# The Scientific Naturalization of Ethics

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I outline a program for the scientific naturalization of ethics, focusing on metaethics and the sciences of biology and psychology. I suggest that metaethical questions can be framed in terms of questions about the nature, acquisition, activation, justification and function of moral agency. I present a model of moral agency based on current theories and findings in human sociobiology, developmental psychology, operant theory and social cognitive theory. In particular, I propose a selectionist model, based on natural, behavioral, and social/cultural selection, to explain the origin, development, and operation of moral agency.

Arguably epistemology is being scientifically naturalized (Kornblith, 1994; Kitcher, 1992). Can ethics also be naturalized, scientifically naturalized? In this paper, I argue that there is good reason to think so. After sketching some requirements for a successful scientific naturalization of ethics, I show how one piece of those requirements can be filled in by appeal to current plausible theories in evolutionary biology, developmental psychology, and social cognitive theory. I conclude that although the project of naturalizing ethics is not as far along as that of naturalizing epistemology, the former project merits pursuit.

## The Return of the Ethical Naturalists

In a paper examining the history of the last century of Anglo-American epistemology, Philip Kitcher (1992) argues that Anglo-American epistemology is (and ought to be) abandoning its century-long infatuation with linguistic philosophy and returning to its scientific naturalistic roots. Can and ought the same argument be made for ethics?

Stephen Darwall, Allan Gibbard and Peter Railton (1992) in a similar review of the last 100 hundred years of Anglo-American ethics do not go as far in their comments on current attempts to naturalize ethics as Kitcher does in the case of epistemology. They point out that currently three forms of naturalism in metaethics compete with traditional Utilitarian, Kantian, Virtue, and Communitarian accounts of ethics. However, they do suggest, without indicating how, that ethics must make more use of psychology and the social sciences in the next century.

But some moral philosophers have gone further. For instance advocates of moral realism like Nicholas Sturgeon (1985,1986a, 1986b); Richard Boyd (1988) and Peter Railton (1986) have urged methodological analogies between science and ethics, as well as the use of the social sciences in ethics. Moreover, some philosophers of biology, notably Michael Ruse (1986), Robert Richards (1987) and Michael Bradie (1994) have proposed various versions of an evolutionarily based naturalistic ethics. Alvin Goldman (1992) who has pioneered efforts in the naturalization of epistemology has also begun to extend his effort to ethics, while broadening the

scientific bases of the project to include psychology, in particular, cognitive psychology, and findings in the social sciences. Nonetheless, it seems clear that the scientific naturalization of ethics is less far advanced than that of epistemology.

One of the best worked out attempts at naturalization, one that recognizes a role for not only biology but also psychology and the social sciences, indeed for the arts, literature, and history, is Owen Flanagan's (1996). Flanagan proposes a Minimal Naturalism with the following components:

1. **Non-Transcendentalism**: Minimal Naturalism rules out abstract reason as a source of justification in ethics and rejects divine design as both a substantive metaphysical commitment and as a source for ethical justification.

2. **No Problem with a Naturalistic Fallacy**: Minimal Naturalism contends that the Naturalistic Fallacy is no problem for naturalism, either because there is no such fallacy or, if there is one, it can be avoided.

3. **Scientifically Determined Delimitation of Moral Capacities**: Since "ought implies can," and since the sciences are the best source for finding out what we can do, the sciences play at least a negative normative role, by providing information about the extent of our moral capacities.

4. **Determining What Well-Functioning Is**: The sciences play a role, along with the arts, humanities, history, conversation and discussion and mutual decision making, in determining contextually what is human well-functioning, including both self-realization and interpersonal goals.

5. **Discovering the Means to Well-Functioning**: These same disciplines and methods play a role in determining the means to attaining contextually defined instances of human well-functioning and, thereby, in determining what is valuable and, thus, what is the right and/or obligatory thing to do in various contexts.

6. **No Commitments re Moral Realism or Cognitivism**.

7. **Lack of Cumulativity and Progressiveness in Ethics**: To the extent that the sciences are cumulative and progressive ethics is unlike the sciences due to (1) the admixture of prudential, social, and ethical ends in action, (2) the amount of socialization that often occurs for the benefit of socializers, and (3) the intrinsic tension between intrapersonal and interpersonal ethical ends prevents the sort of cumulativity and progressivity that, arguably, the sciences display.

