.

57.   Ibid., 145.

58.   Hilary Putnam, "There Is at Least One A Priori Truth," 98. Putnam provides a lucid summary of his case against the a priori in " 'Two Dogmas' Revisited." For a more

comprehensive discussion of the opposing arguments, see Casullo, *A Priori Justification*, chap. 5.

59. Kitcher, *The Nature of Mathematical Knowledge*, 88.

60. Self-correction comes in degrees. A weaker form can be defined as follows: for *some* false belief that p produced in S by Φ, Φ can also justify for S the belief that not-p. Patently, other versions, both stronger and weaker, are possible. I use the strong version in this context since it yields a more straightforward argument.

61. See for example, D. M. Armstrong, "Is Introspective Knowledge Incorrigible?," *Philosophical Review* 72 (1963): 417–432.

62. John Stuart Mill, *A System of Logic*, ed. J. M. Robson (Toronto: University of Toronto Press, 1973), book II, chaps. V and VI.

63. Ibid., 41.

64. Quine, "Two Dogmas of Empiricism."

65. Putnam, "'Two Dogmas' Revisited."

66. Paul Benacerraf, "Mathematical Truth," *Journal of Philosophy* 70 (1973): 661–679.

67. W. D. Hart, "Review of Mark Steiner, *Mathematical Knowledge*," *Journal of Philosophy* 74 (1977), 125–126, argues that "it is a crime against the intellect to try to mask the problem of naturalizing the epistemology of mathematics with philosophical razzle-dazzle. Superficial worries about the intellectual hygiene of causal theories of knowledge are irrelevant to and misleading from this problem, for the problem is not so much about causality as about the very possibility of natural knowledge of abstract objects."

68. W. V. Quine, "Epistemology Naturalized," in *Ontological Relativity and Other Essays* (New York: Columbia University Press, 1969).

69. Alvin Goldman, *Epistemology and Cognition* (Cambridge: Harvard University Press, 1986), 63.

70. This is a variation of a case presented by BonJour, *The Structure of Empirical Knowledge,* 40, and discussed by Goldman, *Epistemology and Cognition*, 111–112.

71. Gilbert Harman, *Thought* (Princeton: Princeton University Press, 1973), chap. 9, and *Change in View* (Cambridge: The MIT Press, 1986), chap. 5, forcefully draws attention to the importance of evidence one does not possess. Alvin Goldman, "What is Justified Belief?" in *Justification and Knowledge*, ed. George S. Pappas (Dordrecht: Reidel, 1979), 20, acknowledges the relevance of available belief forming processes in an earlier account of undermining evidence. This account, however, is too restrictive to handle the case of Maud since Goldman explicitly rules out gathering new evidence from the scope of available processes.

72. Penelope Maddy, *Realism in Mathematics* (Oxford: Oxford University Press, 1990), 43.

73. Ibid., 44.

74. Ibid., 45–46.

75. Ibid., 31.

76. This proposal is more fully elaborated and defended against potential objections in Casullo, *A Priori Justification*, chap. 6.

77. Our focus here, and in the subsequent discussion, is on the sources of *noninferential*, or *basic*, a priori justification since inferential, or nonbasic, a priori justifi-

cation results from applying inferential principles that are (noninferentially) justified a priori to other beliefs that are (noninferentially) justified a priori. Hence, in the final analysis, all a priori justified beliefs are ultimately justified by those sources.

78. Plantinga, *Warrant and Proper Function*, 106.

79. Ibid., 105.

80. BonJour, *In Defense of Pure Reason*, 106.

81. Ibid., 108.

82. Ibid., nn. 12 and 13.

83. George Bealer, "A Priori Knowledge and the Scope of Philosophy," *Philosophical Studies* 81 (1996), 123, reprinted in *A Priori Knowledge*, ed. Casullo.

84. Ernest Sosa, "Rational Intuition: Bealer on its Nature and Epistemic Status," *Philosophical Studies* 81 (1996), 154, reprinted in *A Priori Knowledge*, ed. Casullo.

85. George Bealer, "A Priori Knowledge: Replies to William Lycan and Ernest Sosa," *Philosophical Studies* 81 (1996), 169, reprinted in *A Priori Knowledge*, ed. Casullo.

86. The Müller-Lyer illusion provides an example of a sensory seeming.

87. BonJour, *In Defense of Pure Reason*, 133–137. He offers two different descriptions of what occurs when a cognizer fails to satisfy a background condition for justification by an apparent rational insight: (1) the cognizer fails to have even an apparent rational insight; and (2) the justificatory force of the apparent rational insight is defeated.

88. Alvin Goldman, "A Priori Warrant and Naturalistic Epistemology," *Philosophical Perspectives* 13 (1999), 1–28, argues that psychological studies are relevant to the existence of a priori knowledge. His focus is on whether such studies support the view that basic mathematical and logical skills are innate.

89. George Bealer, Alvin Plantinga and Ernest Sosa endorse such a condition although there are differences in their positions. Bealer, "A Priori Knowledge and the Scope of Philosophy," 129, endorses a reliabilist conception of *basic sources of evidence*: "something is a basic source of evidence iff it has a certain kind of reliable tie to the truth." Plantinga, *Warrant and Proper Function*, 17, endorses a reliabilist constraint on *warrant*: "the module of the design plan governing its production must be such that it is objectively highly probable that a belief produced by cognitive faculties functioning properly according to that module (in a congenial environment) will be true or verisimilitudinous." Sosa, "Modal and Other A Priori Epistemology: How Can We Know What is Possible and What Impossible?," *Southern Journal of Philosophy* 38, Supplement (2000), 4, endorses a reliabilist condition on *epistemic justification*: "The epistemic justification of a belief B at a time t may thus require the production of B at t through a virtue V resident in that subject. What is required for a disposition V to be a virtue is that in normal circumstances V would yield a sufficient preponderance of true beliefs in subjects like S." Although Laurence BonJour, *In Defense of Pure Reason*, 1, rejects reliabilist accounts of epistemic justification, he does introduce truth-conduciveness into his characterization of *epistemic reasons*: "Knowledge requires instead that the belief in question be justified or rational in a way that is internally connected to the defining goal of the cognitive enterprise, that is, that there be a reason that enhances, to an appropriate degree, the

chances that the belief is *true*. Justification of this distinctive, truth-conducive sort will be here referred to as *epistemic justification*."

90. The most familiar example holds that, in the case of basic (or noninferentially) justified a priori belief that p, understanding that p is sufficient to "see" that p is true.

91. Thanks to Tim Black for his careful reading of an earlier version of this paper and for his helpful comments.

7

Epistemic Overdetermination and
A Priori Justification

Radical empiricism is the view that experience is the only source of knowledge. Hence, radical empiricism denies the existence of a priori knowledge. Its most famous proponents are John Stuart Mill and W. V. Quine. Although both reject a priori knowledge, they offer different empiricist accounts of the knowledge alleged by their opponents to be a priori. My primary concern in this paper is not with the cogency of their positive accounts. My focus is their arguments against a priori knowledge. My goal is to establish that although they offer very different arguments against the existence of a priori knowledge, each of their arguments suffers from a common defect. They both fail to appreciate the phenomenon of epistemic overdetermination and its role in the theory of knowledge.

In section 1 of the paper, I articulate Mill's position and maintain that the key premise in his argument against the existence of a priori knowledge is a version of the Explanatory Simplicity Principle. In section 2, I elaborate the role of epistemic overdetermination in a theory of knowledge, and argue that the Explanatory Simplicity Principle is incompatible with a form of epistemic overdetermination. In section 3, I turn to a version of Quine's argument against the a priori, which has been forcefully advanced by both Hilary Putnam and Philip Kitcher, and show that the key premise of the argument is the Weak Unrevisability Condition. Finally, in section 4, I examine the relationship between epistemic overdetermination and defeasible justification, and argue that the Weak Unrevisability Condition is incompatible with a form of epistemic overdetermination.

I. MILL

Mill's argument against the existence of a priori knowledge is presented within the context of offering an empiricist account of our knowledge of geometry and arithmetic. The stage for Mill's account is set by Kant. Kant characterizes a priori knowledge as "independent of experience," contrasting it with a posteriori knowledge, which has its "sources" in experience.[1] Presumably, when Kant speaks of the "source" of knowledge, he does not mean the source of the belief in question, but the source of its justification. Hence, according to Kant,

> (K)　S knows a priori that p just in case S's belief that p is justified by some nonexperiential source and the other conditions for knowledge are satisfied.

Kant argues that necessity is a criterion of a priori knowledge, and maintains that "if we have a proposition which in being thought is thought as *necessary*, it is an a priori judgment."[2] He goes on to argue that "mathematical propositions, strictly so-called, are always judgments a priori, not empirical; because they carry with them necessity, which cannot be derived from experience."[3] Since Kant maintains that we know some mathematical propositions, he concludes that such knowledge is a priori.

Mill begs to differ. He agrees that we know some mathematical propositions, but denies that such knowledge is a priori. His account of mathematical knowledge is a version of inductive empiricism. Inductive empiricism with respect to a domain of knowledge involves two theses. First, some propositions within that domain are epistemically more basic than the others, in the sense that the non-basic propositions derive their justification from the basic propositions via infer-ence. Second, the basic propositions are known by a process of inductive inference from observed cases. Mill's focus is on the basic propositions of arithmetic and geometry: the axioms and definitions of each domain. His primary goal is to establish that they are known by induction from observed cases.

The details of Mill's account are strained. He advances four primary theses regarding the definitions of geometry. First, they are not stipulations regarding the meanings of terms, but involve "an implied assumption that there exists a real thing conformable thereto."[4] Second, no real things—i.e., real points, real lines, real circles, real squares, etc.—conform exactly to the definitions. Third, they are generalizations about the points, lines, circles, and squares of our experience, and sufficiently approximate the truth regarding those things that no significant error occurs if we assume that they are exactly true. Fourth, since the definitions are not true, they are not necessarily true.

Mill advances three primary theses regarding the axioms of geometry. First, they are exactly true of the objects of our experience. Second, they are inductive

generalizations based on our experience of those objects. Third, the contention that they are necessary truths is dubious since (a) it is based on the claim that their falsehood is inconceivable, but (b) the inconceivability of their falsehood is explained by the laws of associationist psychology—i.e., by the fact that we have experienced many confirming instances of them but no disconfirming instances.

Mill's account, taken in the crude form in which he presents it, is untenable, and my goal here is not to attempt to rehabilitate it. Instead, I propose to concede that Mill offers a defensible inductive empiricist account of mathematical knowledge. The question I wish to address is: How does this concession bear on the existence of a priori knowledge? The concession entails that Kant's contention that mathematical knowledge *cannot* be derived from experience is incorrect. It does not, however, entail that his contention that mathematical knowledge *is* a priori is also incorrect. The fact that mathematical knowledge is or can be derived from experience does not immediately entail that it is not or cannot be derived from some nonexperiential source. Mill recognizes that more needs to be said at this juncture. In particular, he recognizes that his opponents can maintain that experience is not necessary to justify the axioms of geometry.

Mill attempts to close the gap in his argument with the following observations:

> They cannot, however, but allow that the truth of the axiom, "Two straight lines cannot inclose a space," even if evident independently of experience, is also evident from experience. Whether the axiom needs confirmation or not, it receives confirmation in almost every instant of our lives, since we cannot look at any two straight lines which intersect one another without seeing that from that point they continue to diverge more and more. . . . Where, then, is the necessity for assuming that our recognition of these truths has a different origin from the rest of our knowledge when its existence is perfectly accounted for by supposing its origin to be the same? . . . The burden of proof lies on the advocates of the contrary opinion; it is for them to point out some fact inconsistent with the supposition that this part of our knowledge of nature is derived from the same sources as every other part.[5]

Mill moves from the premise that inductive empiricism provides an account of knowledge of geometrical axioms to the stronger conclusion that knowledge of those axioms is not a priori. The key premise in his argument appeals to a version of the *Explanatory Simplicity Principle* (ES): If a putative source of knowledge is not necessary to explain knowledge of the axioms of geometry, then it is not a source of knowledge of the axioms of geometry. Since Mill provides an account of knowledge of the axioms of geometry based on inductive generalization from observed cases, the Explanatory Simplicity Principle yields the conclusion that such knowledge is not a priori. There is no need to introduce a nonexperiential source in order to

explain knowledge of the axioms of geometry. The general form of Mill's argument against the existence of a priori knowledge can be articulated as follows:

(M1) Inductive empiricism provides an account of mathematical knowledge based on inductive generalization from observed cases.

(ES) Φ is a source of knowledge for some domain D of knowledge only if Φ is necessary to explain knowledge of some propositions within D.

(M2) Therefore, mathematical knowledge is not a priori.

Clearly, the burden of the argument is carried by (ES), the Explanatory Simplicity Principle. We now turn to understanding the principle and its consequences.

II. EPISTEMIC OVERDETERMINATION

(ES) is ambiguous. In order to bring out the ambiguity, consider the *Single Source Principle* (SS):

(SS) For each domain D of knowledge, there is only a single source of justification for the propositions within that domain.[6]

(ES) does not entail (SS) since it leaves open the possibility that a domain of knowledge is *epistemically segregated*—i.e., some propositions within D are justified only by source A, and some other propositions within D are justified only by a different source B. In such a situation, since both A and B are necessary to justify some propositions within D, (ES) allows that both are sources of justification for the propositions within D.

(ES), however, does entail the following weaker version of (SS):

(SS0) For *some* propositions within D, there is only a single source of justification.

Consider again our epistemically segregated domain of knowledge. If source A justifies every proposition justified by source B, then source B would be unnecessary to explain knowledge of domain D. Similarly, if source B justifies every proposition justified by source A, then source A would be unnecessary to explain knowledge of domain D. So, in order for both A and B to be necessary to explain knowledge of domain D, there must be at least one proposition within D justified by A but not B, and at least one proposition within D justified by B but not A.

An interesting question arises at this juncture. Does (ES) also entail

(SS1)   For *each* proposition within D, there is only a single source of justification?

If we again consider our epistemically segregated domain of knowledge, (SS1) entails that for each proposition p within domain D, p is justified by either source A or source B but not both. In order to simplify matters, let us assume that domain D consists solely of four propositions: P_1, P_2, P_3, and P_4. Let us also assume that source A justifies P_1, P_2, P_3, but not P_4. Hence, source B is necessary to explain only the justification of P_4. Does (ES) leave open the possibility that source B justifies P_1, P_2, or P_3 as well?

There are two readings of (ES):

(ES1) Φ is a source of knowledge for proposition P_i of domain D only if Φ is necessary to explain the justification of P_i.

(ES2) Φ is a source of knowledge for proposition P_i of domain D only if Φ is necessary to explain the justification of some proposition, but not necessarily P_i, within D.

The first, more stringent, reading of (ES) does entail (SS1). According to (ES1), source B justifies only those propositions within D that are not justified by source A. The second, more liberal, reading of (ES) does not entail (SS1). According to (ES2), if source B is necessary to explain the justification of some proposition of D, such as P_4, it can also justify other propositions within D, such as P_1, that are also justified by source A. Although (ES2) does not entail (SS1), it does entail

(SS2)   If some source Φ explains the justification of *all* propositions within domain D, then for *each* proposition within D, there is only a single source of justification.

We now have two versions of (ES), each of which has different implications regarding the possibility of multiple sources of justification within a certain domain of knowledge. Is there some reason to prefer one over the other?

(ES1) strikes me as the more plausible reading of (ES). Consider again our example. Let P_1 be Euclid's first postulate: A straight line can be drawn from any point to any other point. Let P_4 be Euclid's second postulate: Any straight line can be extended continuously in a straight line. Assume that reason is necessary to explain only the justification of P_4. Moreover, assume that reason also justifies P_1. If P_1 is indeed justified by reason, then it is in virtue of some relationship between the evidence produced by reason and

the content of P_1. One familiar account is that reason produces an intuition that P_1, and the intuition that P_1 justifies the belief that P_1. Presumably, neither the fact that reason produces the intuition that P_1 nor the fact that the intuition justifies P_1 depends on whether reason also justifies P_4, let alone on whether it is necessary to justify P_4. (ES2), however, entails the following puzzling counterfactual:

(PC)   If reason were not necessary to justify P_4, then reason would not justify P_1.

(PC) is puzzling because there is no apparent explanation for why P_1's being justified by reason depends on P_4's being justified by reason. Since this argument against (ES2) is not conclusive, I address both versions of (ES) in the subsequent discussion.

Both (ES1) and (ES2) should be rejected. (ES1) entails (SS1), and (ES2) entails (SS2). But (SS1) and (SS2) should be rejected for two reasons. The first is methodological. Both (SS1) and (SS2) settle by fiat substantive epistemological issues. Epistemology is concerned with the sources and extent of human knowledge. Addressing these concerns requires identifying the most general domains of human knowledge and the putative sources of knowledge for each domain. A source of knowledge for a particular domain is a cognitive capacity that, under certain conditions, generates justification for propositions within that domain. The question of how many cognitive capacities humans possess that have the requisite properties for justifying propositions within a certain domain of knowledge is substantive. In some cases, say visual perception, the evidence that humans possess such a capacity and that it justifies a certain domain of propositions about the external world may be so readily available that no further investigation is necessary in order to answer it. But epistemologists have proposed more controversial putative sources of knowledge. Roderick Chisholm offers two examples. Some maintain that, in order to explain our knowledge of other minds, "there must be another source—possibly the *Verstehen*, or 'intuitive understanding', of German philosophy and psychology."[7] The second example pertains to knowledge of religious truths: "Hugh of St. Victor held, in the twelfth century, that in addition to the *oculis canis*, by means of which we know the physical world, and the *oculis rationis*, by means of which we know our own states of mind, there is an *oculis contemplationis*, by means of which we know the truths of religion."[8]

Whether such cognitive capacities exist and, if they do, whether they have the requisite properties to justify propositions within a certain domain are substantive epistemological questions. Providing an answer to them requires both empirical and philosophical investigation. Moreover, in the absence of compelling

independent evidence, there is no basis for assuming that if humans possess some cognitive capacity that explains the justification of all propositions within some particular domain of knowledge, they have no other cognitive capacity that justifies any beliefs within that domain. Both (SS1) and (SS2) make such an assumption in the absence of any independent evidence. For example, suppose that the observation of the behavior of others together with some legitimate process of inductive inference explains the justification of all propositions about other minds within a certain domain. It follows from both (SS1) and (SS2) that either humans lack intuitive understanding or it is not a source of justification of beliefs about other minds. Hence, (ES1) and (ES2) settle by fiat substantive epistemological questions. The questions of whether the cognitive capacity of intuitive understanding exists and, if it does, whether it has the requisite properties to justify beliefs about other minds should not be settled by a methodological assumption that has no independent support. Similarly, if we suppose that rational theology explains the justification of all propositions within some domain of religious knowledge, (SS1) and (SS2) entail that either humans lack an *oculis contemplationis* or that it is not a source of justification of religious beliefs. Once again, such substantive epistemological issues should not be settled by a methodological assumption that has no independent support.

There is a second reason for rejecting (SS1) and (SS2). They conflict with a familiar feature of our epistemic lives: epistemic overdetermination. The justification of some of our beliefs is overdetermined—i.e., for some of our beliefs, we have more than one justification, each of which is sufficient to justify the belief in question in the absence of the others. For example, you attended a party last night and someone asks you if Jill also attended. You didn't interact with her at the party, so you have to stop and think about it. You suddenly recall that you saw her talking to Jack, and that recollection triggers a host of additional recollections of Jill's being at the party. Presumably, your original recollection justifies your belief that Jill was at the party. But each of the other recollections that came in its wake also justifies your belief. So you have many different recollections, each of which is sufficient to justify your belief that Jill was at the party. Your justification for that belief is overdetermined.

There are two different types of epistemic overdetermination: epistemic overdetermination by the *same* source, and epistemic overdetermination by *different* sources. The first type of epistemic overdetermination occurs when we have more than one justification for a particular belief, each of which is sufficient to justify the belief in question in the absence of the others, and they come from the same source. The example in the previous paragraph is of the first type. The second type of epistemic overdetermination occurs when we have more than one justification for a particular belief, each of which is sufficient to justify the belief in question in the absence of the others, and they come from different sources. Here's an example. I've misplaced my

wallet again. I wonder where I might have left it. I suddenly recall having left it on the kitchen counter when I came in from the garage last night. Presumably, my recollection justifies me in believing that my wallet is on the kitchen counter. But, just to be sure, I walk out to the kitchen to check. To my relief, I see my wallet on the counter. Presumably, my seeing my wallet on the counter also justifies me in believing that my wallet is on the counter. So here my justification is overdetermined by different sources. Both my recollection and my visual experience justify my belief about my wallet, and each is sufficient to justify that belief in the absence of the other.

Both (SS1) and (SS2) have significant consequences regarding the possibility of epistemic overdetermination. Assume that

(EO)   S's belief that p is epistemically overdetermined by two different sources.

It follows that

(EO1)   S's belief that p is justified by two different sources.

But (EO1) is incompatible with

(SS1)   For *each* proposition within D, there is only a single source of justification.

Since (SS1) is incompatible with epistemic overdetermination by different sources, which is a familiar fact of our epistemic lives, (SS1) and, *a fortiori*, (ES1) should be rejected.

The relationship between (SS2) and epistemic overdetermination is more complicated. Although

(SS2)   If some source Φ explains the justification of all propositions within domain D, then for *each* proposition within D, there is only a single source of justification

is compatible with (EO1), it is incompatible with

(EO2)   S's belief that p is justified by some source A, where p is a member of domain D and A explains the justification of all propositions within domain D, and S's belief that p is justified by source B.

Providing an uncontroversial example of epistemic overdetermination that satisfies (EO2) is more difficult since Mill provides little information about how

to individuate domains and sources of knowledge. Hence, we must rely on the intuitive principles of individuation that epistemologists typically employ. Consider the problem of perception and knowledge of the external world. The traditional view is that perception explains the justification of propositions about the present existence and certain properties, such as shape, color, and location, of medium-sized physical objects in our immediate vicinity. Let D be the domain of all such propositions, and let us assume that perception explains the justification of all propositions within D. Now consider the following example. I'm at my desk working on a paper. I jot down some ideas with my pencil and stop to think. A new idea occurs to me, which I want to jot down quickly before I forget it. But I can't find my pencil. I suddenly recall having seen it roll off the desk a few minutes ago. I look down and see it. My belief that my pencil is on the floor is justified both by my seeing it there and by my recollection of having seen it roll off the desk. Since the proposition that the pencil is on the floor is a member of domain D and perception explains the justification of all propositions in that domain, we have a familiar case of epistemic overdetermination that satisfies (EO2). Moreover, since (SS2) is incompatible with such familiar cases of epistemic overdetermination, (SS2) and, *a fortiori*, (ES2) should be rejected.

III. QUINE

Although both Mill and Quine reject a priori knowledge, they offer very different accounts of mathematical knowledge. Quine rejects inductive empiricism in favor of a version of holistic empiricism, which views all mathematical propositions as components of scientific theories and maintains that their epistemic properties are analogous to those of the more theoretical propositions of such theories. The theoretical propositions of scientific theories have two important epistemic properties. First, they are not tested directly against observation, but only indirectly via their observational consequences. Second, they don't have observational consequences in isolation, but only in conjunction with the other propositions of the theory. Hence, according to holistic empiricism, mathematical propositions are theoretical components of scientific theories, and entire scientific theories, including their mathematical components, are indirectly confirmed by experience via their observational consequences.

Our main concern, however, is not with Quine's positive account of mathematical knowledge, but with his case against a priori knowledge. Here we find a second contrast with Mill. Mill is straightforward in presenting his case against a priori knowledge; Quine's case is more elusive. Some take Quine's program of naturalized epistemology to be the primary challenge to the existence of a priori knowledge.[9] Others locate the primary challenge in his classic paper,

"Two Dogmas of Empiricism."[10] But even if we focus exclusively on the latter, as I propose to do, the argument remains difficult to articulate.

In "Two Dogmas," Quine attacks a conception of analyticity inspired by Frege: a statement is analytic if it can be turned into a logical truth by replacing synonyms with synonyms. The primary points of the attack can be summarized as follows:

(1) Definition presupposes synonymy rather than explaining it.

(2) Interchangeability *salva veritate* is a sufficient condition of cognitive synonymy only in relation to a language containing an intensional adverb "necessarily."

(3) Semantic rules do not explain "Statement S is analytic for language L," with variable "S" and "L," even if "L" is limited to artificial languages.

(4) The verification theory of meaning provides an account of statement synonymy that presupposes reductionism. Reductionism fails but survives as the view that individual statements admit of confirmation or infirmation.

(5) Any statement can be held to be true come what may. No statement is immune to revision.

There are two striking aspects of the attack. First, it is directed at two different targets. Points (1), (2) and (3) target the notion of synonymy; points (4) and (5) target the doctrine of reductionism. Second, none of the points is explicitly directed at a priori knowledge. Hence, if "Two Dogmas" does indeed present a challenge to the existence of a priori knowledge, as many of its champions claim, then some additional premise is necessary that connects one of the two targets to the a priori. What is the additional premise?

One common response is that Quine is attacking the logical empiricist account of a priori knowledge, whose central claim is

(LE)   All a priori knowledge is of analytic truths,

and that his argument purports to show that the concept of analytic truth is incoherent. Let us grant that Quine's goal is to undermine (LE), and that he succeeds in establishing that the analytic/synthetic distinction is incoherent. Does it follow that there is no a priori knowledge? No. (LE) is a thesis about the nature of the propositions alleged to be known a priori. According to logical empiricism, the truths traditionally claimed to be known a priori, such as mathematical and logical truths, are analytically equivalent to logical truths. If Quine is right, then

this claim is incoherent. But from the fact that the claim that mathematical and logical truths are analytic is incoherent, it does not follow that those truths are not known a priori.

An alternative response is to take (LE) as a conceptual claim—i.e., to take it as claiming that the concept of a priori knowledge involves, either implicitly or explicitly, the concept of analytic truth. On this reading, the incoherence of the concept of analytic truth entails the incoherence of the concept of a priori knowledge. This response, however, rests on a false conceptual claim. Since I have argued this point in detail elsewhere, I will be brief here.[11] First, the concept of analytic truth is not explicitly part of the concept of a priori knowledge. As we saw earlier, the traditional concept of a priori knowledge is the concept of knowledge whose justification is nonexperiential. That concept, taken alone, neither states nor immediately entails anything about the nature of the propositions so justified. Second, the most promising route to maintaining that the concept of analytic truth is implicitly part of the concept of a priori knowledge is to endorse two theses: (a) the concept of a priori knowledge involves the concept of necessary truth; and (b) some version of the so-called "linguistic theory" of necessary truth, which maintains that the concept of necessary truth is analyzable in terms of the concept of analytic truth. There are, however, two problems with this route. First, the concept of a priori knowledge does not involve, either explicitly or implicitly, the concept of necessary truth. Second, no one has ever offered an even remotely plausible analysis of the concept of necessary truth in terms of the concept of analytic truth.

Some recent champions of "Two Dogmas" propose a different reading of its main argument that explicitly articulates the additional premise necessary to establish the conclusion that there is no a priori knowledge. Hilary Putnam rejects the orthodox reading of Quine's argument, which takes it to be an attack on the analytic/synthetic distinction based on the contention that all attempts to define "analytic" are ultimately circular.[12] Putnam views this reading as too simplistic because Quine's arguments are not all directed toward the same target. In particular, point (5) attacks the concept of a statement that is confirmed no matter what. But, according to Putnam, that concept, unlike the concept of analyticity, is epistemic and not semantic:

> But why should this concept, the concept of a statement which is confirmed no matter what, be considered a concept of *analyticity*? Confirmation, in the positivist sense, has something to do with rational belief. A statement which is highly confirmed is a statement which it is rational to believe, or rational to believe to a high degree. If there are indeed statements which have the maximum degree of confirmation in all circumstances, then these are simply

truths which it is *always rational to believe*, nay, more, truths which it is never rational to even begin to doubt.... On the face of it, then, the concept of a truth which is confirmed no matter what is not a concept of *analyticity* but a concept of *apriority*.[13]

Moreover, Quine's argument against the concept of a truth that is confirmed no matter what is not based on some alleged circularity. Instead, according to Putnam, it is "an argument from what is clearly a normative description of the history of modern science," which Putnam locates in the following celebrated passage:

> Any statement can be held true come what may, if we make drastic enough adjustments elsewhere in the system. Even a statement very close to the periphery can be held true in the face of recalcitrant experience by pleading hallucination or by amending certain statements of the kind called logical laws. Conversely, by the same token, no statement is immune to revision. Revision even of the logical law of the excluded middle has been proposed as a means of simplifying quantum mechanics; and what difference is there in principle between such a shift and the shift whereby Kepler superseded Ptolemy, or Einstein Newton, or Darwin Aristotle?[14]

Putnam goes on to endorse Quine's argument and to maintain that the importance of "Two Dogmas" lies not in its rejection of the analytic/synthetic distinction but in its rejection of a priori knowledge.

Philip Kitcher agrees that the importance of "Two Dogmas" lies in its rejection of a priori knowledge:

> Defenders of analyticity have often construed the main thrust of Quine's most famous attack, "Two Dogmas of Empiricism," as arguing that the concept of analyticity is undefinable in notions Quine takes to be unproblematic.... I locate Quine's central point elsewhere. The importance of the article stems from its final section, a section which challenges not the existence of analytic truths but the claim that analytic truths are knowable a priori.[15]

Kitcher goes on to maintain that Quine's central argument is located in the very same passage that Putnam quotes, and reconstructs it the following manner:

> Quine connects analyticity to apriority *via* the notion of unrevisability. If we can know a priori that p then no experience could deprive us of our warrant to believe that p.... But "no statement is immune from revision." It

follows that analytic statements, hailed by Quine's empiricist predecessors and contemporaries as a priori, cannot be a priori; . . . [16]

Hence, Putnam and Kitcher agree on three points. First, the most important argument in "Two Dogmas" targets the existence of a priori knowledge. Second, the argument is located in the passage in which Quine claims that no statement is immune to revision. Finally, and most importantly, the argument involves an implicit premise that connects the concept of apriority with the concept of rational unrevisability.

Both Putnam and Kitcher endorse a version of the Unrevisability Condition, which states that rational unrevisability is a necessary condition for a priori knowledge. But the conditions that they propose are different. Putnam maintains that the concept of a statement that is confirmed no matter what is a concept of apriority. A statement that is confirmed no matter what is, according to Putnam, one that it is always rational to believe, one that is never rational to doubt. But a statement that is *always* rational to believe is one that is rational to believe in the face of *any* evidence to the contrary. Hence, Putnam endorses a *Strong Unrevisability Condition*:

(SU)   If S's belief that p is justified a priori, then S's belief that p is not rationally revisable in light of *any* evidence.

Kitcher's proposal is more modest. He maintains that if S knows that p a priori then "no experience could deprive us of our warrant to believe that p." Hence, Kitcher endorses a *Weak Unrevisability Condition*:

(WU)   If S's belief that p is justified a priori, then S's belief that p is not rationally revisable in light of any *experiential* evidence.

We will focus on (WU) for two reasons. First, it is more plausible than (SU). (SU) entails that if S's justified belief that p is rationally revisable, then S's belief that p is justified a posteriori. But consider a competent mathematician who, working within her field of research expertise, carefully constructs a proof that A entails B and believes, on that basis, that A entails B. Presumably, such a belief is justified. Suppose, however, that upon later reviewing the proof, she discovers a subtle flaw and, as a consequence, withholds the belief that A entails B. (SU) has the implausible consequence that the mathematician's belief that A entails B is justified a posteriori even if both her original justification for that belief and her subsequent justification for the belief that her proof is flawed are exclusively nonexperiential. Second, even if (SU) is

defensible, it is not necessary to secure the validity of Quine's argument; (WU) is sufficient. Hence, the Putnam-Kitcher version of Quine's argument can be stated as follows:

(Q1)   No statement is immune to revision in light of recalcitrant experience.

(WU)   If S's belief that p is justified a priori, then S's belief that p is not rationally revisable in light of any *experiential* evidence.

(Q2)   Therefore, no knowledge is a priori.

Although (Q1) is open to dispute, I propose to grant it in order to assess its bearing on the existence of a priori knowledge. My focus will be on (WU).

IV. DEFEASIBLE JUSTIFICATION

We rejected Mill's argument against the existence of a priori knowledge on the grounds that it is incompatible with a familiar form of epistemic overdetermination. Quine's argument, as reconstructed by Putnam and Kitcher, does not appear to make any commitments with respect to the possibility of epistemic overdetermination. The appearances, however, are misleading. To show why they are misleading, we need to explore more carefully the relationship between defeasible justification and epistemic overdetermination.

We begin by introducing some additional conceptual resources. Experiential sources of justification, such as visual perception, are fallible. Some beliefs justified by visual perception are false. For example, if I carefully visually examine a sheet of paper that is on the table before me in ordinary lighting conditions and, on that basis, conclude that it is square, but fail to notice that two sides of the sheet are slightly longer than the other two sides, I have a false belief that is justified by visual perception. Fortunately, however, experiential sources also have the capacity to correct errors. Returning to our example, if I were to visually inspect the sheet of paper a second time and notice that two of its sides are slightly longer than the other two, I would have a belief, justified by visual perception, that the sheet is not square but rectangular. So, in such a situation, a single source justifies both the belief that p and the belief that not-p. Let us say that a *self-revising source of justification* is one that satisfies the following condition:

(SR)   Source Φ can justify S's belief that p just in case Φ can justify S's belief that not-p.[17]

We now turn to the concept of defeasibility and distinguish two types of defeaters for a justified belief. Let us assume that S's belief that p is justified by source A.

(Call a belief justified by source A an *A-justified belief.*) There are two types of defeaters for S's A-justified belief that p. An overriding defeater for S's A-justified belief that p is

(OD)   S's justified belief that not-p.

An undermining defeater for S's A-justified belief that p is

(UD)   S's justified belief that S's A-justification for the belief that p is inadequate or defective.

Finally, recall our distinction between epistemic overdetermination by a single source and epistemic overdetermination by different sources. My goal is to show that, in the case of self-revising sources of justification, there is an important connection between epistemic overdetermination by different sources and defeasibility by overriding defeaters.

Let us begin by assuming that S's belief that p is epistemically overdetermined by two different sources, one of which is self-revising:

(1)   S's belief that p is justified by source A and by self-revising source B.

(1) entails

(2)   Source B can justify S's belief that p.

Since B is a self-revising source of justified beliefs, it follows that

(3)   Source B can justify S's belief that not-p.

Since S's justified belief that not-p is an overriding defeater for S's justified belief that p, it follows that

(4)   S's A-justified belief that p is defeasible by an overriding defeater justified by source B.

Since (1) entails (4),

not-(4)   S's A-justified belief that p is not defeasible by an overriding defeater justified by source B

entails

not-(1)   It is not the case that S's belief that p is justified by source A and by
            self-revising source B.

In short, where B is a self-revising source, the indefeasibility of A-justified beliefs
by overriding defeaters justified by source B is incompatible with epistemic over-
determination by sources A and B.

We now turn to the implications of this connection for the Putnam-
Kitcher version of Quine's argument. Here we are faced with an immediate
problem. Quine's argument focuses exclusively on the conditions for rational
belief revision, but it does not explicitly address the conditions under which
beliefs are justified. Since the case of Euclidean geometry provides the most
striking putative example of experiential disconfirmation of a mathematical
proposition, and since it is alleged to exemplify the holistic empiricist's
account of how such propositions are disconfirmed by experience, we will
focus on it. Moreover, we will assume that the very same empirical evidence
that disconfirms the principles of Euclidean geometry also confirms the
principles of the alternative non-Euclidean geometry. In short, we will
assume that the Quinean story about the rational revision of the principles
of Euclidean geometry is also the Quinean story about the rational adoption
of the principles of non-Euclidean geometry. This assumption is controver-
sial since, when generalized, it leads to a potentially problematic consequence
for Quine's account. We will return to that issue later since it does not impact
my case against the Putnam-Kitcher version of Quine's argument.

The Quinean story about the rational revision of the principles of Euclidean
geometry is familiar. The principles of Euclidean geometry are part of an overall
scientific theory describing the structure of physical space, which includes, in
addition to the geometrical theory, a physical theory. Scientific theories are
accepted or rejected on the basis of standard criteria such as conformity to obser-
vational data, explanatory power, conservatism, and simplicity. The principles of
Euclidean geometry were rejected in favor of the principles of non-Euclidean
geometry because the conjunction of Euclidean geometry with physical theory
yielded an overall theory inferior, when measured by the standard criteria, to the
overall theory yielded by the conjunction of non-Euclidean geometry with
physical theory.

It is critical to note here that Quine's claim that no statement is immune to
revision by recalcitrant experience applies to the newly adopted principles of
non-Euclidean geometry. Hence, more generally, the claim that no statement is
immune to revision in light of recalcitrant experience entails that the empirical
evidence relevant to the justification of mathematical beliefs is self-revising in the
sense defined earlier. If there is some set of experiences that can justify the

principles of some geometry, then there is also some alternative set of experiences that can justify the denial of those principles, and vice versa.

How does this bear on (WU)? Let us assume the basic thesis of radical empiricism:

(RE)   If p is a mathematical statement and S's belief that p is justified, then S's belief that p is justified by experiential evidence.

Since Quine maintains that all mathematical statements are subject to revision in light of recalcitrant experience, it follows that

(SR*)   Experiential evidence can justify S's belief that p, where p is a mathematical statement, just in case experiential evidence can justify S's belief that not-p.

The conjunction of (RE) and (SR*) entails

(5)   If S's belief that p, where p is some mathematical statement, is justified by experiential evidence, then S's belief that not-p can be justified by experiential evidence.

Since S's justified belief that not-p is a defeater for S's justified belief that p, (5) entails

(6)   If S's belief that p, where p is some mathematical statement, is justified by experiential evidence, then S's belief that p is defeasible by an experientially justified belief that not-p.

(WU), however, entails

(WU*)   If S's belief that p is justified a priori, then S's belief that p is not defeasible by an experientially justified belief that not-p.

The conjunction of (6) and (WU*) entails

(7)   If S's belief that p, where p is some mathematical statement, is justified by experiential evidence, then S's belief that p is not justified a priori.[18]

(7) is incompatible with the following form of epistemic overdetermination:

(8)   S's belief that p, where p is some mathematical statement, is justified both a priori and by experiential evidence.

But it is a substantive epistemological question whether mathematical statements are justified both a priori and by experience. Hence, (WU) settles by fiat a substantive epistemological question.

Let me briefly summarize. Quine's remarks in "Two Dogmas" can be parlayed into an argument against a priori knowledge only by introducing a substantive necessary condition on a priori justification: (WU). (WU), however, has the consequence of ruling out the possibility that mathematical statements are justified both a priori and by experience. But since it is a substantive epistemological question whether there are statements that are justified both a priori and by experience, any conception of the a priori that settles it by fiat should be rejected. Hence, Quine's argument, like Mill's, ultimately fails because it fails to take into account the possibility of epistemic overdetermination.

My argument against the Quinean account is based on the assumption that mathematical statements are justified by being embedded in an overall scientific theory that is justified by experience. That assumption, however, leads to the consequence that, in the absence of a good deal of scientific knowledge, one cannot be justified in believing elementary mathematical statements. But it is implausible to deny that skilled craftsmen, who build cabinets or musical instruments but know little physics, and educated adults, who have studied geometry and calculus but not physics, are not justified in believing any mathematical statements. Hence, some theorists who are sympathetic to both Quine's radical empiricism and his account of rational belief revision offer alternative accounts of the justification of elementary mathematical statements. Philip Kitcher, for example, stresses the authority of textbooks and teachers in accounting for one's rudimentary mathematical knowledge.[19] An alternative strategy employed by some neo-Quineans is to endorse a version of epistemic conservatism, which maintains that a belief is prima facie justified to some degree merely in virtue of being held. William Lycan, for example, endorses the Principle of Credulity: "Accept at the outset each of those things that seems to be true."[20] Gilbert Harman endorses General Foundationalism: "A general foundations theory holds that all of one's beliefs and inferential procedures at a given time are foundational at that time."[21] A belief or inferential procedure is foundational for a person at a time just in case it is non-inferentially prima facie justified for that person at that time.

Neither of these alternative accounts of the justification of mathematical statements escapes my argument against (WU) because the sources of justification they invoke, like the one that we previously considered, are self-revising. If I can be justified in believing that p on the basis of reading that p in a textbook or hearing a teacher assert that p, then I can also be justified in believing that

not-p on the basis of reading that not-p in a textbook or hearing a teacher assert that not-p, and vice-versa. If I can be justified in believing some statement that p solely on the basis of believing that p (or p's seeming true to me), then I can also be justified in believing that not-p solely on the basis of believing that not-p (or not-p's seeming true to me), and vice-versa. Hence, the alternative accounts, when conjoined with (WU), also rule out the possibility that S's belief that p, where p is a mathematical statement, is justified both a priori and by experiential evidence.[22]

Notes

1. Immanuel Kant, *Critique of Pure Reason*, trans. Norman Kemp Smith (New York: St Martin's Press, 1965), 43.
2. Ibid.
3. Ibid., 52.
4. John Stuart Mill, *A System of Logic*, ed. J. M. Robson (Toronto: University of Toronto Press, 1973), 224.
5. Ibid., 231–232.
6. For Mill, the source of one's knowledge that p is the source of one's justification for the belief that p. Accordingly, he maintains that it is not necessary to assume that our knowledge of the axioms of geometry is a priori because experience confirms them in almost every instance of our lives. I frame my discussion in terms of justification, rather than knowledge, since the focus on justification locates more precisely the basis of Mill's argument.
7. R. M. Chisholm, *Theory of Knowledge*, 1st ed (Englewood Cliffs: Prentice-Hall, Inc., 1966), 65.
8. Ibid., 67.
9. W. V. Quine, "Epistemology Naturalized," in *Ontological Relativity and Other Essays* (New York: Columbia University Press, 1969).
10. W. V. Quine, "Two Dogmas of Empiricism," in *From a Logical Point of View*, 2nd ed revised (New York: Harper and Row, 1963).
11. See Albert Casullo, *A Priori Justification* (New York: Oxford University Press, 2003), chapters 1 and 8.
12. Hilary Putnam, " 'Two Dogmas' Revisited," in *Realism and Reason: Philosophical Papers, Vol. 3* (Cambridge: Cambridge University Press, 1983).
13. Ibid., 90.
14. Quine, 43; quoted by Putnam, ibid.
15. Philip Kitcher, *The Nature of Mathematical Knowledge* (New York: Oxford University Press, 1983), 80.
16. Ibid.
17. Self-revision comes in degrees since a source may be able to justify the falsehood of all or only some of the propositions that it can justify.
18. The transition from (6) and (WU*) to (7) presupposes the Equality of Strength Thesis:

     (ES)   The degree of justification minimally sufficient for a priori knowledge equals the degree of justification minimally sufficient for knowledge in general.

     For a discussion of (ES) and the implications of denying it, see Casullo, chapter 2.

19. Kitcher, 91–95.

20. William Lycan, "Bealer on the Possibility of Philosophical Knowledge," *Philosophical Studies* 81 (1996), 145.

21. Gilbert Harman, "General Foundations versus Rational Insight," *Philosophy and Phenomenological Research* 63 (2001), 657.

22. An earlier version of this paper was presented as the keynote address at the Canadian Society for Epistemology International Symposium on A Priori Knowledge, University of Sherbrooke, October 1–2, 2004. I would like to thank the conference participants and my colleagues at the University of Nebraska-Lincoln for their insightful comments.

Testimony and A Priori Knowledge

The epistemic status of testimony bears on the scope of a priori knowledge in at least two ways. If testimonial knowledge is a priori, then the scope of a priori knowledge expands beyond its traditional bounds. On the other hand, the premise that testimonial knowledge is a posteriori plays a pivotal role in an influential argument against the existence of a priori knowledge.[1] If this argument is sound, then the scope of a priori knowledge recedes from its traditional bounds.

Tyler Burge (1993) offers a theory of testimony that allows for the possibility of both testimonial a priori warrant and testimonial a priori knowledge.[2] I uncover a tension in his account of the relationship between the two, and locate its source in the analogy that Burge draws between testimonial warrant and preservative memory. I contend that this analogy should be rejected, and offer a revision of Burge's theory that eliminates the tension. I conclude by assessing the impact of the revised theory on the scope of a priori knowledge.

Section I distinguishes three questions regarding the epistemic status of testimony and identifies the primary focus of my investigation. Section II uncovers a tension in Burge's account of the relationship between testimonial warrant and testimonial knowledge, and argues that it derives from the fact that his account of testimonial warrant is informed by two different, but incompatible, analogies:

one with preservative memory and one with perception. Sections III, IV and V address three approaches to resolving the tension: rejecting the analogy with preservative memory, rejecting the analogy with perception, and reconciling the two analogies. The first approach is defended. Section VI assesses the impact of this approach on the scope of a priori knowledge.

I

Burge addresses three issues regarding testimony that bear directly on the a priori:

1. Is testimony a fundamental source of warrant?
2. What is the epistemic status of beliefs warranted by testimony?
3. What is the epistemic status of the epistemic principle governing testimonial warrant?

