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## INFERENCEAL ROLE AND THE IDEAL OF DEDUCTIVE LOGIC

**ABSTRACT:** Although there is a *prima facie* strong case for a close connection between the meaning and inferential role of certain expressions, this connection seems seriously threatened by the semantic and logical paradoxes which rely on these inferential roles. Some philosophers have drawn radical conclusions from the paradoxes for the theory of meaning in general, and for which sentences in our language are true. I criticize these over-reactions, and instead propose to distinguish two conceptions of inferential role. This distinction is closely tied to two conceptions of deductive logic, and it is the key, I argue, for understanding first the connection between meaning and inferential role, and second what the paradoxes show more generally.

### 1. INTRODUCTION

There is a substantial question in the philosophy of language whether understanding a language involves knowledge of some metalinguistic facts about words. Does understanding a language in part consist in knowing what the words in that language mean? Most of the debate about this topic is carried out in the philosophy of language proper, where it seems to belong.<sup>1</sup> But recently a subculture of philosophers has emerged who have argued that one of the lessons we must draw

from issues in the philosophy of logic and theory of truth is that this picture of language understanding is mistaken. These philosophers aim to make sense of the idea that the paradoxes show that our language itself is inconsistent. One way this idea is spelled out is that the semantic facts that are constitutive of the meaning of certain words are inconsistent with each other. Language understanding thus can not be based on knowledge of semantic facts, and not even on true belief about semantic facts. The semantic ‘facts’ we take to obtain about our language don’t obtain, and so they can’t be known or truly believed. Another attempt to make sense of an inconsistency theory is to hold that language understanding involves belief in a false semantic theory. The main proponent of this line of thought is Douglas Patterson who has argued that we can’t know the truth conditional semantic theory for the language that we employ in understanding utterances of English since that truth theory can’t itself be true. The paradoxes show, he argues, that the compositional semantic theories on which language understanding is based itself aren’t true. And since these theories are not true they can not be known, nor can they be the content of a true belief. Language understanding is instead based on sharing a false belief about what semantic facts govern our language. But since this false theory is shared among speakers of the language, communication is still possible. We come to know what speakers are trying to say, even though we do not know what the truth conditions of the sentences they utter are.<sup>2</sup>

In this paper I will argue that this is all a mistake. The lessons from the semantic paradoxes should not be tied to the debate about meaning, understanding and knowledge this volume is dedicated to. Instead the proper lesson is one almost exclusively confined to the philosophy of logic. To make this point I will outline what I take to be the right reaction to the paradoxes, something I have defended in outline elsewhere, and hope to defend in more detail in the future.<sup>3</sup> This will, of course, be contentious, but it should be of interest for the debate in this volume nonetheless. If I am right then meaning can be constitutively tied to expressions having inferential roles, and the relevant expressions have the inferential role that we think they have, the ones that leads to the paradoxes. The source of the trouble that philosophers take the paradoxes to give rise to is a mistaken conception of logic, one

that arises not in the practice of reasoning or inferring, but in the philosophy of logic. Once it is cleared up we can see that the paradoxes have no connection to the debate about meaning and understanding.

## 2. INFERENCEAL ROLE, MEANING, AND LOGIC

There is a powerful idea about there being a connection between meaning and inferential role for certain expressions in our language. These expressions are the ones that are typically picked up in the study of logic, conjunction, disjunction, and so on. Which expressions precisely exhibit this connection is controversial, and one example of a controversial one is the truth predicate. We will see more about this case below. The expressions that are taken to exhibit this connection have as their function to form sentences that inferentially relate to other sentences in a certain way. And this is exactly the use we make of these expressions in our use of language. Since they have the function to play a certain inferential role it seems only fair to say that their meaning is tied to this inferential role. This is meant fairly neutrally. It does not endorse an inferentialist theory of meaning in general, nor any other substantial theory of meaning. And it does not require that speakers are disposed to infer a certain way, or that they make judgments about what inferences are good or bad. All the above means is that there is a connection between the meaning of certain expressions and an inferential role they play.

