How to adopt a logic

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Introduction

Strategy

- Under the label “the adoption problem” philosophers of logic have started to discuss a challenge that Kripke presents against Quine’s view on logic.
- Which aspect of a broadly Quinean view of logic is the target of the adoption problem is, however, not always clear (to us, in any case).
- We propose to begin by considering the adoption problem as a problem for adopting a *new* logic, thus as a propblem that targets Quine’s view on the revisability of logic.
- Finding that here the adoption problem is not substantial here, we will investigate alternative targets.

What is the problem?

- According to Kripke, considerations that are similar (if not identical) to those that Quine used to critisize conventionalism should also apply against revisionism.
- The point being that we can't simply adopt a new logical rule.

Structure of the Talk

1. Quine's challenge to conventionalism
2. Kripke's argument
3. Assessment of Kripke's Argument
4. What can we adopt?
5. Where can we adopt?
6. Logical theories
7. Alternative Targets for the Adoption Problem

Quine’s challenge to conventionalism

Truth by convention

In the adoption of the very conventions (the schematic axioms of propositional logic) whereby logic itself is set up, however, a difficulty remains to be faced. Each of these conventions is general, announcing the truth of every one of an infinity of statements conforming to a certain description; derivation of the truth of any specific statement from the general convention thus requires a logical inference, and this involves us in an infinite regress. (Quine, *Ways of Paradox*, 103)

Truth by convention

- The upshot of Quine's discussion is that a logic can not be adopted by convention from scratch.
- Quine does agree that a logic may be adopted from scratch as a regularity of behavior, but he thinks that the label 'convention' does not do any explanatory work then: such "conventions" are indistinguishable from firmly held beliefs.
- The latter is his preferred view: logical and mathematical statements are just more firmly held beliefs; in extraordinary circumstances they may be given up and a new logic thus may be adopted.

Kripke's Argument

Kripke on the adoption problem

Let's try to think of someone – and let's forget any questions about whether he can really understand the concept of "all" and so on – who somehow just doesn't see that from a universal statement each instance follows. But he is quite willing to accept my authority on these issues – at least, to try out or adopt or use provisionally any hypotheses that I give him. So I say to him, 'Consider the hypothesis that from each universal statement, each instance follows.' Now, previously to being told this, he believed it when I said that all ravens are black because I told him that too. But he was unable to infer that this raven, which is locked in a dark room, and he can't see it, is therefore black.

Kripke on the adoption problem

. . . And in fact, he doesn't see that that follows, or he doesn't see that that is actually true. So I say to him, 'Oh, you don't see that? Well, let me tell you, from every universal statement each instance follows.' He will say, 'Okay, yes. I believe you.' Now I say to him, ' "All ravens are black" is a universal statement, and "This raven is black" is an instance. Yes?' 'Yes,' he agrees. So I say, 'Since all universal statements imply their instances, this particular universal statement, that all ravens are black, implies this particular instance.' He responds: 'Well, Hmm, I'm not entirely sure. I don't really think that I've got to accept that.'

Kripke on Quinean revisionism

[T]he Carnapian tradition about logic maintained that one can adopt any kind of laws for the logical connectives that one pleases. This is a principle of tolerance, only some kind of scientific utility should make you prefer one to the other, but one is completely free to choose. Of course, a choice of a different logic is a choice of a different language form.

Kripke on Quinean revisionism

. . . Now, here we already have the notion of adopting a logic, which is what I directed my remarks against last time. As I said, I don't think you can adopt a logic. Quine also criticises this point of view and for the very same reason I did. He said, as against Carnap and this kind of view, that one can't adopt a logic because if one tries and sets up the conventions for how one is going to operate, one needs already to use logic to deduce any consequences from the conventions, even to understand what these alleged conventions mean.