A source of warrant is fundamental just in case a cognizer need not certify the epistemic credentials of that source in order for beliefs based on it to be prima facie warranted. If testimony is not a fundamental source of warrant, it follows immediately that beliefs warranted by testimony are not warranted a priori.[3] If it is a fundamental source, then the epistemic status of beliefs warranted by testimony remains open.

Burge maintains that testimony is a fundamental source of warrant. He endorses the following epistemic principle, the Acceptance Principle (1993, 469):

(AP)   A person is a priori entitled to accept a proposition that is presented as true and that is intelligible to him, unless there are stronger reasons not to do so.

(AP) entails that a cognizer need not certify the credentials of a source in order to be entitled to accept a belief on the basis of the testimony of that source.

Testimony involves communication, which typically involves perception in one of its forms. The epistemic status of beliefs warranted by testimony turns on the role of perception in testimony. If perception plays a warranting role, then it follows immediately that beliefs warranted by testimony are not warranted a priori. But if it plays only a causal or enabling role, then the epistemic status of beliefs warranted by testimony remains open.

Burge maintains that perception plays only a causal or enabling role by appealing to an analogy with preservative memory:

> In interlocution, perception of utterances makes possible the passage of propositional content from one mind to another rather as purely preservative memory makes possible the preservation of propositional content from one time to another. Memory and perception of utterances function similarly, in reasoning and communication respectively.... They function to preserve and enable—not to justify. (1993, 481)

What then is the status of the entitlement provided by (AP)? According to Burge,

> In interlocution, the individual's basic default entitlement normally derives from the presumptive intelligibility of a message understood, not from anything specific in the words perceived. (481)

Basic default testimonial entitlement is normally a priori since it derives from conceptual understanding.[4]

Burge, however, stresses that testimonial warrant is not always a priori. (AP) represents the epistemic default position with respect to testimonial warrant. But we are not always in that position. We often rely on empirically based information about the source's trustworthiness and expertise. We sometimes make inferences from perceptual beliefs about words to conclusions about their content. When testimonial warrant involves such empirical elements, it is not a priori.

If (AP) itself is warranted, then it is warranted either a priori or empirically. Here it is important to recognize that the epistemic status of (AP) and the epistemic status of beliefs warranted by testimony are logically independent of one another. From the fact that (AP) is warranted a priori (a posteriori), it does not follow that beliefs warranted by testimony are warranted a priori (a posteriori). Conversely, from the fact that beliefs warranted by testimony are warranted a priori (a posteriori), it does not follow that (AP) is warranted a priori (a posteriori). Burge maintains that (AP) is warranted a priori and offers an independent argument for that contention (1993, 470–3).

My primary concern is with the second question and, in particular, with Burge's account of the relationship between the epistemic status of default testimonial entitlement and the epistemic status of testimonial knowledge. Since Burge's contention that default testimonial entitlement is a priori presupposes that testimony is a fundamental source of entitlement, I propose to grant that presupposition. I will not address the epistemic status of (AP) since it does not bear on the epistemic status of default testimonial entitlement.

II

According to Burge, "In the absence of countervailing considerations, application of the Acceptance Principle often seems to provide sufficient entitlement for knowledge." Here Burge appeals to an analogy with perception:

> Our entitlement to ordinary perceptual belief is usually sufficient for perceptual knowledge.... If there is no reason to think that the defeating conditions threaten, one has knowledge despite ignoring them. Something similar holds for acquisition of belief from others. Other things equal, ordinary interlocution suffices for knowledge. (1993, 485)

Consider a case where S knows that p solely on the basis of accepting that p from the testimony of another, and S is in the default position with respect to the acceptance in question. In such a case, (AP) entails that (a) S's belief that p is entitled to a degree that is minimally sufficient for knowledge, and (b) S's entitlement to believe that p is a priori. The conjunction of (a), (b), and the following widely accepted principle:

(APK)   S knows a priori that p just in case S knows that p and S's belief that p is warranted a priori to a degree minimally sufficient for knowledge

entails

(DTE)   If S knows that p and S's warrant for the belief that p derives exclusively from default testimonial entitlement, then S knows a priori that p.

Burge, however, rejects (DTE).

In order to articulate why Burge rejects (DTE), we need to introduce a further distinction. Consider a person who knows something solely on the basis of the testimony of another. According to Burge, that person has his *own proprietary justification*, which consists of "his own entitlement to accept the word of the interlocutor, together with any supplementary justification the recipient might have that bears on the plausibility of the information." (1993, 485) Burge, however, maintains that "The recipient's own proprietary entitlement to rely on interlocution is insufficient by itself to underwrite the knowledge." He supports this contention with the following observations:

> the recipient depends on sources' proprietary justifications and entitlements (through a possible chain of sources). The recipient depends on at

least some part of this body of justification and entitlement in the sense that without it, his belief would not be knowledge. The recipient's own justification is incomplete and implicitly refers back, anaphorically, to fuller justification or entitlement. (486)

Burge calls "the combination of the recipient's own proprietary justification with the proprietary justifications (including entitlements) in his sources on which the recipient's knowledge depends," the *extended body of justification* (486).

Burge rejects (DTE) because the default proprietary entitlement that the recipient derives from (AP) is not sufficient for knowledge. It is not sufficient for knowledge because it is incomplete and depends on the source's proprietary warrants.[5] Since the recipient's proprietary entitlement is incomplete and depends on the source's proprietary warrants, it does not follow from the fact that the recipient's proprietary entitlement is a priori that the recipient's testimonial knowledge is a priori. The proprietary warrants of the source on which the recipient's entitlement depends must also be a priori.[6] Knowledge whose warrant derives exclusively from default testimonial entitlement is a priori only if the extended body of justification is a priori.

There is a tension between Burge's two leading contentions regarding default testimonial entitlement:

(B1)   In the absence of countervailing considerations, application of the Acceptance Principle often seems to provide sufficient entitlement for knowledge.

(B2)   The recipient's own proprietary entitlement to rely on interlocution is insufficient by itself to underwrite the knowledge.

(B1) and (B2) suggest two different models of testimonial warrant. (B1) suggests that testimony is an independent source of warrant. It generates its own warrant without relying on other sources. The analogy with perceptual entitlement supports this model. (B2) suggests that testimony is a dependent source of warrant. It does not generate its own warrant but preserves the testifier's warrant. The analogy with preservative memory supports this model.

There are three options for addressing the tension in Burge's account. The first is to reject the view that testimony is a dependent source of warrant along with the analogy with preservative memory that informs it. The second is to reconcile the two models in some fashion. The third is to reject the view that testimony is an independent source of warrant along with the analogy with perception that informs it. My goal is to defend the first option. The defense consists of three parts. In section III, I reject the analogy between testimony and preservative memory. In section IV, I consider and reject two attempts to reconcile the two

models of testimonial warrant. Finally, in section V, I reject an alternative argument in support of (B2).

III

Burge supports (B2) by invoking an analogy with the role of preservative memory in constructing long proofs. In constructing such proofs, one depends on memory to reinvoke earlier steps that are no longer occurrently before one's mind. The primary epistemic question is whether memory warrants the reinvoking of those earlier steps. Here Burge maintains that

> reasoning processes' working properly depends on memory's preserving the results of previous reasoning. But memory's preserving such results does not add to the justificational force of the reasoning. It is rather a background condition for the reasoning's success. (1993, 463)

In a later paper, Burge is more explicit in stating that memory not only preserves the earlier steps in the proof but also their original warrant: "If an argument is to support its conclusion, one must rely on purely preservative memory to preserve the past steps with the warrant unchanged." (2003, 300) Moreover, the warrant for the reinvoked step is the same as its original warrant: "The warrant for reinvoking a content in an inference must be presupposed to be the same as the warrant for establishing that content in the argument." (301) Hence, preservative memory is a dependent source of warrant: it does not generate the warrant that it confers on a belief, but merely preserves the cognizer's original warrant for that belief. The cognizer's warrant for the reinvoked step is the same as the cognizer's original warrant for that step. By analogy, testimony does not generate the warrant that it confers on a belief, but merely preserves the testifier's original warrant for that belief. The recipient's warrant for a belief based on testimony is the same as the testifier's warrant for that belief.

The preservative model of testimonial warrant is open to an immediate objection. Consider first an example that does not involve testimony. You and I walk into a room and encounter a page from a notebook on which is written what appears to be a proof for some mathematical proposition that p. You and I both know the premises of the apparent proof and understand the conclusion; but neither one of us, upon walking into the room, has any reason to believe that p. We both wonder: Is this a genuine proof that p? You quickly work through the apparent proof and realize that it is indeed a genuine proof that p. I, on the other hand, struggle. I think that I see how the first few steps go, although I am not entirely sure. Once I get beyond the initial steps, I cannot follow the proof even at some minimal level. Here it is clear that you are warranted in believing that p on

the basis of the proof, but I am not. You grasp the proof; I do not. Your grasp of the proof warrants *your* belief that p, but it does not warrant *my* belief that p.

Let us now extend the example to the case of testimony. Suppose that I confess that I cannot follow the proof. You reply that p is indeed true. I understand what you say and believe that p on that basis. According to the preservative model, my belief that p is warranted and, moreover, my warrant for my belief that p is the same as your warrant for your belief that p. According to the preservative model, *my* warrant for my belief that p is *your* grasp of the proof that p. But, as the example above shows, your grasp of the proof that p does not warrant my belief that p.[7]

This example reveals an important disanalogy between preservative memory and testimony. Preservative memory involves only a *single* cognizer; but testimony involves (at least) *two* cognizers. The disanalogy is significant because warrant is *cognizer-sensitive*: whether a particular cognizer is warranted in believing that p depends (at least in part) on features of that particular cognizer, such as that particular cognizer's experiences, beliefs, and intellectual capacities. You are warranted in believing that p on the basis of the proof because *you* grasp the proof. I am not warranted in believing that p on the basis of the proof because *I* do not grasp the proof. The fact that I do not grasp the proof does not detract from your warrant, and the fact that you do grasp the proof does not enhance my warrant.

Consider again the case of preservative memory. Suppose that you are working through a proof and are warranted in believing that p on the basis of a grasp of the initial steps of the proof. At a later step in the proof, you reinvoke the proposition that p. You are warranted in believing that p by virtue of *your* grasp of the initial steps of the proof. Preservative memory *retains* the content of the earlier step together with *your* original warrant for it. On the preservative model, however, testimony *transfers* the testifier's content along with the *testifier's* original warrant to the recipient. If the testifier is warranted in believing that p on the basis of a grasp of a proof that p, then the *testifier's* grasp of that proof is transferred to the recipient. But *someone else's* grasp of the proof that p does not warrant the recipient's belief that p. Therefore, the fact that preservative memory retains the *same* cognizer's original warrant for the preserved content but testimony transfers *someone else's* warrant for the preserved content introduces an important disanalogy between the two cases.

In a later discussion, Burge acknowledges that his account of the role of preservative memory in constructing long proofs presupposes that a single cognizer instantiates each step of the proof. More specifically, he maintains that if the cognizer who reinvokes a step in a proof were not identical to the cognizer for whom it was originally warranted, then that warrant would not be preserved in the proof. Consider, again, an individual who constructs a proof for some mathematical proposition that p. Suppose that this individual is warranted in believing a premise of the proof by thinking it through and grasping it. In order for preservative

memory to warrant reinvoking the step at a later stage in the proof, it must pre-serve both the content of the earlier step and its original warrant. Burge, however, maintains that

> If the individual only had a capacity that preserved content from some previous person's thought, warrant could not be preserved from the earlier instantiation. For the content had been warranted by the other person's thinking through the premise, not by any thinking-through by the agent of the inference. (2003, 301)[8]

Therefore, Burge concludes that constancy of content and warrant throughout an argument "is possible only through use of purely preservative memory with its presupposition of identity of the agent of the inference through the argument." (301) In short, identity of cognizer is an essential feature of preservative memory. Testimony, however, lacks this feature.[9]

IV

The second option for addressing the tension between (B1) and (B2) is to recon-cile them in some fashion. I consider two attempts at such a reconciliation. The first, proposed by Jim Edwards (2000, 128), accepts (B1) at face value and recon-strues (B2) in a manner that is compatible with (B1):

(B2*) The default entitlement to believe propositions one receives in interlocution presumes *so far as the status of the warrant to believe the proposition is concerned* a more primary epistemic warrant in the chain of interlocutors.[10]

By the status of a warrant, Edwards means whether it is an a priori or an a poste-riori warrant.

Consider a recipient who (a) knows that p solely on the basis of the testimony of some testifier whose warrant for the belief that p is empirical, and (b) is in the default position with respect to that testimony. According to the Edwards pro-posal, the recipient's belief that p is warranted solely by virtue of the fact that the proposition that p is presented as true and is intelligible to the recipient. The recipient's warrant for the belief that p does not depend on, derive from, or pre-sume the testifier's warrant. It is generated, not preserved, by testimony. Although the recipient's *warrant* for the belief that p does not depend on the testifier's warrant for the belief that p, the *status* of the recipient's warrant for the belief that p does depend on the status of the testifier's warrant for the belief that p. The recipient's warrant for the belief that p is a priori just in case the testifier's warrant

for the belief that p is a priori. Since the testifier's warrant for the belief that p is empirical, the recipient's warrant is also empirical.

The Edwards proposal is implausible because it is incompatible with (APK). Since the proposal endorses (AP) and (B1), it follows that

(1)   The recipient's default testimonial entitlement for the belief that p is minimally sufficient for knowledge; and

(2)   The recipient's default testimonial entitlement for the belief that p is a priori.

The conjunction of (1), (2), and

(APK)   S knows a priori that p just in case S knows that p and S's belief that p is warranted a priori to a degree minimally sufficient for knowledge,

entails

(3)   The recipient knows a priori that p.

But, according to the Edwards proposal, (3) is false because the testifier's warrant for the belief that p is empirical. So, in effect, the proposal maintains that the status of a person's warrant for the belief that p is partially determined by the status of *someone else's* warrant for that belief. The contention that the status of a person's warrant for a belief is not fully determined by the status of *that person's* warrant for the belief has no independent plausibility.

There is an alternative strategy for reconciling the tension between (B1) and (B2) that does not have the implausible consequence of the Edwards proposal.[11] This strategy takes (B2) at face value and reconstrues (B1) in a manner that is compatible with (B2):

(B1*)   In the absence of countervailing considerations, if a proposition that p is presented as true and is intelligible to the recipient, then (a) the recipient's belief that p is warranted to *some* degree, (b) that degree of warrant does not depend on, derive from, or presume the testifier's warrant for the belief that p, but (c) that degree of warrant is *not* minimally sufficient for knowledge.

In cases where the recipient knows that p solely on the basis of such testimony, there are two sources that contribute to the recipient's warrant for the belief that p: (a) the recipient's own proprietary entitlement that derives exclusively from (AP);

and (b) the testifier's warrant for the belief that p, which is preserved via testimony. Both sources are necessary, and neither alone is sufficient, for the recipient to have a degree of testimonial warrant minimally sufficient for knowledge.

The alternative strategy has the virtue of being compatible with (APK). In cases where the recipient knows that p solely on the basis of testimony and the testifier's warrant for the belief that p is empirical, the recipient's knowledge is also empirical since it is partially based on the testifier's empirical warrant for the belief that p. Unfortunately, it is also vulnerable to the objection presented in section III against the preservative model of testimonial warrant. Consider the case of a testifier who (a) knows that p on the basis of grasping a proof that p and (b) presents p as true to a recipient who does not grasp the proof. According to the alternative strategy, if p is intelligible to the recipient, then the recipient's belief that p is partially warranted by the *testifier's* grasp of the proof that p. But it is implausible to maintain that the recipient's belief that p is even partially warranted on the basis of *someone else's* grasp of a proof that p.

V

In section III, I argued against (B2) by rejecting the analogy between testimony and preservative memory. In section IV, I argued that two attempts to reconcile (B1) and (B2) fail. The only option that remains is to accept (B1) at face value and to reject (B2) outright. Burge, however, offers an alternative supporting argument for (B2). Consequently, unless there is a response to that argument, the remaining option is foreclosed.

Some care must be exercised in assessing (B2). (B2) is incompatible with (B1) only if it asserts that default testimonial entitlement is not sufficient for knowledge *because* it does not confer a degree of warrant that is minimally sufficient for knowledge. This reading of (B2) is supported by the analogy with preservative memory. It is also suggested by Burge's claim that default testimonial entitlement is incomplete and depends on the testifier's warrant. That claim suggests that, in the absence of the testifier's warrant, default testimonial entitlement does not confer a degree of warrant minimally sufficient for knowledge.

There is, however, an alternative reading of (B2). It can be read as an application to the specific case of testimonial knowledge of the more general Gettier principle:

(G)   Warranted true belief is not sufficient for knowledge.

(G) makes a claim about the conditions that *knowledge* must satisfy; it does not make a claim about the conditions that *warrant* minimally sufficient for knowledge must satisfy. When applied to testimonial knowledge, (G) entails

(G*)   Default testimonial warrant plus true belief is not sufficient for
         knowledge.

(G*) also makes a claim about the conditions that *knowledge* must satisfy; it does
not make a claim about the conditions that testimonial *warrant* minimally
sufficient for knowledge must satisfy. It does not entail that default testimonial
warrant does not confer a degree of warrant minimally sufficient for knowledge;
it entails that testimonial warrant minimally sufficient for knowledge in
conjunction with true belief is not sufficient for knowledge.

   If we turn to Burge's defense of (B2) (1993, 486 n. 24), it appears to be directed
at the conditions necessary for *knowledge*, as opposed to the conditions necessary
for *warrant* minimally sufficient for knowledge:

> Because the interlocutor must have knowledge and because of Gettier cases,
> the interlocutor must have more than true, justified belief if the recipient is
> to have knowledge. The recipient's dependence for having knowledge on
> the interlocutor's having knowledge is itself an instance of the Gettier point.
> The recipient could have true justified belief, but lack knowledge because
> the interlocutor lacked knowledge.

This argument establishes, at most, that the testifier's failure to know that p is one
of those Gettier conditions that prevents the recipient's warranted true belief that
p from being a case of knowledge. It does not establish that the recipient's warrant
for the belief that p is incomplete, or that it depends on the testifier's warrant, or
that it is not minimally sufficient for knowledge. Therefore, Burge's supporting
argument for (B2) supports only (G*). (G*), however, is neutral with respect to
(B1) and (B2). It does not favor either the generative or preservative model of
testimonial warrant. It merely states that, whatever the correct account of default
testimonial warrant, such warrant together with true belief is not sufficient for
knowledge. Since Burge's argument does not support (B2), (B2) can be rejected
outright, which resolves the tension in his account of testimonial warrant.

VI

I conclude by assessing the bearing of my proposed revision of Burge's account of
testimonial warrant on the two issues regarding the scope of a priori knowledge
that were introduced in the opening paragraph. I address the second issue first.
The premise that testimonial knowledge is a posteriori plays a pivotal role in an
influential argument against the existence of a priori knowledge. Philip Kitcher
(1983), drawing inspiration from W. V. Quine's (1963) celebrated "Two Dogmas
of Empiricism," maintains that a priori warrant entails indefeasibility by

experience. He goes on to contend that most, if not all, beliefs traditionally claimed to be warranted a priori are defeasible by testimony, and concludes that a priori knowledge is, at best, quite limited and, at worst, nonexistent.[12]

Burge's account of testimonial warrant appears to provide proponents of the a priori with the following rejoinder to the argument. Kitcher's argument takes for granted that beliefs warranted by testimony are warranted by experience. Burge's account of testimonial warrant, however, shows that Kitcher's assumption is false. Therefore, Kitcher must provide examples of experientially warranted nontestimonial defeaters for beliefs traditionally claimed to be warranted a priori in order for his argument to go through.

This rejoinder suffers from two shortcomings. First, if Kitcher's conception of a priori warrant is correct, then Burge has not shown that default testimonial entitlement is a priori. Although Burge maintains that such entitlement does not depend on experience, he also allows that it is defeasible by experience. But, given Kitcher's conception of a priori warrant, warrant that is defeasible by experience is not a priori. Burge and other proponents of the a priori favor a narrower conception of a priori warrant: warrant that does not depend on experience. But, in the absence of a defense of the narrower conception, the rejoinder is question-begging.[13]

Even if we reject Kitcher's conception of a priori warrant, the rejoinder suffers from a second shortcoming. On Burge's account, only default testimonial entitlement is a priori. Once the recipient moves out of the default position by taking into account experientially based information regarding the trustworthiness or expertise of the testifier, testimonial warrant becomes a posteriori. Therefore, it is a consequence of Burge's account that any belief that can be warranted a priori by testimony can also be warranted a posteriori by testimony. One simply has to move the recipient out of the default position. Since Burge's account of testimonial warrant does not entail that beliefs warranted a priori by testimony are warranted *only* a priori by testimony, it does not provide a rejoinder to Kitcher's argument.

The remaining issue is whether my revision of Burge's account has the consequence that default testimonial entitlement is a priori. If it does, then any proposition that is intelligible to a cognizer can be warranted a priori for that cognizer. All that is necessary is that (a) some testifier present that proposition as true to the cognizer, (b) the cognizer be in the default position with respect to the testifier, and (c) the cognizer not possess any defeaters for that proposition. Consequently, if default testimonial entitlement is a priori, the scope of a priori knowledge expands beyond its traditional bounds.

My revision of Burge's account does not entail that default testimonial entitlement is a priori. Whether such entitlement is a priori turns on the answer to two further questions. Is testimony a fundamental source of warrant? Does

perception play a warranting role in testimony? I have not addressed the first question; I assumed an affirmative answer for purposes of this paper. If that assumption is false, then default testimonial entitlement is not a priori.[14] With respect to the second question, I rejected one line of argument that Burge offers in support of the claim that perception does not play a warranting role in testimony: the analogy with preservative memory. Burge, however, offers an alternative line of support which I have not addressed. He contends that the role of perception in interlocution is different from its role in entitling beliefs about the external world (1993, 476–9). If that contention is mistaken, then default testimonial entitlement is not a priori.[15]

ACKNOWLEDGMENTS

NOTES

1. The argument is presented in section VI.
2. Burge's terminology is somewhat idiosyncratic. He maintains that entitlement and justification are species of warrant, which is a necessary condition for knowledge. In what follows, I defer to his terminology, although it should be noted that he sometimes uses "justification" to refer to both species of warrant. For a more detailed discussion of Burge's conception of entitlement, see Casullo (2007).
3. I assume here that certifying the credentials of a source of testimony involves certifying its trustworthiness or expertise, which requires some empirically warranted beliefs.
4. According to Burge: "Traditionally, a justification or entitlement was a priori if it could be derived from conceptual understanding—however experientially dependent the understanding might be." (1993, 479)
5. In order to avoid the complexities introduced by chains of testimonial warrant, I assume that the source's warrants are not testimonial.
6. Burge maintains: "It seems most natural to think that a strand of justification that runs through the extended body into the individual's proprietary body of justification must be a priori for the recipient's knowledge to be a priori." (1993, 487)
7. I am not claiming here that your testimony that p does not warrant my belief that p. I am claiming that your grasp of a proof that p does not warrant my belief that p.
8. Burge offers a second example that reinforces this point:

> Suppose that a perceptual belief's representational content and warrant are maintained over time by purely preservative memory in an argument.... If the content, as preserved at the later time, had derived from an earlier instantiation of the

content in another person (a person who had the perceptual experiences), the warrant for the later instantiation could not be the same as the warrant for the earlier one (the warrant for the perceptual belief). For the recipient, the putative agent of inference, did not have the perceptions. So the recipient cannot have the same warrant. Transference across persons would not preserve warrant for a step in an inference. (2003, 300)

9. Burge recognizes that the fact that testimony involves two cognizers introduces a crucial disanalogy between testimony and preservative memory, but does not explicitly reject the preservative model of testimony because of the disanalogy:

    Of course, mathematicians accept lemmas from others, even if the recipient has not thought through the proof. And there is simple acceptance of the word of others in less mathematical domains. In both cases the recipient's warrant for acceptance will never be the same as the original prover's or informant's warrant for the lemma, if the recipient relies on the source. Dependence on another forces a difference in the warrant had by the dependent recipient(s) from that had by the ultimate source. The recipient is warranted through interlocution. The source is not. Transitions across persons through communication do not have the same epistemic status and thus cannot be preservations of steps in an inference or argument. (2003, 301–2)

10. Edwards does not endorse the proposal. The quoted statement is numbered "(7)" in the original article. The emphasis is the author's. McGrath (2007) proposes, but does not endorse, a similar reconciliation for the case of memory.

11. Malmgren (2006, 219 n. 44) attributes a version of this view to Burge: "the recipient's overall warrant is a compound, made up of her own a priori entitlements plus (in the case where she knows) of her source's warrant." She does not explicitly address the issue of whether the recipient's own entitlement is minimally sufficient for knowledge. If it is, some explanation is required of why the source's warrant is necessary for knowledge.

12. For a discussion of the contention that all beliefs traditionally claimed to be warranted a priori are defeasible by testimony, see Casullo (2008).

13. For defenses of the narrower conception, see BonJour (1998), Casullo (2003), and Goldman (1999).

14. For more on this question, see the essays in Lackey and Sosa (2006).

15. Christensen and Kornblith (1997) and Malmgren (2006) maintain that Burge's contention is mistaken. Burge (1997) responds to Christensen and Kornblith.

References

Burge, Tyler. 1993. "Content Preservation." *Philosophical Review* 102: 457–488.

Burge, Tyler. 1997. "Interlocution, Perception, and Memory." *Philosophical Studies* 86: 21–47.

Burge, Tyler. 2003. "Memory and Persons." *Philosophical Review* 112: 289–337.

BonJour, Laurence. 1998. *In Defense of Pure Reason*. Cambridge: Cambridge University Press.

Casullo, Albert. 2003. *A Priori Justification*. New York: Oxford University Press.

Casullo, Albert. 2007. "What Is Entitlement?" *Acta Analytica* 22: 267–279.

Casullo, Albert. 2008. Defeasible A Priori Justification: A Reply to Thurow. *The Philosophical Quarterly* 58: 336–343.

Christensen, David and Hilary Kornblith. 1997. "Testimony, Memory and the Limits of the *A Priori*." *Philosophical Studies* 86: 21–47.

Edwards, Jim. 2000. "Burge on Testimony and Memory." *Analysis* 60: 124–131.

Goldman, Alvin. 1999. "A Priori Warrant and Naturalistic Epistemology." *Philosophical Perspectives* 13: 1–28.

Kitcher, Philip. 1983. *The Nature of Mathematical Knowledge*. New York: Oxford University Press.

Lackey, Jennifer and Ernest Sosa (eds.). 2006. *The Epistemology of Testimony*. New York: Oxford University Press.

Malmgren, Anna-Sara. 2006. "Is There A Priori Knowledge by Testimony?" *Philosophical Review* 115: 199–241.

McGrath, Matthew. 2007. "Memory and Epistemic Conservatism." *Synthese* 157: 1–24.

Quine, W. V. 1963. "Two Dogmas of Empiricism." In his *From a Logical Point of View*, 2nd ed revised, pp. 20–46. New York: Harper and Row.

9

Analyzing A Priori Knowledge

There are four distinct approaches to analyzing the concept of a priori knowledge. The approaches can be distinguished by posing two questions:

(1)   What is the primary target of the analysis?
(2)   Does the analysis of the primary target presuppose some general theory of knowledge or justification?[1]

There are two primary targets of analysis. A reductive approach analyzes the concept of a priori knowledge in terms of the concept of a priori justification: S knows a priori that p just in case S's belief that p is justified a priori and the other conditions on knowledge are satisfied. The primary target of analysis is the concept of a priori justification. A nonreductive approach offers an analysis of the concept of a priori knowledge in terms of conditions that do not involve the concept of the a priori. The primary target of analysis is the concept of a priori knowledge. There are two approaches to analyzing the primary target. A theory-neutral approach provides an analysis that does not presuppose any general

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1. By "general theory of knowledge or justification," I mean any theory that offers an account of the conditions necessary or sufficient for knowledge or justification.

theory of knowledge or justification. A theory-laden approach provides an analysis that does presuppose some general theory of knowledge or justification (call it *the background theory*).

Those who embrace a theory-laden analysis incur a special burden: they must separate the features of their analysis that are constitutive of the a priori from those that are constitutive of the background theory. The constitutive features of the a priori are those that *differentiate* it from the a posteriori. The constitutive features of the background theory are those that are necessary for knowledge or justification; they are *shared* by a priori and a posteriori knowledge. My goal is to illustrate how the failure to separate these features leads to erroneous conclusions about the nature of a priori knowledge.

Philip Kitcher (1983) offers the following influential argument in support of the conclusion that mathematical knowledge is not a priori: (1) the concept of a priori knowledge entails that a priori warrant is indefeasible by experience; but (2) the warrant conferred by alleged a priori sources of mathematical knowledge is defeasible by experience. Kitcher's critics, including myself, reject (1). Kitcher (2000) provides two divergent responses. The first concedes that his original supporting argument for (1) is flawed, but offers a new multi-faceted defense. The second contends that the important question about mathematical knowledge is not whether it is a priori but whether it is tradition-independent.

I defend three theses in this paper. First, Kitcher's defense of (1) is undercut by a failure to distinguish the requirements of the reliabilist background theory that he originally favored from those constitutive of the a priori. Second, his contention that the important question about mathematical knowledge is whether it is tradition-independent is also undercut by a failure to distinguish the requirements of the socio-historical background theory that he currently favors from the those constitutive of the a priori. Third, once they are distinguished, we can see that the question of whether mathematical knowledge is a priori remains central to the current debate.

1

Kitcher (2000, p. 67) maintains that

> X knows a priori that p iff X knows that p and X's knowledge that p was produced by a process that is an a priori warrant for p.
> α is an a priori warrant for X's belief that p just in case α is a process such that for any sequence of experiences sufficiently rich for X [to acquire the concepts in] p
>
> (a) some process of the same type could produce in X a belief that p;
> (b) if a process of the same type were to produce in X a belief that p, then it would warrant X in believing that p;

(c)   if a process of the same type were to produce in X a belief that p, then p.

The analysis is theory-laden since Kitcher (2000, p. 66) maintains that his "general understanding of warrants is a version of reliabilism." It is reductive since he (1983, p. 25) identifies "the general notion of warrant" with Goldman's (1979) notion of justification.[2]

Kitcher's critics focus on conditions (b) and (c), which share a common feature: both impose higher standards on a priori justification than those required by his background theory. I (1988, 2003) have argued that, in the absence of some compelling supporting argument, the higher standards are ad hoc and should be rejected.

The problem is clear in the case of condition (c), which precludes the possibility of a priori justified false beliefs. Reliabilism does not preclude the possibility of empirically justified false beliefs. So what is the basis for the higher standard on a priori justification? Kitcher (2000, p. 72) maintains that (c) is a consequence of (b). Thus, the burden of supporting the higher standards falls entirely on supporting (b); and, moreover, supporting it independently of (c). Condition (b) requires that S's a priori justified belief that p be indefeasible by experience in any world in which S has sufficient experience to acquire the concepts in p. Reliabilism, however, does not preclude the possibility of empirically defeasible justified beliefs. So what is the basis for the higher standard on a priori justification?

Kitcher (1983, p. 89) originally argued that the higher standard is supported by the intuitive idea that a priori knowledge is independent of experience:

> But if alternative experiences could undermine one's knowledge then there are features of one's current experience which are relevant to the knowledge, namely those features whose *absence* would change the current experience into the subversive experience. The idea of the support lent by kindly experience is the obverse of the idea of the defeat brought by uncooperative experience.

In response, I (1988, pp. 220–221) questioned his account of the relationship between supporting and defeating evidence. It is uncontroversial that if S's belief that p is supported (i.e., justified) by experience then S's belief that p is not justified (and, hence, not known) a priori. But suppose that S's belief that p is justified nonexperientially and that S's nonexperiential justification for the belief that p is

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defeasible by experience. From the fact that S's justification for the belief that p is defeasible by evidence of kind K, it does not follow that S's belief that p is supported (i.e., justified) by evidence of kind K. Kitcher now concedes this point and agrees that his original defense of (b) fails.

2

Kitcher's new defense consists of a series of arguments that purport to reveal the shortcomings of the rival conception of the a priori favored by his critics. I follow Kitcher in referring to his conception, which includes both conditions (a) and (b), as the *Strong conception* or (SC); and the rival conception, which includes only (a), as the *Weak conception* or (WC). Let us introduce the term "nonexperiential process" to refer to processes that are available independently of experience. We can now articulate the two conceptions as follows:

(SC)   S's belief that p is justified a priori iff S's belief that p is justified by a nonexperiential process and that justification cannot be defeated by experience.

(WC)   S's belief that p is justified a priori iff S's belief that p is justified by a nonexperiential process.

There is a further complication that must be addressed before turning to Kitcher's arguments against (WC).

Kitcher no longer endorses the background theory of knowledge that informed his original defense of (SC). He now rejects reliabilism in favor of a socio-historical conception of knowledge. As a result, his arguments against (WC) fall into two categories: those that presuppose reliabilism, and those that presuppose socio-historicism. I address the former in this section and the latter in the next section.

Kitcher offers three arguments against (WC) that presuppose reliabilism. The first alleges that (WC) is satisfiable only if (SC) is satisfiable. The second contends that (WC) fails to capture an important feature of the traditional conception of the a priori. The third maintains that (WC) is too weak.

In support of the contention that (WC) is satisfiable only if (SC) is satisfiable, Kitcher (2000, p. 74) invites us to "envisage Gauss or Dedekind or Cantor coming to a priori knowledge that nobody has had before on the basis of some kind of process (call it 'intuition')." Let us assume that intuition is sufficiently reliable to produce justified beliefs but that there are possible experiences that call into question the reliability of intuition. Here it appears that (WC) entails that mathematical beliefs based on intuition are justified a priori since the

undermining experiences are not present in the actual situation, but (SC) entails that such beliefs are not justified a priori.

Kitcher, however, maintains that this difference is only apparent. In support of this claim, he cites three considerations: (C1) the ability of mathematicians such as Cantor to attain knowledge of new mathematical principles is rare; (C2) since it is rare, it is difficult to find others who can verify that it has been exercised appropriately; and (C3) the history of mathematics indicates that the exercise of this ability has had variable results. Kitcher (2000, p. 75) concludes that "appeals to elusive processes of a priori reason ought always to be accompanied by doubts about whether one has carried out the process correctly, and whether, in this instance, the deliverances are true." The upshot of this conclusion is that "The power [of intuition] to warrant belief in the actual situation would be undermined—and, indeed, we might claim that one couldn't satisfy the Weak conception unless the Strong conception were also satisfied" (Kitcher 2000, p. 75).

Kitcher's argument raises two questions. Is it sound? If it is sound, does it provide a basis for preferring (SC) over (WC)? Kitcher contends that Cantor's mathematical beliefs, although reliably produced by the process of intuition, are unjustified. They are unjustified because the justification conferred on them by the process of intuition is undermined by the fact that

(D)   Cantor ought always to have doubts about whether he has exercised the process correctly and whether the resulting beliefs are true.

Let us grant that if Cantor's mathematical beliefs are accompanied by such doubts then his justification for those beliefs is undermined. But why should we suppose that his exercise of the process of intuition ought always to be accompanied by such doubts?

Kitcher maintains that (D) is a consequence of (C1)–(C3). But (C1)–(C3) fail to support (D) since it need not be the case either that Cantor believes (C1)–(C3) or that his cognitive state justifies him in believing (C1)–(C3). Moreover, reliabilism does not require that Cantor believes (C1)–(C3) or that his cognitive state justifies him in believing (C1)–(C3). If he does not believe (C1)–(C3) and his cognitive state does not justify him in believing (C1)–(C3), however, then it is hard to see on what basis Kitcher can sustain the claim that Cantor's exercise of the process of intuition ought to be accompanied by such doubts.[3] But if Cantor's exercise of the process of intuition need not be

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3. Even if Cantor believes (C1)–(C3), (D) does not follow since those beliefs need not impugn the reliability of *his* exercise of the process and, moreover, they do not preclude his having evidence that *his* exercise of the process is reliable.

accompanied by such doubts, then it is possible that Cantor's mathematical beliefs satisfy (WC) but not (SC).

But suppose that Kitcher's argument is sound. Does it provide any basis for favoring (SC) over (WC)? No. Kitcher introduced (SC) in order to offer the following argument against mathematical apriorism: (1) the concept of a priori knowledge entails that a priori warrant is indefeasible by experience; but (2) the warrant conferred by alleged a priori sources of mathematical knowledge is defeasible by experience. If (WC) is satisfiable only if (SC) is satisfiable, then (WC) is sufficient to secure the truth of (1). But, if (WC) is sufficient to secure the truth of (1), then there is a strong dialectical reason to abandon (SC). Embracing (SC) requires offering some rationale for imposing higher standards on a priori justification than those required by the background theory of justification. Why incur the burden of supporting (SC) if you can get what you want for free?

Kitcher's (2000, p. 77) second contention is that (WC) fails to capture a feature of the traditional conception of a priori knowledge: "the tradition ascribes to a priori knowledge the functional significance of being in a position to prescribe to future experience; knowledge that prescribes to future experience is irrefutable by future experience." Let us grant that the tradition ascribes to a priori knowledge the functional significance of prescribing to future experience. This observation, taken by itself, does not provide a basis for favoring (SC) over (WC) since Kitcher has not addressed whether this feature is constitutive of the traditional concept of knowledge. If it is, then it is not a feature that differentiates a priori knowledge from empirical knowledge and, hence, it is not constitutive of the a priori.

It is generally accepted that the traditional concept is Cartesian foundationalism:

> Descartes, along with many other seventeenth- and eighteenth-century philosophers, took it that any knowledge worthy of the name would be based on cognitions the truth of which is guaranteed (infallible), that were maximally stable, immune to ever being shown to be mistaken (incorrigible), and concerning which no reasonable doubt could be raised (indubitable). (Alston 1992, p. 146)

If this characterization is correct, then it follows that, according to the tradition, incorrigibility is a necessary feature of knowledge and, a fortiori, a necessary feature of a priori knowledge. It is not a feature that is constitutive of the a priori. Therefore, the fact that the tradition ascribes to a priori knowledge the functional significance of prescribing to future experience, taken by itself, provides no basis for preferring (SC) over (WC).

Moreover, once we clearly distinguish the requirements of the traditional Cartesian concept of knowledge from the requirements of the a priori, we are in a position to see that (WC) is actually more consonant with the tradition than

(SC). Given the Cartesian concept of knowledge, the distinctive condition of (SC) is both redundant and misleading. It is redundant since the Cartesian concept of knowledge guarantees that it is satisfied. It is misleading since it suggests that irrefutability by future experience is a feature that differentiates a priori knowledge from empirical knowledge.

Kitcher's third contention is that (WC) is too weak. Consider the following thought experiment. Suppose that a cubical die, which is made of some homogeneous material and whose faces are numbered 1 through 6, is rolled once. What is the chance that the uppermost face will be the one numbered 6? One might reason as follows: The material is homogeneous. Therefore, the situation is symmetrical with respect to the six faces. One of the numbered faces will be uppermost. Therefore, the probability that it will be the one numbered 6 is 1/6. Kitcher (2000, p. 78) maintains that the process involved in this thought experiment is nonexperiential and meets reliabilist standards. Therefore, (WC) has the consequence that the conclusion in question is known a priori.

Kitcher's contention that the conclusion in question meets reliabilist standards is tenuous. But suppose that it should turn out that the belief forming process in question is reliable. Why is this result problematic for (WC)? Kitcher (2000, p. 79) contends that "this will set the Weak conception at variance with the classical view of the bounds of apriority." This contention is mistaken because it fails to distinguish the requirements of (WC) from those of the background theory in which it is embedded. If (WC) is embedded within the classical Cartesian theory of knowledge then it does not deliver results at variance with the classical theory. In order for a belief to be justified or known a priori within a Cartesian theory of knowledge, it must meet the general conditions on justification and knowledge imposed by that theory. Since Kitcher's example does not meet those conditions—it is neither infallible nor incorrigible nor indubitable— it is not justified or known a priori on the classical view. Kitcher generates the appearance of variance between (WC) and the classical theory by embedding (WC) within a reliabilist theory of knowledge. The variance is due entirely to the difference in the background theories of knowledge in which (WC) is embedded. It is not due to (WC).

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Kitcher's remaining arguments against (WC) derive from a shift in his background theory of knowledge. Kitcher (2000, p. 80) now rejects reliabilism in favor of socio-historicism:

> On my *socio-historical* conception of knowledge, the knowledge we have
> today isn't simply a matter of what we have experienced or thought during

the course of our lives, but is dependent on the historical tradition in which
we stand and on the social institutions that it has bequeathed to us.

Kitcher maintains that socio-historicism has two significant consequences. First,
it shows that only (SC) underwrites the classical view that a priori knowledge is
tradition-independent. Second, it reveals that the primary issue regarding
mathematical knowledge is not whether it is a priori but whether it is tradition-
independent.

Kitcher supports the claim that only (SC) underwrites the tradition-indepen-
dence of a priori knowledge by alleging that Frege provided an a priori route to
mathematical knowledge that Frege regarded as tradition-independent. If Frege
were employing (WC), however, that route would be tradition-dependent:

> Suppose that the conception of a priori knowledge employed in these dis-
> cussions were just the Weak conception. Then there are possible lives, given
> which processes that would normally warrant belief in various mathematical
> propositions would fail to do so. Now imagine a historical tradition whose
> members have such experiences in the generation that precedes ours. There
> are two possibilities: in socializing us they either respond to the subversive
> experiences by explicitly identifying certain processes as unreliable . . . or
> they do not. If they do, then we are not warranted in believing parts of math-
> ematics on the basis of the process, any more than someone who has been
> told about mirages is warranted by his perceptions in believing that there is
> an oasis in the distance. . . . If they do not, then we are still not warranted, for
> our epistemic situation is akin to that of people reared in a community of
> dedicated clairvoyants who ignore evidence that their chosen methods
> are unreliable. . . . Hence, . . . our knowledge turns out to be tradition-
> dependent. (Kitcher 2000, p. 82)

Kitcher also contends that if (SC) is adopted, this argument is blocked and the
tradition-independence of mathematical knowledge is preserved.

Kitcher's argument is not transparent. I offer the following reconstruction. Let
us begin with the simplifying assumption that, for Frege, a single process Φ is the
source of all mathematical knowledge. Consider now some mathematical propo-
sition that p and assume that it is justified a priori by Φ:

(A1)   S's belief that p is justified a priori by Φ.

Kitcher invites us to assume that Frege is employing (WC):

(A2)   (WC).

On the basis of this assumption, he concludes in the second sentence of the quoted passage that

(C1)   Therefore, the justification conferred on S's belief that p by Φ is defeasible by experience.

Kitcher now invites us to imagine that S's socializers have such experiences. Since those experiences provide evidence that Φ is unreliable, he concludes that

(C2)   Therefore, it is possible that S's socializers have experiential evidence that Φ is not reliable.

He then argues by dilemma in support of the following epistemic principle:

(EP)   If S's belief that p is produced by a reliable process Φ and S's socializers have evidence that Φ is not reliable, then the justification conferred on S's belief that p by Φ is defeated.

Since the justification of S's belief that p depends on whether or not her socializers have evidence that Φ is not reliable, it follows that

(C3)   S's justification for the belief that p is tradition-dependent.

Kitcher's argument is flawed. Its initial step rests on a critical misunderstanding of (WC). Kitcher alleges that it is a consequence of (WC) that if S's justification for the belief that p is a priori, then S's justification is defeasible by experience. (WC), however, does not entail that a priori justification is defeasible by experience. It entails only that defeasibility by experience is compatible with a priori justification. Since the inference from (A1) and (A2) to (C1) is invalid, Kitcher's argument fails to establish that (WC) leads to the tradition-dependence of a priori knowledge.[4]

Kitcher's contention that his argument is blocked if (SC) is adopted is also mistaken. Consider again some mathematical proposition that p and assume that it is justified a priori by Φ:

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4. One might suggest, in Kitcher's defense, that he can avoid my objection by adding (C1) to his argument as an independent assumption. This assumption, in conjunction with (A1) and (A2), does entail (C2). Therefore, if the remainder of Kitcher's original argument is sound, the revised argument is also sound. The revised argument, however, only shows that (WC) leaves open (rather than entails) that a priori knowledge is tradition-dependent.

(A1)   S's belief that p is justified a priori by Φ.

Now assume that Frege is employing (SC):

(A2*)   (SC).

The conjunction of (A1) and (A2*) entails

not-(C1)   Therefore, the justification conferred on S's belief that p by Φ is
            not defeasible by experience.

Not-(C1), however, does not entail

not-(C3)   S's justification for the belief that p is not tradition-dependent.

Kitcher overlooks the possibility of *nonexperiential* evidence that Φ is not
reliable—say, for example, that the exercise of Φ frequently leads to appar-
ently paradoxical or inconsistent results. If such evidence is possible, it
follows that

(C2*)   Therefore, it is possible that S's socializers have nonexperiential
         evidence that Φ is not reliable.

The conjunction of (C2*) and (EP) entails that the justification of S's belief that
p depends on whether or not her socializers have nonexperiential evidence that
Φ is not reliable. Therefore,

(C3)   S's justification for the belief that p is tradition-dependent.