8. **Ethics as a Branch of Human Ecology**: If ethics is to be placed within the schema of the sciences, it is a branch of human ecology.

Scientific naturalists who are more expansive about the possibilities for the scientific naturalization of ethics can accept most of Minimal Naturalism. The first five theses seem to be necessary conditions for any sort of scientific naturalistic view of ethics. Although as a scientific realist I am committed to both moral cognitivism and moral realism, I shall not argue for those positions here. As far as the issues of cumlativity and progress go, I believe that Flanagan should make a distinction between the discipline of ethics and ethical practice. The reasons that he alleges for the lack of cumulativity and progressiveness in ethics as compared to the sciences pertain, in my view, mostly to ethical practice rather than to anything intrinsic to the subject matter or methodologies of ethics. A similar sort of case could be made for the lack of progress and cumulativity in scientific knowledge with respect to the possession and use of scientific knowledge by the general public. Finally, human ecology may provide a home for the science of ethics, but, perhaps, only for part of ethics. Environmental ethics may demand a framework that is more expansive, perhaps ecology itself.

I turn now to illustrating how the scientific naturalistic project, whether minimalist or more expansive, might be elaborated. To do so, I will sketch out some aspects of a scientific naturalistic metaethics conceived of as a moral science, perhaps a branch of some larger scientific discipline or disciplines, as Flanagan envisions it.

## Ethics: What is it that is to be Naturalized?

Traditionally ethics has been considered to be a philosophical discipline concerned with morality, that is, with the nature of the human good and how it might be attained. Modern characterizations of ethics in the Anglo-American tradition have often divided it into three distinct parts: (1) *metaethics* which deals with the nature and function of morality; (2) *normative ethics* which is concerned with ethical principles and norms; and (3) *applied ethics* which has to do with the application of ethical principles and norms to particular areas of moral concern. Although the traditional Anglo-American conception of ethics need not be taken as normative, I will use it to illustrate how the naturalization of ethics might go. In this paper I shall focus on metaethics. To understand scientific naturalization we need, of course, to have some account of science. Unfortunately, even if there were such an account, I would not have time to go into here. I shall assume, for purposes of this discussion, that if ethics in each of its parts is related in a proper way to one or another of the recognized scientific disciplines such as biology or psychology, then ethics has been scientifically naturalized.

## Metaethics and a Scientific Naturalistic Account of Moral Agency

Focusing now on metaethics, we can describe it as that part of ethics that deals with the nature and function of morality. Questions about the nature of morality concern (a) moral psychology -- questions about what is a moral agent and what processes are involved in being a moral agent; (b) moral justification -- questions about how the correctness of moral actions, attitudes, judgments, and motivations are to be determined; (c) moral ontology -- questions about the realities involved in morality. Questions about the function of morality concern the purposes or ends of morality.

I suggest that these metaethical issues can be better addressed by refashioning them in terms of questions about moral agency: (1) What count as moral capacities and actions, both substantively and functionally? (2) How does one acquire moral capacities? (3) How does one put these moral capacities to work? (4) How does one assess the adequacy of the operation of

these moral capacities and actions? (5) What is the function or purpose of moral agency? These questions concern the issues of constitution, acquisition, action, justification and meaning respectively.

A scientifically naturalized metaethics will make significant use of the relevant sciences to answer these questions of moral agency. Although I believe that the social sciences may come to play an even more important role in a science of moral agency than the natural sciences, at this point in time the potential contributions of biology and psychology seem clearer. Nor do I intend to exclude in principle the contributions of common sense since I contend that there is a continuity between scientific and common sense methods. But I set aside the issue of the extent to which a scientifically naturalized ethics will replace folk ethics. So let me focus on biology and psychology in illustrating the kind of scientific naturalized account of the study of moral agency that I have in mind.