The threat for this alleged connection between meaning and inferential role to be discussed in this paper is the threat from the paradoxes. If we were to list the expressions whose function in communication can be tied to their figuring in certain inferences we would naturally list the usual logical expressions, but also the truth predicate and others as well. But these expressions can't all have the inferential role that we want them for, since the inferential roles we want them for allow us to infer anything. And thus either the meanings of these expressions can't be tied to the inferential role they are supposed to have, or else we are led to a form of an 'inconsistency theory of language', to be spelled out shortly. This is the connection I want to resist in this paper. The expressions in question, including the truth predicate, can have the inferential role we use them for, and this inferential role can

be tied to their meaning. To see how this can be so we need to look at what one should say about the paradoxes. In this part of the paper I will outline a position I have defended, and will defend further, elsewhere in more detail. I will suggest that the lesson from the paradoxes is one in the philosophy of logic, one about how deductive logic should be understood. There are no lessons for the theory of meaning of the kind alluded to above, nor for how we should conceive of language understanding.

Before we can look at what, if any, lesson should be drawn from the paradoxes for the connection between meaning and inferential role it is important to keep in mind what kind of inferential role the connectives and the truth predicate are supposed to have. There is a crucial difference between the inferential behavior of expressions like 'dog' and 'and'. 'dog' figures in all kinds of valid inferences, i.e. inferences that are such that the truth of the premises guarantee the truth of the conclusion. 'Fido is a dog.' implies 'Fido is an animal.' But 'and' in contrast has its inferential behavior characterized not just by an inferential relation to various other sentence with or without 'and' in them. The inferential role of 'and' is captured by a simple schema: we can specify what inferences 'and' figures in with simple schematic sentences. And in this schema everything is left schematic except for the 'and'. This is paradigmatically done with the natural deduction introduction and elimination rules:<sup>4</sup>

- (1) A and B. / A.
- (2) A, B. / A and B.

Of course, such schematic sentences by themselves are neither true nor false. They are schemas, not themselves truth evaluable sentences. But valid inference is supposed to be truth preserving, and so how can a schema be valid if it is neither true nor false? The answer is simply that schemas have instances, and via the instances of the schema we can understand the notion that the schema is truth preserving, and thus valid. We can therefore say that

[(VAL)] A schema is valid just in case instances of the schema are truth preserving.

Here we say that an instance is truth preserving just in case that if the premises are true then the conclusion has to be true. And so validity is tied to truth preservation, as it should be. It makes sense of why reasoning in accordance with valid deductive rules is rational. Belief aims at the truth and whatever you can conclude from true beliefs with truth preserving and valid rules will lead to true conclusions. Deductive inference is rational since the valid rules are truth preserving. So far so good.

When we think about which rules are valid in this sense we naturally come up with the natural deduction rules for classical logic, and the “naive” truth rules:

(3)  $A / \text{True}(A)$ .

(4)  $\text{True}(A) / A$ .

All this seems fairly compelling and hardly anyone would doubt it if there wasn't the big bad trouble: the rules allow you to deduce any conclusion whatsoever from no or only trivial premises. We can simply instantiate the rules with grammatical sentences of English to derive any conclusion whatsoever. This fact is best illustrated with Curry's Paradox. It simply uses the introduction and elimination rules for the material conditional, for truth, and for identity, to derive an arbitrary conclusion:

- (5) (a) Let  $S = \text{'If True('S') then Santa exists'}$  (Definition)  
 (b) Suppose:  $\text{True('S')}$ . (Assumption)  
 (c)  $\text{True('If True('S') then Santa exists.')} (= \text{Elim})$   
 (d)  $\text{If True('S') then Santa exists. (True Elim)}$   
 (e)  $\text{Santa exists. } (\rightarrow \text{Elim})$   
 (f)  $\text{If True('S') then Santa exists. } (\rightarrow \text{Intro})$  (Cancels assumption)  
 (g)  $\text{True('If True('S') then Santa exists.')} (\text{True Intro})$

(h)  $\text{True('S')} (= \text{Elim})$

(i)  $\text{Santa exists. } (\rightarrow \text{Elim})$

And, of course, the same argument shows that Santa doesn't exist, or anything else. What should be concluded from this surprising, although of course nowadays well-known, fact that the rules that we find so compelling allow us to derive any conclusion? In the next couple of pages I will discuss what the usual reply to this situation is and why it is unsatisfactory. Then I will discuss so-called ‘inconsistency theories’ and why they are unsatisfactory as well. After that I will outline the reaction I have defended elsewhere and why it is superior to the other alternatives. Finally I will get back to the relationship between meaning and inferential role.