The moral is clear. A priori knowledge is tradition-independent only if a priori
justification is indefeasible. This leads to a second, more fundamental, criticism
of Kitcher's argument.
    In order to show that (WC) entails that a priori knowledge is tradition-
dependent, Kitcher embeds (WC) within a background theory of knowledge,
socio-historicism, which he acknowledges represents a departure from the epis-
temological tradition that includes Frege. If we make the plausible assumption
that Frege's background theory of knowledge is Cartesian foundationalism, then
it follows that for Frege:

(F)   If S's belief that p is justified, then S's justification for the belief that p
       is indefeasible.

The conjunction of (F) and (A1) entails

(C)   Therefore, the justification conferred on S's belief that p by Φ is not defeasible,

and Kitcher's argument for the tradition-dependence of a priori knowledge is immediately blocked. So Kitcher is faced with a dilemma. Either Frege's background theory of knowledge entails (F) or it does not. If it does not, then neither (SC) nor (WC) preserves the tradition-independence of a priori knowledge. If it does, then both (SC) and (WC) preserve the tradition-independence of a priori knowledge.

We can now generalize and sharpen the basic criticism of (SC). Either (SC) is embedded in a traditional theory of knowledge that entails (F) or it is not. Within a traditional theory of knowledge, condition (b) is both unnecessary and misleading. It is unnecessary, because the possibility of experiential defeaters for beliefs justified a priori is ruled out by the general theory of knowledge. It is misleading because indefeasibility by experience is not a feature that differentiates a priori from empirical justification; it is a feature that is common to both. Condition (b) is necessary only if (SC) is embedded in a nontraditional theory of knowledge that does not entail (F). But if (SC) is embedded in a nontraditional theory of knowledge and condition (b) differentiates a priori from empirical justification, then condition (b) imposes a higher standard on a priori justification than the general theory of knowledge requires. In the absence of some compelling supporting argument, the higher standard is ad hoc. Therefore, (SC) is either unnecessary or ad hoc.

Kitcher alleges that socio-historicism has a second important consequence. It reveals two ways in which contemporary mathematical knowledge depends on the experiences of our ancestors. First, there are "those scattered perceptions that began the whole show," and, second, there is "the division of labour [between mathematics and science] and the long sequence of experiences that have warranted our ancestors, and now us, in making that division." (Kitcher 2000, p. 84) Once we see this, "we'll recognize that the issue isn't one of apriorism versus empiricism, but of apriorism versus historicism, and here the interesting question is whether one can find, for logic, mathematics, or anything else, some tradition-independent warrant, something that will meet the requirements that Descartes and Frege hoped to satisfy—in short, something that will answer to the Strong conception." (Kitcher 2000, p. 85)

Let us provisionally grant Kitcher's claim that our mathematical knowledge depends on the experiences of our ancestors and examine its alleged consequences. The first is rooted in conceptual confusion. The important epistemological question regarding mathematical knowledge cannot be framed as a choice

between historicism and apriorism because historicism is a thesis about the nature of knowledge in general; apriorism is not. The central claim of historicism is that the justification of a person's beliefs sometimes depends on the cognitive states and processes of that person's intellectual ancestors. Kitcher (2000, pp. 81–82) contrasts the socio-historical conception of justification with "synchronic" conceptions, which hold that the justification of a person's beliefs depends only on that person's cognitive states and processes. Hence, the debate between socio-historical theories and synchronic theories is a debate over the *general* requirements for justification. The central claim of apriorism is that the beliefs that meet the general requirements on justification can be divided into two categories based on the *difference* that experience plays in meeting those requirements. Hence, apriorism is not a thesis about the general requirements for justification.

Kitcher's contention that the interesting question about mathematics is whether one can find for it some tradition-independent justification cannot be right for similar reasons. The tradition-independence of justification is a consequence of the synchronic conception of justification. Hence, the debate over whether justification is tradition-independent is a debate about the *general* requirements for justification. Consequently, when Frege claims that the justification of mathematical propositions differs from the justification of scientific propositions—that the former is a priori and the latter is not—his claim cannot be that the justification of mathematical propositions is tradition-independent but the justification of scientific propositions is not. His commitment to Cartesian foundationalism ensures that the justification of both is tradition-independent. Frege's claim is that although the justification of both is tradition-independent, experience plays a different role in the justification of each.

Perhaps the source of Kitcher's confusion is the assumption that (SC) is essentially tied to the synchronic theory of justification. If it is, then embracing (SC) entails rejecting historicism. But it is not. Both (SC) and (WC) can be formulated within both socio-historical and synchronic theories of justification. Within a synchronic theory of justification, (WC) holds that S's belief that p is justified a priori iff the cognitive states and processes of S that justify the belief that p are exclusively nonexperiential. (SC) adds a further condition: S's nonexperiential justification is not defeasible by S's experiences. Within a socio-historical theory, (WC) holds that S's belief that p is justified a priori iff the cognitive states and processes of S *and S's intellectual ancestors* that justify the belief that p are exclusively nonexperiential. (SC) adds the further condition: S's nonexperiential justification is not defeasible by S's experiences *or those of S's intellectual ancestors*. Hence, whichever conception of justification one adopts, the two traditional questions about the a priori can be posed: What is the correct analysis of the concept of a priori knowledge? Is mathematical knowledge a priori?

4

Let us step back and ask: What conclusions can we draw about the current debate over the nature of mathematical knowledge? The traditional debate centers around the question: Is mathematical knowledge a priori? Kitcher (1983) addresses this question directly: he offers a negative response supported by an argument whose linchpin is (SC). He (2000, p. 85) now rejects the importance of that question because he is pessimistic about providing an analysis of the concept of a priori knowledge:

> It seems to me that the discussions of the past decades have made clear how intricate and complex the classical notion of the a priori is, and that *neither* the Strong conception *nor* the Weak conception (nor anything else) can provide a coherent explication.

The first conclusion that we can draw is that Kitcher's pessimism is unwarranted.

The difficulty of providing a clear and coherent account of the classical conception of the a priori is due largely to a failure to distinguish the conditions constitutive of the concept of a priori knowledge from those constitutive of the more general concept of knowledge. This point emerges in two different ways in Kitcher's discussion. First, the weaknesses that he attributes to (WC) are consequences of the reliabilist theory of knowledge in which he embedded his original discussion of the a priori. Second, the features of the classical conception of the a priori that Kitcher alleges are captured only by (SC) are features of the Cartesian foundationalist theory of knowledge in which it is embedded. Once we carefully distinguish the requirements of the background theories of knowledge that Kitcher presupposes from those of the a priori, we see that he has neither offered any cogent criticisms of (WC) nor shown that (WC) is at odds with the classical conception of the a priori. Hence, his contention that (WC) fails to provide an accurate and coherent analysis of the classical conception of a priori knowledge is baseless.

Kitcher's (2000, p. 85) pessimism regarding the concept of a priori knowledge leads him to conclude that we should move beyond the traditional debate regarding mathematical knowledge:

> The important point is to understand the tradition-dependence of our mathematical knowledge and the complex mix of theoretical reasoning and empirical evidence that has figured in the historical process on which current mathematical knowledge is based.

The second conclusion that we can draw is that Kitcher's new account of mathematical knowledge provides no reason to move beyond the traditional debate.

Kitcher's new account of mathematical knowledge can be formulated as follows:

(1) Socio-historicism is the correct general theory of knowledge.
(2) The experiences of our ancestors play a role in the justification of our mathematical beliefs.
(3) Therefore, our mathematical knowledge is based on a mix of theoretical reasoning and empirical evidence.

Once we recognize that the concept of a priori knowledge can be articulated within a socio-historical theory of knowledge, we also see that Kitcher's new account, when conjoined with (WC), offers a direct answer to the traditional question regarding mathematical knowledge:

(4) (WC) is the correct analysis of a priori justification.
(5) Therefore, our mathematical knowledge is not a priori.

So why not endorse (WC) and claim victory?

The third conclusion that we can draw is that Kitcher's claims about the role that experience plays in justifying the mathematical beliefs of our ancestors raises epistemological questions identical to those raised in the traditional debate regarding the nature of mathematical knowledge. His first claim is that the elementary mathematical knowledge of our early ancestors is justified by ordinary sense perception. This claim applies a familiar Millian account to the mathematical knowledge of our early ancestors. But the very same questions that have been raised regarding whether Mill has shown that *our* mathematical knowledge is empirical can be raised with respect to Kitcher's claims about the mathematical knowledge of *our ancestors*. For example, suppose that Mill provides a coherent empiricist account of the mathematical knowledge of our ancestors. It does not follow that their mathematical knowledge is not a priori unless Mill can rule out the possibility of epistemic overdetermination—i.e., the possibility that their mathematical beliefs are justified both experientially and nonexperientially.[5]

Kitcher's second claim is that the institutionalization of a division of labor in the early development of modern science in which some members were

5. See Casullo (2005).

given the task of developing new mathematical concepts and principles plays a role in the justification of the mathematical beliefs of our ancestors. Evaluating this claim is more challenging since he is not fully explicit about how this epistemic division of labor shows that mathematical beliefs are justified by experience. His (2000, p. 84) clearest articulation comes in the following passage:

> We have learned, *from experience*, that having a group of people who think and scribble, who proceed to extend and articulate mathematical languages in the ways that mathematicians find fruitful and who provide resources for empirical science is a good thing, that creating this role promotes our inquiry.

Kitcher maintains that we have learned from experience that a division of labor promotes fruitful inquiry. But the fact that experience shows that a division of labor promotes fruitful mathematical inquiry does not entail that experience plays any role in the justification of mathematical beliefs. Perhaps Kitcher is here stressing the role of mathematics in promoting scientific inquiry and suggesting that this role is essential to the justification of mathematical beliefs. This reading of Kitcher introduces a familiar Quinean theme to the effect that the applications of mathematical theories in empirical science play an essential role in their justification. Once again, the same questions that have been raised regarding whether Quine has shown that *our* mathematical knowledge is empirical can be raised with respect to Kitcher's claims about the mathematical knowledge of *our ancestors*. For example, does the Quinean picture provide an accurate representation of our actual mathematical practices or is it yet another philosophical "rational reconstruction" of a body of human knowledge of the sort that Quine and Kitcher explicitly reject?[6]

So, in the end, Kitcher's circuit through socio-historical theories of knowledge returns the current debate about mathematical knowledge to familiar territory. (WC) provides a coherent articulation of the concept of the a priori that is consonant with both the classical conception of knowledge and Kitcher's socio-historical conception. The socio-historical account of mathematical knowledge in conjunction with (WC) entails that mathematical knowledge is not a priori. The soundness of his argument rests on two familiar issues regarding mathematical knowledge. Are the experiences that are typically involved in the genesis of our

6. Maddy (1997, p. 184) maintains that the Quinean picture of mathematics is incompatible with his epistemological naturalism.

mathematical beliefs (and those of our ancestors) essential to their justification? Are the empirical applications of mathematical propositions essential to their justification?[7]

References

Alston, W. (1992). "Foundationalism." In J. Dancy & E. Sosa (Eds.), *A Companion to Epistemology*. Oxford: Basil Blackwell.

Casullo, A. (1988). "Revisability, Reliabilism, and A Priori Knowledge." *Philosophy and Phenomenological Research*, 49, 187–213.

Casullo, A. (2005). "Epistemic Overdetermination and A Priori Justification." *Philosophical Perspectives*, 19, 41–58.

Casullo, A. (2003). *A Priori Justification.* New York: Oxford University Press.

Goldman, A. (1979). "What Is Justified Belief?" In G. Pappas (Ed.), *Justification and Knowledge*. Dordrecht: D. Reidel Publishing Company.

Kitcher, P. (1983). *The Nature of Mathematical Knowledge*. New York: Oxford University Press.

Kitcher, P. (2000). "A Priori Knowledge Revisited." In P. Boghossian & C. Peacocke (Eds.), *New Essays on the A Priori*. Oxford: Oxford University Press.

Maddy, P. (1997). *Naturalism in Mathematics*. Oxford: Oxford University Press.

Pust, J. (2002). "Kitcher on Tradition-Dependent *A Priori* Warrant." *The Philosophical Quarterly*, 52, 375–376.

10

Knowledge and Modality

The primary focus of Saul Kripke's (1971, 1980) pioneering investigations is not epistemological. Yet he makes two striking epistemological claims that continue to resonate in the contemporary literature:

(E1)   There are necessary a posteriori truths; and
(E2)   There are contingent a priori truths.

Kripke maintains that (E1) is a consequence of one of his primary metaphysical theses:

(MT)   Identity statements involving proper names are necessarily true if true,

and that (E2) is a consequence of one of his primary semantic theses:

(ST)   A definite description that is employed to introduce a name fixes the reference of that name rather than providing its sense.

He also acknowledges that it is a widely held view, one that he associates with Kant, that

(K)   All knowledge of necessary truths is a priori and all a priori knowledge
       is of necessary truths.

Therefore, he argues against (K) in order to defuse a potential objection to (MT) and (ST).

Kripke's epistemological claims continue to be resisted. Some deny that (E1) is a consequence of (MT) and that (E2) is a consequence of (ST).[1] Others distinguish two notions of necessity and maintain that (K) is defensible with respect to one of those notions.[2] Others offer alternative versions of (K) that are alleged to be compatible with either (E1) or (E2).[3] The resistance indicates that (K) remains an attractive thesis regarding the relationship between the epistemic and the modal.

My goal is to identify the most plausible principles linking the epistemic and the modal. My strategy for identifying the principles is to investigate two related questions. Are there compelling general supporting arguments for (K)? Are there decisive counterexamples to (K)? Section 1 identifies two primary sources of support for (K). In section 2, I argue that (K) provides a very crude account of the relationship between the epistemic and the modal because it masks two crucial distinctions. I utilize these distinctions to introduce a number of more nuanced principles, which I assess by determining whether they are open to traditional counterexamples—i.e., counterexamples that are not based on Kripke's novel metaphysical and semantic theses. Section 3 utilizes the distinctions introduced in section 2 to argue that the two sources of support for (K) are open to serious objections. Section 4 examines Kripke's novel counterexamples to (K)—i.e., those that are based on his novel metaphysical and semantic theses. Here I identify two features that distinguish the novel counterexamples from the traditional counterexamples discussed in section 2 and show that they are incompatible. Section 5 concludes the investigation by identifying two intuitively plausible principles linking the epistemic and the modal that are not open to decisive counterexamples but which enjoy no compelling independent support.

1. See, for example, Salmon (1987/1988,1991,1993), and Soames (2002).

2. See, for example, Evans (1979); Davies and Humberstone (1980); Chalmers (1996), and Jackson (1998). Evans, and Davies and Humberstone offer partial defenses. Chalmers and Jackson offer fuller defenses.

3. See, for example, Casullo (1977) and Swinburne (1987).

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Why accept (K)? General supporting arguments for (K) are difficult to come by.[4] (K) is the conjunction of two principles:

(K1)   All knowledge of necessary truths is a priori; and
(K2)   All a priori knowledge is of necessary truths.

My primary contention is that each principle derives its support from a different source. (K1) derives its support from a particular *strategy* for arguing in support of the existence of a priori knowledge. (K2) derives its support from a particular *conception* of a priori knowledge.

(K) is usually associated with Kant. Four aspects of Kant's perspective on the a priori are salient for our purposes. First, Kant (1965, p. 43) characterizes a priori knowledge as "absolutely independent of all experience," but never specifies the respect in which a priori knowledge must be independent of experience. Most contemporary theorists agree that the relevant respect is justification and, hence, the Kantian conception can be stated as follows:

(KAP)   S knows a priori that p iff S's justification for the belief that p is independent of all experience and the other conditions on knowledge are satisfied.[5]

There is, however, one respect in which Kant's characterization of the a priori is clear: it makes no mention of the concept of necessity. Hence, Kant's conception of the a priori does not underwrite (K). Second, Kant does not argue directly for the existence of a priori knowledge by showing that there are cases of knowledge that satisfy the conditions in (KAP). Instead, he argues indirectly by seeking

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4. Some theorists, such as Kripke (1980, pp. 38–39) and Kitcher (1983, pp. 29–30), provide supporting arguments, which they quickly dismiss as notoriously weak. Davies (2004, pp. 100–101) offers two observations regarding the claim of Evans (1979) that a statement that is deeply contingent but knowable a priori would be intolerable: "He does not provide very much in the way of an argument for the claim that the combination of deep contingency with *a priority* is intolerable....Second, while a powerful intuition speaks in favour of some hedged version of the claim that *a priority* entails deep necessity it is not easy to see how to provide the intuition with illuminating argumentative support,..." Quinton (1972), and Swinburne (1987) offer general arguments that purport to connect a priori knowledge and analytic truth.

5. There is controversy over the correct articulation of (KAP). Some, such as Kitcher (1983), maintain that "S's justification for the belief that p is independent of all experience" entails "S's justification for the belief that p is not defeasible by experience." Others, such as BonJour (1998), Casullo (2003), and Goldman (1999) deny this. None of the arguments in this paper requires taking a stance on the issue.

criteria of a priori knowledge, where a criterion is a sufficient condition that is not constitutive of the concept of a priori knowledge. Kant's contention that necessity is a criterion of the a priori underwrites (K1). Third, since necessity is not constitutive of Kant's conception of the a priori, the contention that necessity is a criterion of the a priori requires independent support. Fourth, (K2) plays no role in either Kant's articulation of the concept of a priori knowledge or his arguments in support of the existence of such knowledge. It plays no role in the framework for discussing the a priori that Kant articulates in his introduction to the *Critique*.

There is, however, a second epistemological tradition that endorses a more intimate connection between a priori knowledge and necessary truth. This tradition, which I will call *rationalism*, contends that such knowledge consists in a rational (intellectual, intuitive) apprehension (grasp of, insight into) the necessary truth of some proposition. Laurence BonJour (1985, p. 192) offers the following lucid characterization of the traditional rationalist conception: "a proposition is justified a priori when and only when the believer is able, either directly or via some series of individually evident steps, to intuitively 'see' or apprehend that its truth is an invariant feature of all possible worlds." Hence, according to the traditional rationalist conception:

(RAP)   S knows a priori that p iff S's justification for the belief that p consists in intuitively "seeing" (directly or indirectly) that p is necessarily true and the other conditions on knowledge are satisfied.[6]

There are three important differences between the rationalist conception of a priori knowledge and the Kantian conception. First, according to (RAP), necessity is constitutive of the concept of a priori knowledge. Second, (RAP) supports (K2). Since "'seeing' that p is necessarily true" entails "p is necessarily true," it follows from (RAP) that a priori knowledge is restricted to necessary truths. Third, (RAP) does not support (K1).[7] Although (RAP) entails that a

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6. Contemporary proponents of rationalism include BonJour (1985, 1998); Chisholm (1989), and Plantinga (1993).

7. An anonymous reviewer suggests that (RAP) may support a weaker version of (K1), such as: All (or, perhaps, all justifiable) necessary truths are justifiable a priori. I have two concerns with this suggestion. First, the weaker versions of (K1) introduce the modal notion "justifiable." Hence, evaluating these proposals requires articulating the sense of "possible" embedded in this notion. If the relevant sense is suitably narrow, then the example of a rationally blind cognizer, which is introduced in section 2, shows that the weaker variants are false. Second, the weaker variants also run up against Kripke's example of a physical object (say, a lectern) having some property essentially (say, being made out of wood), where it appears that one can know only a posteriori that the object has the property in question.

priori justification consists in a rational apprehension of necessary truth, it does not entail that necessary truths cannot be justified a posteriori.[8]

We can now draw three conclusions regarding (K). First, (K) is the conjunction of two principles, each of which draws its support from a different source. Second, the type of support that each draws from its respective source is different. (K1) is a consequence of Kant's contention that necessity is a criterion of the a priori. (K2) is a consequence of the rationalist conception of a priori knowledge. Third, the support that Kant's contention provides for (K1) is only as strong as the supporting arguments for that contention, and the support that (RAP) provides for (K2) is only as strong as the supporting arguments for (RAP). We will examine the supporting arguments for both Kant's contention and (RAP) in section 3.

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(K1) and (K2) provide a very crude account of the relationship between the epistemic and the modal because they mask two important distinctions. On the epistemic side, there is the distinction between knowledge and justified belief. On the modal side, there is the distinction between truth and modal status. Utilizing these distinctions, I introduce a number of more nuanced principles and assess their plausibility by determining whether they are open to

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8. An anonymous reviewer points out that I do not consider the following classic argument for (K2). The only explanation for a priori knowledge involves the concept of analyticity. The concept of analyticity explains S's a priori knowledge that p only if p is necessarily true. The reviewer offers Ayer as an example of a proponent of such an argument. I don't find such arguments plausible because I don't think that the concept of analyticity explains a priori knowledge. Consider the following passage from Ayer (1952, p. 73):

the proposition "Either some ants are parasitic or none are" is an analytic proposition. For one need not resort to observation to discover that there either are or are not ants which are parasitic. If one knows what is the function of the words "either," "or," and "not," then one can see that any proposition of the form "Either *p* is true or *p* is not true" is valid, independently of experience. Accordingly, all such propositions are analytic.

Here Ayer appeals to the fact that one can know a priori (without "resort to observation") that there either are or are not ants which are parasitic to establish that the proposition in question is analytic. Since Ayer establishes that propositions, such as "Either some ants are parasitic or none are," are analytic by appeal to the fact that they are knowable a priori, it is difficult to see how analyticity can explain apriority. Moreover, in support of the claim that "Either some ants are parasitic or none are" is knowable a priori, Ayer appeals to the fact that "one can see that any proposition of the form 'Either *p* is true or *p* is not true' is valid, independently of experience." Hence, a priori knowledge of logical truths is explained in terms of an ability to "see" their truth independently of experience. Patently, this is not the literal sense of "see," but the extended sense of "see" employed by rationalists, which brings Ayer's position perilously close to the rationalist position. I offer a more general consideration of various conceptions of analyticity, arguing that none explains a priori knowledge in Casullo (2003, chapter 8).

traditional counterexamples—ie., counterexamples that are not based on Kripke's novel metaphysical and semantic theses. This sets the stage for (a) an evaluation, in section 3, of the sources of support for (K1) and (K2); and (b) an assessment, in section 4, of whether Kripke's counterexamples to (K1) and (K2) are distinctive.

(K1) conceals an ambiguity, which we can reveal by distinguishing between

(KA)   S knows the *truth value* of p just in case S knows that p is true or S knows that p is false; and

(KB)   S knows the *general modal status* of p just in case S knows that p is a necessary proposition (i.e., necessarily true or necessarily false) or S knows that p is a contingent proposition (i.e., contingently true or contingently false).

Armed with this distinction, we can articulate two versions of (K1):

(K1A)   If p is necessarily true and S knows that p then S knows a priori that p; and

(K1B)   If p is necessarily true and S knows that p is a necessary proposition then S knows a priori that p is a necessary proposition.

In the case of (K2), we have

(K2A)   If S knows a priori that p then p is necessarily true; and

(K2B)   If S knows a priori that p is a necessary proposition then p is a necessary proposition is necessarily true.

There is a second source of complexity. Although knowledge entails justified belief, the relationship between justified belief and the modalities is different from that between knowledge and the modalities because knowledge entails truth but justified belief does not. Recasting our four principles in terms of justified belief yields four new principles:

(J1A)   If p is necessarily true and S's belief that p is justified then S's belief that p is justified a priori.

(J1B)   If p is necessarily true and S's belief that p is a necessary proposition is justified then S's belief that p is a necessary proposition is justified a priori.

(J2A)   If S's belief that p is justified a priori then p is necessarily true.

(J2B)   If S's belief that p is a necessary proposition is justified a priori then p is a necessary proposition is necessarily true.

(J2A) and (J2B) are open to immediate objections. Consider first (J2A). Since a priori justification is fallible then it is possible that S's belief that p is justified a priori and p is false.[9] Moreover, there are compelling examples of a priori justified false beliefs. Frege's endorsement of the naive comprehension axiom is a familiar example. Traditional metaphysical debates provide a host of arguments with incompatible conclusions whose premises, if justified, are justified on a priori grounds. Mathematically and logically competent individuals make routine errors in performing calculations or constructing proofs even when they are careful and attentive.[10] Although these examples establish that (J2A) is false, they do not impugn (K2A).

Now consider (J2B). Examples of a priori justified false beliefs regarding the general modal status of propositions are not as common as cases of a priori justified false beliefs regarding the truth value of propositions because beliefs regarding the general modal status of propositions are far less common than beliefs regarding their truth value. Explicit beliefs regarding the general modal status of propositions are rare outside of philosophy. So we must turn to philosophy for examples. First, some theorists maintain that the principle of the identity of indiscernibles is in fact true, but disagree over whether it is necessarily true.[11] Second, there is disagreement over the status of iterated modal statements.[12] If a statement is necessarily true, for example, is it necessarily necessarily true? Third, Kant (1965, p. 54) maintained that the proposition "In all changes of the material world, the quantity of matter remains unchanged" is necessary, but most contemporary philosophers maintain that it is contingent. If both parties to each of these philosophical disagreements have justified beliefs, then some have false a priori justified beliefs regarding the general modal status of a proposition.[13] Although these examples establish that (J2B) is false, they do not impugn (K2B).

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9. There is general agreement among contemporary theorists that a priori justification is fallible. See, for example, BonJour (1998); Casullo (2003); Goldman (1999), and Plantinga (1993). Kitcher (1983) is the exception.

10. See BonJour (1998, chapter 4) for a discussion of such cases.

11. See, for example, Armstrong (1978, chapter 9) and Brody (1980, chapter 1).

12. See, for example, Chandler (1976) and Salmon (1989).

13. A note of caution: It is only cases of justified false belief that a proposition is necessary (as opposed to a justified false belief that a proposition is contingent) that constitute counterexamples to (J2B). Since the first two examples cited in this paragraph involve issues that remain controversial, we cannot be sure that they will generate such counterexamples until those issues are resolved. However, irrespective of the ultimate resolution of these issues, the first two examples do indirectly show that (J2B) is false since they show that there are justified false beliefs regarding the general modal status of a proposition and there is no reason to believe that such mistakes occur only when someone believes that a proposition is contingent.

(J1A) and (J1B) are not open to counterexamples that are a consequence of the fallibility of a priori justification, but they are open to counterexamples that are a consequence of a particular form of epistemic overdetermination. Some beliefs can be justified by more than one source. For example, my belief that I left my keys on the kitchen table can be justified by my wife's telling me that they are on the kitchen table, or by my remembering that I left them there, or by my walking out to the kitchen and seeing them on the table. Moreover, some beliefs can be justified by both a posteriori and a priori sources. For example, my belief that 3 x 4 = 12 can be justified by my wife telling me that 3 x 4 = 12, or by my remembering that 3 x 4 = 12, or by my segregating 3 collections of 4 objects each and counting them, or by my intuitively "seeing" that 3 x 4 = 12. Cases of epistemic overdetermination in which one's belief that p, where p is a necessary truth, can be justified both a posteriori and a priori generate counterexamples to (J1A). For example, if my belief that 3 x 4 = 12, although *justifiable* a priori, *is justified* exclusively by an a posteriori source, then it constitutes such a counterexample. Cases of epistemic overdetermination in which one's belief that p is a necessary proposition, where p is a necessary truth, can be justified both a posteriori and a priori generate counterexamples to (J1B). For example, my belief that "3 x 4 = 12" is a necessary proposition can be justified by a colleague telling me that "3 x 4 = 12" is a necessary proposition, or by my remembering that "3 x 4 = 12" is a necessary proposition, or by my trying to conceive of its falsehood and failing. If my belief that "3 x 4 = 12" is a necessary proposition, although *justifiable* a priori, *is justified* exclusively by an a posteriori source, then it constitutes such a counterexample. The counterexamples to (J1A) and (J1B) are also counterexamples, respectively, to (K1A) and (K1B).

Since the fallibility of a priori justification is the source of the counterexamples to (J2A) and (J2B), one might suggest that they be revised to eliminate the reference to *truth* in their respective consequents:

(J2A*)   If S's belief that p is justified a priori then p is necessarily true or necessarily false.

(J2B*)   If S's belief that p is a necessary proposition is justified a priori then p is a necessary proposition is necessarily true or necessarily false.

Are there examples of contingent propositions whose truth value is justified a priori? In order to address this question, let us distinguish between two types of fallible justification:

(FJA)   Fallible justification regarding the truth value of p; and

(FJB)   Fallible justification regarding the general modal status of p.

If a priori justification is fallible with respect to both the truth value and general modal status of a proposition, then one can be a priori justified in believing that p is true, where p is some contingent proposition. Consider, again, the case of Kant. Presumably, the proposition "In all changes of the material world, the quantity of matter remains unchanged" appeared to him to be necessarily true and it was its apparent necessary truth that justified his belief that it is true. Kant, however, was wrong on both counts: the proposition is neither necessary nor true.

The case of (J2B*) is more complex since the status of iterated modal propositions is controversial. Clearly, if the general modal status of a proposition (i.e., its necessity or contingency) is a contingent feature of that proposition, then counterexamples to (J2B*) are readily available. On the other hand, if it is not, then there are no counterexamples to (J2B*): "p is a necessary proposition" is either necessarily true or necessarily false. The same reasoning applies to (K2B).

Since epistemic overdetermination is the source of the counterexamples to (J1A) and (J1B), one might suggest that they be revised by replacing "justified" by "justifiable" in their respective consequents:

(J1A*)   If p is necessarily true and S's belief that p is justified then S's belief that p is justifiable a priori.

(J1B*)   If p is necessarily true and S's belief that p is a necessary proposition is justified then S's belief that p is a necessary proposition is justifiable a priori.

Are there examples of necessary propositions whose truth value is justifiable a posteriori but not a priori? Some cognizers are born blind. Such cognizers cannot have justified visual beliefs. Presumably, it is also possible for a cognizer to be born "rationally blind" as the result of some neurophysiological impairment. Consider now a necessary proposition, such as "3 x 4 = 12," that can be justified both a priori and a posteriori for unimpaired cognizers. If our rationally blind cognizer's perceptual faculties are intact, then his or her belief that 3 x 4 = 12 can be justified a posteriori but not a priori. Similar considerations apply to (J1B): our rationally blind cognizer's belief that "3 x 4 = 12" is a necessary proposition can be justified a posteriori but not a priori.

This counterexample, although plausible, is not decisive. It introduces a further level of complexity that a comprehensive account of the relationship between the epistemic and the modal must address. (J1A*) and (J1B*) introduce the modal notion "justifiable." The sense of "possible" embedded in this notion can be read either narrowly or broadly. A proponent of (J1A*) or (J1B*) might argue that the counterexample is not genuine since (a) the sense of "possible" involved in those principles is suitably broad; and (b) given this suitably broad sense, it *is* possible that our rationally blind cognizer's belief that 3 x 4 = 12, as well as the

belief that "3 x 4 = 12" is a necessary proposition, are justifiable a priori. Settling this issue requires an investigation into the sense of "possible" embedded in (J1A*) and (J1B*). Such an investigation goes beyond the scope of this paper.[14]

In a similar fashion, one might propose revising (K1A) and (K1B) by replacing "knows" with "can know" in their respective consequents in order to circumvent the counterexamples generated by epistemic overdetermination:

(K1A*)   If p is necessarily true and S knows that p then S can know a priori that p.

(K1B*)   If p is necessarily true and S knows that p is a necessary proposition then S can know a priori that p is a necessary proposition.

The proposed counterexample to (J1A*) and (J1B*), along with its limitations, apply equally to (K1A*) and (K1B*).

Let us briefly take stock. We broadened our discussion of the relationship between the epistemic and the modal by distinguishing between knowledge of the truth value and knowledge of the general modal status of a proposition, and by distinguishing between having knowledge of those features and having justified beliefs regarding them. These distinctions provided the conceptual resources to articulate more nuanced versions of (K1) and (K2) and to assess their plausibility. Counterexamples were offered to (J2A), (J2B), and (J2A*) based on the fallibility of a priori justification. Counterexamples were offered to (K1A), (K1B), (J1A), and (J1B) based on a form of epistemic overdetermination. A more controversial counterexample was offered to (K1A*), (K1B*), (J1A*), and (J1B*) based on rational blindness. Our discussion of (K2B) and (J2B*) was less conclusive since the possibility of counterexamples turns on the controversial issue of whether the general modal status of a proposition is a necessary feature of the proposition. (K2A) introduces some further complications that will be discussed in section 5.

3

In this section we examine the putative support for (K1) and (K2). The support (RAP) provides for (K2) is only as strong as the support it enjoys. The primary

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14. Recall Kripke's (1980, pp. 34–35) remarks about the characterization of a priori truths as those that can be known independently of any experience:

> That means that in some sense it's *possible* (whether we do or do not in fact know it independently of any experience) to know this independently of any experience. And possible for whom? For God? For the Martians? Or just for people with minds like ours? To make this all clear might [involve] a host of problems all of its own about what sort of possibility is in question here.

I address some of these issues in Casullo (2003, chapter 3).

support for (RAP) is the contention that the Kantian conception of the a priori is not sufficiently informative: rather than telling us what the source of a priori knowledge *is*, it tells us what it is *not*. By identifying the putative primary source of a priori justification, (RAP) provides a more informative characterization of the a priori.[15]

(RAP), however, faces an immediate objection. In order to bring out the objection clearly, let us focus on the conception of a priori justification entailed by (RAP):

(RJ)   S's belief that p is justified a priori iff S intuitively "sees" (directly or indirectly) that p is necessarily true.

(RJ) introduces an extended sense of "see" to characterize the primary source of a priori justification. The point of introducing this extended sense of "see" is to underscore that the primary source of a priori justification has basic features in common with the primary source of a posteriori justification, which is characterized by the literal sense of "see." There are two basic features of the literal sense of "see." "S sees that p" entails both "p is true" and "S believes that p." Presumably, the extended sense of "see" preserves these basic logical features of the literal sense. Plantinga (1993, p. 105), who provides the only explicit rationalist analysis of the extended sense of "see," corroborates this presumption: he maintains that in order for S to "see" that p, S must "form the belief that p is true and indeed necessarily true (when it *is* necessarily true, of course)." Hence, "S intuitively 'sees' that p is necessarily true" entails both "p is necessarily true" and "S believes that p is necessarily true."

Since one can intuitively "see" that p is necessarily true only if p is necessarily true, (RJ) is incompatible with fallibilism. This places an implausible restriction on a priori justification. If two metaphysicians offer philosophical arguments on different sides of a controversial metaphysical issue, it is a consequence of (RJ) that the metaphysician supporting the incorrect view is either justified a posteriori or not justified at all. Similarly, a competent mathematician who makes a subtle error in a proof and, as a consequence, draws an incorrect conclusion is either justified a posteriori or not justified at all in accepting that conclusion.

In order to accommodate a priori error, (RJ) must be revised as follows:

15. I add the qualifier "primary" to remain neutral on the question of whether memory and testimony, respectively, preserve and transmit justification. If they do, then memory and testimony can be derivative sources of a priori justification since they can, respectively, preserve and transmit such justification. They cannot be primary sources of a priori justification since they cannot generate such justification. For a discussion of this issue, see Burge (1993) and Casullo (2007).

(RJ*)   S's belief that p is justified a priori iff S seems to intuitively "see" (directly or indirectly) that p is necessarily true.[16]

In the case of the literal sense of "see," the only difference between "S sees that p" and "S seems to see that p" is that the former, but not the latter, entails "p is true." Since the extended sense of "see" presumably preserves this feature of the literal sense, it follows that "S seems to intuitively "see" that p is necessarily true" entails "S believes that p is necessarily true" but not "p is necessarily true."[17] Therefore, (RJ*) is compatible with fallibilism.

Since one can seem to intuitively "see" that p is necessarily true only if one believes that p is necessarily true, (RJ*) faces two problems. The first is the problem of the modal sceptic. Consider a metaphysician who is convinced by philosophical considerations that the distinction between necessary and contingent truths is not coherent. Given this perspective on modal discourse, our modal sceptic refrains from forming modal beliefs—i.e., beliefs that would standardly be expressed by modal sentences such as "p is necessarily true" or "p is contingently true." Let us also assume that our modal sceptic is a professional mathematician, whose proofs of interesting theorems have appeared in the leading mathematical journals. It follows, according to (RJ*), that either our modal sceptic is not justified in believing his mathematical results or his justification is a posteriori merely in virtue of the fact that he does not believe that mathematical truths are necessarily true. It is implausible to maintain that one's views about an esoteric metaphysical issue determine the epistemic status of one's beliefs about mathematical theorems that have no modal content.

There is a second, related problem. Among the propositions that we are justified in believing a priori, according to proponents of (RJ*), are modal propositions, such as (P1): Necessarily nothing is both red and green all over at the same time. According to (RJ*), in order to be justified a priori in believing (P1), one must believe (P2): Necessarily, necessarily nothing is both red and green all over at the same time. This give rise to our second problem: the problem of modal agnosticism. There are alternative modal logics available. According to some, "Necessarily p" entails "Necessarily, necessarily p;" according to others, it does

16. BonJour (1998) offers such a revision by distinguishing between genuine and apparent rational insight, and maintaining that the latter suffices for a priori justification.

17. Once again, Plantinga corroborates this presumption. In order to accommodate fallibilism, Plantinga (1993, p. 106) introduces the expression "believes a priori" in place of "seems to 'see'" and maintains that "to believe *p a priori* is to meet the set of those conditions [severally necessary and jointly sufficient for seeing that p is true] minus the *truth* conditions—that is, the condition that *p* be true (in the case of seeing directly that *p* is true) and the condition that *p* follows from *q* (in the case of seeing indirectly that *p* is true)."

not. There is controversy among modal metaphysicians over which captures the logic of metaphysical necessity.[18] Consider a modal metaphysician who is familiar with the issue and the relevant literature but is undecided about the entailment. As a consequence, she refrains from forming iterated modal beliefs. Suppose that our modal metaphysician believes that (P1) on the basis of finding its falsehood inconceivable. (RJ*) entails that her belief is either justified a posteriori or not justified at all. But, once again, it is implausible to maintain that her attitude toward (P2) determines the epistemic status of her belief that (P1), since her belief that (P1) is not based on her belief that (P2). Since (RAP) is open to serious objections, it cannot support (K2).[19]

The support that Kant's claim that necessity is a criterion of the a priori offers for (K1) is only as strong as the supporting argument for that claim. Kant (1965, p. 43) supports his contention with the terse remark: "Experience teaches us that a thing is so and so, but not that it cannot be otherwise." Kant's remark has exerted considerable influence on the tradition. For example, William Whewell (1840, pp. 59–61) maintains that

> Experience cannot offer the smallest ground for the necessity of a proposition. She can observe and record what has happened; but she cannot find, in any case, or in any accumulation of cases, any reason for what *must* happen.... To learn a proposition by experience, and to see it to be necessarily true, are two altogether different processes of thought.

Over one hundred years later, Roderick Chisholm (1966, pp. 74–75) quotes the passage above from Whewell and maintains that

> Thus, Kant said that *necessity* is a mark, or criterion, of the a priori. If what we know is a necessary truth—if we may formulate it in a sentence prefixed by the model [*sic*] operator "necessarily," or "it is necessary that"—then our knowledge is not a posteriori.

The question we must address is: How strongly does Kant's observation, which is echoed by Whewell and Chisholm, support his criterion?

In assessing Kant's remark, it is critical to recall our earlier distinction between knowledge of the truth value of a proposition and knowledge of its general modal status. Kant allows that experience can teach us that "a thing is so and so." Whewell grants that experience "can observe and record what has

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18. See, for example, Chandler (1976) and Salmon (1989).

19. As an anonymous reviewer astutely notes, (RJ*) is open to another objection: it leads to an infinite regress. I articulate this objection in Casullo (2003, chapter 1).

happened." Both appear to concede that experience can teach us what is the case or the truth value of propositions. What they deny is that experience can teach us, in Kant's words, that "it cannot be otherwise," or, in Whewell's words, that experience "can find any reason for what *must* happen." Both deny that experience can teach us what must be the case or the general modal status of a proposition.[20]

Keeping this distinction in mind, we can now see that Chisholm's claim

(RC)   If what we know is a necessary truth, then our knowledge is not a posteriori

is ambiguous. It does not differentiate between

(RCA)   If what we know is a necessary truth, then our knowledge of its truth is not a posteriori; and

(RCB)   If what we know is a necessary truth, then our knowledge of its necessity is not a posteriori.

Moreover, the remark of Whewell, which echoes Kant's remark and to which Chisholm appeals in defense of (RC), supports (RCB) but not (RCA).

Our results can be generalized. (K1), like (RC), is ambiguous. It does not differentiate between

(K1A)   If p is necessarily true and S knows that p then S knows a priori that p; and

(K1B)   If p is necessarily true and S knows that p is a necessary proposition then S knows a priori that p is a necessary proposition.

If we take Kant's remark at face value, it supports (K1B) but not (K1A). Moreover, it provides no *independent* support for (K1B); it makes the equivalent claim:

(K1B*)   Knowledge of the necessity of a proposition is not a posteriori.

Nevertheless, many subsequent philosophers have found the remark to be compelling.

20. An anonymous reviewer suggests that the quoted passages from Kant and Whewell in the previous sentence support the conclusion that both deny that experience can teach us what must be the case but not the stronger conclusion that both deny that experience can teach us the general modal status of a proposition. It seems to me, however, that the arguments that Kant and Whewell offer in support of those quoted passages also support the stronger conclusion. Since Kant maintains that "Experience teaches us that a thing *is* so and so," he would also deny that it can teach us that something *can* be otherwise. Similarly, since Whewell maintains that experience "can record and observe what *has* happened," he would deny that it can find any reason for what *can* happen. No arguments in the paper turn on this claim.

4

We now turn to Kripke's examples in support of

(E1)   There are necessary a posteriori truths; and
(E2)   There are contingent a priori truths.

His examples continue to be resisted in the literature. Yet we have offered traditional examples of necessary propositions justified a posteriori and contingent propositions justified a priori. But, unless Kripke's examples are distinctive in some way, they should evoke no more resistance than the traditional examples. So I propose to take his examples at face value—i.e., I propose to grant that they are genuine examples of necessary a posteriori truths and contingent a priori truths—and ask whether there are any features that distinguish them from the traditional examples that were introduced in section 2.

Kripke initially provides two different examples in support of (E1): (a) statements in which an essential property is attributed to a physical object; and (b) identity statements involving different co-referential proper names. Kripke later extends his discussion of identity statements to include theoretical identity statements. We will focus on (a) and (b). Let "a" be the name of a particular lectern and "F" be the property of being made of wood. Suppose that someone knows that Fa—i.e., that this lectern is made of wood. Such knowledge is a posteriori since one knows that something is made from wood as opposed to, say, water frozen from the Thames on the basis of how it looks and feels. Yet, if Fa is true, it is necessarily true since F is an essential property of a. In any possible world in which a exists, a is F. Hence, one who knows that Fa has a posteriori knowledge of a necessary truth.

To assess the implications of Kripke's example, we must keep in mind that the expression "a posteriori knowledge of a necessary truth" is ambiguous since it does not distinguish between (A) a posteriori knowledge of the truth value of a necessary proposition and (B) a posteriori knowledge of the general modal status of a necessary proposition. Kripke's case is an example of a posteriori knowledge of the truth value of Fa since one discovers via experience that the lectern is made of wood. What about knowledge of its general modal status? Here Kripke (1971, p. 153) is quite explicit in maintaining that we know by "a priori philosophical analysis" that if Fa is true, then it is necessarily true. Hence, Kripke's case is not an example of a posteriori knowledge of the general modal status of a necessary proposition.

The same observations apply to Kripke's example of identity statements involving proper names. Since, according to Kripke, ordinary proper names, such as "Hesperus" and "Phosphorus," are rigid designators, each picks out the same

object in all possible worlds in which it picks out any object. Therefore, if both pick out the same object in the actual world, both pick out the same object in all possible worlds in which they pick out any object. Hence, if "Hesperus is Phosphorus" is true, it is necessarily true. On the other hand, it was an astronomical discovery that Hesperus is Phosphorus. So, once again, Kripke has provided an example of a posteriori knowledge of the truth value of a necessary proposition. Moreover, he (1980, p. 109) maintains that we know "by a priori philosophical analysis" that such identity statements are necessarily true if true. Hence, Kripke's examples, taken at face value, are at odds with (K1A) but not (K1B). Moreover, Kripke endorses (K1B).

In section 2, we argued that familiar cases of epistemic overdetermination—i. e., cases of necessary propositions that are knowable (justifiable) both a priori and a posteriori—generate counterexamples to both (K1A) and (J1A). Are Kripke's examples of a posteriori knowledge of the truth value of necessary propositions distinctive in any way? Do they have features that distinguish them from our traditional counterexamples? There appears to be one distinctive feature of his examples. Recall that we revised (K1A) and (J1A), respectively, to

(K1A*)   If p is necessarily true and S knows that p then S can know a priori that p; and

(J1A*)   If p is necessarily true and S's belief that p is justified then S's belief that p is justifiable a priori

in order to accommodate the counterexamples based on epistemic overdetermination. We went on to offer a counterexample to (K1A*) and (J1A*) based on the phenomenon of rational blindness. We suggested that a rationally blind cognizer whose perceptual faculties are intact can know (justifiably believe) that 3 x 4 = 12 a posteriori but not a priori. The example, however, is not decisive because of the vagueness of the modality embedded in "can know" and "can justifiably believe." Kripke's examples, however, appear to be decisive against both (K1A*) and (J1A*) as well as (K1A) and (J1A). There does not appear to be any plausible reading of "knowable" or "justifiable" on which "Hesperus is Phosphorus" or "This lectern is made of wood" is knowable or justifiable a priori. Hence, Kripke's counterexamples are distinctive because they are *not cases of necessary propositions knowable (justifiable) both* a posteriori *and* a priori. They are cases of necessary propositions that are knowable (justifiable) *only* a posteriori.