My scientific naturalistic account is constituted by seven increasingly controversial substantive hypotheses concerning the connections between the sciences and ethics.[i] Specifically, with respect to biology and psychology, I propose the following substantive hypotheses:

> 1. *Informational Connection Hypothesis:* Because of the relevant information about the circumstances and conditions of moral action that they have, the biological and psychological sciences can provide a moral agent with factual information important in ethical decision making and significant for ethical understanding.
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> 2. *Explanatory Connection Hypothesis*: Moral capacities have genetic, developmental, behavioral and cognitive components. Biology and psychology provide descriptive, explanatory and predictive knowledge concerning the origin, development, maintenance, use, change or extinction of the cognitive, affective, and behavioral capacities that are employed in ethical action.
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> 3. *Critical Connection Hypothesis*: An account of the biological and psychological bases of moral agency can effectively critique the claims of common sense and non-scientifically-based philosophical or religious theories concerning human moral capacities and the nature and function of morality.
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> 4. *Normative Connection Hypothesis*: From a knowledge of our moral capacities, and on the basis of knowledge from other sources, for instance, perceptual and social, we can

formulate some general *prima facie* normative principles about what it is good for us to do morally, what is morally permissible and impermissible, and what is morally obligatory.

5. *Epistemological Connection Hypothesis*: If the explanatory hypothesis is substantiated, we can conclude that the capacities of moral agency provide us with relatively reliable mechanisms for achieving moral goals. So we can appeal to their use in attempting to justify moral beliefs, motivations and actions and in trying to understand the nature and function of morality.

6. *Ontological Connection Hypothesis*: If the explanatory hypothesis is substantiated, we can give a naturalistic ontological account of the nature and role of moral values in human agency.

7. *Meaningfulness Hypothesis*: An account of the biological and psychological bases of moral agency can make an important contribution to the vision of a meaningful human life, one connected in fulfilling ways to other humans, non-humans and the environment.

The Informational Connection Hypothesis is uncontroversial. Indeed, most anti-naturalists also grant the Explanatory Connection Hypothesis conceding, on the basis of the principle that "ought implies can" that the sciences have a role in the determination of moral values in so far as these are bound up in moral obligations, and the latter are tied to a moral agent's capacities. Thus, in so far as biology and psychology can tell us something about a moral agent's abilities and limitations, they set the parameters for any action, including moral action. However, the remaining five hypotheses are controversial. In particular, what anti-naturalists are not willing to concede is that the sciences are capable of bridging the is-ought and fact-value gaps that scientific naturalists assert can be bridged in these five hypotheses.[ii] From an epistemological perspective anti-naturalists deny the possibility of justifying any claim about positive moral values, norms or obligations, whether universal, general, particular or individual using only naturalistic means. Thus, they reject hypotheses four and five. From an ontological point of view, anti-naturalists deny the possibility of determining the nature and role of moral values using only naturalistic means. Thus, they reject hypothesis six. Their reason in both instances is straightforward, the sciences deal with facts and ethics deals with values and normative issues. To confuse these different tasks is to commit some form of the naturalistic

fallacy. The classical formulations are Hume's deductive fallacy and Moore's open question argument.

## Moral Values from Natural Facts

I distinguish two *versions* of the naturalistic fallacy, an epistemological version and an ontological version, corresponding to issues of justification and the nature of values, respectively. We can also distinguish two *forms* of the naturalistic fallacy: a *definitional form* that involves the illegitimate identification of values with facts, the Moorean form, and a *derivational form* that involves the illegitimate derivation of values from facts, the Humean form. Each version has two forms. In its definitional form, the epistemological version of the fallacy concerns confusing more immediate or direct *causes* of beliefs about values with more direct or immediate (basic) justificatory *reasons* for accepting a moral belief. In its derivational form, it takes mediate *causal sources* for moral beliefs for mediate (nonbasic) *justifiers* of moral claims. In each case, causal explanations are confused with or substituted for justifying reasons. Charged with the epistemological version of the naturalistic fallacy, the appropriate response of the scientific naturalist is to follow the lead of the naturalizers of epistemology. One needs to distinguish reliable from unreliable mechanisms, whether immediate or inferential, and give an account of the latter. I set this task aside.

On the other hand, the ontological version of the fallacy involves, in its definitional form, the confusion and illegitimate identification of natural facts, properties, or characteristics with moral facts, properties, or characteristics. In its inferential form, it involves the claim that natural causes bring about moral facts. I shall illustrate a way in which the scientific naturalist can pursue the task of providing scientifically based explanations of moral phenomena. I maintain that one can bridge the inferential form of the ontological gap by showing how naturalistically construed moral values play a role in accounting for moral agency. In terms of the above-mentioned hypotheses, I will be addressing the explanatory component of the Ontological Connection Hypothesis. I shall leave open the definitional side of the question in so

far as I shall not take a stand on whether naturalistically construed values should be characterized superveniently, reductively, or in an emergent fashion,