### 3. PLAN A

Perhaps the most natural, most immediate reaction to the paradoxes is the following: The paradoxes show that we can derive any conclusion with a couple of apparently valid rules when we instantiate them with an apparently grammatical sentence, like the liar sentence or the Curry conditional (our sentence  $S$  above). Thus it must be that either one of the rules is not valid, or else somehow it is not appropriate to instantiate the rules with the problematic sentence. Thus what we must do is to find which one of the rules or the sentence is to blame: which is the invalid rule, or why can I not instantiate the problematic sentence in the valid rules? This is by far the most popular reaction to the paradoxes. Different philosophers of course disagree over whether it's one of the rules or the problematic sentence, and they disagree about which rule is to blame or why the sentence can't be instantiated. Many feel compelled to blame the truth predicate for the trouble. Almost all of the literature on the paradoxes is in this ballpark.<sup>5</sup> And since it is the most natural immediate reaction to the paradoxes I will call this approach *Plan A*. It is Plan A not because it necessarily deserves to be tried first, but because it is simply the most natural and immediate thing to try, which is witnessed by the fact that almost everyone tries it first. Despite its popularity, there are a growing number of philosophers who think that Plan A misses the point. There are a number of basic things wrong with Plan A that suggest that something completely

different must be right. Here are some of my main worries about Plan A:

1. *Revenge Paradoxes* There are some rather natural routes to argue that a particular rule is invalid. Maybe the truth rules only work for sentences that don't contain a truth predicate. Maybe there are levels of truth, etc.. With the rejection of a rule comes a certain story about the justification of its rejection, what in particular made that rule invalid. But the vocabulary used in the justification of the rejection of the rule can now be used to instantiate the rules again. It has to be considered a part of English, for which the rules are supposed to be valid. And this gives rise to the so-called revenge paradoxes: paradoxes that use the terminology of an alleged solution to the paradoxes to give rise to new, equally bad, or even worse, paradoxes. For example, if we solve the liar paradox by requiring levels of truth, what about the sentence 'This sentence is not true on any level.' It used the terms of the original solution to give rise to a new paradox.

Revenge paradoxes are often hard to find when the terminology used in an alleged solution is complicated. For some attempts to solve the paradoxes with a Plan A solution no revenge paradoxes are known, but for most attempted solutions revenge paradoxes are widely accepted by all except possibly the proponents of that particular solution. But since many of the more recent solutions can get so complicated one might have the suspicion that few are willing to master the terms of the solution enough to properly formulate the revenge paradox. The occurrence of revenge paradoxes seems to be a general threat to attempts to solve the paradoxes by rejecting one or another of the rules. It is a threat to Plan A in general.<sup>6</sup>

2. *Justifying the rules* Those who reject one of the rules as valid must explain why it is nonetheless legitimate to reason in accordance with the rule in ordinary reasoning when it does not give rise to paradoxes. To reason in accordance with a rule is to reason in a way that corresponds to what the rule allows, whether one is aware of the rule or not. So, when I transition from my belief that A and B to my belief that B then I reason in accor-

dance with the conjunction elimination rule since the contents of my beliefs correspond to the contents of the sentences which instantiate the schema. Classical logic in this sense corresponds to classical reasoning, reasoning that is in accordance with the rules of classical logic. If one thus rejects classical logic then one has to explain why it is nonetheless legitimate to reason classically in mathematics and other areas. In general it is, of course, not acceptable to reason in accordance with invalid rules, but for those who reject classical logic this seems to be exactly what we are doing in mathematical reasoning. Why is this legitimate? Why are we entitled to reason classically in mathematics, even though the classical rules are not all valid? It is not enough to answer this challenge by simply stating that in mathematics we are "in a consistent context", and in a consistent context I am entitled to reason classically.<sup>7</sup> How is "I am in a consistent context." supposed to help justify reasoning in accordance with invalid rules? It can't be seen as a premise in such reasoning, since reasoning with classical rules was rejected because I can derive too much with them. Having extra premises doesn't stop that even when the premises talk about what is consistent. Logic, after all, is monotonic, and the more premises the more one can derive. If the classical rules and the truth rules allow me to derive anything from no premises then having extra premises and these rules won't help, no matter what the content of the premises. On the other hand, simply because reasoning with invalid rules about a certain subject matter, mathematics, say, won't give rise to contradictions or error isn't enough to justify reasoning in accordance with the rules, nor does it entitle me to the conclusions I establish this way. Reasoning in accordance with the invalid rule 'x is American, thus x likes hamburgers' does not entitle me to the conclusions I reach even if the subject matter of my reasoning is the students in my class, all of which happen to like hamburgers. And if reasoning with invalid classical rules in mathematics is supposed to be different, I have yet to see how such a difference would give us any entitlement to the conclusions we reach with this invalid reasoning. Simply saying that we are entitled to reason classically in mathematics since this reasoning has in

fact proven unproblematic is not enough to justify that we are entitled to the conclusions we have thus achieved. It might well be, and in fact has frequently happened in the history of mathematics, that there was a form of mathematical reasoning that has proven to be unproblematic, but once it was found out to be invalid, all arguments that relied on it had to be reassessed.