Kripke on Quinean revisionism

…This is all very familiar as a criticism of Carnap. Somehow people haven't realised how deep this kind of issue cuts. It seems to me, as I said last time, obviously to go just as strongly against Quine's own statements that logical laws are just hypotheses within the system which we accept just like any other laws, because then, too, how is one going to deduce anything from them? I cannot for the life of me, see how he criticises this earlier view and then presents an alternative which seems to me to be subject to exactly the same difficulty.

Assessment of Kripke's Argument

Reactions to the Adoption Problem

- Several authors (Michael Devitt, Jillian Rose Roberts, Graham Priest) seem to take this problem very seriously and primarily discuss how one can get to be trained in a logic such that one can be said to have adopted it properly.
- We try to take a step back here, and first really just concentrate on what triggers the supposed regress in the first place.

Aim of this assessment

- We want to take a closer look at what this problem actually means for the (Quinean) revisionist.
- What is required for the adoption of an inference rule?
- Which types of logical revision are in fact faced with this problem?

Local and Global Adoption

- Kripke presents the problem as a problem for the adoption of a rule that is provided by an oracle.
- In Kripke's case the revising subject is just supposed to revise its logic in a specific, local way.
- However, the adoption of a logic might involve a different change in view completely.
- We will in this talk now only concentrate on Kripke's problem and reserve the broader picture for later work.

Logica docens / logica utens

- A logica docens (in our terminology) is an explicit theory that may or may not be formalized in mathematical terms.
- A logica utens (in our terminology) is the logic that an individual reasons with under idealized circumstances.

What are we revising when we are revising logic?

- It seems that the problem of how we can revise our *logica docens* is not at issue: we are dealing with an explicit theory which seems rationally revisable.
- Priest has a simple empirical argument here: *logica docens* is (rationally) revisable because it has been (rationally) revised.
- Thus, the relevant issue seems to be how can the rational revision of our *logica docens* lead to a rational revision of our *logica utens*?

What can we adopt?

What can we adopt?

The Structure of Problem

Taking new logical laws as given and learning how to infer from them.

Question

Does such a procedure always presuppose that very rule?

Example: Existential Introduction

A. Consider the hypothesis that, if some predicate φ holds of an individual t, then there is at least one individual that satisfies φ.

B. OK, I am considering it.

A. This piece of paper is white, isn't it?

B. Yes.

A. Now 'this piece of paper is white' is telling us that the predicate 'is white' applies to this piece of paper. Therefore, since if some predicate φ holds of an individual t, then there is at least one individual that satisfies φ, so *there is something that is white*.

B. Sure, thanks!

Analysis

No *Existential Introduction* required. But *Modus Ponens* (or Cut) and some sort of *Universal Instantiation*.
(Notice: the recipe applies equally to conjunction introduction $p, q \Rightarrow p \wedge q$.)

Universal Instantiation?

Our Example

If one accepts the argument $\langle \varphi(t/v), \exists v \varphi \rangle$, then she would accept $\langle P(t/v), \exists v P \rangle$.

Kripke's Example

From $\langle \forall v \varphi, \varphi(t/v) \rangle$ to $\langle \forall v P, P(t/v) \rangle$.

A Weaker Principle

Schematic Substitution (SCS)

For any *formula* φ, if $\Phi(\varphi)$, then $\Phi(P/\varphi)$, for some fixed argument pattern Φ.

Schematic substitution is a presupposition of our reasoning: *intuitive* and *metatheoretic* in Kripke's sense.

A recipe for adoption

1. We're given a logical schema:

$$\text{if } \Phi_1(\vec{X};\vec{z}) \text{ and} \ldots \text{and } \Phi_k(\vec{X};\vec{z}), \text{ then } \Psi(\vec{X};\vec{z}),$$

2. ... and a schematic instance of the antecedent of the conditional

$$\Phi_1(\vec{A};\vec{t}) \text{ and} \ldots \text{and } \Phi_k(\vec{A};\vec{t})$$

3. By Schematic Substitution (scs):

$$\text{if } \Phi_1(\vec{A};\vec{t}) \text{ and} \ldots \text{and } \Phi_k(\vec{A};\vec{t}), \text{ then } \Psi(\vec{A};\vec{t}),$$

4. Finally, by Modus Ponens/Cut: $\Psi(\vec{A}.\vec{t})$.

Where can we adopt?