## A Selection Model for Understanding the Explanatory Role of Moral Values

The scientific naturalist claims that moral phenomena are natural as opposed to supernatural or non-natural phenomena, that is, they require matter as defined in the physical sciences for their existence and operation. Moreover, they are relational natural phenomena involving agents, the objects of their activities and the complex causal interactions that bring about and constitute these activities. Thus the naturalist maintains that the constituents and sources of moral agency and values, the subjective and objective sides of moral phenomena, are natural phenomena. One way to explicate and assess this claim is to examine the theories that form the bases of the naturalist's account of moral agency. The naturalist's contention is that these theories explain both the nature and constitution of moral agency from a completely naturalistic perspective. That is to say, they make use of standard sorts of explanatory patterns found in scientific disciplines, such as biology and psychology, disciplines that are prototypical examples of those that are concerned with studying the nature and causes of natural phenomena. To see this I now turn to a model of moral agency and illustrate how the origin, maintenance, and operation of its components are explained making use of current biological and psychological theories. . I contend that it illustrates how a scientific naturalistic model of moral agency and moral values can be constructed. I believe that the theories and findings that it is based on make it a plausible model, worth further pursuit, though I shall not argue for either of those contentions. I certainly do not contend that it captures completely the phenomena of moral agency and moral values.

Psychologist Albert Bandura (See, for instance, 1986) has developed a highly confirmed model of agency that can be extended and used to understand moral agency.[iii] The model of moral agency I am proposing includes four functional levels:

(1) a *base level*, constituted by evolutionarily acquired and behaviorally learned capacities and tendencies that incline the agent to act morally in given situations;
(2) a *behavioral level*, consisting of a set of moral beliefs and desires that are the immediate sources of moral actions and that are influenced by both base level and higher level components;
(3) a *reflective level*, comprised of higher level beliefs and desires, including moral norms or their equivalents, that influence the behavioral level beliefs and desires; and
(4) A *self-referential level*, constituted by conceptions of the self, including the self as moral agent, that motivate the use of moral norms and, indirectly, moral action.

In the complete model that I am proposing, then, I conceive of moral agency in its fullest extent as cognitively and morally motivated agency that is both reflective and self-referential. However, I do not contend that for an action to be moral it requires the engagement of all four levels of moral agency.

Focusing now on an explanation of moral agency, we can ask how each level of moral agency is acquired, maintained, and activated. The base level of moral agency is explained on the basis of three important sources. I conceive of the base level capacities to consist of those that are evolutionarily based and others that are due to social cultural learning. Of course, developmental processes involving learning will be needed for the acquisition of even the evolutionarily based capacities. To explain the origin, development, activation of such a capacity, one needs to call on the theory of natural selection from evolutionary biology and the theory of operant selection from behavioral psychology. Evolutionarily based moral capacities are the results of natural selection, and the operantly learned capacities at the base level are the consequences of social/cultural selection by means of operant reinforcement. The capacity for empathic distress is a plausible candidate for being such a base level moral capacity (Hoffman, 1984, Moore et al., 1984, Raddke-Yarrow et al., 1983, Zahn-Waxler et al., 1979, 1982 & 1990). Furthermore, the cognitive, motivational and behavioral capacities constitutive of the behavioral,

reflective, and self-reflective levels of moral agency are in part the results of social/cultural and cognitive selection process. Each of the explanatory theories that account for these levels of moral agency has the structure of a selection theory. Moreover, at each level moral values play an explanatory role by means of the processes of natural selection, social/cultural selection or cognitive selection.

I shall take causal explanations to include explanations in terms of constitutive factors or in terms of either efficient or final causes. Efficient and final causes are often distinguished as mechanical and teleological. Mechanical and teleological explanations refer respectively to explanations in terms of a phenomenon's antecedents and consequences respectively.

The expansive scientific naturalistic account of moral agency that I am advocating places the explanation of the various capacities constitutive of moral agency within the larger framework of teleological explanations in the sciences. Explanations of the capacities that enable intentional actions, goal-directed behaviors (based on past reinforcement) and functions based on adaptations, all display a common teleological structure, where the consequences which serve to explain the acquisition and use of the moral capacities in question are moral values.[iv] That structure has the following form:

(1) Capacity C in organism O tends to bring about effect E in situation S.