Kripke offers a single example in support of (E2). He maintains that when a name is introduced via a definite description, the description does not provide the sense (or meaning) of the name, but fixes its reference. Suppose that someone fixes the reference of "one meter" using the definite description "the length of stick S at t_0." Kripke maintains that such a person knows without further

investigation that stick S (if it exists) is one meter long at t_0. "One meter," according to Kripke, picks out the same length in all possible worlds. Consequently, the sentence "Stick S (if it exists) is one meter long at t_0" expresses a contingent truth since there are possible worlds in which stick S has a length at t_0 that is different from its length at t_0 in the reference-fixer's world. So, taken at face value, we have an example of a contingent truth that is knowable a priori.

In section 2, we argued that familiar examples of fallible a priori justification—i.e., cases of mathematical, logical, or metaphysical propositions that are justified a priori but false—provide counterexamples to (J2A). Is Kripke's example of the contingent a priori distinctive in any way? Does it have features that distinguish it from our traditional counterexamples? Recall that we revised (J2A) to

(J2A*)   If S's belief that p is justified a priori then p is necessarily true or necessarily false

to accommodate the counterexamples based on fallible a priori justification. We offered Kant's proposition, "In all changes of the material world, the quantity of matter remains unchanged," as an example of a contingent proposition that Kant was justified in believing on a priori grounds. Although this example is a counter-example to (J2A*), neither it nor the traditional examples of fallible a priori justification are counterexamples to (K2A) since they all involve false beliefs. Kripke's example, however, appears to be decisive against (K2A) as well as (J2A) and (J2A*). Hence, Kripke's counterexample is distinctive because it is *not a case of a contingent falsehood that is justified* a priori . It is an example of a contingent *truth* that is justified a priori.

We have identified two features that appear to distinguish Kripke's counterexamples to (K1) and (K2) from the traditional examples that we offered in section 2: (1) the counterexamples to (K1) are necessary propositions that are knowable *only* a posteriori; and (2) the counterexample to (K2) is a contingent *truth* that is justifiable and knowable a priori. These two features, however, are incompatible.

Consider the lectern example. It appears that the only way in which one can know that the lectern is made of wood is by experience: by looking at it, or by touching it, or by performing some physical operation on it, say subjecting it to heat, and observing the results. Yet, analogously, it appears that the only way in which one can know that some stick is one meter long is by experience: by looking at it carefully, or by measuring it, or by comparing its length with the length of some other object whose length one knows. Kripke, however, maintains that one can know this fact a priori on the basis of a reference-fixing description. But if one can know facts about the lengths of sticks on the basis of a reference-fixing description, why can't one know facts about the substance of which a lectern is made on the basis of a reference-fixing description? Suppose that someone

introduces "wood" using the reference-fixing definite description "the substance from which lectern a is made." Doesn't that person know a priori, without further investigation that Fa—i.e., that a is made of wood? The cases appear to be on a par; there are no obvious differences between them.[21]

Similar considerations apply to the astronomical example. Suppose that someone introduces "Hesperus" using the reference-fixing description "the planet identical to Phosphorus." Doesn't that person know a priori, without further investigation, that Hesperus is identical to Phosphorus?[22] Once again, this case seems to be on a par with the meter stick case. But if all three cases are on a par, Kripke faces a dilemma. Either reference-fixing descriptions are a source of a priori knowledge or they are not. If they are, the alleged unique feature of his counterexamples to (K1) vanishes. If they are not, his counterexample to (K2) vanishes.[23]

21. See Jeshion (2000) for further discussion of this issue.

22. An anonymous reviewer contends that since "Hesperus" did not have its reference fixed in the actual world by the description "the planet identical to Phosphorus," my argument establishes at most (A) but not (B):

(A)   "Hesperus is Phosphorus" would be knowable a priori if the reference of "Hesperus" were fixed using the description "the planet identical to Phosphorus."

(B)   "Hesperus is Phosphorus" is knowable a priori in the actual world.

This contention is questionable. Let us assume that long ago (in the actual world) some astronomer originally fixed the reference of "Hesperus" using the description "the celestial body appearing at such-and-such location in the evening sky." Let us also assume, following Kripke, that subsequent speakers (in the actual world) typically refer to Hesperus when they use "Hesperus" by virtue of some chain of communication that is appropriately related to its original introduction via the description "the celestial body appearing at such-and-such location in the evening sky." Nevertheless, any speaker (in the actual world) can stipulate that he/she will use "Hesperus" to refer to the planet identical to Phosphorus and can thereby come to know a priori, if Kripke is correct, that Hesperus is Phosphorus. One might worry here that the sentence "Hesperus is Phosphorus," in the mouth of such a stipulator, expresses a content different from that expressed by the same sentence in the mouth of a speaker for whom the reference of "Hesperus" is fixed (either directly or indirectly) by the description "the celestial body appearing at such-and-such location in the evening sky." This worry, however, is misplaced. Since the only semantic contribution of a reference-fixing description is to pick out the object to which one means to refer, it is hard to see how fixing the reference of "Hesperus" using the description "the planet identical to Phosphorus" changes the content expressed by "Hesperus is Phosphorus." The description "the planet identical to Phosphorus" picks out the same object as the description "the celestial body appearing at such-and-such location in the evening sky." Therefore, both make the same semantic contribution to the content expressed by the sentence "Hesperus is Phosphorus."

23. There is an alternative strategy for challenging the uniqueness of Kripke's examples by invoking cases involving "actually." Let "p" stand for some contingent truth that is knowable only a posteriori and "A" stand for the actuality operator. Since the sentence "Ap" is true in any possible world iff "p" is true in the actual world, "Ap" expresses a necessary truth. Therefore, "Ap" expresses a necessary

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What conclusions can we draw about the relationship between the epistemic and the modal? First, despite the attractiveness of (K1) and (K2), we are unable to find any compelling general argument in support of them. Hence, the debate surrounding (K) proceeds largely by considering cases, both supporting cases and putative counterexamples.

Second, the most resilient general principles linking the epistemic and the modal are:

(K1A*)   If p is necessarily true and S knows that p then S can know a priori that p;

(K1B*)   If p is necessarily true and S knows that p is a necessary proposition then S can know a priori that p is a necessary proposition;

(J1A*)   If p is necessarily true and S's belief that p is justified then S's belief that p is justifiable a priori;

(J1B*)   If p is necessarily true and S's belief that p is a necessary proposition is justified then S's belief that p is a necessary proposition is justifiable a priori; and

(K2A)   If S knows a priori that p then p is necessarily true.

Moreover, (K1A*) and (J1A*) stand or fall together, and (K1B*) and (J1B*) stand or fall together.

Third, Kripke's examples of necessary a posteriori truths provide counterexamples to (K1A*) and (J1A*), and his example of a contingent a priori truth provides a counterexample to (K2A). But, as we argued in section 4, Kripke cannot have it both ways. My inclination is to maintain, following Donnellan (1979), that reference-fixing stipulation yields only knowledge that a sentence expresses a truth and not knowledge of the truth expressed. Hence, (K2A) survives Kripke's counterexample. On the other hand, strong cases have been made that identity statements involving different co-referential terms are knowable a priori.[24] Consequently, the counterexample involving essential properties poses the strongest threat to (K1A*) and (J1A*).

Fourth, the essential properties counterexample is traditional since it is not based on Kripke's novel semantic and metaphysical theses. Kripke introduces

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truth that is knowable only a posteriori. On the other hand, one can know that "Ap" is true iff "p" is true solely on the basis of understanding the meaning of "actually." But "Ap iff p" is contingent, since it is false in worlds where "p" is false. Therefore, "Ap iff p" expresses a contingent truth that is knowable a priori.

24. Most notably, Salmon (1991) and Soames (2002).

it to forestall an objection to his account of identity statements involving proper names: namely, that if the account is correct, then such statements are necessary but not knowable a priori. He maintains that proponents of the objection confuse necessity and a priori knowability, and introduces the discussion of essential properties to show that there are considerations other than his treatment of identity statements involving proper names that require that we distinguish between necessity and a priori knowability. Considerations about *de re* modality require such a distinction, according to Kripke (1980, p. 110), since we "might very well discover essence empirically." He defends this contention by drawing on Timothy Sprigge's (1962) discussion of essential properties.

Fifth, (K2A) may be open to a traditional counterexample. Recall, again, our counterexample to (J2A*). The contingently false proposition "In all changes of the material world, the quantity of matter remains unchanged" appeared to Kant to be necessarily true and, on that basis, he was justified a priori in believing that it is true. But if a contingent falsehood can appear to be necessarily true, then surely a contingent truth can appear to be necessarily true. In fact, Kant provides what is arguably such an example. He maintains that the proposition "In all communication of motion, action and reaction must always be equal" is necessary and, hence, justified a priori. This proposition, although contingent, is arguably true.[25] Hence, we have a contingently true proposition that appeared to Kant to be necessarily true and, on that basis he was justified a priori in believing that it is true. The vexing question here is whether such a case of a priori justified true belief is a case of a priori knowledge. One might argue that this is a Gettier case since it is a coincidence that Kant's belief is true given his evidence. But this contention is not entirely convincing in light of the fact that, in general, Kant's a priori pronouncements are taken seriously by philosophers even if some are ultimately rejected.

Finally, (K1B*) and (J1B*) emerge as the least controversial principles linking the epistemic and the modal. (K1B*) is endorsed by Kant, Whewell, Chisholm, and Kripke. It faces no decisive counterexamples since the example of the rationally blind cognizer introduced in section 2 raises unresolved issues about the sense of "possibility" embedded in the expression "knowable a priori." Yet there is no general argument in support of it beyond the (question-begging) contentions that experience teaches us only what *is* the case and that experience cannot

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25. Here I go out on a limb. According to Symon (1971, p. 568): "Newton's third law, applied to cases where action and reaction occur at the same point, does satisfy the postulate of relativity." Hence, it appears that, if we give Kant the benefit of doubt and take his version of the third law to be suitably restricted to such cases, his belief is true. Thanks to Joe Mendola for drawing my attention to this reference.

find any reason for what *must* be the case.[26] Nevertheless, these contentions are intuitively plausible and continue to enjoy widespread acceptance. Hence, (K1B*) is an intuitively plausible, widely accepted principle that enjoys no independent support but faces no clear counterexamples. (J1B*) is rarely discussed in the literature since (K) focuses attention exclusively on the relationship between a priori *knowledge* and the modalities. (J1B*)'s status, however, is analogous to that of (K1B*). It faces no decisive counterexamples, but there is no general argument in support of it beyond the (question-begging) contentions that also support (K1B*). The intuitive plausibility and widespread acceptance of these contentions also support (J1B*). Hence, (J1B*), like (K1B*), is an intuitively plausible, but not as widely accepted, principle that enjoys no independent support but faces no decisive counterexamples.

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26. An anonymous reviewer drew my attention to Barnes (2007), who offers a challenging defense of (K1B*). I don't find the defense compelling for several reasons. First, the overall structure of Barnes's argument takes the form of a disjunctive syllogism: (1) Assume that S knows that p is absolutely necessary. (2) There is no good empirical explanation of S's knowledge that p is absolutely necessary. Therefore, (3) knowledge of absolute necessity is a priori. The bulk of the paper consists of a defense of (2). Radical empiricists, such as Devitt (2005), offer parallel arguments to the denial of (3): (1) Assume that S knows that p is absolutely necessary. (2*) There is no good a priori explanation of S's knowledge that p is absolutely necessary (or anything else). Therefore, (3*) knowledge of absolute necessity (or anything else) is not a priori. Both arguments share a common logical structure and first premise. Hence, the choice between the two competing conclusions turns on the relative merits of (2) and (2*). Since we can safely assume that both a priori and empirical explanations will be open to *some* problems, the choice between (2) and (2*) will turn on which explanation faces *more* or *more serious* problems. Barnes, however, focuses exclusively on the problems facing empirical explanations. Therefore, he is not in a position to argue that those problems are greater in number or more serious than the problems facing a priori explanations. Second, as Barnes himself notes, his defense of (2) appears to prove too much: it appears to prove (2+) There is no good empirical explanation of S's knowledge that p is nomologically necessary. Barnes (2007, p. 520) resists this charge by arguing "We can observe a sample of F's in the actual world, and we can see that they are all G. Then if we limit ourselves to relevantly similar F's in other relevantly similar possible worlds, we can justify an inductive inference to the claim that all of these F's are also G." I find the argument opaque. Consider a true accidental generalization, (AG) All A's are G, and a true law of nature, (LN) All L's are N. Presumably, we can justify an inductive inference from observed A's and L's, to, respectively, (AG) and (LN). The crucial question, however, is how do we justify the inference from (LN) to (LN*) It is nomologically necessary that (LN). It is not sufficient to maintain that we limit ourselves to the relevantly similar L's in other relevantly similar possible worlds; for, if that response were sufficient, we could also utilize it to argue from (AG) to (AG*) It is nomologically necessary that (AG). But, clearly, we cannot do so in the case of (AG). So what is the inductive method that allows us to move from (LN) to (LN*), but prohibits us from moving from (AG) to (AG*)?

References

Armstrong, D. (1978). *Nominalism and Realism*. Cambridge: Cambridge University Press.

Ayer, A. J. (1952). *Language, Truth and Logic*. New York: Dover Publications, Inc.

Barnes, G. (2007). "Necessity and Apriority." *Philosophical Studies*, 132, 495–523.

BonJour, L. (1985). *The Structure of Empirical Knowledge*. Cambridge: Harvard University Press.

BonJour, L. (1998). *In Defense of Pure Reason*. Cambridge: Cambridge University Press.

Brody, B. (1980). *Identity and Essence*. Princeton: Princeton University Press.

Burge, T. (1993). "Content Preservation." *The Philosophical Review*, 102, 457–488.

Casullo, A. (1977). "Kripke on the *A Priori* and the Necessary." *Analysis*, 37, 152–159.

Casullo, A. (2003). *A Priori Justification*. New York: Oxford University Press.

Casullo, A. (2007). "Testimony and A Priori Knowledge." *Episteme*, 4, 322–334.

Chalmers, D. (1996). *The Conscious Mind: In Search of a Fundamental Theory*. Oxford: Oxford University Press.

Chandler, H. (1976). "Plantinga and the Contingently Possible." *Analysis*, 36, 106–109.

Chisholm, R. M. (1966). *Theory of Knowledge* (1st ed.). Englewood Cliffs: Prentice-Hall, Inc.

Chisholm, R. M. (1989). *Theory of Knowledge* (3rd ed.). Englewood Cliffs: Prentice-Hall, Inc.

Davies, M. (2004). "Reference, Contingency, and the Two-Dimensional Framework." *Philosophical Studies*, 118, 83–131.

Davies, M. and Humberstone, L. (1980). "Two Notions of Necessity." *Philosophical Studies*, 38, 1–30.

Devitt, M. (2005). "There Is No *a Priori*." In M. Steup and E. Sosa (Eds.), *Contemporary Debates in Epistemology*. Oxford: Blackwell Publishing.

Donnellan, K. S. (1979). "The Contingent *A Priori* and Rigid Designators." In P. French et al. (Eds.), *Contemporary Perspectives on the Philosophy of Language*. Minneapolis: University of Minnesota Press.

Evans, G. (1979). "Reference and Contingency." *The Monist*, 62, 161–189.

Goldman, A. (1999). "A Priori Warrant and Naturalistic Epistemology." *Philosophical Perspectives*, 13, 1–28.

Jackson, F. (1998). *From Metaphysics to Ethics: A Defence of Conceptual Analysis*. Oxford: Oxford University Press.

Jeshion, R. (2000). "Ways of Taking a Meter." *Philosophical Studies*, 99, 297–318.

Kant, I. (1965). *Critique of Pure Reason* (trans: Smith, N. K.). New York: St Martin's Press.

Kitcher, P. (1983). *The Nature of Mathematical Knowledge*. New York: Oxford University Press.

Kripke, S. (1971). "Identity and Necessity." In M. K. Munitz (Ed.), *Identity and Individuation*. New York: New York University Press.

Kripke, S. (1980). *Naming and Necessity*. Cambridge: Harvard University Press.

Plantinga, A. (1993). *Warrant and Proper Function*. New York: Oxford University Press.

Quinton, A. (1972). "The *A Priori* and the Analytic." In R. C. Sleigh (Ed.), *Necessary Truth*. Englewood Cliffs: Prentice-Hall, Inc.

Salmon, N. (1987/1988). "How To Measure the Standard Metre." *Proceedings of the Aristotelian Society*, 88, 193–217.

Salmon, N. (1989). "The Logic of What Might Have Been." *The Philosophical Review*, 98, 3–34.

Salmon, N. (1991). *Frege's Puzzle*. Atascadero, CA: Ridgeview Publishing Company.

Salmon, N. (1993). "Relative and Absolute Apriority." *Philosophical Studies*, 69, 83–100.

Soames, S. (2002). *Beyond Rigidity: The Unfinished Semantic Agenda of Naming and Necessity*. New York: Oxford University Press.

Sprigge, T. (1962). "Internal and External Properties." *Mind*, 71, 197–212.

Swinburne, R. G. (1987). "Analyticity, Necessity, and Apriority." In P. Moser (Ed.), *A Priori Knowledge*. Oxford: Oxford University Press.

Symon, K. (1971). *Mechanics* (3rd ed.). Reading, MA: Addison-Wesley Publishing Company.

Whewell, W. (1840). *Philosophy of the Inductive Sciences Founded upon Their History, I*. London: J.W. Parker & Son.

Intuition, Thought Experiments, and the A Priori

There has been a significant shift in the discussion of a priori knowledge. The shift is due largely to the influence of Quine. The traditional debate focused on the epistemic status of mathematics and logic. Kant, for example, maintained that arithmetic and geometry provide clear examples of synthetic a priori knowledge and that principles of logic, such as the principle of contradiction, provide the basis for analytic a priori knowledge. Quine's rejection of the analytic-synthetic distinction and his holistic empiricist account of mathematic and logical knowledge undercut the traditional defenses of the a priori in two ways. First, one could no longer defend the view that mathematical and logical knowledge is a priori solely by rejecting Mill's inductive empiricism. Moreover, holistic empiricism proved to be a more challenging position to refute than inductive empiricism. Second, the rejection of the analytic-synthetic distinction blocked an alternative defense of the a priori status of mathematics and logic that appealed to their alleged analyticity.

The new debate focuses on the implications of empiricism for the practice of philosophy itself. Rather than arguing that empiricism cannot accommodate mathematical or logical knowledge, contemporary proponents of the a priori contend that it cannot accommodate philosophical theorizing. For example, Laurence BonJour (1998) maintains that either empiricism is false or skepticism

about the external world is true.[1] Hence, empiricism cannot provide a plausible philosophical account of knowledge of the external world. George Bealer (1992) and Frank Jackson (1998) focus on the role of intuition in conceptual analysis. Jackson argues that serious metaphysics requires conceptual analysis. Hence, empiricism fails to accommodate metaphysical knowledge. Bealer maintains that empiricists rely on intuition when constructing their own epistemological theories. Hence, empiricism fails to deliver an epistemological theory that underwrites its epistemological practice.

My purpose in this paper is to examine the role of intuition in conceptual analysis and to assess whether that role can be parlayed into a plausible defense of a priori knowledge. The focus of my investigation will be Bealer's attempt to provide such a defense. In section 1, I clarify the parameters of the debate between Bealer and his empiricist rivals, present his account of intuition and its evidential status, and argue that the account faces three problems. Sections 2 and 4 examine the two primary arguments that Bealer offers against empiricism: the Starting Points Argument and the Argument from Epistemic Norms. In section 2, I argue that the Starting Points Argument fails because Bealer fails to show that intuitions are a priori evidence. Section 3 examines Hilary Kornblith's (2002) response to the Starting Points Argument and contends that it is inconclusive. In section 4, I argue that the Argument from Epistemic Norms fails because it is open to the Stalemate Problem. Section 5 offers an alternative approach to defending the a priori status of intuitions that avoids the Stalemate Problem. The alternative approach highlights the role of empirical investigation in defending the a priori.

1

Bealer's (99) goal is to reject the principle of empiricism: "A person's experiences and/or observations comprise the person's *prima facie* evidence."[2] His strategy for doing so is to defend the evidential status of intuitions. His defense takes place within the context of what he calls the "Standard Justificatory Procedure" (SJP): "the procedure we standardly use to justify our beliefs and theories" (100). He maintains that the SJP counts not only experiences, observations, memory, and testimony as prima facie evidence but also intuitions. In support of the latter contention, Bealer invites us to consider one of the counterexamples that provide our evidence that the justified true belief analysis of the concept of knowledge is wrong:

1. For a discussion of BonJour's argument, see Casullo (2003), Beebe (2008), and Thurow (2009).

2. All page references in the text are to Bealer (1992) unless otherwise indicated.

> We find it intuitively obvious that there could be a situation like that
> described and in such a situation the person would not know that there is a
> sheep in the pasture despite having a justified true belief. This intui-
> tion…and other intuitions like it are our evidence that the traditional
> theory is mistaken. (100)

Although the SJP includes intuitions as prima facie evidence, it does not follow
automatically that the SJP is incompatible with empiricism. The SJP, according to
Bealer (101), includes a mechanism of self-criticism that "permits one to
challenge the legitimacy of any standing source of *prima facie* evidence." If that
mechanism eliminates intuition as a source of prima facie evidence, then the SJP
is compatible with empiricism.

Before turning to Bealer's account of intuition and his arguments against
empiricism, some points of clarification are necessary. First, Bealer's description
of the counterexample that provides our evidence against the justified true belief
analysis of the concept of knowledge suggests that it involves only a single intui-
tion. There are, however, two distinct types of intuition involved: (1) a *modal*
intuition that the state of affairs described in the counterexample is possible, and
(2) a *classificatory* intuition that the state of affairs described in the counterex-
ample is not a case of knowledge. My focus is on the latter.[3] Second, his descrip-
tion of the evidence that the counterexample provides is not, at least on one
straightforward reading, incompatible with empiricism. The fact that we find
certain things *obvious* is not incompatible with empiricism. Moreover, the fact
that we find certain things *intuitively obvious* is not incompatible with empiricism
if all that means is that we find certain things obvious immediately without the
need for conscious reasoning. Consequently, the parameters of the debate bet-
ween Bealer and empiricism need to be sharpened.

As Bealer sets up the debate, empiricism is at odds with the SJP apart from any
considerations about the evidential status of intuitions. The principle of empiri-
cism maintains that only a person's experiences and/or observations comprise
the person's prima facie evidence. The SJP, according to Bealer (101), also counts
memory and testimony as prima facie evidence. Bealer (128 n. 1) maintains that
if memory and testimony are added to empiricism's list of legitimate sources of
prima facie evidence, his arguments will not be impacted. Why can't intuition
also be added to that list? Presumably, because Bealer takes intuition to be a
source of a priori evidence and he takes empiricism to maintain that no evidence
or justification is a priori. But, if this is the case, then in order to assess the eviden-
tial status of intuitions, we need two further pieces of information.

3. Modal intuitions and modal knowledge raise a distinct set of issues. For a discussion of these
issues, see Hill (2006), Williamson (2007), Casullo (2012a), and chapters 12 and 13 here.

The first is a characterization of a priori evidence or justification. There are two prominent accounts of a priori justification on the contemporary scene. Each offers a different characterization of the central idea that such justification is independent of experience:

(AP1)   S's belief that p is justified a priori iff S's belief that p is nonexperientially justified (i.e., justified by a nonexperiential source).[4]

(AP2)   S's belief that p is justified a priori iff S's belief that p is nonexperientially justified and that justification cannot be defeated by experience.[5]

For purposes of this paper, I will assume (AP1). Nothing in the paper turns on that choice.

The second is a characterization of the concept of *experience* that is constitutive of both (AP1) and (AP2). There are three relevant senses of the term "experience." The first, or narrow, sense includes only the experience of the five senses. The second, or broad, sense includes any conscious occurrent state, including one's sense experiences and intuitions. Most proponents of the a priori, including Bealer, think that the sense of "experience" involved in (AP1) and (AP2) is broader than the narrow sense but narrower than the broad sense. They think that this intermediate sense includes, in addition to the experience of the five senses, at least some of the following: the deliverances of introspection, memory, or testimony. Any complete articulation of the concept of a priori justification must include a characterization of this intermediate sense of experience.[6] For purposes of this paper, I will assume that the intermediate sense of "experience" includes the deliverances of introspection, memory, and testimony. Once again, nothing in the essay turns on that assumption.

We can now articulate more precisely the central point of dispute between Bealer and empiricism. Empiricism maintains that all evidence or justification is experiential. Bealer's central claim is that the classificatory intuitions involved in thought experiments constitute nonexperiential evidence. To sustain this claim, he must show (a) that classificatory intuitions are evidence, and (b) that they are nonexperiential. To assess whether he has done so, we need to clarify his account of intuition and its evidential status.

Intuitions are not beliefs, judgments, guesses, hunches, or common sense. Instead, according to Bealer:

4. See Casullo (2003) and Casullo (2009) for an articulation and defense of (AP1).

5. See Kitcher (1983) and Kitcher (2000) for an articulation and defense of (AP2).

6. In Casullo (2003), I argue that attempts to characterize the intermediate sense of experience by a priori conceptual analysis fail and suggest that it is a natural kind term, whose extension is to be determined by empirical investigation.

> When you have an intuition that A, it *seems* to you that A. Here 'seems' is understood, not in its use as a cautionary or 'hedging' term, but in its use as a term for a genuine kind of conscious episode. (101)

Bealer, however, distinguishes between two types of intuition: a priori and physical. We have an intuition that when a house is undermined, it will fall. But, according to Bealer (102), it is not an a priori intuition, "for it does not present itself as necessary." On the other hand, Bealer (102) maintains that "when we have an a priori intuition, say, that if p then not not p, this presents itself as necessary: it does not seem to us that things could be otherwise." Bealer makes two further claims about the evidential status of intuitions. First, intuitions are fallible; they can be mistaken. Second, "the standard justificatory procedure directs us to give greatest evidential weight to intuitions about specific concrete cases…'theoretical' intuitions have relatively less evidential weight" (104). Bealer, however, is not explicit about what counts as a theoretical intuition.

Bealer's account of intuition and its evidential status faces three objections. The first is methodological. Bealer attempts to establish that intuitions are a priori evidence solely on the basis of phenomenological considerations. According to Bealer, not all intuitions are a priori. There are also physical intuitions. Bealer marks the distinction between a priori and physical intuitions solely on the basis of phenomenological differences. The former present themselves as necessary; the latter do not. But if an a priori intuition that A is a priori evidence that A and a physical intuition that A is a posteriori evidence that A, then it must be the case that the former derives from a nonexperiential source but the latter does not. Bealer's account, however, leaves unexplained how the phenomenological difference between a priori and physical intuitions is sufficient to show that they derive from different sources. If the physical intuition that when a house is undermined it will fall derives from an experiential source, the underlying cognitive process that produces it involves experience. By contrast, if the intuition that some Gettier case is not a case of knowledge derives from a nonexperiential source, the underlying cognitive process that produces it does not involve experience. The phenomenology of a cognitive state alone cannot reveal such differences in the underlying cognitive process that produces it. Empirical investigation is necessary in order to identify the cognitive process that produces a cognitive state such as intuition and to determine whether it involves experience.

Empirical investigation is also relevant in a second way. Bealer introduces a number of different types of intuition: classificatory, modal, logical, set-theoretic, mathematical, and conceptual. Even if they all present themselves as necessary, it does not follow that the cognitive processes that produce them are all of the same type. It is an open question whether the cognitive process that produces, for example, classificatory intuitions is the same as the process that produces modal

intuitions. Moreover, it is a question that cannot be answered without empirical investigation. No amount of reflection on the phenomenological similarities and differences between classificatory and modal intuitions can reveal whether they are produced by the same or different cognitive processes. The question whether they are produced by the same or different cognitive processes, however, is central to their epistemic assessment. For example, if the cognitive process that produces modal intuitions is different from the cognitive process that produces classificatory intuitions, then one cannot conclude that the latter is nonexperiential from the fact that the former is nonexperiential.

The second objection is theoretical. For Bealer, a priori intuitions are essentially modal. An a priori intuition that A presents itself as necessary. If A presents itself to S as necessary, then it seems to S that necessarily A. So, S has an a priori intuition that A if and only if it seems to S that necessarily A. The modal character of a priori intuitions raises two questions for Bealer's account. First, can it provide a plausible account of the relationship between knowledge of the truth value and knowledge of the general modal status of a proposition? Second, is it compatible with his contention that a priori intuition is fallible?

In order to fix ideas, let us introduce some distinctions:

(A) S knows the *truth value* of p just in case S knows that p is true or S knows that p is false.

(B) S knows the *general modal status* of p just in case S knows that p is a necessary proposition (i.e., necessarily true or necessarily false) or S knows that p is a contingent proposition (i.e., contingently true or contingently false).

(C) S knows the *specific modal status* of p just in case S knows that p is necessarily true or S knows that p is necessarily false or S knows that p is contingently true or S knows that p is contingently false.

(A) and (B) are logically independent: one can know one but not the other. One can know that the Goldbach Conjecture is either necessarily true or necessarily false but not know whether it is true or false. Similarly, one can know that the Pythagorean Theorem is true, but not know whether it is necessarily true or contingently true. The specific modal status of a proposition, however, is the conjunction of its truth value and its general modal status. Therefore, one cannot know the specific modal status of a proposition unless one knows both its truth value and its general modal status.

Since knowledge of the general modal status of a proposition and knowledge of its truth value are independent of one another, the source of one's justification for the former need not be the same as the source of one's justification for the latter. Kripke's (1971) treatment of necessary a posteriori propositions provides a compelling illustration. If we consider a proposition of the form "Fa," where "a"

rigidly designates some contingent object and "F" stands for some essential property of that object, Kripke maintains that our knowledge that necessarily Fa is based on our a posteriori knowledge that Fa and our a priori knowledge that if Fa then necessarily Fa. If we consider an analogous example from the a priori domain, such as that necessarily two is even, and concede that all a priori knowledge is ultimately based on intuition, it is an open question whether a similar *dual source* model applies. On such a model, one's knowledge that two is even is based on a mathematical intuition, one's knowledge that if two is even then necessarily two is even is based on a different modal intuition, and the two intuitions are produced by different cognitive processes.

Bealer is faced with a dilemma when articulating the relationship between knowledge of the truth value and knowledge of the general modal status of a proposition. Suppose that S has an a priori intuition that A—that is, suppose that it seems to S that necessarily A. Does the a priori intuition that A provide S with evidence that A is true or that A is necessarily true? If an a priori intuition that A provides evidence that A is necessarily true, then Bealer's account rules out the possibility of having a priori knowledge of the truth value of A without having a priori knowledge of the general modal status of A.[7] All a priori knowledge that A is true is based on inference from a priori knowledge that A is necessarily true. But this conflicts with the fact that many mathematicians have a priori knowledge that mathematical propositions are true but lack knowledge of their general modal status. On the other hand, if an a priori intuition that A provides evidence that A is true but not that it is necessarily true, then Bealer's account of modal knowledge is strained. Proponents of the a priori, including Bealer, typically maintain that one can know a priori modal propositions, such as that necessarily 2 + 1 = 3. But if S's a priori intuition that A—that is, if its seeming to S that necessarily A—provides evidence for only the truth of A, then in order to know a priori that necessarily A, S must have an a priori intuition that necessarily A: that is, it must seem to A that necessarily, necessarily A. But Bealer has not shown that there are such iterated modal intuitions.

The modal character of a priori intuitions also conflicts with their alleged fallibility. Since Bealer maintains that there is a priori knowledge of both the truth value and the general modal status of a proposition, there are two forms of fallibilism with respect to the a priori:

(F1)   Fallibilism with respect to the truth value of a proposition;

and

(F2)   Fallibilism with respect to the general modal status of a proposition.

7. Here I assume that intuition is the only source of a priori knowledge.

Bealer allows that his intuition regarding the naive comprehension axiom is mistaken; the axiom is false despite seeming true. His intuition is fallible with respect to the truth value of a proposition. His account, however, precludes a form of fallibilism with respect to the general modal status of a proposition. Mistake regarding the general modal status of a proposition can occur in two ways: (1) if some contingent truth, say C, were to seem necessary to someone, or (2) if some necessary truth, say N, were to seem contingent to someone. Bealer's account can accommodate the first but not the second. On his account, if N does not seem to be necessarily true then it is not an a priori intuition. Hence, one cannot have a mistaken a priori intuition that some necessary truth is a contingent truth.

The third objection is expository. It draws attention to a critical lacuna in Bealer's account of a priori knowledge. Bealer, following BonJour (1998), describes his account as a version of moderate rationalism. There are, however, two different ways of developing moderate rationalism. BonJour offers a version of *traditional* moderate rationalism. According to traditional moderate rationalism, intuition is a source of basic a priori knowledge of general principles such as "3 + 2 = 5" and "Nothing can be both red and green all over." According to BonJour, the fact that intuition, unlike experience, can directly justify *general* principles to a degree sufficient for knowledge allows moderate rationalism to avoid the skeptical consequences of empiricism.

Bealer, however, maintains that specific concrete case intuitions have greatest evidential weight; theoretical intuitions have less evidential weight. Bealer does not articulate what he means by a "theoretical" intuition, but the contrast with specific concrete case intuitions suggests that theoretical intuitions are *general*: they are intuitions that some general principle is true. In the case of conceptual analysis, he maintains that our knowledge of the general principles that constitute the analysis of a concept is based on an abductive inference from specific concrete case intuitions. If this model of knowledge of general principles extends to the domains of logic, mathematics, and set theory, then our knowledge of general logical, mathematical, and set-theoretic principles is based on abductive inference from specific concrete case intuitions. This version of moderate rationalism, call it *modern* moderate rationalism, is different from traditional moderate rationalism since it gives less evidential weight to general intuitions. General intuitions do not directly justify general principles to a degree sufficient for knowledge.

Bealer does not explicitly address the evidential status of general intuitions. He maintains that he has an intuition that the naive comprehension axiom is true and that if P or Q then it is not the case that both not-P and not-Q. The content of both intuitions is general. Bealer, however, does not address the evidential weight of such general intuitions or the status of specific concrete case set-theoretic and logical intuitions. So it is not clear whether his comments about the

evidential weight of specific concrete case intuitions pertain only to classificatory intuitions and their role in conceptual analysis or whether they represent a general view about the evidential status of specific concrete case intuitions and general principles.

Although it is unclear whether Bealer's moderate rationalism is traditional or modern, I conclude by articulating three prima facie concerns with the latter view. First, an immediate consequence of modern moderate rationalism is that there is no basic a priori knowledge of general principles. Such knowledge is always inferential and based on abductive inference. Most proponents of the a priori, however, maintain that there is basic a priori knowledge of some general mathematical, logical, and synthetic a priori principles, such as that nothing is both red and green all over. Second, rationalists frequently contend that empiricist accounts of knowledge of elementary mathematical and logical principles are at odds with the fact that such principles are known with certainty, for the empiricist accounts maintain that knowledge of such principles is based on inductive inference. If that argument is cogent, then it applies with equal force to modern moderate rationalism. Third, since modern moderate rationalism maintains that knowledge of general principles is based on abductive inference, it faces the questions whether the principles that govern such inference are themselves general and, if so, whether it can provide a coherent account of knowledge of those principles.

2

Bealer offers three arguments in support of the contention that empiricism is incoherent. I consider only two of them since the third is directed at a narrow version of empiricism, inspired by Quine, which is widely rejected by contemporary proponents of the view.[8] The first argument is the *Starting Points Argument*. Bealer employs the term "starting points" for basic epistemic classifications, such as what does and does not count as an experience, an observation, a theory, an explanation, and so on. The argument is straightforward:

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8. Bealer's third argument is directed at a narrow version of empiricism that is committed to

   (Q)   The simplest regimented formulation of the natural sciences contains no modal sentences or sentences to the effect that such and such is a definition, an analytic truth, or synonymous with so and so. (119)

Empiricism need not be committed to (Q). Moreover, (Q) is widely rejected by contemporary proponents of the view on the grounds that questions about the status of semantic concepts and their role in the formulation of the natural sciences are questions that are answered from within the sciences and not by philosophical argument.

(SP1)   According to empiricism, a person's evidence consists solely of that person's experiences and/or observations.

(SP2)   Empiricists use their intuitions as prima facie evidence in order to determine what does and does not count as experience, observation, theory, explanation, and so on.

(SP3)   Therefore, in actual practice, they are not faithful to their principles. (105)

The argument faces two problems. First, Bealer distinguishes between a priori and physical intuitions. The latter are compatible with empiricism; the former are not. Bealer, however, has not shown that the intuitions involved in classificatory judgments are a priori rather than physical. According to Bealer (100), if we consider a Gettier situation, we find it intuitively obvious that "in such a situation the person would not know that there is a sheep in the pasture." This description of the Gettier situation, taken at face value, does not involve an appearance of necessity. Instead, it indicates that when one considers a Gettier case, it seems to one that it is not a case of knowledge. Since Bealer has not shown that classificatory intuitions do, let alone must, involve an appearance of necessity, he has not shown that they are a priori intuitions. Second, suppose that we grant that such classificatory intuitions do involve an appearance of necessity. Both leading accounts of a priori justification maintain that intuitions are sources of a priori justification only if they are nonexperiential sources of justification. Bealer assumes that they are nonexperiential sources of justification solely in virtue of the fact that they involve an appearance of necessity. The fact that an intuition involves an appearance of necessity, however, provides little reason to believe that the underlying cognitive process that produces it does not involve experience. So unless Bealer can show that intuitions are nonexperiential sources of justification, empiricists can freely employ their intuitions without being open to the charge that they are unfaithful to their principles.

Bealer considers a response to the Starting Points Argument that contends that empiricists employ their intuitions as guides in formulating their theories but not as evidence. Bealer maintains (106–107) that such empiricists are faced with a dilemma:

(SP4)   Either intuitions regarding starting points are reliable or not.

(SP5)   If not, the error will be reflected in the theories based on them.

(SP6)   If so, then our intuitions about what counts as prima facie evidence are also reliable.

(SP7)   We have many concrete case intuitions that intuitions are prima facie evidence.

(SP8)   Therefore, intuitions are prima facie evidence and empiricism is false.

The argument is open to immediate objection. Bealer offers no evidence in support of (SP7). He maintains that it is a "plain truth" about our standard justificatory procedure that intuitions count as prima facie evidence (100). But, even if we concede this plain truth, it does not follow that we have intuitions that intuitions are prima facie evidence. Moreover, empiricists frequently deny (SP7). They maintain that they have a very different intuition with respect to intuition: it seems to them that intuition is "mysterious" rather than a source of prima facie evidence.[9] The argument is also open to the two objections that were presented against the Starting Points Argument. First, even if we grant that we have concrete case intuitions that intuitions are prima evidence, Bealer has not shown that such intuitions involve an appearance of necessity. Second, even if we grant that the intuitions in question do involve an appearance of necessity, Bealer has provided no reason to believe that the cognitive processes that produce such intuitions do not involve experience.

3

Kornblith rejects the initial premise of the Starting Points Argument. He contends that empiricists need not deny that intuitions are evidence. In support of this contention, he contrasts two different views of the epistemic role of intuitions. On the traditional view, appeals to intuition reveal the essential features of our shared concepts. On the naturalistic view, our intuitions are triggered by obvious instances of the kind under investigation, which gives rise to the illusion that judgments based on them are a priori. Kornblith (2002, 13) contends, however, that such judgments, although obvious, are a posteriori:

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9. Bealer considers a second response to the Starting Points Argument, which maintains that starting-point judgments are not determined by intuition but by some other mechanism. He rejects it by offering the following dilemma:

(SP9)   If our pretheoretic starting-point judgments are unreliable, then the resulting theory is unreliable.

(SP10)   If these judgments are reliable, then whatever makes them reliable should also make our pretheoretic judgments about what is and is not prima facie evidence reliable.

(SP11)   We have pretheoretic judgments to the effect that intuitions are prima facie evidence.

(SP12)   These pretheoretic judgments are reliable.

(SP13)   Therefore, intuitions are prima facie evidence. (107–108)

Just as empiricists deny (SP7), they would deny (SP11)—i.e., they would deny that they have pretheoretic judgments to the effect that intuitions are prima facie evidence.

These judgments are corrigible and theory-mediated. The extent of agreement among subjects on intuitive judgments is to be explained by common knowledge, or at least common belief, and the ways in which such background belief will inevitably influence intuitive judgment, although unavailable to introspection, are none the less quite real.

In short, Kornblith contends that intuitive judgments have two features that are incompatible with their being justified a priori: they are corrigible and influenced by background knowledge.

Kornblith's argument is inconclusive since the two features that he cites are in fact compatible with the a priori. A belief is corrigible, in the relevant sense, just in case it is subject to revision in light of new evidence. Assume that S's belief that p is justified by nonexperiential evidence. The fact that S's belief that p is subject to revision in light of further nonexperiential evidence does not show that it is justified a posteriori. For example, suppose that Frege's belief that the naive comprehension axiom is true was nonexperientially justified. The fact that he revised that belief in light of Russell's paradox does not show that his original justification for that belief was a posteriori. But what if S's belief that p is nonexperientially justified and revisable in light of experiential evidence? Is S's belief that p justified a posteriori? It is not if, as I maintain, (AP1) is the correct analysis of a priori justification. Hence, considerations about corrigibility cannot show that a belief is justified a posteriori.

The issue of background knowledge is more complex. Let us suppose that S's belief that p is justified by intuition, but that intuition is influenced by background knowledge in a manner that explains the agreement between S's intuitive judgments and those of others. Does it follow that S's belief that p is justified a posteriori? If the background knowledge that influences S's justification for the belief that p is nonexperiential, then the influence of such background knowledge provides no basis for concluding that S's belief that p is justified a posteriori. If, however, the relevant background knowledge is a posteriori, then it is plausible to maintain that S's belief that p is justified a posteriori. So influence by a posteriori background knowledge is incompatible with a priori justification.

The disagreement between Bealer and Kornblith on the epistemic status of intuitions turns on two questions:

(Q1)   Are intuitive judgments influenced by background knowledge?
(Q2)   Is that background knowledge a posteriori?

A vindication of Kornblith's position requires an affirmative answer to both questions. Kornblith rightly points out, with respect to (Q1), that Bealer cannot dismiss the role of background knowledge merely on the grounds that it is not

introspectively available. Introspection cannot reveal the nature of the cognitive processes that lead to intuitive judgments. Empirical investigation is necessary. But this observation cuts both ways. Kornblith cannot simply assert that background knowledge influences such judgments. Empirical evidence is necessary to substantiate this claim. Moreover, if background knowledge does influence such judgments, empirical investigation is also necessary to show that such knowledge is empirical.

4

Bealer's second argument is the *Argument from Epistemic Norms*. Consider visualism, which is the view that only visual experience provides prima facie evidence. Bealer maintains that we would not be justified in accepting this departure from the SJP. He poses (108) the question: How is empiricism relevantly different from views, such as visualism, that arbitrarily exclude evidence admitted by the SJP?

Bealer maintains that the empiricist can respond in one of two ways. The first is from within empiricism. Here the empiricist would attempt to show that the comprehensive theory that results from following the empiricist justificatory procedure sanctions itself as justified but rejects all other theories as unjustified. Bealer dismisses this response on the grounds that a competing theory, such as visualism, might yield a comprehensive theory that is self-approving in this sense. The result would be a stalemate between proponents of visualism and proponents of empiricism. Call this the *Stalemate Problem*.

In order to avoid the Stalemate Problem, the empiricist must respond in the second way, which is from within the SJP. Here the empiricist would employ the SJP's mechanism of self-criticism to show that one of its components is defective. The SJP offers two methods to challenge a candidate source of prima facie evidence. The first is to show that it fails to satisfy the three c's: consistency, corroboration, and confirmation. The empiricist cannot exploit the first method because, according to Bealer (109–110), specific concrete case intuitions pass all three tests. A person's intuitions are largely consistent with one another and corroborated by those of others.[10] Moreover, our intuitions are rarely disconfirmed by our experiences, and many are affirmed by our empirical theories.

The SJP offers a second method for challenging a candidate source of prima facie evidence. Suppose, for example, that the pronouncements of a political authority have acquired the status of prima facie evidence and that they satisfy

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10. Although Bealer acknowledges that there are apparent conflicts among one's intuitions and with those of others, he maintains that they can be reconciled by redescribing the intuitions using relevant distinctions or by describing cases more fully.

the three c's test. Bealer maintains that the political authority can be challenged as a source of prima facie evidence by showing that it fails the reliability test:

> First, we should formulate the best overall theory based on all *other* sources of *prima facie* evidence. If this theory were not to deem the pronouncements of the political authority to be (largely) reliable, then we would be justified in rejecting the political authority as a special source of *prima facie* evidence. (115)

The reliability test, however, cannot always be used to challenge a candidate source of prima facie evidence. For example, a visualist could not use visual experience to legitimately challenge other modes of sense experience. What is the difference between the two cases? According to Bealer:

> The political authority is *intuitively not as basic* a source of *prima facie* evidence as the sources of *prima facie* evidence that are being used to eliminate it (i.e., experience, observation, etc.). By contrast, vision and touch are *intuitively equally basic* sources of *prima facie* evidence. The standard justificatory procedure permits us to apply the present method against a currently accepted source of *prima facie* evidence if and only if *intuitively* that source is not as basic as the sources of *prima facie* evidence being used to challenge it. (115–116)

Bealer (117), however maintains: "Intuitively,…intuitions are evidentially as basic as a person's experiences." Therefore, the empiricist cannot invoke the reliability test to challenge intuition as a source of prima facie evidence, and intuition survives the SJP's method of self-criticism.[11] The upshot is that there is no relevant difference between visualism, which arbitrarily excludes touch as a source of prima facie evidence, and empiricism, which excludes intuition as a source of prima facie evidence.