When can we adopt?

Target inferences

The pattern of adoption presupposes some logical principles and the capability of inferring from them.

When is this a problem?

Two cases: ADD and DROP

DROP

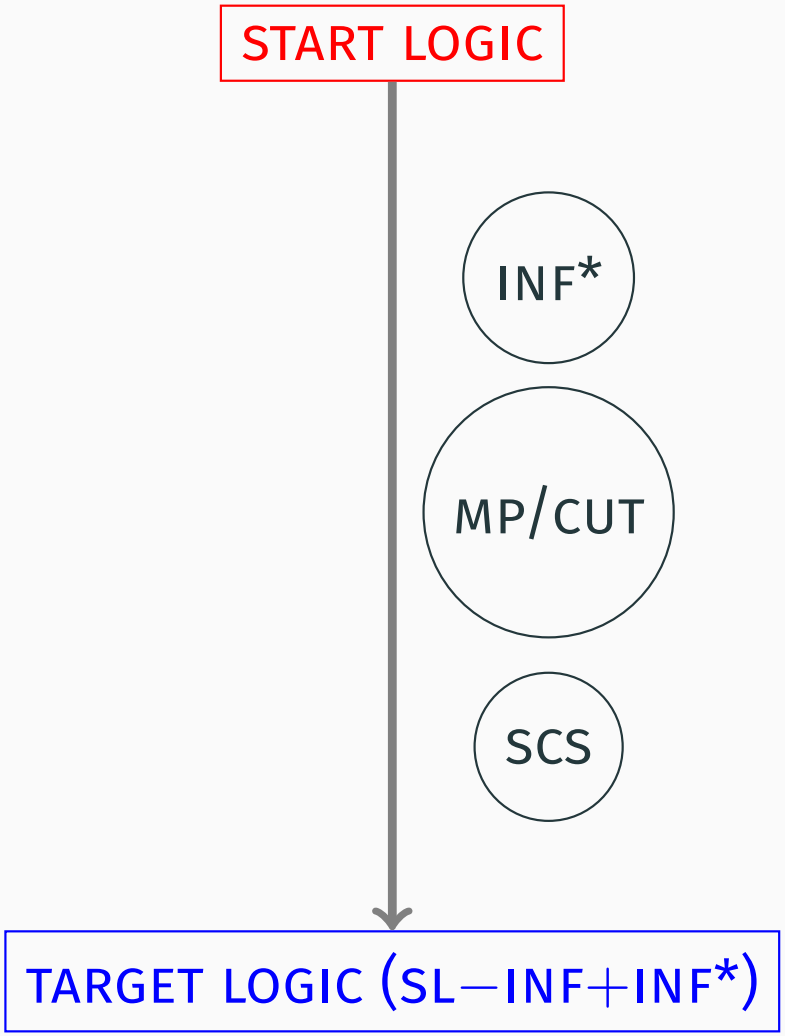
Revise downwards by restricting, or dropping altogether some logical principles.

Most of the cases of logical revision amount to cases of DROP.