(2) C is there in O because in the past C has often been successful in bringing about E.

(3) Having C and bringing about E in S allows O 1's to do better than O 2's which have trait C' or better than O-1s themselves would have done, if they had had C' rather than C.

(4) When Es are in the moral realm, O-1's doing better than O-2 means doing better morally.

The causal clause, (1), refers to the current causal activity of capacity C in bringing about E, and the goal clause, (2), to the presence of C because of its past *successful* causal activity in bringing about E. In each type of teleological process, the presence of the disposition or capacity is due in part, at least, to *successful* past performances. Since a selection process is involved there is selection among variant capacities. In the case of organisms with relevant, heritable

genetic differences the selection is evolutionary. In the case of organisms that differ because of non-genetically-based non-cognitive or cognitive capacities the selection is social/cultural and/or intentional. What is selected for is differentially good or bad for the organism and others.[v] In the case of humans at least, some of these goods are moral goods, that is, (1) the goods of human flourishing, for instance, food, shelter, clothing, safety, companionship, the development of intellectual, creative, practical and social capacities and (2) goods of the human community, for instance, social and distributive justice and moral rights. The schema leaves open whether these moral goods are to be understood to be reduced to, supervene on, or emerge from their non-moral bases. In any case, these moral goods are understood in an entirely naturalistic fashion so that they can play an explanatory role in the acquisition, activation, and operation of the moral capacities constitutive of moral agency.

Although I am not able to support it here, I maintain that there are sufficient scientific results of both the theoretical and empirical sort to support the claim that the above selectionist account of the role of moral values in the origin and maintenance of moral agency. Thus, I contend that the explanatory component of the Ontological Connection Hypothesis is supported at least to the extent that it makes further pursuit of the expansive scientific naturalization of ethics that I am proposing worthwhile.

## Conclusion

In this paper I have attempted to sketch the outlines of a scientifically based explanation of moral agency, thus providing an illustration of an expansive scientific naturalistic account of one aspect of a central feature of traditional metaethics, that of the explanatory role of moral values in moral agency. My larger contention for which I have not argued here is that all the central features of the discipline of ethics can be scientifically naturalized in the sense of confirming the seven substantive hypotheses that I have outlined earlier. Although not as far advanced as the naturalization of epistemology, the scientific naturalization of ethics is, I contend, a project worth further pursuit.

## References


Bandura, A. (1986), *Social Foundation of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall.

Bradie, M. (1994), *The Secret Chain: Evolution and Ethics*. Albany, NY: State University of New York Press.

Brandon, R. (1990), *Adaptation and Environment*. Princeton: Princeton University Press.

Boyd, R. (1988), "How to be a Moral Realist", in G. Sayre-McCord, (ed.), Essays on Moral Realism. Ithaca: Cornell University Press, pp. 181-228.

Darwall, S., Gibbard, A. & Railton, P.: 1992, '"Toward Fin de siècle Ethics: Some Trends", *Philosophical Review* 101, 115-189.

Flanagan, O. (1996), "Ethics Naturalized: Ethics as Human Ecology", in L. May, M. Friedman, and A. Clark (eds.), *Minds and Morals: Essays on Ethics and Cognitive Science*. Cambridge, MA: The MIT Press, pp. 19-43.

Flanagan, O. (1996), *Self Expressions: Mind, Morals, and the Meaning of Life.* New York: Oxford.

Godfrey-Smith, P. (1994), "A Modern History Theory of Functions", *Nous* 28: 344-362.

Goldman, A. I. (1992), *Liaisons: Philosophy Meets the Cognitive and Social Sciences.* Cambridge, MA : The MIT Press.

Hoffman, M. (1984), "Empathy, Its Limitations, and Its Role in a Comprehensive Moral Theory", in W. Kurtines and J. Gewirtz, (eds.), *Morality, Moral Behavior, and Moral Development*. New York: Wiley, pp. 283–302.

Kitcher, P. (1993), "Function and Design", in P. French, T. Uehberg, Jr. and H. Wettstein, (eds.), *Midwest Studies in Philosophy*. Vol. XVIII, *Philosophy of Science.* Notre Dame, Indiana: Notre Dame Press, pp. 379-397.

Kitcher, P. (1992). "The Naturalist Returns", *Philosophical Review* 101, 53-114.