Bealer maintains that the empiricist cannot explain how empiricism differs from other views, such as visualism, that arbitrarily exclude standard sources of prima facie evidence. The SJP, however, faces an analogous problem: it cannot

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11. Bealer's account of our standard justificatory procedure is at odds with actual epistemic practice. We have available on the contemporary epistemological scene one example of a controversy over whether an alleged source of evidence is basic—namely, testimony. The typical defenses of testimony as a basic source involve considerations such as (1) analogies between testimony and other undisputed basic sources such as perception; (2) the view that testimony is a nonbasic source of evidence cannot accommodate intuitively plausible cases of testimonial evidence, such as children relying on the testimony of their parents or adults relying on the testimony of strangers; and (3) any attempt to certify the credentials of testimony as a nonbasic source of evidence is ultimately circular and leads to skepticism. No one appeals to the intuition that testimony is a basic source of evidence.

explain how it differs from views that arbitrarily introduce nonstandard sources of prima facie evidence. Bealer's case of the political authority can be easily transformed into one in which the political authority is recognized as a legitimate source of prima facie evidence by the SJP. We need only add to his description of the case that those who hold the political authority to be a source of prima facie evidence also have the intuition that the political authority is as basic a source of evidence as those being used to challenge it.[12] Given this modification, the reliability test cannot be used against the political authority; the political authority survives the SJP's mechanism of self-criticism. The result is a stalemate between proponents and opponents of the political authority as a basic source of evidence. Those who have the intuition that the political authority is not as basic a source of evidence as those being used to challenge it can employ the SJP's method of self-criticism to reject the political authority as a source of prima facie evidence. Those who lack such an intuition cannot employ the SJP's method of self-criticism to reject the political authority as a source of prima facie evidence.

Where does this leave us? Bealer maintains that the empiricist cannot explain how empiricism is relevantly different from views that arbitrarily exclude basic sources of evidence admitted by the SJP. An explanation from within empiricism fails because it leads to the Stalemate Problem. Visualism might yield a comprehensive theory that is self-approving. The SJP is faced with an analogous problem. It cannot explain how the SJP is relevantly different from views that arbitrarily introduce basic sources of evidence not admitted by the SJP. An explanation from within the SJP fails because it leads to the Stalemate Problem.[13] The pronouncements

12. Alternatively, we could add that they lack the intuition that the political authority is not as basic a source of evidence as those being used to challenge it.

13. The Stalemate Problem also arises with respect to Bealer's defense of the claim that intuition satisfies the three c's test. Although Bealer acknowledges that one's own intuitions are sometimes inconsistent with one another and with those of others, he maintains that such conflicts can be dissolved by redescribing the intuitions using relevant distinctions. So, to take one example pertinent to the present discussion, if some empiricist has the intuition that defeasibility by experience is incompatible with a priori justification and some rationalist has the intuition that defeasibility by experience is compatible with a priori justification, the conflict can be dissolved by distinguishing two senses of a priori justification: a strong sense, which requires indefeasibility by experience, and a weak sense, which does not. The apparent conflict of intuitions is dissolved because the empiricist's intuition is that defeasibility by experience is incompatible with the *strong* sense of a priori justification but the rationalist's intuition is that defeasibility by experience is compatible with the *weak* sense of a priori justification. When properly described, the two intuitions do not conflict. But the reconciliation also leads to the Stalemate Problem. Assume that the leading examples of beliefs alleged to be justified a priori are in fact nonexperientially justified but defeasible by experience. If the empiricist denies that such propositions are justified a priori and the rationalist affirms that they are justified a priori, both are correct. The result is a stalemate over the existence of a priori knowledge.

of the political authority might survive the SJP's method of self-criticism. Hence, empiricism fares no worse than rationalism in terms of defending its epistemic norms.[14]

5

Bealer's defense of rationalism is unsatisfying since it is no better than the defense that he acknowledges the empiricist can offer on behalf of empiricism. Both lead to the Stalemate Problem. The source of the shortcoming in Bealer's defense is that it exemplifies two characteristic features of most defenses of rationalism: it attempts to show, primarily on a priori grounds, that empiricism is deficient in some respect. Such defenses are both ineffective and misguided. They are ineffective since they typically lead to an impasse, where proponents of each position list the deficiencies of the opposing position and claim that those facing the opponent are greater than those it faces. They are misguided since no evidence to the effect that one theory does not provide an adequate account of some domain of knowledge can show that an opposing theory does provide an adequate account of such knowledge. Remedying these shortcomings requires a fundamentally different approach to defending rationalism. It requires offering evidence in support of rationalism that is compelling to both rationalists and empiricists.

A case that is compelling to both parties must be based on common ground. In order to identify common ground, one must be clear about the parameters of the controversy between rationalists and empiricists. In particular, one must be clear about points of agreement as well as points of disagreement. Empiricists are not skeptics in the traditional sense. Rationalists typically maintain that logic, mathematics, and alleged synthetic a priori truths, such as that whatever is red is colored, provide the leading examples of a priori knowledge. Empiricists, unlike skeptics, do not deny that we have such knowledge. Their disagreement with rationalists is over the source of such knowledge. Empiricists, on the other hand, place an exclusive premium on empirical knowledge and, in particular, on the methods and results of the sciences. Rationalists, however, do not deny that we have scientific knowledge. Their disagreement with empiricists is over the claim that such knowledge is justified exclusively by experience. They insist that scientific theories involve elements, such as mathematical and logical principles, that are not so justified. Hence, the fundamental disagreement between rationalists and empiricists is not over the *scope* of human knowledge. There are broad

14. The Argument from Epistemic Norms is open to a further problem. An empiricist who lacks the intuition that intuitions are evidentially as basic as experiences can employ the SJP's mechanism of self-correction to legitimately challenge intuition as a source of prima facie evidence.

areas, including mathematics, logic, and the sciences, where both agree that we have knowledge. Their disagreement is over the *source* of that knowledge. Rationalists, such as Bealer, have not fully exploited this common ground. Rather than relying exclusively on a priori arguments against empiricism, rationalists should enlist empirical support for the existence of a priori knowledge.

What empirical evidence is relevant to establishing the existence of a priori knowledge? The shortcomings of Bealer's arguments highlight five areas where such evidence is relevant. Bealer's case for the existence of the a priori, based on the evidential status of intuitions, fails because he does not show that intuitions are nonexperiential sources of evidence. Bealer characterizes intuitions solely on the basis of their phenomenological features. In order to establish that intuitions are nonexperiential sources of evidence, two questions must be addressed. First, what cognitive process or cognitive processes produce intuitions? Second, does experience play a relevant role in the production of intuitions? Empirical evidence is relevant to answering both questions. Bealer offers two tests for adjudicating disputes about sources of evidence: the three c's test and the reliability test. Establishing that intuition satisfies these tests requires answering three questions. First, what is the extent of (genuine) conflicts among the intuitions of individual cognizers and among those of different cognizers? Second, is intuition a reliable source? Third, is there an explanation of the reliability of intuition? Once again, empirical evidence is relevant to answering these questions.

A case built on empirical evidence that establishes that (a) experience does not play a relevant role in the production of intuitions; (b) intuition satisfies the three c's; (c) intuitions are a reliable source of belief formation; and (d) there is an explanation of that reliability is one that both rationalists and empiricists would find compelling in light of their own respective epistemic commitments. It avoids the Stalemate Problem and the impasse generated by negative a priori arguments. Hence, there is much to recommend this approach to defending the a priori.[15]

References

Bealer, George. 1992. "The Incoherence of Empiricism." *Proceedings of the Aristotelian Society,* supp., 66: 99–138.

Beebe, James. 2008. "BonJour's Arguments against Skepticism about the A Priori." *Philosophical Studies* 137: 243–267.

BonJour, Laurence. 1998. *In Defense of Pure Reason.* Cambridge: Cambridge University Press.

Casullo, Albert. 2003. *A Priori Justification*. New York: Oxford University Press.

———. 2009. "Analyzing A Priori Knowledge." *Philosophical Studies* 142: 77–90.

———. 2010. "Knowledge and Modality." *Synthese* 172: 341–359.

Hill, Christopher. 2006. "Modality, Modal Epistemology, and the Metaphysics of Consciousness." In *The Architecture of the Imagination,* ed. S. Nichols. Oxford: Oxford University Press.

Jackson, Frank. 1998. *From Metaphysics to Ethics: A Defence of Conceptual Analysis*. Oxford: Oxford University Press.

Kitcher, Philip. 1983. *The Nature of Mathematical Knowledge*. New York: Oxford University Press.

———. 2000. "A Priori Knowledge Revisited." In *New Essays on the A Priori*, ed. P. Boghossian and C. Peacocke. Oxford: Oxford University Press.

Kornblith, Hilary. 2002. *Knowledge and Its Place in Nature*. Oxford: Oxford University Press.

Kripke, Saul. 1971. "Identity and Necessity." In *Identity and Individuation,* ed. M. K. Munitz. New York: New York University Press.

Thurow, Joshua. 2009. "The A Priori Defended: A Defense of the Generality Argument." *Philosophical Studies* 146: 273–289.

Williamson, Timothy. 2007. *The Philosophy of Philosophy.* Oxford: Blackwell.

12

Counterfactuals and Modal Knowledge

One influential argument in support of the existence of a priori knowledge is due to Kant, who claimed that necessity is a criterion of the a priori—that is, that all knowledge of necessary propositions is a priori. That claim, together with two others that Kant took to be evident—we know some mathematical propositions and such propositions are necessary—led directly to the conclusion that some knowledge is a priori. Kripke (1971, 1980) challenged Kant's central claim by offering examples of necessary a posteriori propositions.[1] Kripke's challenge has led epistemologists to reconsider questions about the relationship between a priori knowledge and necessary truth and the nature of modal knowledge.

Although modal knowledge is often touted as a compelling example of a priori knowledge, there are few available accounts of how we acquire such knowledge. Timothy Williamson (2007) offers a novel approach that attempts to provide a reductive account of modal knowledge in terms of knowledge of counterfactual conditionals.[2] The account is developed in a broader context of defending two more general theses regarding the subject matter and methodology of philosophy. My primary focus in this paper is Williamson's account of

1. For a more detailed discussion of these issues, see Casullo (2003, chapter 7).

2. Christopher Hill (2006) also offers such an account, which is discussed in chapter 13 here.

modal knowledge. In section 1, I argue that Williamson's account does not support his more general theses regarding the subject matter and methodology of philosophy. Section 2 addresses Williamson's account of knowledge of counterfactuals. Here I argue that the two central claims of his account are rooted in unsubstantiated empirical assumptions. Section 3 presents Williamson's argument in support of the conclusion that modal knowledge is a special case of counterfactual knowledge. In sections 4 through 6, I contend that his supporting argument rests on three errors: conflating logical reduction and epistemological reduction, a misguided appeal to cognitive economy, and incorrectly locating what needs to be explained by an account of modal knowledge.

1

Williamson's account of modal knowledge is presented as the central premise in a broader argument whose goal is to defend two general theses regarding the subject matter of philosophy and its methodology:

(T1)   The differences in subject matter between philosophy and other disciplines are not very deep;

(T2)   The differences in methodology between philosophy and other disciplines are not very deep.

Williamson's (134) defense of (T1) and (T2) begins by considering a characteristic philosophical question: "Philosophers characteristically ask not just whether things are some way but whether they could have been otherwise."[3] He thinks that we have some answers to that question. We know, for example, that Henry VIII could have had more than six wives and that three plus three could not have been more than six.

Williamson's characteristic question requires some clarification. In order to provide it, the following distinctions are necessary:

(A)   S knows the *truth value* of p just in case S knows that p is true or S knows that p is false.

(B)   S knows the *general modal status* of p just in case S knows that p is a necessary proposition (i.e., necessarily true or necessarily false) or S knows that p is a contingent proposition (i.e., contingently true or contingently false).

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3. All page references in the text are to Williamson (2007) unless otherwise indicated.

(C)   S knows the *specific modal status* of p just in case S knows that p is necessarily true or S knows that p is necessarily false or S knows that p is contingently true or S knows that p is contingently false.

It is critical to distinguish two aspects of Williamson's characteristic question. To ask whether things are some way is to ask whether p is true or false. To ask whether they could have been otherwise is to ask whether p is necessary or contingent. So we have two questions:

(Q1)   What is the truth value of p?
(Q2)   What is the general modal status of p?

The two questions are independent of one another. One can know the answer to one of the questions without knowing the answer to the other. Moreover, the characteristic philosophical question is (Q2) not (Q1).

These points are transparent if we consider Williamson's two examples:

(E1)   Henry VIII had six wives.
(E2)   Three plus three equals six.

One can know that (E1) is true without knowing whether it is necessary or contingent, and one can know that (E1) is a contingent proposition without knowing whether it is true or false. Similarly, one can know that (E2) is true without knowing whether it is necessary or contingent, and one can know that (E2) is a necessary proposition without knowing whether it is true or false. Whether (E1) is true is not a characteristically philosophical question; it is a historical question. Similarly, whether (E2) is true is not a characteristically philosophical question; it is a mathematical question. But whether (E1) and (E2) are necessary or contingent propositions is a characteristically philosophical question.

If (Q2) is the characteristic philosophical question then, unless other disciplines are concerned with the general modal status of the propositions that they investigate, philosophy has a distinctive subject matter. Its distinctive subject matter is metaphysical necessity and metaphysical contingency. Mathematicians, however, are concerned with the truth value of (E2) and not with its necessity or contingency. Similarly, historians are concerned with the truth value of (E1) and not with its necessity or contingency. So philosophy appears to have a distinctive subject matter.

Williamson, however, disagrees. He maintains: "If thought about metaphysical modality is the exclusive preserve of philosophers, so is knowledge of metaphysical modality" (135). But Williamson disputes the view that there is a special cognitive capacity distinctive of philosophical thought. Instead, he maintains

that a plausible account should subsume our capacity to discriminate the metaphysical modalities "under more general cognitive capacities used in ordinary life" (136). Hence, his goal is to show that "the ordinary cognitive capacity to handle counterfactual conditionals carries with it the cognitive capacity to handle metaphysical modality" (136).

Before turning to the evaluation of Williamson's account of our knowledge of the metaphysical modalities, I conclude this section by arguing that even if the account is correct it does not support either (T1) or (T2). This contention is more obvious with respect to (T1). From the fact that our ability to discriminate the metaphysical modalities is tied to cognitive capacities that are employed in ordinary life, it does not follow that the subject matter of history or mathematics includes the metaphysical modalities. For example, if certain theories of natural theology are true, then our ability to discriminate a divine presence in the world is tied to our ordinary cognitive capacities. But, even if our ordinary cognitive capacities can discriminate the presence of the divine, it does not follow that the divine is part of the subject matter of mathematics or history. If philosophy is the unique discipline whose subject matter is the metaphysical modalities, then that is a striking difference between it and the other disciplines, irrespective of which cognitive capacities are responsible for modal knowledge.

Although perhaps less obvious, this contention is also true with respect to (T2). From the fact that the cognitive capacities that are employed in the methodology of disciplines such as mathematics and history can also be employed to discriminate the metaphysical modalities, it does not follow that such an employment plays any role in the methodology of those disciplines. Returning to the example of natural theology, even if the cognitive capacities employed in mathematics and history can also be employed to discriminate a divine presence in nature, it does not follow that such an employment of those cognitive capacities plays any role in the methodology of mathematics or history. If the methodology of philosophy is unique in its capacity to reveal the metaphysical modalities, then that is a striking difference between it and the other disciplines, irrespective of which cognitive capacities underlie that methodology.

2

Williamson's strategy is to offer an account of the epistemology of counterfactuals and to extend that account to the epistemology of the metaphysical modalities. We begin with his account of the epistemology of counterfactuals. Williamson maintains that there is no uniform epistemology of counterfactuals. He does, however, provide a schematization of a typical overall process of evaluating a counterfactual conditional:

(CC1)   One supposes the antecedent and develops the supposition, add-
         ing further judgments within the supposition by reasoning, offline
         prediction mechanisms, and other offline judgments.

(CC2)   To a first approximation: one asserts the counterfactual conditional
         if and only if the development eventually leads one to add the
         consequent. (152–153)

His leading example of the application of this process involves the following
counterfactual:

(CC3)   If the bush had not been there, the rock would have ended in the
         lake.

I will focus my discussion on this example.

Suppose that you are in the mountains and see a rock slide down the moun-
tainside and into a bush. You wonder where the rock would have landed had the
bush not been there. Williamson maintains that you come to know (CC3) by
using your imagination. The explanation, as it stands, is not very satisfying since
it offers no account of what guides the imagination in such an exercise. After all,
one can imagine the rock behaving in many different ways. One straightforward
account maintains that we have tacit knowledge of some general principles
regarding the behavior of physical objects. Given such tacit knowledge, one can
conjoin the antecedent of (CC3) and some further premises about the rock and
mountainside with the general principles to infer the consequent of (CC3).

Williamson, however, rejects this account and offers an alternative based on
simulation, where simulation involves the "offline" application of our cognitive
processes:

(S1)   Imagine the rock falling as it would visually appear from your actual
         present location.

(S2)   Simulate (imagine) the initial movement of the rock in the absence
         of the bush, form an expectation as to where it goes next, feed the
         expected movement back into the simulation, form a further
         expectation as to its subsequent movement, and so on. (148–149)

Williamson's account rests on two central claims: (1) we evaluate counterfactuals
by employing a process of imaginative simulation, and (2) such evaluations suf-
fice for knowledge. Both claims, however, are rooted in unsubstantiated empirical
claims.

Questions about which cognitive mechanisms are involved in the evaluation
of counterfactuals are empirical. In particular, whether tacit knowledge or

simulation better explains a particular cognitive capacity is a question addressed within cognitive science using empirical methods.[4] It is not an issue that can be settled from the armchair. Williamson, however, offers the following argument in support of the claim that expectations generated in imaginative simulation, as opposed to tacit knowledge of the general principles of folk physics, guide our evaluation of counterfactuals such as (CC3):

(TK1)   If someone believes a conclusion solely on the basis of inference from premises and p is an essential premise, then one knows the conclusion only if one knows p.

(TK2)   Folk physics is an essential background premise of the supposed inferences from antecedents to consequents of counterfactuals like (CC3).

(TK3)   Folk physics is false and, therefore, not known.

(TK4)   The conclusion that no belief formed on the basis of folk physics constitutes knowledge is wildly skeptical.[5] (145–146)

The argument is striking because it turns on a priori considerations about the necessary conditions for knowledge and the claim that skepticism regarding knowledge of counterfactuals is false. But it is implausible to maintain that a controversial question in the cognitive sciences can be settled by such a priori considerations. It is more plausible to maintain that if (a) the empirical evidence supports a tacit knowledge account of our evaluation of counterfactuals, and (b) the conjunction of the tacit knowledge account and Williamson's epistemological assumptions entail skepticism regarding counterfactuals, then (c) the problem lies with the epistemological assumptions.

Moreover, unless Williamson can establish that the capacities that guide our development of counterfactual conditionals do not involve tacit knowledge of general principles regarding the behavior of physical objects, his account does not explain our knowledge of counterfactuals. According to the tacit knowledge account, our development of counterfactual conditionals is guided by a tacit folk physical theory. But if the general principles involved in such tacit knowledge are themselves natural laws (or rough approximations of such laws), they have modal import. They support counterfactual

4. For a discussion of the debate within cognitive science between tacit theory and simulation accounts of cognitive capacities, see Stich and Nichols (1992) and Nichols et al. (1996).

5. Williamson offers two other arguments. The first, by his own admission, is technical and can be resolved by a technical refinement. The second is based on empirical speculations for which no supporting evidence is provided. The third, which is discussed in the text, carries the burden of his case against tacit knowledge accounts.

conditionals. So if antecedent knowledge of natural laws guides the development of counterfactuals, the account presupposes rather than explains modal knowledge. Moreover, the problem does not disappear merely by invoking an account in terms of the offline use of our cognitive capacities. The reason is straightforward. If our online use of the capacities in question appeals to tacit knowledge of such laws, then so does our offline use of those capacities. Consequently, Williamson's account of our knowledge of counterfactuals can discharge its explanatory burden only if the capacities he invokes to explain such knowledge do not involve tacit knowledge of natural laws. But he has not shown that this is the case.

Williamson's contention that beliefs based on imaginative simulations constitute knowledge also rests on an unsubstantiated empirical claim. He maintains that the use of the imagination in evaluating counterfactuals is reliable and offers the following consideration in support of that contention:

(S3)   The natural laws and causal tendencies our expectations roughly track also help us determine which counterfactuals really hold. (149)

(S3) is an empirical claim, but Williamson offers only anecdotal evidence in support of it. Suppose, however, that our expectations track universal generalizations that are supported by our past experiences. Not all true universal generalizations are natural laws; some are so-called accidental generalizations. One important difference between accidental generalizations and natural laws is that the latter, but not the former, support counterfactual conditionals. Consequently, if our expectations track universal generalizations rather than natural laws, they will be much less reliable in helping us determine which counterfactuals hold. Williamson, however, has offered no evidence in support of the claim that our expectations track natural laws rather than universal generalizations. But, if our cognitive capacities do not track natural laws in their online applications, then they do not do so in their offline applications and Williamson's account collapses.

3

Section 2 raised questions about Williamson's account of knowledge of counterfactuals. But let us suppose that those concerns can be allayed and that the account can be sustained. Williamson's primary and most significant claim is that this account can be extended to provide an account of knowledge of the metaphysical modalities. His supporting argument involves two steps. First, he (157) presents two equivalences, due to David Lewis (1973), between counterfactual conditionals and metaphysical modalities:

(17) $A \equiv (\neg A \ \rightarrow \perp)$, and
(18) $\Diamond A \equiv \neg (A \ \rightarrow \perp)$,

where $\perp$ is a contradiction.[6] Second, he contends that these equivalences show that the epistemology of the metaphysical modalities is a special case of the epistemology of counterfactual conditionals:

(W1)   Given (17) and (18), we should expect the epistemology of metaphysical modality to be a special case of the epistemology of counterfactuals.

(W2)   Despite the nonsynonymy of the two sides, our cognitive capacity to evaluate the counterfactual conditionals gives us exactly what we need to evaluate the corresponding modal claims too.

(W3)   The idea that nevertheless we evaluate them by some quite different means is highly fanciful, since it indicates a bizarre lack of cognitive economy and has no plausible explanation of where the alternative cognitive resources might come from.

(W4)   Furthermore, characteristic features of the epistemology of modality are well explained by subsumption under corresponding features of the epistemology of counterfactuals:

By (17), we assert $\square A$ when our counterfactual development of the supposition $\neg A$ robustly yields a contradiction; we deny $\square A$ when our counterfactual development of $\neg A$ does not robustly yield a contradiction (and we do not attribute the failure to a defect in our search).

Similarly, by (18), we assert $\Diamond A$ when our counterfactual development of the supposition A does not robustly yield a contradiction (and we do not attribute the failure to a defect in our search); we deny $\Diamond A$ when our counterfactual development of A robustly yields a contradiction. (162–163)

Williamson (163) concludes that "our fallible imaginative evaluation of counterfactuals has a conceivability test for possibility and an inconceivability test for impossibility built in as fallible special cases."

Williamson's argument introduces three issues. The first, introduced by premises (W1) and (W2), is the relationship between logical reduction and

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6. Williamson articulates two additional pairs of equivalences and argues that we have no reason to regard any of them as strict synonymies. His supporting arguments, however, appeal only to the first.

epistemological reduction. The second, introduced by premise (W3), is the value of cognitive economy. The third, introduced by premise (W4), is what needs to be explained by an account of modal knowledge. Each of these issues is significant in its own right and requires separate treatment.

4

Williamson (160) contends that "If we treat (17) and (18) like definitions of □ and ◊ for logical purposes, and assume some elementary principles of the logic of counterfactuals, then we can establish the main principles of elementary modal logic for □ and ◊." Our goal is to examine the epistemological significance of such a derivation of the main principles of modal logic from principles of the logic of counterfactuals. In order to do so, let us consider another well-known attempt to provide an analogous derivation: Frege's attempt to derive the main principles of arithmetic from principles of second-order logic. Frege's attempt, of course, failed due to the paradox that Russell derived from his notorious Axiom 5. Since we are not concerned with the success of Frege's reduction but only with the epistemological consequences of a successful reduction, let us make the three following assumptions: (1) that Frege had at his disposal a consistent set of logical principles; (2) that he provided definitions of the basic concepts of arithmetic in terms of the vocabulary of his logical principles; and (3) that he derived the truths of arithmetic, suitably translated into his logical vocabulary, from his logical principles.[7] Given the successful derivations, it follows that

(F1)   The truths of arithmetic are reducible to truths of logic.

Does it also follow that

(F2)   We should expect the epistemology of arithmetic to be a special case of the epistemology of logic; or

(F3)   Our capacity to evaluate logical claims gives us exactly what we need to evaluate the corresponding arithmetical claims; or

(F4)   The idea that we evaluate them differently is highly fanciful since it indicates a bizarre lack of cognitive economy; or

(F5)   In the absence of a plausible explanation of where the alternative cognitive resources come from, we should deny that we evaluate them differently?

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7. If these assumptions are too fanciful, one can consider in their place Hale and Wright's (2000) neo-Fregean view that the truths of arithmetic are derivable from the principles of second-order logic and Hume's Principle.

(F2) is clearly false. If the epistemology of arithmetic is a special case of the epistemology of logic, then if one knows an elementary arithmetical truth, such as that 7 + 5 = 12, then one knows it by deriving its logical analogue—that is, its translation into the vocabulary of second-order logic—from principles of second-order logic. Most literate adults, however, have no understanding, implicit or explicit, of the principles of second-order logic necessary to derive the truths of arithmetic. Moreover, most also lack the logical acumen necessary to translate an elementary arithmetical truth, such as that 7 + 5 = 12, into the vocabulary of second-order logic and to derive it from the principles of second-order logic. Yet virtually all literate adults know that 7 + 5 = 12. It follows, therefore, that logical equivalence is not the same as epistemological equivalence. Even granting that the logical analogue of "7 + 5 = 12" can be derived from principles of second-order logic, the epistemology of arithmetic is not a special case of the epistemology of logic.

(F3) is also questionable. It does not follow from the fact that one has the capacity to evaluate logical claims that one has the logical capacity to evaluate arithmetical claims by deriving their logical analogues from basic logical principles unless having the capacity to evaluate logical claims requires having the capacity to evaluate *all* logical claims. Cognitive capacities come in degrees, and different tasks may require that one possess that capacity to different degrees. Virtually all literate adults possess the capacity to evaluate logical claims, but virtually none possesses that capacity to a degree sufficient to derive an arithmetical proposition from basic logical principles. Their capacity to evaluate logical claims does not give them exactly what they need to evaluate the corresponding arithmetical claims.

Suppose that we have the capacity to evaluate arithmetical claims by deriving them from basic logical principles using our logical capacities. It does not follow that the idea that we employ a different cognitive capacity to evaluate such claims indicates a lack of cognitive economy. (F4) overlooks the fact that there are different types of cognitive economy. One type of cognitive economy is ontological, which pertains to the number of different cognitive systems possessed by a cognizer. But there is another type of cognitive economy, efficiency, which pertains to the cognitive costs of a system and the speed of its results. In human cognizers, a system dedicated to mathematical reasoning gives quicker results with less investment of cognitive effort than a logical reasoning system employed to do mathematics. The cognitive time and energy necessary to employ a logical reasoning system to prove an elementary truth of arithmetic from principles of second-order logic is so great that if such a system were the only means to arithmetical knowledge, very few people would have very little knowledge of elementary arithmetic at great cognitive cost. Therefore, a reduction in ontological economy can produce a gain in cognitive efficiency.

Finally, (F5) has little plausibility. Suppose we concede that our capacity to evaluate logical claims gives us what we need to evaluate arithmetical claims. Since we also know that, given its inefficiency in evaluating arithmetical claims, the hypothesis that it is our only means to such knowledge cannot plausibly explain the extent of our arithmetical knowledge, we also have ample reason to conclude that we have an alternative capacity to evaluate arithmetical claims. The force of that reason is not hostage to whether we have a plausible explanation of where the alternative cognitive resources come from.

5

Premise (W3) of Williamson's argument depends on an appeal to cognitive economy.[8] Principles of cognitive economy bear on two more general epistemological issues. First, unless such principles are wielded with considerable care, they will put philosophers in the position of deciding controversial empirical issues on largely a priori grounds. For example, Williamson (104) maintains that it is a widespread view among psychologists that humans have two reasoning systems. System 1 is associative, holistic, automatic, undemanding of cognitive capacity, and relatively fast. System 2 is rule-based, analytic, controlled, demanding of cognitive capacity, and relatively slow. This widespread view is open to immediate objection by an analogue of (W3): it is highly fanciful since it indicates a bizarre lack of cognitive economy. It is evident, however, that whether psychologists are correct on this matter is an empirical issue; it cannot be decided a priori by appeal to a principle such as (W3). Williamson, however, maintains that some principle of cognitive economy rules out the possibility that humans have different systems for evaluating counterfactual conditionals and modal claims. What remains unclear, however, is the basis for Williamson's differential treatment of the two cases.

Second, unrestricted principles of cognitive economy are incompatible with a type of epistemic overdetermination. S's justification for the belief that p is overdetermined just in case S has more than one justification for the belief that p, each of which is sufficient to justify that belief in the absence of the others. There are two varieties of epistemic overdetermination:

(EOS)   S's justification for the belief that p is overdetermined by the *same* source just in case S has more than one justification for the belief that p, each of which is sufficient to justify that belief in the absence of the others, and they all come from the same source; and

8. Appeals to cognitive economy figure prominently in the traditional debate over the existence of a priori knowledge. In Casullo (2005), I argue that the arguments of both J. S. Mill and W. V. Quine against the existence of a priori knowledge turn on appeals to cognitive economy.

(EOD)   S's justification for the belief that p is overdetermined by *different* sources just in case S has more than one justification for the belief that p, each of which is sufficient to justify that belief in the absence of the others, and they do not all come from the same source.

The following is an example of (EOS). You attended a concert last night and someone asks you if Sam also attended. You suddenly recall that you saw him during intermission, which triggers a host of additional recollections of his presence at the concert. Your original recollection justifies your belief that Sam attended the concert, and each of your subsequent recollections also justify that belief. Your justification for that belief is overdetermined by the same source. The following is an example of (EOD). You have misplaced your keys and wonder where they are. You suddenly recall having left them in the car. Your recollection justifies your belief that your keys are in the car. But, to be sure, you walk out to the car and see your keys. Your seeing your keys also justifies your belief that your keys are in the car. Your justification for that belief is overdetermined by different sources.

According to Williamson's (W3), some principle of cognitive economy rules out the following possibility: there are two different sources of modal knowledge. If some principle of cognitive economy rules out this possibility for modal knowledge, presumably it does so for other domains of knowledge as well. Hence, (W3) leads to the *Single Source Principle* (SS):

(SS)   For each domain of knowledge, there is only a single source of justification for the propositions within that domain.

(SS) is incompatible with epistemic overdetermination by different sources.[9] There are, however, uncontroversial examples of epistemic overdetermination by

9. Epistemic overdetermination has significant epistemic benefits. It plays an important role in three desirable features of our epistemic practices: corroboration, correction, and calibration. If one has two different sources of information about a particular feature of one's environment, then one can use one source in order to corroborate the results of another. For example, if one sees a book on the table, one can corroborate one's perceptual evidence by attempting to pick up the book. If one succeeds, one's tactile evidence both increases one's justification for believing that there is a book on the table, since it is an independent source of evidence, and corroborates one's perceptual evidence by providing independent evidence that one's perceptual evidence is not misleading (say the result of hallucinating). Having two different sources of information about a particular feature of one's environment also allows one to correct the results of another. Returning to our previous example, if tactile evidence fails to corroborate the visual evidence that there is a book on the table then, in suitable circumstances, it provides a basis for correcting the erroneous belief that there is a book on the table. The ability to detect and correct erroneous beliefs by some source also provides the basis for calibrating the results of that source. For example, if in certain

different sources, such as the example offered in the previous paragraph.[10] Therefore, at the very least, appeals to principles of cognitive economy require significant refinement.

6

I have offered very general criticisms of Williamson's argument in sections 4 and 5. One might respond, in defense of Williamson, that my criticisms establish only that logical reduction and epistemological reduction do not always go hand in hand and that considerations of ontological economy do not always rule out epistemic overdetermination. One might also maintain that, in this particular case, there is a basis for thinking that logical reduction and epistemological reduction do go hand in hand and for thinking that ontological economy does rule out epistemic overdetermination. That basis is provided by premise (W4) of Williamson's argument, which contends that the characteristic features of the epistemology of modality are well explained by the corresponding features of the epistemology of counterfactuals.

Williamson maintains that the epistemology of modality is a special case of the epistemology of counterfactuals. In particular, his account of knowledge of counterfactuals yields a conceivability test for possibility and an inconceivability test for impossibility. The resulting tests are alleged to explain the characteristic features of our knowledge of modality. In this concluding section, I argue that Williamson's account does not explain the characteristic features of our modal knowledge. The argument proceeds in two stages. I initially argue, by considering the conceivability test, that the account faces analogues of the problems raised in section 3 with respect to Frege's account of arithmetical knowledge. I go on to argue, by considering the inconceivability test, that the account faces two deeper problems: it presupposes, rather than explains, the capacity for modal knowledge, and it mislocates what needs to be explained by an account of the modal knowledge characteristic of philosophical investigation.

lighting conditions one's perceptual beliefs about the number of objects on the table are corroborated by tactile experience, but in other lighting conditions they fail to be corroborated by tactile experiences, such information provides a basis for determining the conditions under which perceptual evidence is reliable. Given that epistemic overdetermination underwrites these desirable epistemic features of our cognitive practices and that epistemic overdetermination betrays a lack of cognitive economy, one should be skeptical about glib appeals to the virtues of cognitive economy.

10. There are other uncontroversial examples. One's belief that there is a book on the desk can be justified both by seeing it and by touching it. There are also some more controversial, but widely accepted, examples. Most who maintain that mathematical truths are justifiable a priori also allow that such truths can also be justified on the basis of experience.

Consider an example of an elementary modal proposition that most of us know:

(1)   Possibly, something is both red and hexagonal.

According to Williamson's conceivability test for possibility, we assert (1) when our counterfactual development of the supposition

(2)   Something is both red and hexagonal

does not robustly yield a contradiction. Our capacity to employ this test is a byproduct of our capacity to evaluate counterfactuals. Therefore, the epistemology of modality is a special case of the epistemology of counterfactuals.

Williamson's account of modal knowledge faces problems analogous to those faced by Frege's account of arithmetical knowledge. First, if the epistemology of modality is a special case of the epistemology of counterfactuals, then if one knows (1), one knows (1) by employing Williamson's conceivability test. But most literate adults are not cognizant, either implicitly or explicitly, of that test. Moreover, most also lack the skill to implement it effectively.[11] Yet they know (1). They employ a different test to evaluate modal claims such as (1). They try to imagine a red hexagon and, if they succeed, they assert (1). Therefore, the epistemology of modality is not a special case of the epistemology of counterfactuals.

Second, it does not follow from the fact that one has the capacity to evaluate counterfactuals that one has the capacity to evaluate modal claims by employing Williamson's conceivability test unless having the capacity to evaluate counterfactuals requires having the capacity to evaluate *all* counterfactuals. Although most literate adults have the capacity to evaluate ordinary counterfactuals such as

(3)   If I had left the house earlier, I would not have missed the bus,

few have the capacity to evaluate counterfactuals to the degree necessary to implement effectively Williamson's conceivability test. Therefore, the capacity to evaluate ordinary counterfactuals does not give one exactly what it takes to evaluate modal claims.

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11. A number of questions arise with respect to its implementation. There are indefinitely many premises that one could add to (2) in an effort to derive a contradiction. Must one try a large number of premises to verify that none leads to a contradiction? If so, how many? Will any premises do? Must one also ensure that one has a representative sampling of the range of premises that one might try? If so, what counts as a representative sampling?

Third, even if we have the capacity to evaluate modal claims by employing the conceivability test, it does not follow that the idea that we employ a different method to evaluate them betrays a lack of cognitive economy. Just as our ordinary method for evaluating arithmetical claims is more efficient than the method that falls out of Frege's account, our ordinary method of evaluating modal claims is more efficient than the method that falls out of Williamson's account. Ontological extravagance is offset by a gain in cognitive efficiency.

Williamson's account of the epistemology of modality faces two deeper problems, which emerge when we consider his inconceivability test for impossibility. According to it, we assert

(4)   Necessarily, nothing is both red and green all over

when our counterfactual development of the supposition

(5)   It is not the case that nothing is both red and green all over

yields a contradiction.

Suppose that I wish to apply the test to evaluate (4). I begin by supposing (5). How do I proceed in order to show that the counterfactual development of (5) yields a contradiction? If there are no constraints on the premises I can introduce, then I can derive a contradiction from any supposition by introducing its negation. For example, I can establish

(6)   Necessarily, something is both red and green all over

by supposing

(7)   It is not the case that something is both red and green all over

and introducing

(8)   Something is both red and green all over

and adding it to (7) to derive a contradiction.

Williamson (143), however, maintains that "the imagination can in principle exploit all our background knowledge in evaluating counterfactuals." My background knowledge restricts what I can introduce. Hence, in the case at hand, I cannot introduce (8) into the counterfactual development of a supposition since I don't know (8). However, since I do know

(9)   Nothing is both red and green all over,

I can add it to (5), derive a contradiction, and thereby come to know (4).

Restricting the propositions that I can introduce into the development of a counterfactual to those that I know is not sufficient to remedy the problem facing Williamson's test. Consider any contingent proposition that I know, such as

(10)   Gold is yellow.

Using Williamson's inconceivability test, I can establish

(11)   Necessarily, gold is yellow

by supposing

(12)   It is not the case that gold is yellow

introducing (10), and adding it to (12) to derive a contradiction. But (11) is false.

Williamson recognizes that there is a problem here:

> Such conceivability and inconceivability will be subject to the same con-straints, whatever they are, as counterfactual conditionals in general, concerning which parts of our background information are held fixed. If we know enough chemistry, our counterfactual development of the supposi-tion that gold is [not] the element with atomic number 79 will generate a contradiction. The reason is not simply that we know that gold is the element with atomic number 79, for we can and must vary some items of our knowledge under counterfactual suppositions. Rather, part of the general way we develop counterfactual suppositions is to hold such constitutive facts fixed. (163–164)

The key to solving the problem is to allow some items of background knowledge to vary but to hold others fixed when we develop counterfactual suppositions. The items of knowledge that are held fixed are those that pertain to constitutive facts. Since the fact that gold is yellow is not constitutive, the problematic example of the previous paragraph is blocked.

Although Williamson's proposal blocks the problematic example, it reveals a significant limitation of his account of modal knowledge. Our capacity for evalu-ating counterfactuals, according to Williamson, gives us exactly what we need to evaluate modal claims. But in order to reliably evaluate modal claims, our capacity

for evaluating counterfactuals must include the capacity to identify those items of one's background knowledge that can be legitimately introduced into the counterfactual development of a supposition—that is, it must include the capacity to identify those items of one's background knowledge that are constitutive facts. Since constitutive facts are necessary, our capacity to evaluate counterfactuals must include the capacity to identify those items of one's background knowledge that are necessary. Therefore, Williamson's account presupposes, rather than explains, our capacity for modal knowledge.[12]

Williamson's account is open to this problem because it mislocates the epistemological fact that requires explanation. It mislocates the modal knowledge that is characteristic of philosophical investigation. The goal of Williamson's conceivability test is to provide an account of knowledge of modal propositions of the form □A, such as

(13)   Necessarily, gold is the element with atomic number 79.

One who knows (13), however, knows the specific modal status of

12. Williamson considers a related objection:

in developing a counterfactual supposition, we make free use of what we take to be necessary truths, but not of what we take to be contingent truths. Thus we rely on a prior or at least independent stock of modal knowledge or belief. (169–170)

He replies:

Once we take something to be a necessary truth, of course we can use it in developing further counterfactual suppositions. But that does nothing to show that we have any special cognitive capacity to handle modality independent of our general cognitive capacity to handle counterfactual conditionals. (170)

My objection is different from the one that Williamson considers. I do not maintain that his account of modal knowledge relies on an independent stock of modal knowledge or belief. Instead, I maintain that the capacity for evaluating modal claims proposed by his account is reliable only if it includes the capacity to identify necessary truths. Moreover, my contention is also consistent with the response that Williamson offers to that objection, which contends that it does not show that we have any special cognitive capacity to handle modality independent of our general cognitive capacity to handle counterfactuals. My contention is not that the capacity for identifying necessary truths is *independent* of the capacity for evaluating counterfactuals; the contention is that the capacity for evaluating counterfactuals must *include* the capacity for identifying necessary truths. Williamson (170) goes on to deny that "our general cognitive capacity to handle counterfactuals has as a separate constituent a special cognitive capacity to handle metaphysical modality." Once again, my contention is consistent with that claim. My contention is not that the capacity for identifying necessary truths is *separate* from the capacity for evaluating counterfactuals; the contention is that the capacity for evaluating counterfactuals must *include* the capacity for identifying necessary truths.

(14)   Gold is the element with atomic number 79.

Knowledge of the specific modal status of (14) is the conjunction of knowledge of its truth value and knowledge of its general modal status. But, as I argued in section 1, knowledge of the specific modal status of a proposition is not the appropriate target of an account of the modal knowledge that is acquired by philosophical investigation. Knowledge of the truth value of (14) is not acquired by philosophical investigation. It is acquired by scientific investigation. The appropriate target of an account of the modal knowledge that is acquired by philosophical investigation is knowledge of the general modal status of a proposition.

This point emerges clearly by reflection on Kripke's discussion of knowledge of the related modal proposition:

(15)   Necessarily, the lectern is not made of ice.

(15), like (13), is an example of an a posteriori necessity. And, like (13), one who knows (15) knows the specific modal status of a proposition. One knows the specific modal status of

(16)   The lectern is not made of ice.

Kripke (1971, 153) provides the following account of our knowledge of (15):

> In other words, if *P* is the statement that the lectern is not made of ice, one knows by a priori philosophical analysis, some conditional of the form "if *P*, then necessarily *P*." If the table is not made of ice, it is necessarily not made of ice. On the other hand, then, we know by empirical investigation that *P*, the antecedent of the conditional, is true—that this table is not made of ice. We can conclude by *modus ponens*:
>
> $$P \supset \quad P$$
> $$\frac{P}{P}$$
>
> The conclusion—"□ *P*"—is that it is necessary that the table not be made of ice, and this conclusion is known a posteriori, since one of the premises on which it is based is a posteriori.

Kripke's account makes explicit that knowledge of the specific modal status of a proposition involves both knowledge of its general modal status and

knowledge of its truth value. Moreover, it also makes clear that philosophical investigation yields only knowledge of the former. Hence, what needs to be explained by an account of the modal knowledge acquired by philosophical investigation is knowledge of the general modal status of a proposition and not knowledge of its specific modal status. The reason is transparent. An account of how we know the specific modal status of a proposition will include an account of how we know its truth value. But we don't know the truth value of propositions such as (14) and (16) by philosophical investigation.

The account of modal knowledge that emerges from Williamson's account of knowledge of counterfactuals is an account of knowledge of the specific modal status of propositions. Knowledge of the specific modal status of a proposition is the conjunction of knowledge of its truth value and knowledge of its general modal status. Knowledge of the truth value of propositions such as (14) and (16) is not the goal of philosophical investigation. An account of the modal knowledge characteristic of philosophical investigation is an account of knowledge of the general modal status of propositions such as (14) and (16). Therefore, since Williamson's account of modal knowledge is directed at the wrong target; it does not explain the features of the modal knowledge characteristic of philosophical investigation.[13]

References

Casullo, Albert. 2003. *A Priori Justification*. New York: Oxford University Press.

———. 2005. "Epistemic Overdetermination and A Priori Justification." *Philosophical Perspectives* 19: 41–58.

———. 2010. "Knowledge and Modality." *Synthese* 172: 341–359.

Gendler, T., and J. Hawthorne, eds. 2002. *Conceivability and Possibility*. Oxford: Oxford University Press.

Hale, Bob, and Crispin Wright. 2000. "Implicit Definition and the A Priori." In *New Essays on the A Priori*, ed. P. Boghossian and C. Peacocke. Oxford: Oxford University Press.