ADD

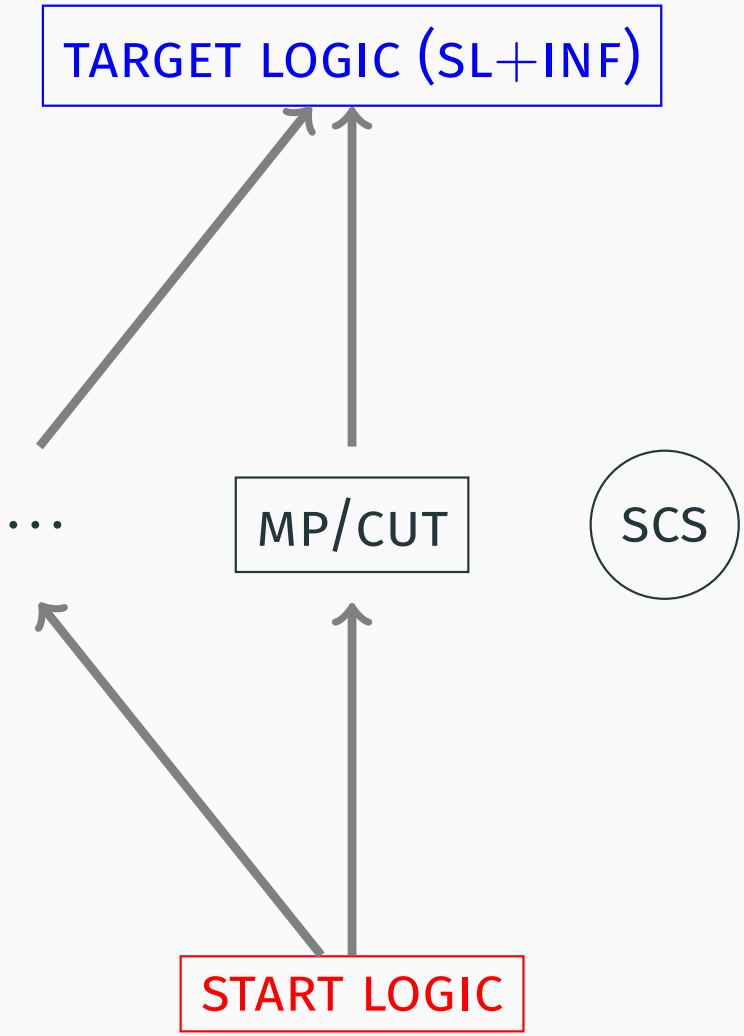
Revise upwards by generalizing or adding logical principles.

Why there's (almost) no issue with DROP



1. SCS is a presupposition to any logical competence. We stipulate that INF≠SCS.
2. INF≠MP. No issue (assuming that MP/CUT are in SL, if not see below).
3. INF=MP. Then INF* could be used in place of MP in the pattern of adoption (if one wanted to). In this case, we may not be able to re-adopt other unrestricted principles *that we have already*. But why would we want to?

ADD



- Again, SCS is presupposed.
- If MP/CUT are in SL, then there's no issue.
- If MP/CUT are not in SL, then our recipe does not license the adoption of INF.

Taking Stock: Three Claims

Claim 1

SCS and MP/CUT are fundamental principles. The former is presupposed by our handling of syntax.

Claim 2

While there are several formal systems without MP/CUT, there's little evidence that such systems may count as logica utenses (we'll go back to this in a moment).

Claim 3

The *local* adoption problem, given our set up, does not seem to be a problem.

Logical Theories

A richer framework?

Logical Theories

A logical theory enriches this acceptance of a class of validities with a collection of meta-theoretic claims concerning semantic and proof-theoretic notions associated with such inferences.

Two reformulations

Option 1

Revision and adoption of the purely logical part of one's metatheory, which may not align with the object-theoretic logical principles.

Option 2

Extend the status of logical principle to core metatheoretic principles such as consequence and truth, and consider their adoption and revision.

Ad Option 1

What we said above transfers with little modification, with the additional caveat that the impact of such a (global) adoption/revision may now be immediately devastating: i.e. it may impede or contradict entrenched mathematical beliefs.

Ad Option 2

The pattern of adoption does not change for standard principles involving truth and consequence. However, such principles may carry commitments that are then inherited in some of the principles involved in the pattern.

For instance, revise paradox-breeding principles such as the Tr -schema, one may require very strong forms of (SCS), inherited by the restriction of the Tr -schema one selects. For instance, we may need to be able to select Π^1_1-sets of instances of the Tr -schema (cf. Kripke 1975).