Kornblith, H. (1994), "Introduction: What is Naturalistic Epistemology", in H. Kornblith (ed.), *Naturalizing Epistemology* 2nd Edition. Cambridge, MA: The MIT Press, pp. 1-14.

Moore, B. S. and N.Eisenberg, (1984), “The Development of Altruism”, in G. Whitehurst (ed.) *Annals of Child Development.* Vol. 1 Greenwich, CT: JAI Press, pp. 107-174.

Millikan, R. (1989), "An Ambiguity in the Notion of 'Function'", *Biology and Philosophy* 4: 172-176.

Radke-Yarrow, M., C. Zahn-Waxler and M. Chapman (1983), “Children's Prosocial Dispositions and Behaviors”, in P. H. Mussen and E. M. Hetherington (eds.), *Handbook of Child Psychology*. Vol. IV, *Socialization, Personality, and Social Development.*. New York: Wiley and Sons, pp. 469-545.

Railton, P. (1986), “Moral Realism”, *Philosophical Review* 95: 163-207.

Sturgeon, N. L. (1985), “Moral Explanations”, in D. Copp and D. Zimmerman, (eds.), *Morality Reason and Truth*.. Totowa, NJ: Rowan and Allanheld, pp. 49-78.

Richards, R. (1987), *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior*r. Chicago: University of Chicago Press.

RINGEN, J. (1976), “Explanation, teleology and operant behaviourism': A study of the experimental analysis of purposive behavior”, *Philosophy of Science* 43: pp. 223-254.

Rottschaefer, W. A., (1998) *The Biology and Psychology of Moral Agency*. New York: Cambridge University Press.

Ruse, M. (1986), *Taking Darwin Seriously: A Naturalistic Approach to Philosophy*. New York: Basil Blackwell.

Sturgeon, N. L. (1986a), “Harman on Moral Explanations of Natural Facts” in N. Gillespie. (ed.), *Spindel Conference, 1986: Moral Realism*., *The Southern Journal of Philosophy , XXIV, Supplement*, pp. 69-78.

Sturgeon, N. L. (1986b), “What Difference Does it Make if Moral Realism is True?” in N. Gillespie (ed.), *Spindel Conference, 1986: Moral Realism*. *The Southern Journal of Philosophy , XXIV, Supplement*,. pp. 115-141.

Wright, L. (1973), "Functions", *Philosophical Review* 82: pp. 139-168.

----------. (1976), *Teleological Explanations.* Berkeley: University of California Press.

Zahn-Waxler, C., M. Radke-Yarrow, and R. A. King (1979), “Child-Rearing and Children's Prosocial Initiations Toward Victims of Distress”, *Child Development*. 50: 319-330.

Zahn-Waxler, C. and M. Radke-Yarrow (1982), “The Development of Altruism: Alternative Research Strategies”, in N. Eisenberg (ed.), *The Development of Prosocial Behavior* . New York: Academic Press, pp. 109-137.

Zahn-Waxler, C. and M. Radke-Yarrow (1990), "The Origins of Empathic Concern", *Motivation and Emotion* 14: 107-130.

[i] What are the relationships, if any, between ethical and scientific knowing? Scientific knowing is typically described in terms of observation, experimentation, the formulation and testing of hypotheses and theories, prediction and explanation. The issue of methodological connections concerns the question of whether there are similar sorts of cognitive processes involved in ethical knowledge. Although I believe that there are significant methodological connections between a scientific naturalistic account of ethical methodology and the methodologies of the sciences, I cannot pursue that issue here.

[ii] The critical connection hypothesis is not specific about whether the proposed critiques are factual or evaluative or both. In so far as it involves evaluative criticism, it, of course, relies on confirmation of at least the epistemological and normative hypotheses.

[iii] I supplement Bandura's model with what I call a base level, making use of sociobiology, operant theory, and Martin Hoffman's (1984) theory of empathic distress.

[iviv] Larry Wright (1973, 1976) is the source of modern discussions of the structure of teleological explanation. I follow roughly the modified versions of Millikan (1989), Kitcher (1993) and Godfrey-Smith (1994) as they apply to biological adaptations and functions, without taking sides on their differences. Ringen has worked out the case for operant conditioning. Although I cannot argue for it here, Bandura's social cognitive account of behavior also fits the pattern for intentional action.

[v] Brandon (1990) makes a similar sort of suggestion.