Hill, Christopher. 2006. "Modality, Modal Epistemology, and the Metaphysics of Consciousness." In *The Architecture of the Imagination,* ed. S. Nichols. Oxford: Oxford University Press.

Kripke, Saul. 1971. "Identity and Necessity." In *Identity and Individuation*, ed. M. K. Munitz. New York: New York University Press.

———. 1980. *Naming and Necessity*. Cambridge, Mass.: Harvard University Press.

Lewis, David. 1973. "Counterfactuals and Comparative Possibilities." *Journal of Philosophical Logic* 2: 418–446.

Nichols, Shaun, Stephen Stich, Alan Leslie, and David Klein. 1996. "Varieties of Off-line Simulation." In *Theories of Theories of Mind*, ed. P. Carruthers and P. Smith. Cambridge: Cambridge University Press.

Stich, Stephen, and Shaun Nichols. 1992. "Folk Psychology: Simulation or Tacit Theory?" *Mind and Language* 7: 35–71.

Williamson, Timothy. 2007. *The Philosophy of Philosophy.* Oxford: Blackwell.

13

Conceivability and Modal Knowledge

Christopher Hill (2006) provides an account of modal knowledge that is set in a broader context of arguing against the view that conceivability provides epistemic access to the metaphysical modalities. His goal is "to identify the sources and forms of our knowledge of metaphysical possibility and metaphysical necessity" (205).[1] The account proceeds in two stages. First, he contends that "metaphysical necessity and metaphysical possibility can be reductively explained in terms of the subjunctive conditional" (224). Second, he maintains that his reductive explanation of metaphysical necessity yields two tests for determining whether a proposition is metaphysically necessary and two corresponding tests for determining whether a proposition is metaphysically possible.[2] Finally, Hill argues that his reductive account of the metaphysical modalities in conjunction with his account of modal knowledge underwrites the further conclusion that conceivability does not provide a reliable test for metaphysical possibility.

1. All page references in the text are to Hill (2006) unless otherwise indicated.

2. For an alternative attempt to reduce the metaphysical modalities to the subjunctive conditional and to provide an account of modal knowledge in terms of knowledge of subjunctive conditionals, see Williamson (2007). Williamson's account is critically evaluated in chapter 12 here.

My focus is on Hill's two tests for determining the metaphysical modalities and how they bear on the view that conceivability provides epistemic access to metaphysical possibility. I argue that Hill's first test does not identify the source of our modal knowledge and, moreover, that an examination of the assumptions that motivate the test reveals that such knowledge does not require the employment of our cognitive mechanisms or procedures for evaluating subjunctive conditionals. I also argue that although the second test appears to provide an account of modal knowledge that does require the employment of our cognitive mechanisms or procedures for evaluating subjunctive conditionals, the appearances are misleading. A closer examination reveals that the second test collapses into the first, which does not require the employment of those cognitive mechanisms or procedures. Hence, Hill's reductive explanation of the metaphysical modalities in terms of the subjunctive conditional does not yield a reductive explanation of knowledge of metaphysical modality in terms of knowledge of subjunctive conditionals. Finally, I argue that his account of modal knowledge is at odds with his contention that conceivability does not provide epistemic access to metaphysical possibility.

1

Hill offers two arguments in support of the claim that metaphysical necessity is reducible to the subjunctive conditional. The first, which I call the *A-argument*, begins with Lewis's (1973) definition of a necessity operator in terms of the subjunctive conditional:

(A1) $\Box A =_{df} \sim A > A.$

Hill's goal is to show that Lewis's operator expresses genuine metaphysical necessity. On Lewis's account, propositions containing $\Box$ have the following truth conditions:

(A2) $\Box A$ is true at a possible world W just in case A is true at every possible world that is accessible from W.

According to the standard picture,

(A3)   If a proposition is metaphysically necessary, then it holds in all possible worlds.

Hill (221), however, maintains:

(A4)   The possible worlds that are accessible from W include all possible worlds.[3]

Therefore, it follows that

(A5)   □A is true at W just in case A is true at all possible worlds.

Since Lewis's operator captures the central feature of the standard picture, Hill concludes:

(A6)   Lewis's operator expresses genuine metaphysical necessity.

Hill (223) notes that Lewis's definition of necessity can be restated as (A1*) by using substitutional quantification

(A1*) $\square A =_{df} (\Pi Q)(Q > A),$

where (ΠQ) is the universal substitutional quantifier. His subsequent discussion employs (A1*).

Hill's second argument, which I call the *B-argument*, has two premises:

(B1)   When we reflectively consider the familiar examples of metaphysical necessity, we find that they are always propositions that we are prepared to presuppose as valid in our subjunctive reasoning.

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3. Hill offers the following supporting argument for (A4):

(S1)   Suppose that R is a respect of comparison such that worlds not similar to the actual world in respect R are not accessible from the actual world.

(S2)   This suggestion is refuted by the fact that there are nonvacuous counterfactuals that begin as follows: If the world were different in respect R, …

(S3)   We regard such counterfactuals as having truth values.

(S4)   We do not see them as vacuously true as is shown by the fact that we are prepared to give substantive reasons for accepting or rejecting them.

(S5)   Therefore, we are prepared to entertain subjunctive conditionals that are arbitrarily different than the actual world. (221–222)

Hill goes on to extend the argument to show that where W is any possible world, all possible worlds are accessible from W.

(B2)   When we consider the propositions that we presuppose as valid across subjunctive reasoning, we find that we are always prepared to regard them as metaphysically necessary.

(B3)   Therefore, metaphysical necessity can be reductively explained in terms of the subjunctive conditional. (224)

The B-argument depends on the idea of presupposing a proposition as valid in subjunctive reasoning. Hill goes on to articulate three underlying assumptions that motivate his use of this idea.

Consider some proposition P that we treat as valid in subjunctive reasoning, such as that George W. Bush is a human being. Hill's underlying assumptions can be stated as follows:

(UA1)   Our subjunctive reasoning reflects commitments to a range of propositions that have the following form: If P, then (ΠQ) (Q > P).

(UA2)   These particular commitments derive from commitments to certain more general propositions such as:

(21)   (∀x) (∀K) (if x is a biological substance and K is a biological kind to which x belongs, then (ΠQ) (Q > x is a biological substance that belongs to K).

(UA3)   Propositions like (21) are a priori propositions that are partially constitutive of certain of the concepts that occur in them—and in particular, of the subjunctive conditional. (226–227)

Hill (227–228) notes that the views articulated in (UA1)–(UA3) are closely related to Kripke's account of a posteriori necessities.

Kripke (1971, 153; quoted by Hill, 227) offers the following account of our knowledge of a posteriori necessities:

In other words, if *P* is the statement that the lectern is not made of ice, one knows by a priori philosophical analysis, some conditional of the form "if *P*, then necessarily *P*." If the table is not made of ice, it is necessarily not made of ice. On the other hand, then, we know by empirical investigation that *P*, the antecedent of the conditional, is true—that this table is not made of ice. We can conclude by *modus ponens*:

$$P \supset \Box P$$
$$\frac{P}{\Box P}$$

According to Kripke, our knowledge that necessarily P, where P is some necessary a posteriori proposition, is based on an inference from two other propositions: (1) P; and (2) If P, then necessarily P. We know (1) a posteriori and (2) a priori.

Hill (228) highlights the following parallel between his account and Kripke's. Where P is any necessary a posteriori proposition, such as that George W. Bush is a human being, Kripke holds that the following proposition can be known a priori:

(24)   If P, then it is metaphysically necessary that P.

Hill, on the other hand, holds the following proposition can be known a priori:

(25)   If P, then $(\Pi Q)\,(Q > P)$.

Given (A1*), (24) and (25) are analytically equivalent. Hill (228), however, adds the further claim, not found in Kripke's account, that propositions of the form (25) are definitional in character, following from more general principles, such as (21), that are partially constitutive of the subjunctive conditional. The fact that (25) follows from more general principles that are partially constitutive of the subjunctive conditional explains the a priori status of (25).[4]

2

Hill contends that his reductive explanation of the metaphysical modalities yields two tests for determining whether a proposition is metaphysically necessary. The first, which I call the *B-test*, derives from the B-argument, whose central claim is that the class of propositions that we presuppose as valid in subjunctive reasoning is the same as the class of propositions that we regard as metaphysically necessary. Utilizing that claim, he argues that we can determine whether the proposition that P is metaphysically necessary by examining its role in subjunctive reasoning:

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4. Hill offers the following remarks regarding constitutive propositions:

> Suppose that the proposition that *P* is partially constitutive of the concept *C*. It appears that all of the following are true. (i) We regard *P* as available for use in justifications of other propositions that contain *C*, and for use in explanations of the truth of other propositions, but we do not regard it as desirable or even possible to provide a justification for *P*, or an explanation of the truth of *P*.... (vi) We are committed to treating *P* as operative in characterizing the belief systems of other agents, provided only that those agents are assumed to possess *C*.... What I mean by this is that if we believe that another agent *A* possesses the concept *C*, then we will think it prima facie appropriate to assume that *A* believes that *P*. (207–208 n. 1)

Suppose that when we analyze that role, we find that we are prepared to use P in elaborating subjunctive suppositions whenever it is relevant to them, and that we never rely on propositions that are incompatible with P in elaborating subjunctive suppositions. In effect, we will have found that we presuppose that P is valid in subjunctive reasoning. Assuming that the foregoing claim about metaphysical necessity is correct, this result makes it reasonable to conclude that P is metaphysically necessary. (230)

According to the B-test, finding that we presuppose some proposition as valid in subjunctive reasoning provides a good reason to conclude that it is metaphysically necessary.

The B-test is of limited epistemic import. Although it may provide a procedure for identifying those propositions that we regard as metaphysically necessary, it tells us nothing about how we know those propositions that we regard as metaphysically necessary. In particular, the B-test does not show that we know those propositions by engaging our cognitive mechanisms or procedures for evaluating subjunctive conditionals.

The B-test exploits the following biconditional:

(BTl)   We regard P as metaphysically necessary just in case we presuppose P as valid in subjunctive reasoning.

Suppose that we examine our subjunctive reasoning and discover:

(BT2)   We presuppose P as valid in subjunctive reasoning.

According to Hill, we now have reason to conclude:

(BT3)   P is metaphysically necessary.

Although (BT2) identifies P as a proposition that we presuppose as valid in subjunctive reasoning, it is silent about how we know the propositions that we presuppose as valid in subjunctive reasoning. More specifically, (BT2) does not entail or support the further conclusion that our knowledge of the propositions that we presuppose as valid in our subjunctive reasoning derives from our cognitive mechanisms or procedures for evaluating subjunctive conditionals. Therefore, the B-argument tells us nothing about the sources of our knowledge of metaphysical necessities.

Moreover, an examination of the assumptions that underlie the B-test reveals that they provide an account of our knowledge of metaphysical necessity in which our cognitive mechanisms or procedures for evaluating subjunctive conditionals

play no role. Hill maintains that if P is a necessary proposition, then we can know a priori a proposition of the form:

(25)   If P, then (ΠQ) $(Q > P)$.

If we consider a necessary a posteriori proposition, such as

(P1)   George W. Bush is a human being,

then the following proposition can be known a priori:

(P2)   If George W. Bush is a human being, then (ΠQ) $(Q >$ George W. Bush is a human being$)$.

Moreover, according to Hill, (P2) follows from a more general a priori principle,

(21) $(\forall x)$ $(\forall K)$ (if x is a biological substance and K is the biological kind to which x belongs, then (ΠQ) $(Q > x$ is a biological substance that belongs to K$)$,

that is partially constitutive of the subjunctive conditional. Given $(A1^*)$, one can infer:

(P3)   Necessarily, George W. Bush is a human being

from (P1) and (P2).

The account of knowledge of necessary a posteriori propositions that emerges from the B-test, which I call the *B-account*, parallels Kripke's account. Knowledge of necessary a posteriori propositions, such as (P3), is inferential. It is based on knowledge of two premises: (P1) and (P2). Knowledge of (P1) is a posteriori, based on observations of Bush's physical features and behavior. (P2) is a consequence of (21), which is a proposition that is constitutive of the subjunctive conditional and that we can know a priori. Therefore, at the fundamental level, knowledge of a posteriori necessities does not involve either engaging our cognitive mechanisms or procedures for evaluating subjunctive conditionals or determining which propositions we presuppose as valid in our subjunctive reasoning. The only role played by subjunctive conditionals is that knowledge of (P2) derives from a priori principles that are constitutive of the concept of the subjunctive conditional.

3

The second test, which I call the *A-test*, derives from the A-argument. According to it, we can determine whether the proposition that P is metaphysically necessary by evaluating a representative range of propositions that have the following form:

(30)   Q > P

Hill (230) maintains: "There is no doubt that we can do this, for there is no doubt that we possess one or more cognitive mechanisms designed specifically to evaluate subjunctives." If we deploy these mechanisms and find that the representative propositions of the form (30) are all true, we will have good reason to believe

(30*)   (ΠQ) (Q > P)

and, a fortiori, that P is metaphysically necessary. For example, Hill (231) maintains that if we wish to determine whether the proposition that 2 x 3 = 6 is metaphysically necessary, we can proceed by considering questions such as the following:

(Q1)   Would it still be true that 2 x 3 = 6 if the only existing objects were abstract entities?

(Q2)   Would it still be true that 2 x 3 = 6 if everything was in constant flux, with objects dissolving into new objects as soon as they were counted?

If the answers are all affirmative, then we have good reason to believe that 2 x 3 = 6 is metaphysically necessary.

Hill goes on to argue that our modal beliefs amount to knowledge. Here he appeals to the fact that subjunctive conditionals can be confirmed and disconfirmed by empirical evidence:

Now it seems to be the case that the subjunctive conditionals that we accept tend to be confirmed by the evidence that is relevant to them. If this impression is correct, then it is reasonable to regard our procedures for evaluating subjunctive conditionals as reliable, and by the same token, it is reasonable to regard our subjunctive beliefs as knowledge. (231–232)

Since we have empirical evidence that our procedures for evaluating subjunctive conditionals are reliable, we have reason to believe that beliefs based on those procedures constitute knowledge.

The A-test appears to provide an account of modal knowledge that differs in a significant way from the B-account. The B-account of modal knowledge parallels Kripke's account. Our knowledge that necessarily P, where P is some necessary a posteriori proposition, is based on an inference from two other propositions: (1) P, and (2) If P, then (ΠQ) $(Q > P)$. We know (1) a posteriori and (2) a priori, but neither our knowledge of (1) nor our knowledge of (2) requires engaging our cognitive mechanisms or procedures for evaluating subjunctive conditionals. The A-test, however, appears to provide an account of our modal knowledge that requires engaging our cognitive mechanisms or procedures for evaluating subjunctive conditionals. According to the A-test, we know propositions such as

(30*) (ΠQ) $(Q > P)$

by inductive generalization from a representative range of propositions that have the form

(30) $Q > P$.

But, in order to know such propositions, we must employ our cognitive mechanisms or procedures for evaluating subjunctive conditionals. Therefore, the A-test appears to require the employment of our mechanisms or procedures for evaluating subjunctive conditionals.

Closer examination, however, reveals that the A-test does not require the employment of our cognitive mechanisms or procedures for evaluating subjunctive conditionals. Given the B-account of modal knowledge, the employment of our cognitive mechanisms or procedures for evaluating subjunctive conditionals is otiose; for anyone who is in the position to evaluate subjunctive conditionals of the form

(30) $Q > P$

is also in a position to know a priori that they are true.

Consider Hill's application of the A-test to the necessary proposition that 2 x 3 = 6. According to that test, we examine instances of (30), such as

(I1)   If the only existing objects were abstract entities, 2 x 3 = 6 would be true;
(I2)   If everything was in constant flux, with objects dissolving into new objects as soon as they were counted, 2 x 3 = 6 would be true.

In order to evaluate (I1) and (I2), however, we must know whether the proposition that 2 x 3 = 6 is true. If, for example, we consider the following subjunctive conditionals

(I3)   If the only existing objects were abstract entities, the Goldbach
        Conjecture would be true;

(I4)   If everything was in constant flux, with objects dissolving into new objects
        as soon as they were counted, the Goldbach Conjecture would be true;

we are not in a position to evaluate them since we don't know whether the
Goldbach Conjecture is true.

Once we recognize that the A-test is applicable only if we know the truth value
of the proposition in question, we can also see that we need not engage our
cognitive mechanisms or procedures for evaluating subjunctive conditionals in
order to apply it. Consider a necessary proposition, such as

(P1)   George W. Bush is a human being,

and assume that we know that it is true. According to Hill, if P is a necessary prop-
osition, then we can know a priori a proposition of the form

(25)   If P, then $(\Pi Q) (Q > P)$.

Hence, we can know a priori

(P2)   If George W. Bush is a human being then $(\Pi Q) (Q \rangle$ George W. Bush
        is a human being$)$.

(P2) is a consequence of the more general a priori principle:

(21) $(\forall x) (\forall K)$ (if x is a biological substance and K is the biological kind to which
        x belongs, then $(\Pi Q) (Q > x$ is a biological substance that belongs to K$)$,

which is constitutive of the subjunctive conditional and can be known a priori.
Hence, anyone who possesses the concept of the subjunctive conditional and
knows that (P1) is true can know via inference from (P1) and (P2) that

(P4) $(\Pi Q) (Q >$ George W. Bush is a human being$)$.

There is no need to evaluate a range of propositions of the form

(P5) $Q >$ George W. Bush is a human being

and to inductively infer (P4) on that basis. Moreover, anyone who possesses the
concept of the subjunctive conditional and knows that (P1) is true can know

propositions of the form (P5) by inference from (P4). Therefore, where P is a necessary proposition, one who knows that P is true can know both general propositions of the form

(30*)   (ΠQ) (Q > P)

as well as their instances, without employing the cognitive mechanisms or procedures that we use to assess subjunctive conditionals.[5] Their employment is otiose.

One might object that my assessment of the significance of the A-test is unduly pessimistic. Even if the B-account of modal knowledge indicates that it is unnecessary to employ our cognitive mechanisms or procedures for evaluating subjunctive conditionals in order to know propositions of the form

(30)   Q > P,

it does not follow that those mechanisms or procedures cannot be employed to arrive at such knowledge. We may have here a case of epistemic overdetermination; that is, two different, but independent, routes to knowledge of the metaphysical modalities.

Although epistemic overdetermination remains a possibility on Hill's account of knowledge of metaphysical necessities, there are two reasons for doubting that

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5. I have argued that the only role played by subjunctive conditionals in Hill's account of modal knowledge is that general principles, such as (21), are alleged to be constitutive of the concept of the subjunctive conditional. But even this role seems dispensable given the close relationship between Hill's first test and Kripke's account. Where P is any necessary a posteriori proposition, Kripke holds that the following proposition is knowable a priori:

(24)   If P, then it is metaphysically necessary that P,

whereas Hill holds the following proposition is knowable a priori:

(25)   If P, then (ΠQ) (Q > P).

For Hill, propositions of form (25) are knowable a priori because they follow from more general principles, such as (21), that are alleged to be constitutive of the concept of the subjunctive conditional. One who favors Kripke's account has available a similar strategy. He or she could maintain that propositions of the form (24) are knowable a priori because they follow from more general principles, such as

(21*)   (∀x) (∀K) (if x is a biological substance and K is the biological kind to which x belongs, then □ (x is a biological substance that belongs to K),

that are constitutive of the concept of metaphysical necessity. Hill's appeal to subjunctive conditionals adds a layer of theory that offers no increase in explanatory power over the view inspired by Kripke's account.

there is an independent route to such knowledge via our procedures for evaluating subjunctive conditionals. First, there is a significant question that can be raised with respect to Hill's argument in support of the claim that beliefs about metaphysical necessity generated by the evaluation of subjunctive conditionals amount to knowledge. Second, there is a significant gap in Hill's account of how we acquire knowledge of metaphysical necessities via the exercise of our procedures for evaluating subjunctive conditionals.

Hill's argument (231–232) in support of the claim that our beliefs about metaphysical necessity amount to knowledge can be stated as follows:

(K1)   Claims of metaphysical necessity are equivalent to generalized subjunctive conditionals.

(K2)   Subjunctive conditionals can be confirmed and disconfirmed by empirical evidence.

(K3)   The subjunctive conditionals that we accept tend to be confirmed by the empirical evidence that is relevant to them.

(K4)   Therefore, it is reasonable to regard our procedures for evaluating subjunctive conditionals as reliable and our subjunctive beliefs as knowledge.

The key premise in the argument is (K3). For example, the subjunctive conditional

(I*)   If I hadn't given her the medicine, she wouldn't have recovered

gives rise to the indicative prediction

(IP*)   If medication is withheld in similar cases, the patients will not recover.

So cases of patients who do not recover because medication is withheld confirm (IP*).

The subjunctive conditionals that are involved in the evaluation of metaphysically necessary propositions, however, do not appear to be confirmed by empirical evidence. Consider, for example, the subjunctive conditionals that, according to Hill, are relevant to the confirmation of the necessary proposition that 2 x 3 = 6:

(I1)   If the only existing objects were abstract entities, 2 x 3 = 6 would be true; and

(I2)   If everything was in constant flux, with objects dissolving into new objects as soon as they were counted, 2 x 3 = 6 would be true;

which give rise to the indicative predictions:

(IP1)   If all concrete objects are destroyed, then 2 x 3 = 6 is true; and

(IP2)   If everything is placed in constant flux, with objects dissolving into new objects as soon as they were counted, 2 x 3 = 6 is true.

It is unclear what empirical evidence, if any, supports (IP1) and (IP2). If we consider

(P1)   George W. Bush is a human being,

the situation is worse. We lack an account of (a) the subjunctive conditionals relevant to confirming (P1), (b) the relevant indicative predictions that derive from those subjunctive conditionals, and (c) the empirical evidence that confirms those predictions. Hence, at best, (K3) remains questionable for the case of metaphysically necessary propositions.

Even if (K3) can be substantiated in the case of metaphysically necessary propositions, a significant gap remains in Hill's account of our knowledge of metaphysical necessities. On his view, a metaphysically necessary proposition that P is analytically equivalent to a universally quantified proposition of the form

(30*) $(\Pi Q)\,(Q > P)$.

His argument, if sound, establishes that we have knowledge of the premises that constitute the basis of our alleged (inductive) inferential knowledge that (30*) via the exercise of our procedures for evaluating subjunctive conditionals. But Hill has not provided any indication of how we move from knowledge of such premises to knowledge of metaphysically necessary propositions. His account is silent about (a) the content of the inferential principle (or principles) that mediate the transition from premises of the form

(30) $(Q > P)$

to conclusions of the form

(30*) $(\Pi Q)\,(Q > P)$,

and (b) how we know those principles. Therefore, the case for overdetermination is, at best, premature.

4

I have argued that the A-test does not require the employment of our cognitive mechanisms or procedures for evaluating subjunctive conditionals. Given the B-account of modal knowledge, their employment is otiose. Moreover, as I shall now argue, the reason why Hill fails to recognize that their employment is otiose is that he fails to distinguish two different targets of an account of modal knowledge. This failure also mitigates his negative assessment of the view that conceivability provides epistemic access to the metaphysical modalities.

There are two different potential targets for an account of modal knowledge. In order to locate them precisely, let us introduce the following distinctions:

(A)   S knows the *truth value* of p just in case S knows that p is true or S knows that p is false.

(B)   S knows the *general modal status* of p just in case S knows that p is a necessary proposition (i.e., necessarily true or necessarily false) or S knows that p is a contingent proposition (i.e., contingently true or contingently false).

(C)   S knows the *specific modal status* of p just in case S knows that p is necessarily true or S knows that p is necessarily false or S knows that p is contingently true or S knows that p is contingently false.

An account of modal knowledge can have as its target either knowledge of the general modal status of a proposition or knowledge of its specific modal status.

The goal of the A-test is to provide an account of knowledge of propositions of the form

(30*) $(\Pi Q)\,(Q > P)$,

which, by (A1*), are analytically equivalent to propositions of the form $\Box P$. Hence, the target of the A-test is knowledge of the specific modal status of necessary propositions. But, as Kripke's discussion of the lectern example highlights, knowledge of the specific modal status of a necessary proposition is the conjunction of knowledge of its truth value and knowledge of its general modal status. Moreover, on Kripke's account, knowledge of the general modal status of a necessary proposition is more fundamental than knowledge of its specific modal status. Knowledge of the specific modal status of a necessary proposition is based on an inference from knowledge of its general modal status and knowledge of its truth value. The B-account of modal knowledge, which parallels Kripke's account, has as its target knowledge of the general modal status of necessary propositions. Since it provides an account of knowledge of the general modal

status of necessary propositions in terms of constitutive a priori principles, it is unnecessary to employ our cognitive mechanisms or procedures for evaluating subjunctive conditionals in order to know propositions of the form (30*). Anyone who is in the position to evaluate subjunctive conditionals of the form

(30)   Q > P

is also in a position to know a priori that they are true.

Hill's failure to distinguish the two different targets of an account of modal knowledge also mitigates his pessimistic assessment of the relationship between conceivability and the metaphysical modalities. He contends that it is a mistake to think that "conceivability is somehow the foundation of our epistemic access to these metaphysical modalities" (205). More specifically, his goal is to argue that the following principle, which I call the *Conceivability Principle*, is false: If it is within our power to conceive coherently of its being the case that P, then it is metaphysically possible that P.

Hill offers the following articulation of the concept of coherent conceiving:

if it is true that we can coherently conceive of its being the case that *P*, then it must also be true (a) that we are able to entertain the proposition that *P*, (b) that the proposition that *P* is compatible with the laws of logic, (c) that the proposition that *P* is compatible with the laws of mathematics, and (d) that the proposition that *P* is compatible with all of the a priori principles that are constitutive of the relevant concepts,...Finally,...in addition to being necessary conditions of our being able to conceive coherently of its being the case that *P*, (a)–(d) are also sufficient for us to have this ability. (207)

Since Hill holds that the propositions in conditions (b)–(d) are both a priori and cognitively robust (i.e., they play an essential role in the edifice of human knowledge), he labels them *AR-propositions*.

Hill's (208) account of coherent conceiving has the consequence that "we can coherently conceive of the truth of any entertainable proposition that is not precluded by AR-propositions." Assuming that an a priori proposition is one that can be known a priori and that an a posteriori proposition is one that can be known only a posteriori, it follows that any entertainable a posteriori proposition is coherently conceivable. In particular, if we consider examples of necessary a posteriori propositions, such as

(P1)   George W. Bush is a human being; and
(P6)   Hesperus is identical with Phosphorus;

their negations are coherently conceivable.[6] We can coherently conceive of the truth of both not-(P1) and not-(P6) because we can entertain them and their truth is compatible with all propositions that are knowable a priori.

In order to assess the relationship between coherent conceiving and possibility, Hill (209–210) distinguishes two forms of possibility:

(CP)   It is *conceptually* possible that P if the proposition that P is compatible with all of the propositions that count as AR-propositions; and

(MP)   It is *metaphysically* possible that P if the proposition that P is compatible with all AR-propositions and, in addition, with a large and heterogenous class of propositions that enumerate the essential properties of substances and kinds.

Hill (211) contends that coherent conceiving is sufficient for conceptual possibility but not for metaphysical possibility since "the conditions that define coherent conceiving are much less restrictive than the conditions that define metaphysical possibility." It is possible for a proposition to satisfy the former without satisfying the latter because the former requires only compatibility with all AR-propositions, but the latter requires, in addition, compatibility with all propositions that state the essential properties of substances and kinds (call them *E-proposition*s).

Hill's argument against the Conceivability Principle is based on three contentions. First, coherent conceiving requires compatibility only with AR-propositions, that is, propositions that are a priori and cognitively robust. Second, metaphysical possibility requires compatibility with both AR-propositions and E-propositions. Third, E-propositions are not a priori. Consider an E-proposition, such as

(P1)   George W. Bush is a human being.

Since (P1) is not an a priori proposition, it is not an AR-proposition. Since (P1) is not an AR-proposition, not-(P1) is compatible with all AR-propositions and, as a consequence, is coherently conceivable. Therefore, according to the Conceivability Principle, it is metaphysically possible that not-(P1), which entails that it is not necessarily true that (P1). Since (P1) is necessarily true, Hill's argument establishes that coherent conceiving is not a reliable guide to the *specific* modal status of E-propositions.

The view that conceivability provides epistemic access to the metaphysical modalities is ambiguous. It can be understood in two ways:

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6. I assume here, following Hill, that Kripke is correct about the epistemic status of these propositions. The issue is controversial. In particular, some maintain that (P6) is a priori. For a discussion of some of the complexities generated by Kripke's examples, see Casullo (2003, chapter 7) and Casullo (2010).

(C1)   Conceivability provides epistemic access to the *general* modal status of propositions; or

(C2)   Conceivability provides epistemic access to the *specific* modal status of propositions.

Hill's argument establishes that (C2) is false. But, from the fact that (C2) is false, it does not follow that (C1) is false. Moreover, if the B-account of modal knowledge is correct, it follows that coherent conceiving is as reliable a guide to the general modal status of E-propositions as it is to the general modal status of AR-propositions.

Consider again

(P1)   George W. Bush is a human being.

According to Hill, the following proposition can be known a priori

(P2)   If George W. Bush is a human being then (ΠQ) $(Q >$ George W. Bush is a human being$)$.

Moreover, (P2) follows from a more general a priori principle:

(21) $(\forall x)$ $(\forall K)$ (if x is a biological substance and K is the biological kind to which x belongs, then (ΠQ) $(Q >$ x is a biological substance that belongs to K$)$,

which is partially constitutive of the subjunctive conditional. Since (21) is an a priori principle that is partially constitutive of the subjunctive conditional, it is an AR-proposition. Therefore, the proposition

(P7)   It is not the case that if George W. Bush is a human being, then necessarily George W. Bush is a human being

is not coherently conceivable.

More generally, Hill maintains that, where P is any E-proposition, the corresponding proposition of the form

(25)   If P, then (ΠQ) $(Q > P)$

follows from more general principles that are partially constitutive of the subjunctive conditional and can be known a priori. Therefore, it is a consequence of the B-account of modal knowledge that coherent conceiving is a reliable guide to

the general modal status of E-propositions. Where P is any E-proposition, the corresponding proposition of the form

(P8)   It is not the case that if P, then it is metaphysically necessary that P

is not coherently conceivable.

The B-account of modal knowledge has two consequences. First, coherent conceiving is a reliable guide to the general modal status of all necessary propositions. The access that it provides to the general modal status (or necessity) of E-propositions is as reliable as the access that it provides to the general modal status (or necessity) of AR-propositions. Second, although coherent conceiving is a reliable guide to the specific modal status of AR-propositions, it is not a reliable guide to the specific modal status of E-propositions.[7] Hence, Hill is correct in maintaining that coherent conceiving is not a reliable guide to the specific modal status of E-propositions. However, since he fails to distinguish between the general modal status and the specific modal status of necessary propositions, he overlooks the fact that the principle that coherent conceiving is a reliable guide to the general modal status of E-propositions is a consequence of the B-account of modal knowledge.[8]

References

Casullo, Albert. 2003. *A Priori Justification*. New York: Oxford University Press.

———. 2010. "Knowledge and Modality." *Synthese* 172: 341–359.

Hill, Christopher. 2006. "Modality, Modal Epistemology, and the Metaphysics of Consciousness." In *The Architecture of the Imagination,* ed. S. Nichols. Oxford: Oxford University Press.

Kripke, Saul. 1971. "Identity and Necessity." In *Identity and Individuation*, ed. M. K. Munitz. New York: New York University Press.

Lewis, David. 1973. "Counterfactuals and Comparative Possibilities." *Journal of Philosophical Logic* 2: 418–446.

Williamson, Timothy. 2007. *The Philosophy of Philosophy*. Oxford: Blackwell.

7. Coherent conceiving is not a reliable guide to the specific modal status of E-propositions because one can coherently conceive of the negation of any E-proposition. Coherent conceiving is a reliable guide to the specific modal status of AR-propositions because one cannot coherently conceive of the negation of any AR-proposition since coherent conceiving requites compatibility with all AR-propositions.

8. Thanks to John Gibbons, Chris Hill, and Joe Mendola for their insightful comments on an earlier version of this essay.

14

Articulating the A Priori–A Posteriori Distinction

The distinction between a priori knowledge and a posteriori knowledge has come under attack in the recent literature. Here are some examples:

> It seems to me that discussions of the past decades have made clear how intricate and complex the classical notion of the a priori is, and *neither* the Strong conception *nor* the Weak conception (nor anything else) can provide a coherent explication. (Kitcher 2000, 85)

> My own externalist commitments…lead me to think that the a priori–a posteriori distinction is not a particularly natural one, and hence that its importance to epistemology has been grossly overestimated. (Hawthorne 2007, 201)

> In short, what we are seeing is that there is a deep instability in the classic collection of platitudes about a priori knowledge. (Jenkins 2008, 255)

> The distinction [between a priori and a posteriori knowledge] is handy enough for a rough initial description of epistemic phenomena; it is out of place in a deeper theoretical analysis, because it obscures more significant epistemic patterns. (Williamson 2007, 169)

The target of the attacks is a particular concept—the concept of a priori knowledge—or, alternatively, a particular distinction—the distinction between a priori and a posteriori knowledge. The attacks are related, but different: two are directed at the coherence of their target; two at its significance.

Evaluating the attacks requires answering two questions. First, have they hit their target? Second, are they compelling? My goal is to argue that the attacks fail because they miss their target. Since the attacks are directed at a particular concept or distinction, they must accurately locate the target concept or distinction. Accurately locating the target concept or distinction requires correctly articulating that concept or distinction. The attacks miss their target because they fail to correctly articulate the target concept or distinction. I go on to present a different challenge to the a priori-a posteriori distinction. This challenge is not directed at the coherence or significance of the distinction. Its target is the traditional view that all knowledge (or justified belief) is either a priori or a posteriori.

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A successful attack on the concept of a priori knowledge requires a correct articulation of the target concept. Correctly articulating the concept of a priori knowledge is challenging since the target concept is obscured by several factors. First, there are two different approaches to articulating it. A reductive approach articulates the concept of a priori knowledge in terms of the concept of a priori justification. According to this approach, S knows a priori that p just in case S's belief that p is justified a priori and the other conditions on knowledge are satisfied. Its primary target is the concept of a priori justification. A nonreductive approach provides an articulation of the concept of a priori knowledge that does not include any conditions involving the concept of the a priori. Its primary target is the concept of a priori knowledge.

Second, there are two approaches to providing an analysis of the target concept: theory-neutral and theory-dependent. The goal of a theory-neutral articulation of the concept of a priori knowledge (or justification) is to provide an analysis of the concept of a priori knowledge (or justification) that does not presuppose any particular analysis or account of the more general concept of knowledge (or justification). It aims at neutrality among the competing conceptions of knowledge (or justification). The goal of a theory-dependent analysis of the concept of a priori knowledge (or justification) is to provide an analysis of the concept of knowledge (or justification) within the more general framework of a particular theory of knowledge (or justification), which I call the *background theory* of knowledge (or justification).

Third, a priori knowledge (or justification) is a species of knowledge (or justification). Consequently, any item of a priori knowledge (or justified belief) must satisfy both the general conditions on knowledge (or justification) and the conditions that differentiate a priori knowledge (or justification) from a

posteriori knowledge (or justification). The goal of an analysis of the concept of a priori knowledge (or justification) is to identify the conditions that differentiate a priori knowledge (or justification) from a posteriori knowledge (or justification), rather than those that are common to both. The former conditions are constitutive of a priori knowledge (or justification); the latter are constitutive of the background theory of knowledge (or justification).

These obscuring factors introduce a number of common errors in accurately locating and articulating the concept of a priori knowledge. Three are worth noting from the start. First, most theorists who offer articulations of the concept of a priori knowledge claim to be articulating the so-called traditional Kantian concept of a priori knowledge. This concept arose in a period dominated by Cartesian assumptions about the nature of knowledge and justification. Hence, when offering an articulation of this concept, it is critical to distinguish between the features constitutive of a priori knowledge (or justification) as opposed to the features constitutive of the background theory of knowledge (or justification). Failure to distinguish between these two features can lead to mistaken articulations of the traditional concept of a priori knowledge.

Second, most contemporary theorists reject the traditional Cartesian accounts of knowledge and justification, and offer articulations of the traditional concept of a priori knowledge within the context of their preferred theory of knowledge. When articulating the traditional concept of a priori knowledge within a nontraditional theory of knowledge, one must take care to ensure that the articulation coheres with the requirements of the new background theory. Failure to do so can result in mistaken conclusions about the implications of the new background theory for the a priori.

Third, if one offers an articulation of the traditional concept of a priori knowledge within a nontraditional background theory and arrives at the conclusion that the resulting account of a priori knowledge is problematic, one must take care to determine whether the source of the problem is the requirements of the background theory of knowledge or the requirements of the a priori. Failure to do so can lead to the mistaken conclusion that the a priori is problematic when the problem is rooted in the background theory of knowledge.

The question before us is whether the concept of a priori knowledge is coherent and significant. The four authors cited earlier express reservations about its coherence or significance. I begin with a selective review of some of Philip Kitcher's seminal work on the a priori.[1] My purpose is twofold. The first is to introduce two different strategies for challenging the coherence or significance of the concept of a priori knowledge. The second is to provide clear examples of arguments against the a priori that miss their target by committing one of

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1. For a fuller discussion, see Casullo (1988, 2003, 2009).

the errors that I identified earlier. In the subsequent sections, I will turn to the arguments of John Hawthorne, C. S. Jenkins, and Timothy Williamson and identify variations of these errors.

2

Philip Kitcher offers two different strategies for arguing that the concept of a priori knowledge is either incoherent or insignificant. His original strategy is to argue that there is no a priori knowledge. If he is correct, it follows that the a priori–a posteriori distinction does not mark a significant division in epistemic reality; it does not mark any division. It does not follow, however, that the concept is incoherent. In fact, Kitcher employs an analysis of the concept of a priori knowledge as an essential premise in his argument in support of the conclusion that there is no a priori knowledge. In his later work, Kitcher adopts a different approach. Rather than offering an argument against the existence of a priori knowledge that involves an analysis of the concept, he challenges the concept itself. He maintains that the traditional concept is too complex to be coherently articulated.

Kitcher (1983) offers the following influential argument against the traditional view that some knowledge is a priori:

(K1)   The concept of a priori knowledge entails that a priori warrant is indefeasible by experience.

(K2)   The warrant conferred by alleged a priori sources of knowledge is defeasible by experience.

(K3)   Therefore, no knowledge is a priori.

(K1) is supported by the following analysis of the concept of a priori knowledge:

X knows a priori that p iff X knows that p and X's knowledge that p was produced by a process which is an a priori warrant for it.

α is an a priori warrant for X's belief that p if and only if α is a process such that, given any life e sufficient for X [to acquire the concepts in] p

(a)   some process of the same type could produce in X a belief that p;

(b)   if a process of the same type were to produce in X a belief that p, then it would warrant X in believing that p;

(c)   if a process of the same type were to produce in X a belief that p, then p. (Kitcher 1983, 24)

The analysis is reductive since it analyzes a priori knowledge in terms of a priori warrant. It is also theory-dependent since Kitcher (2000, 66) maintains that his "general understanding of warrants is a version of reliabilism."

Conditions (b) and (c) of the analysis share a common feature: both impose higher standards on a priori warrant than those required by Kitcher's background theory of warrant. Condition (c) precludes the possibility of a priori warranted false beliefs. Condition (b) requires that S's a priori warranted belief that p be indefeasible by experience in any world in which S has sufficient experience to acquire the concepts in p. Reliabilism, however, does not preclude either the possibility of warranted false beliefs or the possibility of empirically defeasible warranted beliefs. Consequently, in the absence of some compelling supporting argument, the higher standards are ad hoc and should be rejected.[2]

Kitcher's argument provides a clear example of an error of the second type. He offers an articulation of the traditional concept of a priori justification within a reliabilist theory of warrant, but the articulation introduces conditions on a priori warrant that are not supported by his background theory of warrant. As a consequence, he arrives at the mistaken conclusion that the theory precludes a priori warrant.

Kitcher (2000) adopts a different strategy. He acknowledges that his articulation of the concept of a priori warrant faces difficulty, but now argues that the alternative favored by his opponents, the Weak conception or (WC),

(WC)   S's belief that p is justified a priori just in case S's belief that p is justified by a nonexperiential process,

is also open to objection. The upshot is that there is no coherent articulation of the traditional concept of a priori knowledge.

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2. Kitcher argues that (c) is supported by (b) and that (b) is supported by the intuitive idea that a priori knowledge is independent of experience:

> But if alternative experiences could undermine one's knowledge then there are features of one's current experience which are relevant to the knowledge, namely those features whose *absence* would change the current experience into the subversive experience. The idea of the support lent by kindly experience is the obverse of the idea of the defeat brought by uncooperative experience. (1983, 89)

His account of the relationship between supporting and defeating evidence, however, is not supported by his background theory of warrant. It is uncontroversial that if S's belief that p is supported (i.e., warranted) by experience then S's belief that p is not warranted (and hence, not known) a priori. But suppose that S's belief that p is warranted nonexperientially and that S's nonexperiential warrant for the belief that p is defeasible by experience. It does not follow that S's belief that p is supported (i.e., warranted) by experience. Kitcher now concedes this point and agrees that his original defense of (b) fails. This argument resurfaces in Hawthorne (2007), which is discussed in section 3.

We now turn to two of the arguments that Kitcher offers against (WC).[3] The first contends that (WC) fails to capture a feature of the traditional concept of a priori knowledge: "the tradition ascribes to a priori knowledge the functional significance of being in a position to prescribe to future experience; knowledge that prescribes to future experience is irrefutable by future experience" (Kitcher 2000, 77). Let us grant that the tradition ascribes to a priori knowledge the functional significance of prescribing to future experience. This observation, taken by itself, does not provide a basis for rejecting (WC) since Kitcher has not shown that this feature is constitutive of the traditional concept of a priori knowledge. Moreover, there is good reason to deny that it is. It is generally acknowledged that the traditional concept of knowledge is Cartesian foundationalism, according to which S knows that p only if S's justification for the belief that p is infallible, incorrigible, and indubitable.[4] Hence, incorrigibility, or immunity to revision, is a feature constitutive of the traditional concept of knowledge. It is not a feature that differentiates a priori knowledge from empirical knowledge.

This argument provides a clear example of an error of the first type. Kitcher mistakes a feature of the traditional theory of knowledge for a feature of the traditional concept of a priori knowledge and, as a consequence, draws the mistaken conclusion that (WC) does not provide an adequate articulation of the traditional concept of the a priori.

The second argument contends that (WC) is too weak. Kitcher invites us to consider the following thought experiment. Suppose that a cubical die, composed of some homogeneous material and whose faces are numbered 1 through 6, is rolled once. What is the chance that the uppermost face will be the one numbered 6? One might reason as follows. Since the material is homogeneous, the situation is symmetrical with respect to the six faces. One of the numbered faces will be uppermost. Therefore, the probability that it will be the one numbered 6 is 1/6. Kitcher (2000, 78) maintains that this thought experiment involves a nonexperiential process that meets reliabilist standards. Therefore, according to (WC), the conclusion in question is known a priori. But, Kitcher (2000, 79) contends, "this will set the Weak conception at variance with the classical view of the bounds of apriority."

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3. For a discussion of his remaining arguments, see Casullo (2009).

4. William Alston offers the following characterization of the traditional concept of knowledge:

> Descartes, along with many other seventeenth- and eighteenth-century philosophers, took it that any knowledge worthy of the name would be based on cognitions the truth of which is guaranteed (infallible), that were maximally stable, immune to ever being shown to be mistaken (incorrigible), and concerning which no reasonable doubt could be raised (indubitable). (1992, 146)

Kitcher's contention is mistaken. He fails to distinguish between the requirements of (WC) and the requirements of the background theory in which (WC) is embedded. If (WC) is embedded within the traditional Cartesian theory of knowledge then it delivers results consistent with the classical view of the bounds of apriority. In order for the conclusion in question to be known, on the traditional theory, it must be infallible, incorrigible, and indubitable. Since it does not meet those conditions, that conclusion is not known, a priori or otherwise. Kitcher generates the appearance of variance between (WC) and the classical theory by embedding (WC) within a reliabilist theory of knowledge. Since reliabilism imposes lower standards for knowledge than the traditional theory, the conclusion of the argument is (let us grant) known a priori. The variance is due entirely to the difference in the standards for knowledge imposed by the two different background theories in which (WC) is embedded. It is not due to (WC).

This argument provides a clear example of the third type of error. Kitcher mistakes a consequence that is due to the nontraditional background theory in which he embeds (WC) for a consequence of (WC) itself and, as a result, draws the mistaken conclusion that (WC) does not provide an adequate articulation of the traditional concept of a priori knowledge.

3

John Hawthorne contends that the a priori–a posteriori distinction is not a natural one. This conclusion, he maintains, derives from his commitment to epistemological and semantic externalism. My main concern is the case based on his commitment to epistemological externalism, which, I believe, carries the primary burden of his argument. Hawthorne offers three leading arguments based on epistemological considerations. I will argue that all three fall short of their goal. The first fails because it does not distinguish between reductive and nonreductive analyses of the concept of a priori knowledge. The second fails because it turns on an incorrect account of the relationship between experiences that warrant belief and experiences that defeat warrant. The third raises a problem that arises from embedding the traditional concept of a priori knowledge within his externalist general theory of knowledge, but the problem is due entirely to the background theory of knowledge.