Alternative Targets

The Historical Problem of Adoption

- Perhaps Kripke's challenge is indeed closer to Quine's original point against conventionalism and concerns the question how on Quine's view logic could have ever gotten off the ground.
- After all, also on the conception that logic is just general, firmly held belief, there seems to be the issue that firmly believing Modus Ponens does not yet allow you to reason with it, if you don't yet have that capacity.
- Thus, as a general theory of what logic is, Quine's theory isn't better than conventionalism, since it still is open to the challenge that it can't explain how the first logical principles could have been adopted in absence of an already existing logic.

The Historical Problem of Adoption

- Although this well may be so, it is not clear that this is a challenge that Quine needs to address.
- Quine presents a picture according to which the first principles of logic are not adopted as a result of engaging with some explicit formulation of the principles (as conventionalism has it), but where they get adopted in behavior and only later are reconstructed in terms of explicit reasoning principles or rules.
- This adoption in behavior does not require that Quine's theory of belief revision applies to it, so he does not need to explain how homo sapiens managed to develop structured reasoning that is describable in terms of schematic inference principles.

Knowledge that and knowledge how

- Michael Devitt and Jillian Rose Roberts, and Graham Priest think that this is the real issue: How can we move to *knowledge how* from having accepted certain *knowledge that*?
- Take a familiar analogy: from reading a book about how one rides a bike, one doesn't know yet how to ride a bike in the sense that one won't be able (yet) to ride a bike.
- The latter will require a certain practical competence, a skill, that can't be acquired from just understanding a description of it (or an instruction).

Knowledge that and knowledge how

- They respond that also the adoption of logic requires that we train ourselves in the application of a rule in order to be able to apply it (or rather get a coach to train us).
- However, as our discussion above shows, the competence that rule application of logical principles requires is merely the competence with basic rules like Modus Ponens or SCS.
- The relevant *knowledge how* is the mere capacity to reason in the first place. Adoption of a new logic thus does not require training in new rules.

Reasoning and Intuition

- Another question may be what it takes to “see” new implications that one didn’t see as implications with the “old” logic, or how one can get to stop seeing implications that aren’t implications according to a new logic.
- This seems to be what Kripke has in mind when he is complaining that a merely formal account of logic would not be the same as an intuitive form of reasoning:

Reasoning and Intuition

What I mean is this: you can't undermine intuitive reasoning in the case of logic and try to get everything on a much more rigorous basis. One has just to think not in terms of some formal set of postulates but intuitively. That is, one has to reason. [. . .] One can only reason as we always did, independently of any special set of rules called "logic", in setting up a formal system or in doing anything else.

Reasoning and Intuition

- The regress is irrelevant, since the problem is not that for some principles (such as MP or SCS) there is a problem of circularity.
- The problem is rather that any formal statement of logical laws is not the same as a way of reasoning.
- Thus, whether such a formal account is stronger or weaker than our actual way of reasoning, we will not be able to adopt such logic.
- Seeing that a consequence follows is as impossible to adopt as unseeing that a consequence follows, according to that view.

Reasoning and Intuition

- This version of the adoption problem is now based on the following premisses, neither of which is supported by the regress argument:
  (a) recognizing that an inference is valid, or recognizing that an inference is invalid is itself non-inferential,
  (b) the competence for this non-inferential way of recognizing validity or invalidity can not be changed,
  (c) only pure applications of this competence count as reasoning,
  (d) the structure of the outputs of this competence is the proper subject matter of logic.

Reasoning and Intuition

- It is hyper-psychologistic to hold that the proper subject matter of logic is the systematization of our intuitive validity judgments.
- Our intuitive judgments about what follows from what, or what is implied by what are subject to various psychological biases.
- That we recognize these as fallacies is due to the fact that we can see by way of inferential, non-direct reasoning that these invalid inferences would lead us from true premisses to false conclusions.
- Logic systematises at best considered judgments about the validity of principles or particular inferences.

Conclusion

- It seems that the adoption problem fails to present a problem for Quinean revisionism *and* for a general Quinean philosophy of logic.