According to the safety account of knowledge preferred by Hawthorne:

(S)   S knows p iff there is no close world where S makes a mistake that is relevantly similar to his actual belief that p. (2007, 202)

The central idea of the account is that of a relevantly similar mistake. What constitutes such a mistake? Details are scarce, but Hawthorne tells us two things.

First, the fact that S makes a mistake about p in some close possible world does not show that S does not actually know that p "since he may use a relevantly different method at that close world" (2007, 202). Second, the fact that S does not make a mistake about p in any close possible world does not show that S actually knows p. For example, suppose that S uses an unreliable method to form the belief that p, where p is some necessary truth. Although there is no world in which S believes p falsely, "there are relevantly similar cases in which [S is] in error" (2007, 202). So we have two leading ideas. Mistake regarding p, where a different belief forming method is used, is not relevantly similar; and mistake regarding propositions other than p, where the same belief forming method is used, is relevant. Hence, on Hawthorne's account, method of belief formation plays a central role in marking the difference between knowledge and true belief.

Hawthorne (2007, 203 n. 5) takes as his starting point Kitcher's account of a priori knowledge and maintains that "it is quite clear that Kitcher's basic idea is that a process warrants a belief a priori iff, no matter how the environment is, that process is a warrant provider." Building on this idea, Hawthorne (2007, 202) maintains: "It is often thought that in a case of a priori knowledge, the status of a belief as knowledge does not constitutively depend on the external environment (this being one natural take on the idea that a priori knowledge is independent of perceptual experience)." Rather than endorsing Kitcher's articulation, Hawthorne offers the following alternative:

> (HA1)   x knows p a priori after duration d of x's existence iff any possible
>   intrinsic duplicate y of x knows p after duration d of y's existence.
>   (2007, 202)

Hawthorne quickly disposes of (HA1) by inviting us to consider a variant of the well-known fake barn case. Suppose that Henry is driving in barn gas country, an area riddled with barn gas that induces hallucinations of barns. Suppose that the barns are all real in barn gas country and that Henry happens to look at a barn from one of the few locations that is not riddled by the gas. As in the original fake barn case, Henry does not know that there is a barn in front of him. Hawthorne now introduces a parallel case with respect to a priori beliefs:

> Suppose there exists a priori gas that induces the phenomenology of blatant obviousness for false propositions. Consider a person who believes a proposition not for any empirical reason but because the phenomenology of obviousness causes him to do so. Suppose the claim in question is that all bachelors are men. Consider a duplicate of that person who is embedded in an environment riddled with a priori gas. As a matter of luck he does not stumble into the gas. He in fact forms the belief that all bachelors are men. But he could very easily

have stumbled into the gas and believed—due to felt obviousness—that all bachelors are women. Insofar as one judges that the person does not know in fake barn cases, it is natural enough to judge that the person does not know in a priori gas cases. But this means that if we cling to the environment dependence idea, very few of our beliefs will count as a priori. (2007, 205)

Suppose that we grant that the argument is compelling. What moral should we draw from this?

The source of the problem is clear. Hawthorne takes as his starting point Kitcher's analysis of the concept of a priori knowledge. Kitcher's analysis, however, is reductive. He analyzes that concept in terms of the concept of a priori warrant. Hence, he articulates the idea that a priori knowledge is independent of perceptual experience as

(K)   The status of a belief as *warranted* does not constitutively depend on the external environment.

Hawthorne's analysis, however, is nonreductive. He articulates the idea that a priori knowledge is independent of perceptual experience as

(H)   The status of the belief as *knowledge* does not constitutively depend on the external environment.

If the idea that a priori knowledge is independent of perceptual experience is articulated as a condition on a priori warrant, the problem that Hawthorne raises vanishes. There is no immediate objection to maintaining that Henry's belief is warranted in fake barn country or barn gas country. Similarly, a priori gas cases pose no immediate objection to (K). In short, the failure to distinguish between reductive and nonreductive analyses of the concept of a priori knowledge undermines Hawthorne's first argument.

Hawthorne considers the option of providing a reductive analysis of a priori knowledge in terms of a priori justification in a later discussion. There he considers a particular version of the view that intellectual intuition is a source of a priori justification. That view, according to Hawthorne (2007, 214), "is most naturally motivated by the idea that a priori knowledge decomposes into an 'internalist' component that is accessible to the subject … and an 'externalist component' that includes various reliability conditions." He rejects the view by raising a number of considerations against the accessibility features of its internalist component.

Hawthorne's case against reductive analyses is not compelling since it is based on the assumption that an account of a priori warrant must take on the objectionable accessibility features that are the target of his attack. Kitcher, however, provides an

account of a priori warrant that is avowedly externalist. His preferred view of warrants is a version of Goldman's process reliabilism that does not involve the internalist component that Hawthorne rejects. So Hawthorne has not provided any compelling reason to conclude that epistemological externalism presents any special barrier to articulating a reductive analysis of the concept of a priori knowledge.

Hawthorne acknowledges that environment independence is not the traditional way of marking the view that a priori knowledge is independent of experience. He introduces two alternative ways of developing the view. The first appeals to *grounds* of a belief:

(HA2)   A case of knowing is a priori iff experience does not form part of the grounds of the belief. (Hawthorne 2007, 208)

Hawthorne rejects (HA2) because he finds the notion of grounds unclear.[5] The second appeals to *methods of belief formation*, where a method of belief formation is a process that delivers or sustains a belief:

(HA3)   Experience-Independence: A case of knowing is a priori if it is sustained by a method that is not experience involving. (Hawthorne 2007, 208)

Hawthorne maintains that, on initial examination, (HA3) gives favorable results since mathematical knowledge based solely on reasoning, say working through a mathematical proof that p, comes out a priori.[6] Closer examination, however, reveals that there is a problem lurking:

Even though I have carefully worked through a mathematical proof that p, I will not know p if I get empirical evidence that I am mad, or that human or

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5. The argument seems to go as follows:

(1)   One can form perceptual beliefs about the external world that are not based on beliefs about one's perceptual experiences.

(2)   In such cases, beliefs or knowledge about one's perceptual experiences are not part of one's evidence.

(3)   Therefore, it is not clear in what sense experience is part of the grounds of one's belief in such cases.

6. Hawthorne notes that (HA3) has the consequence that, when conjoined with his safety account of knowledge, it allows for the possibility of a wide range of contingent a priori knowledge. If, for example, someone is born with an innate mechanism that is a reliable source of beliefs about some contingent subject matter then those beliefs will count as knowledge by the safety account and a priori knowledge by the Experience-Independence account. He does not, however, view this consequence as problematic.

mechanized experts have agreed that not-p, or that there is a priori gas in the area, or that I have made lots of mistakes using a very similar proof technique in the past, or that lots of smart people are inclined to laugh when they hear my proof.…Call knowledge-destroying experiences Bad experiences. Call the remainder Good experiences.…That my proof counts as knowledge appears to depend crucially on its being accompanied by Good experiences. But if the process of arriving at putatively a priori knowledge is individuated so as to include Good experiences, then it will count as a posteriori by the experience dependent criterion. (Hawthorne 2007, 209–210)

Hence, (HA3) appears to have the consequence that little, if any, knowledge is a priori.

The structure of Hawthorne's argument is immediately puzzling. It looks like this:

(H1)   Experience-Dependence: A case of knowing is a posteriori if it sustained by a method that is experience-involving.

(H2)   Suppose that S has carefully worked through a mathematical proof that p.

(H3)   S's proof does not count as knowledge if it is accompanied by Bad experiences.

(H4)   Therefore, S's proof counts as knowledge only if it is accompanied by Good experiences.

(H5)   If the process of working through a proof is individuated so as to include Good experiences, then it will count as experience-involving and, hence, a posteriori by the experience-dependent criterion.

Consider a parallel argument restricted to the empirical domain. Suppose that S carefully forms the true belief that there is a barn over there on the basis of her perceptual experience. S will not know that there is a barn over there if she gets testimonial evidence that there is barn gas in the area, or that she frequently mistakes other buildings for barns, or that no one else in the vicinity sees a barn. Call knowledge-destroying testimony Bad testimony. Call the remainder Good testimony. The parallel argument looks like this:

(T1)   Testimony-Dependence: A case of knowing is testimonial if it is sustained by a method that is testimony-involving.

(T2)   Suppose that S has carefully formed the true belief that there is a barn over there on the basis of her perceptual experience.

(T3)   S's true belief does not count as knowledge if it is accompanied by Bad testimony.

(T4)   Therefore, S's true belief counts as knowledge only if it is accompanied by Good testimony.

(T5)   If the process of forming a belief based on one's perceptual experience is individuated so as to include Good testimony, then it will count as testimonial by the testimony-dependent criterion.

Although there are many different ways of individuating belief forming processes, it is evident that very few epistemologists, if any, will take seriously a way of individuating them on which paradigm cases of perceptual belief turn out, on closer examination, to be testimonial merely in virtue of the fact that testimonial evidence can destroy perceptual knowledge.

In order to sort out matters, we need to distinguish between experiences that warrant the belief that p as opposed to experiences that defeat warrant for the belief that p. In Hawthorne's terminology, the experiences that defeat warrant are Bad experiences; the remaining experiences are Good experiences. A similar distinction can be made in the testimony example. Testimony that defeats warrant is Bad testimony; testimony that does not is Good testimony. Returning now to the testimony version of Hawthorne's argument, we can see clearly the source of the problem. The step from (T3) to (T4) is invalid. From the fact that Bad testimony can defeat S's perceptual warrant for the belief that p, it does not follow that perception can warrant S's belief that p only if it is accompanied by Good testimony. Perceptual experience can warrant S's belief in the absence of Good testimony. All that is necessary is that S's belief *not* be accompanied by Bad testimony. By parity of reasoning, the step from (H3) to (H4) in Hawthorne's original argument is also invalid. From the fact that Bad experience can defeat the warrant conferred on S's belief that p by having carefully worked through a proof that p, it does not follow that carefully working through a proof that p can warrant S's belief that p only if accompanied by Good experiences. S's proof can warrant S's belief that p in the absence of Good experiences. All that is necessary is that S's proof *not* be accompanied by Bad experiences.[7]

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7. Hawthorne acknowledges that a natural reaction to his concern is to distinguish between cases in which the presence of an experience is epistemologically relevant as opposed to cases in which the absence of an experience is epistemologically relevant. He replies, however:

There are a variety of tricky questions in the vicinity here. Can omissions as well as positive events count as part of a process? If so, should the presence of an experiential omission in a process count as experience involving the relevant sense? (2007, 210)

Suppose we grant that the answer to the first question is affirmative. An affirmative answer to the second has the consequence that all knowledge is testimonial (since, presumably, all knowledge can be destroyed by appropriate testimonial evidence). That result by itself should indicate that, whatever the correct metaphysics of omissions or absences, the answer to the epistemological question is clear.

Hawthorne contends that his externalist theory of knowledge challenges the significance of the a priori–a posteriori distinction. His second argument, pared down to its essential elements, rests on two premises.[8] First, experiences of type E can defeat the warrant (destroy the knowledge) conferred on S's belief that p by virtue of being sustained by method M. Second, if experiences of type E can defeat the warrant (destroy the knowledge) conferred on S's belief that p by virtue of being sustained by method M, then S's belief that p is warranted (known) by virtue of being produced by method M only if it is accompanied by experiences of type E. Hawthorne's externalist theory of knowledge is not essential to the formulation of the argument and does not support its key second premise. Hence, the argument neither derives from nor is supported by his externalist theory of knowledge. It rests on an incorrect account of the relationship between experiences that confer warrant on a belief and experiences that defeat warrant. From the fact that experiences of type E can defeat the warrant (destroy the knowledge) conferred on S's belief that p by virtue of being sustained by method M, it does not follow that S's belief that p is warranted (known) by virtue of being produced by method M only if it is accompanied by experiences of type E. Although (bad) testimonial experiences can defeat the warrant conferred on S's belief that p by virtue of being sustained by visual perception, it does not follow that S's belief that p is warranted by visual perception only if it is accompanied by (good) testimonial experiences.

Hawthorne's final argument turns on the individuation of belief forming methods. Suppose that a student learns some laws of nature from a teacher, remembers them at a later time, and applies them to derive further nomic beliefs and conditional predictions. We are to suppose that the student's beliefs and predictions are highly reliable; most are sufficiently safe to count as knowledge. Hawthorne maintains that our natural reaction is that the student's knowledge is not a priori:

> the process that led to the fixation of belief included experiential exposure to the teacher. The knowledge is a posteriori knowledge, achieved via testimony, not a priori knowledge. (2007, 211)

There is, however, a twist. Suppose that the student derives a conditional prediction from some laws stored in memory. We can distinguish at least two different belief forming processes:

> There is a process that begins with the teacher telling him the laws and ends with applying some laws to derive a conditional prediction. But there is a

8. Hawthorne's argument is essentially the same as the argument Kitcher offers in support of condition (b) in his analysis of the concept of a priori warrant. See note 2 above.

shorter process that begins with retrieving the laws from the relevant internal information bank and ends with producing the conditional prediction. One of the processes is experience-dependent. One is not. Which shall we use to test whether the belief is a priori? Let us call the process beginning with the retrieval Short and the process beginning with the interaction with the teacher Long. Is there any deep mistake in taking Short to be the relevant safe method? (211)

The student's conditional prediction can be viewed as the product of either of two different belief forming processes. Both are safe and yield the result that the student knows the conditional prediction. On one, according to Hawthorne, the resulting knowledge is a priori, but on the other, it is a posteriori. Yet, there is no "deep mistake" in choosing one over the other.

Hawthorne's final argument can be summarized as follows:

(H*1)   Whether the knowledge in question is a priori turns on the choice of belief forming process.
(H*2)   There is no deep mistake in choosing one over the other.
(H*3)   Therefore, the a priori–a posteriori distinction is not deep.

The argument is puzzling since the primary question that it raises concerns the epistemology of preservative memory rather than the epistemology of the a priori. The initial premise of the argument is supported by two claims. If Long is the relevant belief forming process, then the student's knowledge is a posteriori since the student's original knowledge is warranted by testimony. Second, if Short is the relevant belief forming process, the student's knowledge is a priori since it is not warranted by testimony and the student has no other relevant empirical evidence that the law in question is true. Hence, the primary question raised by the argument is

(Q)   If S's original knowledge that p is warranted by testimony and that knowledge is preserved by memory, is S's later knowledge that p warranted by testimony?

On the face of it, (Q) is interesting and significant.[9] Moreover, it is a question about preservative memory and not the a priori. But, on Hawthorne's account, (Q) is not very deep since the answer to it turns on the choice of belief forming process.

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9. Tyler Burge (1993), for example, argues for an affirmative answer.

There are other examples of epistemological questions that appear, on the face of it, to be interesting and significant but turn on the choice of belief forming process. For example, Kitcher rejects reliabilism in favor of a sociohistorical conception of knowledge:

> On my *socio-historical* conception of knowledge, the knowledge we have today isn't simply a matter of what we have experienced or thought during the course of our lives, but is dependent on the historical tradition in which we stand and on the social institutions that it has bequeathed to us. (2000, 80)

More generally, he rejects "synchronic" conceptions of knowledge, which entail that S's warrant for the belief that p depends only on S's cognitive states and processes (2000, 81–82). Hence, if we return to the example of our student who learns scientific laws from a teacher at an early age and later retrieves them from preservative memory, Kitcher would maintain that the relevant belief forming process does not stop with the student's teacher but extends back to his teacher's teachers and beyond. The question whether a socio-historical or synchronic conception of knowledge is correct seems interesting and significant. But, by Hawthorne's lights, it turns out not to be very deep, since the answer to it turns on the choice of belief forming process. So the problem Hawthorne raises, if it is genuine, extends far beyond the a priori. If he is right, many epistemological questions are superficial.

Hawthorne, however, cannot maintain, by the lights of his own theory, that questions that turn on the choice of belief forming process are superficial. Consider a variant of his case of the student who learns laws of nature from a teacher. The variant is identical to Hawthorne's original case, with one exception. As in the original case, the student learns many laws of nature from a competent teacher. But the student also learns a single law of nature from an incompetent teacher, whose scientific pronouncements are usually false. On this particular occasion, by sheer luck, her pronouncement is true. Let us now suppose that the student retrieves from memory the law he learned from the incompetent teacher and bases his conditional prediction on that law. Call the process that results in the conditional prediction Long*. In this case, the student does not know the conditional prediction since it is based on a law that she does not know.

Hawthorne maintains that, in the original Short and Long cases, the choice between the belief forming processes is insignificant because, from the perspective of a safety theory, both yield the result that the student knows the conditional prediction. But Short is also a terminal segment of the process Long*, and the choice between Short and Long* does make a difference in terms of whether the subject knows. If there is no deep mistake in choosing Short over Long*, then the distinction between knowledge and true belief is not very deep. But, assuming

that the distinction between knowledge and true belief is significant, then Hawthorne must provide some account of how to individuate belief forming processes for purposes of determining whether a true belief constitutes knowledge. Once such an account is provided, it can be employed to individuate belief forming processes for purposes of determining whether they are experience-dependent.

The case of the incompetent teacher shows that Long* is the relevant belief forming process for determining whether the student knows the conditional prediction. It also shows that the student's original warrant for the belief that p is relevant to whether a later true belief based on the student's memory that p constitutes knowledge; that is, it shows that the correct answer to (Q) is affirmative. Therefore, in Hawthorne's original case, Long is the relevant belief forming process. It is the process that should be used to test whether the student's knowledge is a priori. Since the student's knowledge in Long is warranted by the teacher's testimony, it is a posteriori.[10]

We can now draw a more general conclusion regarding Hawthorne's final argument. Hawthorne endorses a general theory of knowledge in which method of belief formation plays a central role in determining whether a true belief constitutes knowledge. He then maintains that if one embeds the Experience-Independent account of a priori knowledge in that general theory of knowledge, a problem arises. Whether items of knowledge turn out to be a priori depends on how belief forming processes are individuated. This problem, however, is not due to the embedded concept of a priori knowledge. It is due to the fact that the general theory of knowledge in which it is embedded assigns a central role to methods of belief formation without providing an account of how they are to be individuated.

4

Carrie Jenkins's (2008) goal is to offer an epistemology of arithmetic that reconciles apriorism, realism, and empiricism. Empiricism maintains that "all our knowledge of the world as it is independently of us must either be, or ultimately rest upon, knowledge obtained through the senses" (Jenkins 2008, 2). A priori knowledge is "knowledge secured without epistemic reliance on any empirical

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10. Hawthorne seems to think that if a supporter of the distinction between a priori and a posteriori knowledge opts for Long over Short her position is compromised since knowledge of mathematical principles acquired via earlier training and preserved by memory is a posteriori. But why is this a problem? If testimony is an experiential source of knowledge, then knowledge based on testimony is properly classified as a posteriori. The suggestion seems to be that if this is the case, then much of our mathematical knowledge may turn out to be a posteriori. But how does this support the claim that the a priori–a posteriori distinction is not deep?

evidence" (Jenkins 2008, 4). Jenkins (2008, 4) contends that it is often further assumed that "a priori knowledge is knowledge which does not epistemically depend on the senses *at all*" and maintains, to the contrary, that "there is a significant difference between epistemic independence of empirical evidence and epistemic independence of the senses altogether." This difference is the focus of her investigation. The leading idea of her account of arithmetical knowledge is that "experience grounds our concepts (which is not the same as supplying evidence for any proposition), and then mere conceptual examination enables us to learn arithmetical truths" (Jenkins 2008, 4). The account, according to Jenkins (2008, 4–5), "makes it reasonable to describe our means of acquiring such knowledge as both a priori (in the sense of independent of empirical evidence) and empirical."

Jenkins account of arithmetical knowledge is rich and nuanced. Here I offer a general outline that highlights only the features relevant to my discussion. Jenkins assumes that there is a sense of "knowledge" and a sense of "justification" on which externalism is correct. Her goal is to defend the view that we have a priori knowledge of arithmetic in the externalist sense. According to Jenkins (2008, 126), arithmetical truths are conceptual truths—that is, "we can know about arithmetic by examining our concepts." But, in order to know such truths by examining our concepts, the concepts in question must be grounded. A concept is grounded just in case "it is relevantly accurate and there is nothing lucky or accidental about its being so" (Jenkins 2008, 128). Moreover, a concept must be justified in order to be grounded. A concept is justified just in case "it is rationally respectable for us to rely on it as a relevantly accurate guide to the world" (Jenkins 2008, 129). Hence, according to Jenkins,

> Concept accuracy, justification, and grounding are important because, while we have no reason to suppose that examining just *any old* concepts will help us learn about the independent world, examining *accurate* concepts can help us acquire true beliefs about the world, examining *justified* concepts can help us acquire justified beliefs about the independent world, and examining *grounded* concepts can help us acquire knowledge of it. (2008, 131)

Finally, empiricism mandates that the only data relevant to concept justification and grounding are "*data obtained through the senses*" (Jenkins 2008, 137).

My focus is on the alleged reconciliation between apriorism and empiricism. The reconciliation rests on the following contentions:

(J1)   S knows a priori that p iff S knows that p and S's knowledge is epistemically independent of empirical *evidence*.

(J2)   S's (basic) arithmetical knowledge that p depends epistemically on the concepts constitutive of S's belief that p being grounded by the senses.

(J3)   The sensory input that grounds the concepts constitutive of S's belief that p does not constitute *evidence* for S's belief that p.

(J4)   S knows empirically that p iff S knows that *p* and S's knowledge depends epistemically on the senses *in some way*.

Since S's basic arithmetical knowledge does not depend epistemically on empirical evidence, it is a priori; but since it does depend epistemically on the senses, it is also empirical.

A question immediately arises regarding the reconciliation. Since Jenkins allows that knowledge can depend epistemically on the senses without depending on empirical evidence, her characterization of the a priori seems too narrow. Why not characterize a priori knowledge more broadly as knowledge that is epistemically independent of the senses? Jenkins is sensitive to the issue and offers two arguments in defense of her characterization. The first contends that it is in line with the tradition. The second maintains that the traditional account of the a priori is unstable. Consequently, no characterization can fully salvage it.

The defense based on tradition appeals to Kant, Chisholm, and Moser. With respect to Kant, Jenkins remarks:

> I hope that qualms about my decision to retain the term 'a priori' may be dispelled when we recall that modern usage of the term 'a priori' was largely determined by Kant, and that Kant allowed that some a priori knowledge— the 'impure' sort—depends upon experience in so far as the *concepts* involved are 'derived from' experience.…I have proposed that the only way in which arithmetical knowledge depends on sensory input is in so far as the concepts involved must be appropriately related to that input in order for us to count as knowing arithmetical propositions. (2008, 252)

Kant's distinction between pure and impure a priori knowledge offers little precedent or support for Jenkins's characterization of a priori knowledge. Kant maintains that impure a priori knowledge involves concepts derived from experience but pure a priori knowledge does not. The point of Kant's distinction is negative. He maintains that the fact that experience may be necessary to acquire the concepts constitutive of some proposition that p does not preclude a priori knowledge that p. Moreover, Kant does not maintain that the experience necessary to acquire concepts plays any epistemic role. Jenkins, however, proposes a dependence on experience that is both positive and epistemic. On her account, S has a priori arithmetical knowledge that p only if the concepts constitutive of p are derived

from experience in an appropriate manner. Her account, unlike Kant's, rules out the possibility of pure a priori knowledge based on an examination of concepts.

Jenkins also fails to note that Kant's characterization of empirical knowledge provides compelling evidence that she is not in line with the tradition:

> we shall understand by a priori knowledge … knowledge absolutely independent of all experience. Opposed to it is empirical knowledge, which is knowledge possible only a posteriori, that is through experience. (Kant 1965, 43)

For Kant, empirical knowledge and a posteriori knowledge are the same. Both contrast with a priori knowledge. Hence, if empirical knowledge can epistemically depend on experience in some nonevidential way, then a priori knowledge cannot depend epistemically on experience in that nonevidential way.

Jenkins next appeals to Chisholm, who states:

> Speaking very roughly, we might say that one mark of an a priori proposition is this: once you understand it, you see that it is true. We might call this the traditional conception of the a priori. (1977, 40; quoted in Jenkins 2008, 252)

Here she maintains:

> If this characterization is even 'very roughly' correct, then it looks as though arithmetical knowledge as I envisage it has as good a claim as any to count as a priori. With grounded arithmetical concepts in place, we are in a position to see that 7 + 5 = 12 is true. (2008, 252–253)

But it is clear that Chisholm's remarks, taken at face value, do not support Jenkins's contention. On Chisholm's account, it is understanding alone that is sufficient for a priori knowledge. Putting this point in Jenkins's terminology: with arithmetical concepts in place, we are in a position to see that 7 + 5 = 12 is true. Chisholm's account does not require that those concepts be grounded.

Jenkins (2008, 253), however, does not think that we should read Chisholm too literally here: "Chisholm's characterization is not (in my opinion) best interpreted as implying that concepts don't need to be grounded in order to be a source of knowledge." This suggestion does not square well with Chisholm's official characterization of immediate a priori knowledge:

D 3.1 h is an *axiom* = Df h is necessarily such that (i) it is true and (ii) for every S, if S accepts h, the h is certain for S.

D 3.2 h is *axiomatic* for S = Df   (i) h is an axiom and (ii) S accepts h. (1977, 42)

For Chisholm (1977, 41), accepting some proposition requires that "you grasp *what* it is for that proposition to be true," but there is no requirement that, in order to grasp what it is for some proposition to be true, its constituent concepts must be grounded. Jenkins also overlooks the fact that Chisholm explicitly addresses the role of experience in concept acquisition, and argues that the manner in which one acquires concepts is irrelevant to the epistemic status of beliefs formed on the basis of examining those concepts.[11]

Jenkins's final appeal is to Paul Moser (1987, 1), who maintains that the distinction between a priori and a posteriori knowledge "may be plausibly regarded as connoting two kinds of *epistemic justification*." He (1987, 1) goes on to articulate this idea as follows: "an instance of knowledge is a priori if and only if its justification condition is a priori in the sense that it does not depend on evidence from sensory experience." Moser's characterization, with its specific reference to independence of "evidence" from sensory experience, is similar to that of Jenkins. Hence, it appears to offer some support for her contention that her characterization accords with the tradition.

But there is reason to be cautious here. Moser maintains that justification is a necessary condition for knowledge and that the a priori–a posteriori distinction is fundamentally a distinction between two types of justification. So Moser is offering a reductive analysis of the concept of a priori knowledge in terms of the concept of a priori justification. I have argued that the traditional concept of a priori justification is best articulated as

(APJ)   S's belief that p is justified a priori just in case S's belief that p is nonexperientially justified.

Moser, however, appears to disagree. He maintains:

(APJ*)   S's belief that p is justified a priori just in case the justification of S's belief that p does not depend on evidence from sensory experience.

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11. Chisholm maintains that it is a distinguishing characteristic of intuitive induction—the process of examining concepts that he alleges is the source of immediate a priori knowledge—that the manner in which one acquires the requisite concepts is irrelevant to the epistemic status of beliefs acquired by this process:

> Let us suppose that the knowledge expressed by the two sentences "Necessarily, being red excludes being blue" and "Necessarily, being human includes being animal" is arrived at by intuitive induction; and let us suppose further that in each case, the process began with the perception of certain particular things. Neither conclusion depends for its *justification* upon the particular perceptions which led to the knowledge concerned. . . . If we happen to find our perception was unveridical, this finding will have no bearing upon the result. (1977, 39)

What is the source of this difference?

Moser (1989, 42) favors a particular conception of epistemic justification: "the notion of justification as *an adequate indication, relative to one's total evidence, that a proposition is true.*"[12] We can characterize this conception, which I call the *Adequate Evidence* conception, as follows:

(AE)   S's belief that p is justified just in case S's belief that p is adequately supported by S's total evidence.

The conjunction of (APJ) and (AE) yields (APJ*).

Two points are important for our purposes. First, (APJ) is a theory-neutral articulation of the traditional concept of a priori justification; it does not presuppose any particular theory of epistemic justification. (APJ*) is a theory-dependent articulation of that concept; it presupposes (AE). Second, (APJ) and (APJ*) are equivalent if, but only if, justification is a function of evidence alone. Since Moser takes justification to be a function of evidence alone, he would take (APJ) and (APJ*) to be equivalent.

Given that Moser's articulation of the traditional concept of a priori justification is theory-dependent, Jenkins should endorse it only if she endorses the theory of justification that it presupposes. She should, however, have serious reservations about endorsing (AE) for two reasons. First, Jenkins's account of arithmetical knowledge presupposes an externalist theory of justification, but Moser (1989, 71–77) contends that (AE) is incompatible with externalist theories of justification. Second, and more important, (AE) is at odds with Jenkins's account of the relationship between justified concepts and justified belief. According to Jenkins (2008, 129), a correctly conducted examination of concepts yields justified belief only if the concepts involved in that examination are justified. But, as she stresses, the experiences that justify a concept do not constitute evidence for beliefs based on an examination of those concepts. So either justified belief based on an examination of concepts does not require that the examined concepts be justified, or justified belief is not a function of evidence alone. In other words, if Jenkins's account of arithmetical knowledge is correct, then (AE) is false. Since Moser's theory-dependent analysis of the concept of a priori justification presupposes (AE), it is not a precedent that Jenkins can coherently embrace.

Jenkins recognizes that, despite the alleged historical precedents, many will balk at the very idea of knowledge that is both a priori and empirical. Her second argument addresses this concern directly. Here Jenkins (2008, 255) maintains

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12. Moser (1989, 42) goes on to say: "Such an adequate indication is provided for one by something that makes a proposition, P, evidentially more probable for one, on one's total evidence, than not only ~P but also P's probabilistic competitors."

that there is a deep instability in the classic collection of platitudes about a priori knowledge, since it includes all of the following:

(A)   All a posteriori knowledge is knowledge that depends on empirical evidence.
(B)   Only knowledge that is independent of experience is a priori.
(C)   All knowledge is either a priori or a posteriori and none is both.

Jenkins contends that her account of arithmetical knowledge shows that some member of the collection must be given up. She acknowledges that her proposal to reject (B) may sound radical, but counters that the remaining options are also radical.

But this is a mistake. The instability in the triad (A)–(C) is due to the fact that Jenkins introduces into her theory of arithmetical knowledge a conception of a priori knowledge that presupposes (AE), but (AE) does not cohere with her general theory of justification. Since she maintains that justified belief based on an examination of concepts requires justified concepts, she denies that justified belief is a function of evidence alone. Hence, Jenkins's argument rests on an error of the second type: she endorses an articulation of the traditional concept of a priori knowledge that does not cohere with her background theory of justification.

(APJ), however, coheres with her theory of justification since it is theory-neutral. Moreover, if one replaces (APJ*) with (APJ) in her theory of arithmetical knowledge and amends the triad to reflect that change, the resulting triad is stable:

(A*)   All a posteriori knowledge is knowledge whose justification depends on experience;
(B*)   Only knowledge whose justification is independent of experience is a priori;
(C)   All knowledge is either a priori or a posteriori and none is both.

Nothing must be given up to accommodate Jenkins's theory of arithmetical knowledge. Such knowledge is a posteriori since concept justification is a necessary condition of such knowledge and concept justification depends on experience.

5

Timothy Williamson also has misgivings about the a priori–a posteriori distinction. His misgivings arise within a broader investigation into the methodology

and subject matter of philosophy. In particular, he argues against the view that philosophy involves a distinctive subject matter such as conceptual, linguistic, or analytic truths. Moreover, Williamson denies that philosophical investigation involves a distinctive cognitive faculty. The metaphysical modalities represent one significant domain of philosophical investigation. Here he maintains that knowledge of the metaphysical modalities is reducible to knowledge of counterfactual conditionals, and offers an account of such knowledge in terms of the exercise of the imagination. Williamson's (2007, 165) misgivings about the a priori–a posteriori distinction are based in the observation that "in our imagination-based knowledge of counterfactuals, sense experience can play a role that is neither strictly evidential nor purely enabling."

Since Williamson's misgivings are based on his account of knowledge of the metaphysical modalities, one strategy for rejecting them is to reject his account of knowledge of the metaphysical modalities. There are two basic ways to reject that account. The first is to deny that knowledge of the metaphysical modalities is reducible to knowledge of counterfactual conditionals. The second is to deny his imagination-based account of knowledge of counterfactuals. My goal is not to assess the cogency of his account of knowledge of the metaphysical modalities.[13] My goal is to assess the implications of his account, if cogent, for the a priori–a posteriori distinction. My primary contention is that he overestimates the implications of his account and that the reason he does so is that he invokes a conception of a priori knowledge that does not cohere well with his background theory of knowledge.

The structure of Williamson's argument is straightforward. He begins (2007, 165) by distinguishing two roles that experience can play in the acquisition of knowledge, enabling and evidential, and maintains that a priori knowledge "is supposed to be incompatible with an evidential role for experience ... [but] supposed to be compatible with an enabling role for experience." According to the tradition, most, if not all, propositions known a priori are necessary truths. But Williamson maintains that knowledge of necessary truths is reducible to knowledge of counterfactuals and, on his account of knowledge of conterfactuals, experience can play a role that is neither purely enabling nor strictly evidential. Suppose that S knows that p and experience plays a role that is neither purely enabling nor strictly evidential. Williamson contends that S's knowledge that p is not happily classified either as a priori or a posteriori. He concludes (2007, 169) that the a priori–a posteriori distinction "is handy enough for a rough initial description of epistemic phenomena; it is out of place in a deeper theoretical analysis, because it obscures more significant epistemic patterns."

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13. See chapter 12 here for such an assessment.

Williamson's argument can be summarized as follows:

(W1)   Knowledge of necessary truths is reducible to knowledge of counterfactuals.

(W2)   Experience can play a role in knowledge of counterfactuals that is neither purely enabling nor strictly evidential.

(W3)   In such cases, the resulting knowledge is not happily classified either as a priori or a posteriori.

(W4)   Therefore, the distinction between a priori and a posteriori knowledge is not useful for deep theoretical analysis.

Significant questions can be raised about the premises of the argument as well as its validity. As I indicated earlier, one can question both Williamson's account of knowledge of necessary truths and his account of knowledge of counterfactuals. I propose to grant both. One can also question Williamson's understanding of the distinction between purely enabling and strictly evidential roles, and whether the cases in which he alleges that experience plays neither role are convincing. Once again, I propose to grant his understanding of the distinction and his verdict on the cases. Still, one might maintain that even if there are such cases, it does not follow that the distinction between a priori and a posteriori knowledge is not theoretically significant since such cases are few or inconsequential. Alternatively, one might maintain that such cases are borderline and that the existence of borderline cases is not sufficient to challenge the cogency or importance of a distinction. Once again, I will not pursue those responses. I will grant the centrality and importance of his cases. My focus will be on (W3) since it is the premise that bears directly on the a priori–a posteriori distinction.

In order to assess (W3), we must address two questions. What is the role of experience in those cases in which it is alleged that it is neither purely enabling nor strictly evidential? Why are such cases not happily classified as either a priori or a posteriori? In order to answer the first question, let us focus on Williamson's central example. Consider a person who learns the words "inch" and "centimeter" independently of one another by learning to make reliable naked eye judgments of distances. Suppose that such a person visually judges, for example, that two marks are at most two inches apart. Since the judgment is sufficiently reliable, the person knows a posteriori that the two marks are at most two inches apart. Williamson (2007, 166) contends that the person can employ their capacity to judge distances visually offline to make the following counterfactual judgment:

(25)   If two marks had been nine inches apart, they would have been at least nineteen centimeters apart.

Here the person visually imagines two marks nine inches apart and employs their capacity to judge distances in centimeters visually offline to judge that they are at least nineteen centimeters apart. Since the person's judgment is sufficiently reliable, that person knows (25).

The role of experience in this case is not evidential, according to Williamson, because the judgment is not based on memories of having visually encountered similar distances in the past and it is not deduced from general principles inductively or abductively inferred from past experiences. Moreover, it does not play a purely enabling role since the experiences necessary to reliably evaluate (25) go beyond the experiences necessary to acquire the concepts involved in (25).[14] Williamson articulates its role as follows:

> I know (25) only if my offline application of the concepts of an inch and a centimeter was sufficiently skilful. Whether I am justified in believing (25) likewise depends on how skilful I am in making such judgments. My possession of the appropriate skills depends constitutively, not just causally, on past experience for the calibration of my judgments of length in those units. (2007, 166)

There are three central claims about the role of experience in this passage:

(C1)   One knows (justifiably believes) (25) only if one's offline application of the relevant concepts is sufficiently skillful.

(C2)   One's possession of the appropriate skills depends constitutively, not just causally, on past experience.

(C3)   The experiences necessary to skillfully apply the relevant concepts go beyond the experiences necessary to acquire those concepts.

(C1)–(C3) introduce an epistemic role for experience that is not evidential: experience is necessary for the skillful application of concepts.

We are now faced with the following question:

(Q)   If S knows (justifiably believes) that p and S's knowledge (justified belief) that p depends (epistemically) on experience for the skillful application of concepts but not for evidence, does S know (justifiably believe) that p a priori or a posteriori?

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14. Williamson (2007, 166) contends: "Someone could easily have enough sense experience to understand (25) without being reliable enough in their judgments of distance to know (25). Nor is the role of past experience in the judgment of (25) purely enabling in some other way, for example by acquainting me with a logical argument for (25)."

Premise (W3) contends that neither response to (Q) is satisfactory. Each response faces a significant threat. If one maintains that knowledge of (25) is a priori because experience does not play an evidential role, there is the threat that too much will count as a priori. If one maintains that knowledge of (25) is a posteriori because experience plays more than a purely enabling role, there is the threat that knowledge of many philosophically significant modal truths will turn out to be a posteriori. Therefore, Williamson's case against the significance of the a priori–a posteriori distinction turns on whether both threats are genuine. My contention is that, although the first is genuine, the second is not.

With respect to the first response, Williamson (2007, 167) maintains that "long forgotten experience can mold my judgment in many ways without playing a directly evidential role," and, as a consequence, our knowledge of (25) may be quite similar to our knowledge of (26):

> (26)   If two marks had been nine inches apart, they would have been further apart than the front and back legs of an ant.

One can know (26), according to Williamson (2007, 167), without having any evidence based on sense experience: "The ability to imagine accurately what an ant would look like next to two marks nine inches apart suffices." Knowledge of (26), acquired in this manner, is clearly a posteriori, but the first response would classify it as a priori.

Even if one has reservations about Williamson's example, my earlier discussion of Hawthorne underscores the threat faced by the first option. Williamson's example appeals to the role of forgotten experience in molding judgment. Hawthorne's discussion highlights the role of forgotten evidence. He introduces the example of a student who learns a scientific law on the basis of the testimony of a teacher, and later recalls that law but not the testimonial evidence on which his belief was originally based. Here we argued that whether the student knows the law at the later time depends epistemically on his original evidence even if it is forgotten. If the student originally learned that law from a competent teacher, he knows the law at the later time. But if the student originally learned that law from an incompetent teacher, he does not know the law at the later time. We also argued that, in the case of the student who knows the law, if the student's original (but now forgotten) evidence is based on experience, then the student's later knowledge is properly classified as a posteriori. The first response, however, would classify it as a priori. Therefore, the threat facing the first response is genuine.

With respect to the second response, Williamson invites us to consider three propositions:

(27)   It is necessary that whoever knows something believes it.
(28)   If Mary knew that it was raining, she would believe that it was raining.
(29)   Whoever knew something believed it.

Here he maintains that

> the experiences through which we learned to distinguish in practice between belief and non-belief and between knowledge and ignorance play no strictly evidential role in our knowledge of (27)–(29). Nevertheless, their role may be more than purely enabling.…Why should not subtle differences between two courses of experience, each of which sufficed for coming to understand "know" and "believe," make for differences in how test cases are processed, just large enough to tip honest judgments in opposite directions? (2007, 168)

If this account of the role of experience in our knowledge of (27)–(29) is correct, should we draw the conclusion that the knowledge in question is a posteriori? Williamson contends:

> Not if that suggests that (27)–(29) are inductive or abductive conclusions from perceptual data. In such cases, the question "*A priori* or *a posteriori*?" is too crude to be of much epistemological use. (2007, 169)

Therefore, knowledge of (25) is not happily classified as a posteriori because, if it is so classified, then knowledge of (27)–(29) would also be properly classified as a posteriori, but, contends Williamson, such knowledge is not properly classified as a posteriori.

Williamson's argument against the significance of the a priori–a posteriori distinction turns on two basic ideas. First, a background theory of knowledge (and justification) that introduces an epistemic role for experience that is nonevidential. One knows (or justifiably believes) (25)–(29) only if one can skillfully apply the relevant concepts. But whether one can skillfully apply the concepts depends constitutively on one's past experiences. Second, a conception of a priori knowledge on which such knowledge is incompatible with reliance on experiential evidence. The background theory opens up the possibility of knowledge (and justified belief) that depends epistemically on experience but not on experiential evidence. And we are faced with the question: Is such knowledge a priori or a posteriori?

This question is left open by Williamson's articulation of the concept of a priori knowledge because it consists solely of a necessary condition in terms of the role

of experiential evidence, but his background theory of knowledge denies that justification is exclusively a function of one's evidence. Hence, his articulation of the concept of a priori knowledge does not cohere well with his background theory of knowledge. The traditional conception of a priori knowledge, as I have articulated it, coheres better with Williamson's background theory of knowledge since that conception does not presuppose that justification is exclusively a function of one's evidence. It maintains that a priori knowledge is incompatible with a justificatory role for experience, but it does not restrict the justificatory role of experience to experiential evidence. If we replace Williamson's articulation of the concept of a priori knowledge with the traditional conception, it follows straightforwardly, that if S knows (justifiably believes) that p only if S can skillfully apply the concepts in p and S's skillful application of those concepts depends constitutively on S's past experience, then S knows (justifiably believes) a posteriori that p.

Williamson (2007, 169) maintains that classifying knowledge of (27)–(29) as a posteriori is unacceptable "if that suggests that (27)–(29) are inductive or abductive conclusions from perceptual data." The traditional conception of a posteriori justification neither entails nor suggests that if S knows a posteriori that p, then S knows that p on the basis of an inductive or abductive inference from perceptual data. The traditional conception of a posteriori justification, like the traditional conception of a priori justification, is theory-neutral. It does not entail or suggest that one's justification is exclusively a function of one's evidence. The suggestion that if S knows a posteriori that p, then S knows that p on the basis of an inductive or abductive inference from perceptual data derives from Williamson's articulation of the a priori–a posteriori distinction solely in terms of the role of experiential evidence. Therefore, his argument against the second option fails. The threat facing that option is merely apparent.

Williamson's argument fails because (W3) is false. (W3) is false because knowledge of (25) is happily classified as a posteriori. The alleged threat to classifying knowledge of (25) as a posteriori is merely apparent. Williamson maintained that knowledge of (25) is not happily classified as a posteriori because, if it is so classified, then knowledge of (27)–(29) would also be properly classified as a posteriori. But such knowledge is not properly classified as a posteriori. I maintained, in response, that the argument that he offers to show that knowledge of (27)–(29) is not properly classified as a posteriori depends on a conception of a priori knowledge that does not cohere well with his background theory of knowledge. Once that conception is replaced by the traditional conception of a priori knowledge, the threat that he envisages evaporates. There is, however a residual concern with this response. One might argue that even if Williamson's supporting argument fails, he is correct to insist that knowledge of (27)–(29) is not properly classified as a posteriori. Therefore, if the traditional conception of a

priori knowledge classifies such knowledge as a posteriori, it should also be rejected.

This concern is misplaced. The traditional conception of a priori knowledge classifies knowledge of (27)–(29) as a posteriori only if Williamson is right about the role of experience in our knowledge of (27)–(29). I conceded his account of the role of experience in such knowledge in order to evaluate its implications. But anyone who thinks that knowledge of (27)–(29) is properly classified as a priori will reject his account of the role of experience in such knowledge. Most likely, such a person will reject his claim that the experiences through which we learned to distinguish between belief and nonbelief and between knowledge and ignorance are more than purely enabling, and insist that the conditions for concept possession that he endorses are too lax.

The traditional conception of a priori knowledge is not vulnerable to the argument that Williamson offers in support of (W3). Therefore, his argument fails to show that the traditional a priori–a posteriori distinction is not useful for deep theoretical analysis. Nevertheless, even if his supporting argument fails, the charge may be accurate. So the final issue we must address is whether the traditional version of the distinction is open to that charge. Williamson alleges that the distinction is not useful because it obscures more significant epistemic patterns. His conception of a priori knowledge in terms of independence from experiential evidence is open to that charge since it obscures the fact that a belief can depend epistemically on experience in a nonevidential way—that is, it can depend on experience for the skillful application of concepts. But the traditional conception of a priori knowledge does not suffer from this shortcoming; it articulates that concept in terms of nonexperiential justification. Since Williamson maintains that conceptual skill is a necessary condition of justified belief, the traditional conception does not obscure this form of epistemic dependence on experience. So we are left with the question: What significant epistemic pattern does it obscure?[15]

The a priori–a posteriori distinction has come under attack in the recent literature. I have surveyed the challenges of the leading critics and provided answers to them. I do not conclude, however, that the distinction is invulnerable to attack. In the following section, I articulate an important challenge to the distinction. The challenge is important not because it shows that the distinction is insignificant

15. Williamson maintains (2007, 169): "We may acknowledge an extensive category of *armchair knowledge*, in the sense of knowledge in which experience plays no strictly evidential role, while remembering that such knowledge may not fit the stereotype of the a priori, because the contribution of experience was for more than enabling." Like his conception of a priori knowledge, his conception of armchair knowledge obscures significant epistemic patterns. It obscures the difference between (a) knowledge whose justification does not depend on experience, and (b) knowledge whose justification does depend on experience but not experiential evidence.

or incoherent but because it leads to a rejection of the traditional view that all knowledge (or justified belief) is either a priori or a posteriori.[16]

6

In this section, I consider a loosely related family of views that have recently become more prominent in discussions of the a priori. They share three features. The first is a focus on the epistemic status of basic inferential principles and procedures, including logical principles and procedures. The second is a rejection of both traditional rationalist accounts of their justification in terms of appeals to rational insight and traditional empiricist accounts of their justification in both their Millian and Quinean forms. The third is a strategy for addressing the epistemic status of such principles and procedures, which will emerge in the ensuing discussion.

Gilbert Harman (2001, 657) favors a general foundations theory of epistemic justification, according to which "all of one's beliefs and inferential procedures are foundational." A belief or inferential procedure is foundational for a person "if and only if the person is *prima facie* justified in so believing or inferring in the absence of any appeal to further beliefs or procedures" (Harman 2001, 657). General foundationalism has the consequence that, at a given time, all of one's beliefs and inferential practices are prima facie justified.

Harman (2001, 659–660) notes that if we conjoin general foundationalism with BonJour's (1998, 11) definition of a priori justification—*P* is justified a priori for S if and only if S "has a reason for thinking *P* to be true that does not depend on any positive appeal to experience or other causally mediated quasi-perceptual contact with contingent features of the world"—we arrive at the following striking conclusion: "If 'having a reason' applies even to foundational beliefs and means something like 'is justified in thinking', then this definition could be interpreted to imply that all of one's beliefs are justified a priori, according to general foundationalism." Harman does not resist this consequence. Instead, he argues against BonJour's contention that the only alternative to scepticism is to embrace the traditional rationalist account of a priori justification in terms of rational insight into the necessary truth of a proposition. A general foundations theory can avoid scepticism without introducing rational insight as a source of a priori justification.

Hartry Field offers a strikingly similar perspective on basic inferential procedures and principles. He (2001, 117) begins by defining "a *weakly* a priori

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16. In Casullo (2003), I offer a more radical challenge to the a priori–a posteriori distinction that turns on the question whether the distinction between experiential and nonexperiential sources of justification can be coherently articulated.

proposition as one that can be reasonably believed without empirical evidence; an *empirically indefeasible* proposition as one that admits no empirical evidence against it; and an a priori proposition as one that is both weakly a priori and empirically indefeasible." Field (20011, 119) extends his definition to include methodologies or rules for forming and revising beliefs: "a methodology or rule [is] *weakly* a priori iff it can be reasonably employed without empirical evidence; *empirically indefeasible* if no empirical evidence could undermine the reasonableness of its employment; and a priori if it meets both conditions."

Field (2001, 119) notes that he does not require that an a priori proposition or rule can be reasonably believed only by someone who has a nonempirical justification for it since he wants to leave open the possibility of propositions and rules that can be reasonably believed without any justification at all. Such propositions and rules are called "default reasonable." It follows, given his definitions, that all default reasonable propositions and rules are, trivially, *weakly* a priori, and a priori if and only if they are empirically indefeasible. Field defends this consequence by noting:

> surely among the most plausible examples of default reasonable propositions and rules are simple logical truths like 'If snow is white then snow is white' and basic deductive rules like modus ponens and 'and'-elimination. It would be odd to exclude these from the ranks of the a priori merely because of their being default reasonable. (2001, 119)

Field (2001, 120) also maintains, however, that "there is no obvious reason why propositions such as 'People usually tell the truth' shouldn't count as default reasonable, and it would be odd to count such propositions as a priori." The empirical indefeasibility condition is necessary to block this undesirable result. "People usually tell the truth" is defeasible by empirical evidence, but, according to Field, logical truths are not.[17]

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17. I (2003) argue against the empirical indefeasibility condition on a priori justification on the grounds that it rules out the possibility of propositions that are justified both a priori and empirically. But, as Field (2001, 118) acknowledges, "complex and unobvious logical truths can admit empirical justification without diminishing their claims to a priori status." To circumvent this problem, Field (2001, 118) distinguishes between empirical justification and empirical evidence, and maintains that

> evidence involves something like *ideal* justification, ideal in that limitations of computational capacity are ignored. The idea is that reflection on the logical facts reveals that evidence for p doesn't raise the 'ideal credibility' of the logical truth $((p \supset q) \supset p) \supset p$: for ideally that would have been fully credible to begin with. If an observation doesn't raise the *ideal* credibility of the claim it shouldn't count as evidence for it. Similarly, an observation must lower the *ideal* credibility of a claim to count as evidence against it.

The accounts of Harman and Field share two features. First, both allow that there are propositions or rules that one can justifiably or reasonably believe in the absence of any evidence or justification. Second, both maintain that such propositions or rules have a priori status because they are justifiably or reasonably believed in the absence of empirical evidence or justification. There are two differences in their accounts. First, Field classifies such propositions or rules as weakly a priori, whereas Harman maintains that they are unqualifiedly a priori given BonJour's characterization of the a priori. Second, Harman does not balk, at least explicitly, at the consequence that all foundational beliefs are a priori on the general foundations theory, whereas Field does balk at the consequence that all default reasonable propositions are a priori. Hence, he includes the empirical indefeasibility requirement in his definitions of a priori propositions and rules.

Crispin Wright's position emerges within a broader context of addressing sceptical arguments:

> Call a proposition a *cornerstone* for a given region of thought just in case it would follow from a lack of warrant for it that one could not rationally claim warrant for *any* belief in the region. The best—most challenging, most interesting—sceptical paradoxes work in two steps: by (i) making a case that a certain proposition (or restricted type of proposition) that we characteristically accept is indeed such a cornerstone for a much wider class of beliefs, and then (ii) arguing that we have no warrant for it. (2004b, 167–168)

Wright's focus is on the second step. The sceptic supports the second step by arguing that one cannot acquire evidence for the cornerstone. In the case of one version of the Cartesian sceptical argument, the cornerstone is

(C)   I am not right now in the midst of a persistent coherent dream.

Empirical observations, according to Field, can raise or lower the nonideal credibility of logical truths but not their ideal credibility. Hence, such observations are not evidence for or against logical truths.

Field's proposal faces a number of questions. First, it entails that there is no evidence, empirical or nonempirical, for or against any logical truth. Hence, the concept of evidence can play no role in distinguishing between epistemically acceptable and epistemically unacceptable acquisition or revision of beliefs regarding logical truths. In effect, it tells us little about the *actual*, as opposed to the *ideal*, epistemology of logic. Second, since a person who believes a complex and unobvious logical truth, in the face of empirical observations that well-respected logicians do not accept it, is not justified in believing it and does not know it, the relationship between the concepts of evidence, ideal justification, and ideal credibility—as opposed to the concepts of justification and nonideal credibility—and the concept of knowledge remains unclear.

Since (C) is an empirical proposition, warrant for (C) would presumably consist in empirical evidence. The sceptic, however, maintains that evidence for (C) cannot be any stronger than my independent warrant that I actually gathered that evidence rather than merely dreamed that I did. Therefore, I cannot acquire a warrant for (C).

Wright notes that the sceptical argument involves a crucial assumption:

(A)   If one cannot acquire evidence for a cornerstone then one has no warrant for it.

It is this assumption that Wright proposes to attack:

Suppose there is a type of rational warrant which one does not have to *do any specific evidential work* to earn: better, a type of rational warrant whose possession does not require the existence of evidence—in the broadest sense, encompassing both *a priori* and empirical considerations—for the truth of the warranted proposition. Call it *entitlement.* (2004b, 174–175)

If there are such entitlements, then one can reject (A) by maintaining that the cornerstones are warranted despite the fact that they are unsupported by evidence.

Wright goes on to articulate several varieties of entitlement. An *entitlement of cognitive project* is a presupposition of a particular cognitive project, where

P is a *presupposition* of a particular cognitive project if to doubt P (in advance) would rationally commit one to doubting the significance or competence of the project,

that meets two further conditions:

(i)   We have no sufficient reason to believe that P is untrue

and

(ii)   The attempt to justify P would involve further presuppositions in turn of no more secure a prior standing…and so on without limit;…(2004b, 191–192)

Wright explains the rationale for the entitlement as follows:

wherever we need to carry through a type of project, or anyway cannot lose and may gain by doing so, and where we cannot satisfy ourselves that the presuppositions of a successful execution are met except at the cost of

making further presuppositions whose status is no more secure, we should—are *rationally entitled* to—just go ahead and *trust* that the former are met. (2004b, 192)

The entitlement is not an entitlement to believe the presuppositions in question but to accept or trust them, where acceptance is a more general propositional attitude than belief that includes belief and trust as subcases. We are entitled to accept cornerstones, such as (C), despite the fact that we cannot acquire evidence in support of them. Entitlement is a species of warrant that does not require evidence.

Wright (2004a, 159) exploits this variety of entitlement to provide an account of the epistemological status of the basic laws of logic that differs from the three available accounts on the contemporary scene—that is, that they are justified either empirically (Quine), or a priori inferentially (Boghossian), or a priori non-inferentially (Intuition)—but is, nevertheless, a priorist. Here Wright maintains:

> We have recognized two arguable species of entitlement of cognitive project: to the proper functioning, on an occasion, of relevant cognitive faculties, and to the co-operativeness of the prevailing circumstance in the successful operation of those faculties. . . . Basic logic is clearly a third potential kind of example—we can anticipate exactly this kind of rational entitlement to rely on the validity of the *basic inferential machinery*, if any, involved in the execution of the project. (2004a, 166)

Wright (2004a, 174) articulates his alternative account as follows: "what we have, at the level of the most basic laws of logic, is not knowledge, properly so regarded, at all but something beneath the scope of cognitive enquiry,—a kind of rational trust, susceptible [neither] to corroboration nor rebuttal by any cognitive achievement."[18]

Wright's account differs from the accounts of Harman and Field in a crucial respect. The entitlement that we have to basic logical principles is not an entitlement to believe that they are valid; it is an entitlement to trust or accept that they are valid. Entitlement is a species of positive epistemic status that does not underwrite either justified belief or knowledge. Wright's account, however, has two important features in common with the accounts of Harman and Field. First, Harman and Field allow that there are propositions and rules that one can justifiably or reasonably believe in the absence of any evidence or justification. Wright allows that there

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18. The text actually reads: "a kind of rational trust, susceptible beneath to corroboration nor rebuttal by any cognitive achievement," which I assume is an oversight.

are propositions and rules that one is rationally entitled to accept without any evidence or justification. Second, Harman and Field maintain that such propositions and rules have a priori status. Wright maintains that, on his account, the epistemological status of basic logical principles is a priori, although he does not explicitly address whether other entitlements to cognitive project are a priori.

Harman, Field, and Wright all maintain that a propositional attitude (belief or acceptance) can have a positive epistemic status (justified, reasonable, or entitled) in the absence of any evidence or justification. Moreover, both Harman and Field note that this result, in conjunction with the following negative characterization of a priori justification

(APJN)   S's belief that p is a priori justified (reasonable) if and only if the justification (reasonableness) of S's belief that p does not depend on empirical evidence

yields the result that many beliefs that are typically regarded as a posteriori come out a priori. For Harman, all of one's beliefs are prima facie justified a priori. For Field, all default reasonable propositions are weakly a priori.

Wright maintains that he is offering an account of the epistemological status of basic logical principles on which they are a priori. Although he is not explicit on the issue, his claim that his account has the consequence that basic logical principles are a priori appears to presuppose an analogue of (APJN):

(APEN)   S's acceptance that p is a priori entitled if and only if the entitlement of S's acceptance that p does not originate in empirical evidence.

If this is correct, then it follows that, on Wright's account, all entitlements of cognitive project are a priori, including one's acceptance that one's cognitive faculties are properly functioning and that one's environmental circumstances are suitable for their successful operation.

Harman neither endorses nor rejects (APJN). Moreover, he does not embrace or reject the view that all of one's beliefs are prima facie justified a priori. He simply notes that it is a consequence of the conjunction of BonJour's conception of a priori justification with a general foundations theory. Wright does not explicitly discuss the application of the a priori–a posteriori distinction at the level of entitlements, or the apparent consequence that the conjunction of his account with (APEN) yields the result that all entitlements of cognitive project are a priori. Field, however, is aware that the conjunction of his account with (APJN) yields the result that all default reasonable propositions are a priori and wishes to resist it. Hence, he adds to (APJN) an empirical indefeasibility condition.

Whatever one thinks of the plausibility or implausibility of classifying propositions such as "I am not now dreaming" or "People generally tell the truth" as a priori, the traditional conception of a priori knowledge does not have this consequence. The traditional conception is *positive*: it requires that a priori justified beliefs *have* a particular type of justification rather than that they *lack* a particular type of justification. The traditional conception maintains:

> (APJ)   S's belief that p is a priori justified (reasonable) if and only if the justification (reasonableness) of S's belief that p derives from some nonexperiential source.

On the traditional conception, neither Harman's foundational beliefs nor Field's default reasonable propositions nor Wright's entitlements of cognitive project are a priori.[19] Moreover, such foundational beliefs, default reasonable propositions, and entitlements to cognitive project are not a posteriori. They are neither a priori nor a posteriori.

We are now faced with a dilemma. The traditional conception of the a priori, in conjunction with the family of views articulated in this section, entails that some knowledge (justified belief) is neither a priori nor a posteriori. Yet it is part of the traditional story regarding the a priori that all knowledge (justified belief) is either a priori or a posteriori. That story is premised on the assumption that all justification originates either in evidence or in some cognitive state or process of the believer. The family of views articulated in this section deny that assumption.[20] Some warrant is "for free," to use Wright's term: some acceptances are entitled merely in virtue of being accepted; some beliefs are justified merely in virtue of being believed. Nothing more is necessary to confer positive epistemic status. Faced with these new theories, there are two options. First, embrace (APJN) and maintain that all knowledge and justification is either a priori or a posteriori. Second, embrace (APJ) and deny that all knowledge or justification is either a priori or a posteriori. One must choose between the traditional conception of a priori knowledge (justified belief) and the traditional view that all knowledge (justified belief) is either a priori or a posteriori.

If some warrant, whether it be entitlement or justification, is for free, then propositional attitudes having positive epistemic status fall into three distinct categories:

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19. Strictly speaking, (APJ) is silent on the a priori status of entitlements. The more general principle (APW), which is introduced below, has the consequence that entitlements are not a priori.

20. Strictly speaking, Wright's view does not deny that assumption but only the more general assumption that all warrant originates either in evidence or in some cognitive state or process of the believer.

(PES1)   Attitudes whose warrant derives from experiential evidence or, more broadly, from some experiential source;

(PES2)   Attitudes whose warrant derives from nonexperiential evidence or, more broadly, from some nonexperiential source; and

(PES3)   Attitudes whose warrant does not derive from any evidence or, more broadly, from any source.

Given these three categories, my contention is that the following analogue of (APJ),

(APW)   S's attitude that p is a priori warranted if and only if the warrant of S's attitude that p originates in some nonexperiential source,

is preferable to the following analogue of (APJN),

(APWN)   S's attitude that p is a priori warranted if and only if the warrant of S's attitude that p does not originate in some experiential source,

since it results in a more natural classification of attitudes having positive epistemic status.

Embracing (APWN) entails that the category of a priori warranted attitudes includes all the attitudes in categories (PES2) and (PES3), and that the category of a posteriori warranted attitudes includes only the attitudes in category (PES1). The resulting category of a priori warranted attitudes is unnatural since it includes both attitudes whose warrant originates in some nonexperiential source and attitudes whose warrant does not originate in any source. The latter attitudes have no more in common with attitudes whose warrant originates from some nonexperiential source than they do with attitudes whose warrant originates from some experiential source, and they are as different from attitudes whose warrant derives from some nonexperiential source as they are from attitudes whose warrant derives from some experiential source. Moreover, the resulting classification obscures, or at least fails to highlight, the fact that attitudes falling into category (PES3) have a unique epistemic feature that differentiates them from both attitudes falling into category (PES1) and attitudes falling into (PES2).

Embracing (APW) results in a tripartite classification that respects both the similarities and differences among the three types of positive epistemic status. The a priori–a posteriori distinction becomes a distinction that, at its most fundamental level, is between two sources of warrant: experiential and nonexperiential. Where warrant is for free and does not derive from any source, the distinction does not apply since the basis for the distinction is absent. This approach

avoids the unnatural union of attitudes in categories (PES2) and (PES3) into the category of a priori warranted attitudes. That category includes only the attitudes in (PES2). Moreover, it highlights the unique epistemic status of attitudes in category (PES3) by placing them in a third category. The warrant of the attitudes in (PES3) does not originate in some source; it is for free. The warrant of the attitudes in (PES1) and (PES2) is not for free; it originates in some source.

The tradition embraces two theses regarding a priori knowledge:

(T1)   A priori (a posteriori) knowledge is knowledge whose justification originates in some nonexperiential (experiential) source.

(T2)   All knowledge (justification) is either a priori or a posteriori.

The three views considered in this section maintain that some warrant does not originate in any source: Harman and Field maintain that some knowledge and justification does not originate in any source; Wright maintains that entitlement does not originate in any source. If some knowledge and justification does not originate in any source then, according to (T1), it is neither a priori nor a posteriori and (T2) is false. Moreover, if entitlement does not originate in any source then, according to (APW), entitled attitudes are not a priori. One can retain (T2) by rejecting (APJ) and embracing (APJN). Similarly, one can retain the view that entitled attitudes are a priori by rejecting (APW) and embracing (APEN). But, as I have argued, embracing (APJN) and (APEN) results in an unnatural classification of attitudes having positive epistemic status. The superior resolution is to endorse the traditional conception of a priori knowledge and embrace the consequence that some knowledge (justification) is neither a priori nor a posteriori. Similarly, the superior resolution with respect to entitlement is to endorse (APW) and to embrace the consequence that entitled attitudes are neither a priori nor a posteriori.[21]

References

Alston, William. 1992. "Foundationalism." In *A Companion to Epistemology*, ed. J. Dancy and E. Sosa. Oxford: Blackwell.

BonJour, Laurence. 1998. *In Defense of Pure Reason*. Cambridge: Cambridge University Press.

Burge, Tyler. 1993. "Content Preservation." *Philosophical Review* 102: 457–488.

Casullo, Albert. 1988. "Revisability, Reliabilism, and A Priori Knowledge." *Philosophy and Phenomenological Research* 49: 187–213.

——— . 2003. *A Priori Justification*. New York: Oxford University Press.

———. 2009. "Analyzing A Priori Knowledge." *Philosophical Studies* 142: 77–90.

Chisholm, R. M. 1977. *Theory of Knowledge*. 2d ed. Englewood Cliffs, N.J.: Prentice-Hall.

Field, Hartry. 2000. "Apriority as an Evaluative Notion." In *New Essays on the A Priori*, ed. P. Boghossian and C. Peacocke. Oxford: Oxford University Press.

Harman, Gilbert. 2001. "General Foundations versus Rational Insight." *Philosophy and Phenomenological Research* 63: 657–663.

Hawthorne, J. 2007. "A Priority and Externalism." In *Internalism and Externalism in Semantics and Epistemology*, ed. Sanford Goldberg. Oxford: Oxford University Press.

Jenkins, C. S. 2008. *Grounding Concepts*. Oxford: Oxford University Press.

Kant, Immanuel. 1965. *Critique of Pure Reason*. Trans. Norman Kemp Smith. New York: St. Martin's Press.

Kitcher, Philip. 1983. *The Nature of Mathematical Knowledge*. New York: Oxford University Press.

———. 2000. "A Priori Knowledge Revisited." In *New Essays on the A Priori*, ed. P. Boghossian and C. Peacocke. Oxford: Oxford University Press.

Moser, Paul. 1987. "Introduction." In *A Priori Knowledge*, ed. P. Moser. Oxford: Oxford University Press.

———. 1989. *Knowledge and Evidence*. Cambridge: Cambridge University Press.

Williamson, Timothy. 2007. *The Philosophy of Philosophy*. Oxford: Blackwell.

Wright, Crispin. 2004a. "Intuition, Entitlement and the Epistemology of Logical Laws." *Dialectica* 58: 155–175.

———. 2004b. "Warrant for Nothing (and Foundations for Free)?" *Proceedings of the Aristotelian Society*, supp., 78: 167–212.

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Annotated Bibliography

Questions about the existence, nature, and scope of a priori knowledge have been central to both the historical and contemporary literature in the theory of knowledge. This entry focuses on the contemporary literature, in which two questions are prominent: What is a priori knowledge? Is there such knowledge? The discussion of these two questions frequently introduces two others: What is the relationship between a priori knowledge and necessary truth? What is the relationship between a priori knowledge and analytic truth?

General Overviews

Baehr, J. "A Priori and A Posteriori." In the *Internet Encyclopedia of Philosophy*. Edited by J. Fieser, 2006. http://www.iep.utm.edu/apriori.

A useful survey of basic concepts, distinctions, and views of the a priori, with a limited bibliography.

Bealer, G. "The A Priori." In *The Blackwell Guide to Epistemology*. Edited by J. Greco and E. Sosa, 243–270. Malden, MA: Blackwell, 1999.

A condensed version of the author's case against radical empiricism, his defense of the view that intuitions are evidence, and his explanation of why they are evidence.

BonJour, L. "In Defense of the *A Priori*." In *Contemporary Debates in Epistemology*. Edited by M. Steup and E. Sosa, 98–105. Malden, MA: Blackwell, 2005.

An introduction to the author's arguments against empiricism and his rationalist account of a priori knowledge. Devitt 2005 responds to this article.

Casullo, A. "Knowledge, A Priori." In *The Encyclopedia of Philosophy*, 2nd ed., Vol. 5. Edited by D. M. Borchert, 79–86. Detroit: MacMillan Reference, 2006.

A comprehensive and up-to-date introduction to the main issues that focuses on the concept of a priori knowledge and on the arguments for and against the existence of such knowledge.

Devitt, M. "There is No *A Priori*." In *Contemporary Debates in Epistemology*. Edited by M. Steup and E. Sosa, 105–115. Malden, Mass.: Blackwell, 2005.

A defense of the view that all knowledge is empirical. This article is a response to BonJour 2005.

Moser, P. "A Priori." In the *Routledge Encyclopedia of Philosophy*, Vol. 1. Edited by E. Craig, 3–5. London: Routledge, 1998.

A short introduction to the basic concepts and some main issues.

Peacocke, C. "The A Priori." In *The Oxford Handbook of Contemporary Philosophy*. Edited by F. Jackson and M. Smith, 739–763. Oxford: Oxford University Press, 2005.

A wide-ranging and up-to-date introduction which addresses the concept, scope, and source of the a priori, with an emphasis on the author's metasemantic theory.

Russell, B. "A Priori Justification and Knowledge." In the *Stanford Encyclopedia of Philosophy*. Edited by E. Zalta, 2007. http://plato.stanford.edu/entries/apriori/.

A very comprehensive and up-to-date introduction to the contemporary literature that defends a version of rationalism. Excellent bibliography.

Textbooks

BonJour, L. *Epistemology: Classic Problems and Contemporary Responses*. Lanham, MD: Rowman and Littlefield, 2002.

A condensed version of the author's case against moderate and radical empiricism together with an articulation and defense of his version of rationalism.

Crumley, J. *An Introduction to Epistemology*. Mountain View, Calif.: Mayfield, 1999.

A detailed presentation of historical and contemporary views on the a priori.

Lemos, N. *An Introduction to the Theory of Knowledge*. Cambridge: Cambridge University Press, 2007.

An accessible introduction that focuses on the debate between proponents of strong and weak views of a priori justification and on the controversy over whether there is synthetic a priori knowledge.

Pritchard, D. *What Is This Thing Called Knowledge?* London: Routledge, 2006.

A short accessible introduction to the a priori with a focus on principles of inference.

Steup, M. *Contemporary Epistemology*. Upper Saddle River, N.J.: Prentice-Hall, 1996.

A sophisticated discussion of the concept of a priori justification, the analytic-synthetic distinction, and scepticism regarding the a priori.

Anthologies

Boghossian, P. and C. Peacocke, eds. *New Essays on the A Priori*. Oxford: Oxford University Press, 2000.

A collection of new essays that covers a wide range of topics pertaining to the a priori, both historical and contemporary.

Casullo, A., ed. *A Priori Knowledge*. Aldershot, England: Ashgate, 1999.

A comprehensive collection, covering the main developments in the field from 1980 to 1998; the introduction provides a broad survey of the field and an extensive bibliography.

DePaul, M. and W. Ramsey, eds. *Rethinking Intuition: The Psychology of Intuition and Its Role in Philosophical Inquiry*. Lanham, MD: Rowman and Littlefield, 1998.

The most comprehensive collection of articles on the epistemic status of intuitions and their role in philosophical theorizing. It contains articles by philosophers on all sides of the debate and articles by psychologists pertaining to empirical studies of intuition.

Gendler, T. and J. Hawthorne, eds. *Conceivability and Possibility*. New York: Oxford University Press, 2002.

A collection of new essays, covering a wide range of topics pertaining to the nature of modality and modal knowledge, with an emphasis on the question of whether conceivability is a guide to possibility. It also contains a comprehensive introduction to those issues.

Moser, P., ed. *A Priori Knowledge*. Oxford: Oxford University Press, 1987.

A collection of important articles on the a priori from both the early and the late twentieth century, along with a brief introduction to the field.

Historical Background to the Contemporary Debate

Ayer, A. J. *Language, Truth and Logic*. New York: Dover, 1952.

Rejects Mill's contention that all knowledge is a posteriori but argues that all a priori knowledge is of analytic truths.

Chisholm, R. *Theory of Knowledge*. Englewood Cliffs, NJ: Prentice-Hall, NJ, 1966.

Defends a modern version of Kant's position, rejecting the empiricism of Mill and Quine, arguing that necessity is a criterion of the a priori, and that there is synthetic a priori knowledge.

Frege, G. *The Foundations of Arithmetic*, 2nd ed. rev. Translated by J. L. Austin. Evanston, Ill.: Northwestern University Press, 1980.

Rejects Mill's contention that mathematical knowledge is a posteriori, agrees with Kant that there is synthetic a priori knowledge, but denies that the truths of arithmetic are synthetic.

Gödel, K. "What Is Cantor's Continuum Problem?" In *Philosophy of Mathematics*, 2nd ed. Edited by P. Benacerraf and H. Putnam, 470–485. Cambridge: Cambridge University Press, 1983.

Maintains that we know the objects of set theory by mathematical intuition, which is understood as a faculty that stands in relation to the objects of set theory in a manner analogous to that in which perception stands to physical objects.

Kant, I. *Critique of Pure Reason*. Translated by Norman Kemp Smith. New York: St. Martin's Press, 1965.

Introduces the primary questions regarding a priori knowledge that continue to dominate the contemporary discussion.

Mill, J. *A System of Logic*. Edited by J. M. Robson. Toronto: University of Toronto Press, 1974.

Argues that all knowledge is a posteriori and articulates an inductive empiricist account of mathematical knowledge.

Putnam, H. "'Two Dogmas' Revisited." In *Realism and Reason: Philosophical Papers*, Vol. 3, 87–97. Cambridge: Cambridge University Press, 1983.

Argues that Quine 1963 offers two distinct arguments with different targets: an unsuccessful argument targeting the analytic-synthetic distinction and a successful argument targeting a priori knowledge.

Quine, W. V. "Two Dogmas of Empiricism." In *From a Logical Point of View*, 2nd ed. rev., 20–46. New York: Harper and Row, 1963.

Rejects the cogency of the distinction between analytic and synthetic truths, rejects Mill's inductive empiricist account of mathematical knowledge, and articulates a holistic empiricist account of such knowledge.

General Accounts

Audi, R. "Self-Evidence." In *Philosophical Perspectives* 13 (1999): 205–228.

Introduces a concept of self-evident proposition from which it follows that all self-evident propositions are justifiable a priori.

Bealer, G. "A Theory of the A Priori." In *Philosophical Perspectives* 13 (1999): 29–55.

Offers a defense of the view that rational intuitions are evidence, an explanation of why they are evidence in terms of a modal tie between such intuitions and truth, and an explanation of the tie in terms of the conditions for determinately possessing a concept.

BonJour, L. *In Defense of Pure Reason*. Cambridge: Cambridge University Press, 1998.

Defends the traditional rationalist view that rational insight into the necessary truth of a proposition is the source of a priori knowledge.

Casullo, A. *A Priori Justification*. New York: Oxford University Press, 2003.

Maintains that the traditional arguments for and against the existence of a priori knowledge are inconclusive and that a resolution of the controversy over the existence of such knowledge requires empirical investigation.

Field, H. "Apriority as an Evaluative Notion." In *New Essays on the A Priori*. Edited by P. Boghossian and C. Peacocke, 117–149. Oxford: Oxford University Press, 2000.

Offers an account of the apriority of propositions and rules for forming beliefs within the framework of a general epistemology that holds that epistemological properties, such as reasonableness, are evaluative rather than factual.

Kripke, S. *Naming and Necessity*. Cambridge, Mass.: Harvard University Press, 1980.

Sets the stage for the contemporary discussion by carefully distinguishing the concepts of a priori knowledge, necessary truth, and analytic truth, and challenging traditional assumptions about the relationship between a priori knowledge and necessary truth.

Peacocke, C. *The Realm of Reason*. Oxford: Oxford University Press, 2004.

Defends a moderate form of rationalism according to which a priori knowledge is to be explained by features of concept possession, but without invoking a distinct psychological faculty as the source of such knowledge.

Sosa, E. *A Virtue Epistemology: Apt Belief and Reflective Knowledge*, Vol. 1. Oxford: Oxford University Press, 2007.

Chapter 3 offers an articulation and defense of the view that rational intuition is a source of a priori knowledge.

Mathematical Knowledge

Benacerraf, P. "Mathematical Truth." *Journal of Philosophy* 70 (1973): 661–679.

Maintains that if the objects of mathematical knowledge are abstract entities, such as numbers and sets, and if mathematical knowledge requires a causal relation between knowers and the objects of such knowledge, then mathematical knowledge is not possible, as abstract entities cannot stand in causal relations.

Hale, B. "Is Platonism Epistemologically Bankrupt?" *Philosophical Review* 103 (1994): 299–325.

Maintains that, given an adequate general account of knowledge of necessary truths, there is no additional problem for an account of knowledge of mathematical truths.

Jenkins, C. *Grounding Concepts*. Oxford: Oxford University Press, 2008.

Offers a novel approach to arithmetical knowledge, focused on the role of concept acquisition, which has the consequence that such knowledge is both a priori and empirical.

Katz, J. *Realistic Rationalism*. Cambridge, Mass.: MIT Press, 1998.

Offers a defense of mathematical realism of which a central component is a defense of a rationalist account of knowledge of abstract entities.

Kitcher, P. *The Nature of Mathematical Knowledge*. New York: Oxford University Press, 1983.

Surveys and rejects traditional a priori accounts of mathematical knowledge and articulates a version of mathematical empiricism.

Maddy, P. *Realism in Mathematics*. Oxford: Oxford University Press, 1990.

Defends an account of mathematical knowledge according to which basic beliefs about sets are intuitive beliefs generated by neurophysiological mechanisms that correspond to the general concept of set.

Parsons, C. *Mathematical Thought and Its Objects*. Cambridge: Cambridge University Press, 2008.

Articulates a very nuanced structuralist account of mathematical objects, together with an epistemological theory that highlights the role of intuition in acquiring knowledge of mathematical structures.

Plantinga, A. *Warrant and Proper Function*. New York: Oxford University Press, 1993.

Offers an account of a priori knowledge within the framework of a general theory of knowledge and argues that causal requirements on knowledge, of the kind espoused by Benacerraf 1973, lead to more general skeptical conclusions.

Logical Knowledge

Boghossian, P. "Analyticity Reconsidered." *Nous* 30 (1996): 360–391.

Distinguishes two senses of *analytic*, metaphysical and epistemological, and defends the view that the semantic thesis of implicit definition explains how a grasp of the meanings of the logical constants can underwrite a priori knowledge of basic principles of logic.

BonJour, L. *In Defense of Pure Reason*. Cambridge: Cambridge University Press, 1998.

Argues that the concept of analytic truth does not provide a full explanation of how basic logical truths are known and defends the traditional rationalist account of such knowledge.

Field, H. "The A Prioricity of Logic." *Proceedings of the Aristotelian Society* 96 (1995–1996): 359–379.

Defends the view that all the principles of classical logic are strongly a priori, where p is strongly a priori just in case p can be known or justifiably believed without reliance on empirical evidence and is empirically indefeasible by empirical evidence against p.

Hale, B. "Basic Logical Knowledge." In *Logic, Thought and Language*. Edited by A. O'Hear, 279–304. Cambridge: Cambridge University Press, 2002.

Maintains that acceptance of basic rules of inference involving a logical operator is constitutive of understanding that operator and that, as a consequence, there are rules of inference, including those for the conditional and the universal quantifier, that cannot be rationally doubted and, more tentatively, that can be known to be sound noninferentially.

Horwich, P. "Implicit Definition, Analytic Truth, and A Priori Knowledge." *Nous* 31 (1997): 423–440.

Argues that neither Boghossian's 1996 version of the semantic theory of implicit definition nor Peacocke's 1993 theory of the possession condition for a concept supports the contention that meaning-constituting or concept-constituting rules are knowable a priori.

Peacocke, C. 1993. "How Are A Priori Truths Possible?" *European Journal of Philosophy* 1: 175–199.

Offers a metasemantic account of a priori knowledge of basic logical rules in terms of a theory of the possession condition for a concept and a determination theory that specifies how that possession condition determines a semantic value for that concept.

Williamson, T. *The Philosophy of Philosophy*. Malden, Mass.: Blackwell, 2007.

Examines a number of different conceptions of analytic sentences, both metaphysical and epistemological, and argues that none explains how we can know or justifiably believe such sentences.

Wright, C. "Intuition, Entitlement and the Epistemology of Logical Laws." *Dialectica* 58 (2004): 155–175.

Articulates a conception of epistemic entitlement, inspired by remarks of Wittgenstein, according to which we are entitled to rely on the validity of some basic rules of logical inference, such as modus ponens and conditional proof.

Intuitions and Conceptual Analysis

Bealer, G. "The Incoherence of Empiricism." *Proceedings of the Aristotelian Society*, supp. vol., 66 (1992): 99–138.

Maintains that empiricist epistemologies that deny the evidential status of intuitions are incoherent and, ultimately, self-defeating.

Goldman, A. "Philosophical Intuitions: Their Target, Their Source, and Their Epistemic Status." *Grazer Philosophische Studien* 74 (2007): 1–26.

Maintains that one's intuitions constitute evidence for the content of one's personal psychological concepts but denies that such evidence is a priori.

Jackson, F. *From Metaphysics to Ethics: A Defence of Conceptual Analysis*. Oxford: Oxford University Press, 1998.

Argues that conceptual analysis is essential to serious metaphysics and that such analysis is a source of a priori knowledge.

Kornblith, H. *Knowledge and Its Place in Nature*. Oxford: Oxford University Press, 2002.

Acknowledges the evidential status of intuitions but denies that intuitions constitute a priori evidence for conceptual truths; intuitions are a posteriori judgments that serve to identify obvious examples of the phenomenon under investigation.

Nagel, J. "Epistemic Intuitions." *Philosophy Compass* 2 (2007): 792–819.

Provides a survey of the experimental studies on epistemic intuitions and an assessment of their implications for epistemology.

Pust, J. "Against Explanationist Skepticism Regarding Philosophical Intuitions." *Philosophical Studies* 106 (2001): 227–258.

Contends that arguments challenging the evidential status of intuitions in philosophical inquiry on the grounds that the best explanation of their occurrence does not involve their truth are epistemologically self-defeating.

Sosa, E. "A Defense of the Use of Intuitions in Philosophy." In *Stich and His Critics*. Edited by Dominic Murphy and Michael Bishop, 101–112. Malden, Mass.: Blackwell, 2009.

Offers a defense of the use of intuitions in epistemological theorizing to arrive at conclusions about the nature and extent of human knowledge and justification against the challenges raised by Stich 1988 and Weinberg, et al. 2001.

Stich, S. "Reflective Equilibrium, Analytic Epistemology, and the Problem of Cognitive
    Diversity." *Synthese* 74 (1988): 391–413.

Argues that analytic epistemology, which bases the choice between competing theories
of justification on conceptual analysis, is not suited to the project of determining which
cognitive processes are good ones.

Weinberg, J., S. Nichols, and S. Stich. "Normativity and Epistemic Intuitions." *Philosophical
    Topics* 29 (2001): 429–460.

Contends that results in experimental philosophy challenge the evidential value of
intuitions.

Modal Knowledge

a. Overviews

Evnine, S. "Modal Epistemology: Our Knowledge of Necessity and Possibility." *Philosophy
    Compass* 3 (2008): 664–684.

Discusses the relationship between conceivability and possibility, with a focus on the
accounts of Chalmers and Yablo and on Sidelle's conventionalist account of modal truth
and knowledge.

McLeod, S. "Modal Epistemology." *Philosophical Books* 46 (2005): 235–245.

Highlights the role of modal realism and the analogy between mathematical and modal
knowledge in generating questions about modal knowledge.

Vaidya, A. "The Epistemology of Modality." In the *Stanford Encyclopedia of Philosophy*.
    Edited by E. Zalta, 2007. http://plato.stanford.edu/entries/modality-epistemology/.

Provides a survey of modal epistemology from the early modern period through
Kripke, together with a survey of three contemporary approaches: conceivability-
based, understanding-based, and counterfactual-based. The most detailed and com-
prehensive overview, and contains an extensive bibliography.

b. Primary Sources

Bealer, G. "Modal Epistemology and the Rationalist Renaissance." In *Conceivability and
Possibility*. Edited by T. Gendler and J. Hawthorne, 71–125. Oxford: Oxford University
Press, 2002.

Maintains that modal knowledge ultimately derives from modal intuitions that result
from determinate understanding of concepts.

Chalmers, D. "Does Conceivability Entail Possibility?" In *Conceivability and Possibility*.
    Edited by T. Gendler and J. Hawthorne, 145–200. Oxford: Oxford University Press,
    2002.

Defends a version of weak modal rationalism according to which primary positive ideal
conceivability entails primary possibility.

Hale, B. "Knowledge of Possibility and of Necessity." *Proceedings of the Aristotelian Society* 103 (2003): 1–20.

Distinguishes two different approaches to modal knowledge—the first treats knowledge of necessity as more fundamental than knowledge of possibility, the second treats knowledge of possibility as epistemologically prior—and argues that the first is more promising than the second.

Hill, C. "Modality, Modal Epistemology, and the Metaphysics of Consciousness." In *The Architecture of the Imagination*. Edited by S. Nichols, 205–235. Oxford: Oxford University Press, 2006.

Maintains that metaphysical necessity and possibility can be reductively explained in terms of the counterfactual conditional and that this reduction gives rise to two tests for determining whether a proposition is metaphysically necessary.

Peacocke, C. *Being Known*. Oxford: Oxford University Press, 1999.

Contends that modal knowledge derives from tacit knowledge of principles of metaphysical possibility that is constitutive of possessing the concept of metaphysical modality.

Sidelle, A. *Necessity, Essence, and Individuation*. Ithaca: Cornell University Press, 1989.

Contends that the a priori premises involved in Kripke's examples of necessary a posteriori propositions are analytic truths, which are true by linguistic convention and knowable a priori.

Williamson, T. *The Philosophy of Philosophy*. Malden, Mass.: Blackwell, 2007.

Holds that the epistemology of metaphysical modality is a special case of the epistemology of counterfactual conditionals, which can be explained in terms of simulation or the running offline of our cognitive faculties.

Yablo, S. "Is Conceivability a Guide to Possibility?" *Philosophy and Phenomenological Research* 53 (1993): 1–42.

Provides an articulation of the concept of conceivability which, he maintains, underwrites the claim that conceivability provides basic, but defeasible, justification for believing that something is possible.

Testimonial Knowledge

Burge, T. "Content Preservation." *Philosophical Review* 102 (1993): 457–488.

Maintains that although testimony typically involves perceptual experience in some form, such as hearing the words of the testifier, such perceptual experience does not play a warranting role in testimony; it functions only as a causal enabling condition.

Burge, T. "Interlocution, Perception, and Memory." *Philosophical Studies* 86 (1997): 21–47.

Maintains, in response to Christensen and Kornblith 1997, that although perception is necessary for one to understand what the testifier says, it need not be part of one's justification for the belief acquired via testimony.

Christensen, D. and H. Kornblith. "Testimony, Memory and the Limits of the *A Priori*." *Philosophical Studies* 86 (1997): 1–20.

Argues, contra Burge 1993, that perception plays a justificatory role, and not merely a causal role, in the production of testimonial beliefs.

Malmgren, A. "Is There A Priori Knowledge By Testimony?" *Philosophical Review* 115 (2006): 199–241.

Contends, contra Burge 1993, that in order for one to acquire testimonial knowledge that p, one must be warranted in believing that the testifier said that p and that such warrant cannot be a priori.

Naturalism

Devitt, M. "Naturalism and the A Priori." *Philosophical Studies* 92 (1998): 45–65.

Contends that Rey's 1998 conception of naturalistic epistemology is not Quine's and that Quine's conception is not compatible with a priori knowledge.

Goldman, A. "A Priori Warrant and Naturalistic Epistemology." *Philosophical Perspectives* 13 (1999): 1–28.

Offers a version of naturalistic epistemology that is compatible with a priori knowledge and a discussion of the bearing of empirical research on arithmetical and logical cognition on the question of whether arithmetical and logical knowledge are a priori.

Kornblith, H. "Naturalism and Intuitions." *Grazer Philosophische Studien* 74 (2007): 27–49.

Maintains that methodological naturalism cannot be reconciled with the philosophical practice of constructing theories on the basis of appeals to intuition.

Quine, W. V. "Epistemology Naturalized." In *Ontological Relativity and Other Essays*, 69–90. New York: Columbia University Press, 1969.

Rejects the traditional epistemological project of providing an a priori, philosophical justification of scientific knowledge and offers, in its place, a vision of epistemology as a branch of science.

Rey, G. "A Naturalistic A Priori." *Philosophical Studies* 92 (1998): 25–43.

Endorses Quine's conception of naturalistic epistemology but argues that it can accommodate a priori knowledge.

Skepticism

BonJour, L. *In Defense of Pure Reason*. Cambridge: Cambridge University Press, 1998.

Offers two arguments in support of the claim that denying the existence of a priori knowledge leads to scepticism.

Beebe, J. "BonJour's Arguments against Skepticism about the *A Priori*." *Philosophical Studies* 137 (2008): 243–267.

Criticizes both of BonJour's 1998 arguments, maintaining that neither establishes that there is no rational alternative to accepting the a priori.

Casullo, A. "The Coherence of Empiricism." *Pacific Philosophical Quarterly* 81 (2000): 31–48.

Argues that BonJour's 1998 Generality Argument proves too much, for it can be employed to show that BonJour's version of moderate rationalism also leads to skepticism.

Harman, G. "General Foundations versus Rational Insight." *Philosophy and Phenomenological Research* 63 (2001): 657–663.

Argues, in response to BonJour 1998, that a general foundations theory can avoid skepticism without admitting any beliefs that are justified a priori.

Thurow, J. "The A Priori Defended: A Defense of the Generality Argument." *Philosophical Studies* 146 (2009): 273–289.

Defends BonJour's 1998 Generality Argument against Casullo's 2000 criticism and offers a new version of the argument.

New Developments

Casullo, A. "Analyzing A Priori Knowledge." *Philosophical Studies* 142 (2009): 77–90.

Maintains that the evidence Kitcher 2000 cites regarding the classical conception of the a priori fails to support its pessimistic conclusion regarding the possibility of coherently explicating that concept.

Hawthorne, J. "A Priority and Externalism." In *Internalism and Externalism in Semantics and Epistemology*. Edited by Sanford Goldberg, 201–218. Oxford: Oxford University Press, 2007.

Argues that, from the perspective of an externalist epistemology, the a priori-a posteriori distinction is not a natural one.

Jenkins, C. "A Priori Knowledge: Debates and Developments." *Philosophy Compass* 3 (2008): 436–450.

Offers a defense of the a priori-a posteriori distinction in light of the concerns expressed by Hawthorne 2007 and Williamson 2007.

Kitcher, P. "A Priori Knowledge Revisited." In *New Essays on the A Priori*. Edited by P. Boghossian and C. Peacocke, 65–91. Oxford: Oxford University Press, 2000.

Argues that the classical conception of the a priori is too complex to be coherently explicated and, moreover, that the question of whether mathematical knowledge is a priori is not significant.

Williamson, T. *The Philosophy of Philosophy*. Malden, MA: Blackwell, 2007.

Maintains that the a priori-a posteriori distinction yields little epistemological insight because it obscures more significant epistemological distinctions.

Acknowledgment

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