One popular option for those who do not change classical logic but put all the blame on the truth predicate and other semantic notions is to say that since truth plays no role in mathematical reasoning the paradoxes are no threat, and classical arguments are justified there as they are everywhere else. But this is not quite right. Truth does occur in mathematical reasoning just like anywhere else. But can all reasoning involving truth be eliminated from mathematics? Maybe it can, but shouldn't it follow that we are not entitled to the conclusion we have reached using invalid rules until it has been shown that we don't need to rely on these rules, i.e. by eliminating all talk of truth from all mathematical proofs where it has surfaced? It would seem that we should not accept this reasoning until it has been redone. But this is quite absurd. We are, somehow, entitled to the conclusions we have reached in mathematics, and elsewhere. What is hard to see how this entitlement can be maintained if some of that reasoning was in fact not valid.

3. *Why no problem?* Finally, the Plan A approach does not explain one of the most puzzling features of the paradoxes: why they are in fact no problem whatsoever. No damage has ever been done by them outside of a philosophy department. No planes fell out of the sky because of them, no money was ever lost, no one was confused into believing that Santa exists because of them. But why not? If the Plan A approach was right then this should be surprising. We reason in accordance with rules which allow us to conclude that Santa exists, that planes should take off at 2 mph, and that you should bet everything on that limping horse. But no one is moved by any of the arguments, even though in general we are very moved by arguments we establish using just these rules. We are usually very moved when we establish using classical logic that planes need to go faster than 2 mph to take

off. Why is it that the paradoxes are simply insignificant?

Plan A is initially promising, but despite its popularity it seems to miss a crucial point about the paradoxes. The real answer seems to be somewhere else.

#### 4. INCONSISTENCY THEORIES

Another approach is sometimes presented as an alternative to the standard way of doing things. This approach comes in different flavors, which have more or less in common. The main idea they share is to hold that, in a sense to be spelled out, our language itself is inconsistent. This allows for there to be a close connection between meaning and inferential role, and it can maintain that the logical expressions, and even the truth predicate, have the inferential roles we take them to have. On a simple version of this idea certain inferential roles are constitutive of the meaning of certain expressions, and these inferential roles allow one to derive anything. In this sense the language itself, and not just sentences in that language, is inconsistent.

There are different versions of this idea, but here I will focus on three prominent proponents of it: Jody Azzouni, Matti Eklund, and Douglas Patterson. Of these Azzouni's and Patterson's versions are more radical than Eklund's. Some of these approaches to the paradoxes preserve a close connection between meaning and inferential role, but they are either clearly to be rejected, or they do not make real progress over the traditional versions discussed above. I will briefly discuss them in this section. Among the three authors mentioned Eklund's proposal is the least radical, and so I will start with him. Azzouni and Patterson are much more radical, and I will discuss them next.

Eklund, in Eklund (2002), proposes a sense in which languages themselves, and not just statements in these languages, can be inconsistent. Given that there are requirements on a competent speaker of a language to be drawn to make certain inferences with certain expressions in the language, we can say that a language is inconsistent just in case the requirements that come with competence in the language pull the speaker to make inferences that allow for the derivation of arbitrary conclusions. And this, Eklund holds, is the case with our language. Our

competence with the logical expressions gets us to feel a certain draw to make certain inferences, and these inferences are just the ones that lead to Curry's paradox, the liar and others.<sup>8</sup> This, if true, would nicely explain why we are drawn to infer as we do in the Curry paradox, even though the inferences can not all be valid. And Eklund takes this "explanation of pull" to speak in favor of his account. But this story so far does not resolve the paradoxes. The question remains which inferences are valid, even given the account of how we are pulled into reasoning in accordance with invalid ones. What is needed is to supplement Eklund's account with a Plan A solution to the paradoxes. And his account of the pull we feel does not seem to help with the problems that Plan A solutions have to overcome, in particular problems with revenge paradoxes. Eklund's account doesn't tell us which step, if any, in the Curry reasoning has to go, it only accounts for why we are pulled to make these inferences. Eklund proposes that the valid rules are the ones that best fit our pull, but still are consistent. Which ones these are is to be worked out in what in effect is a Plan A solution.

On the flip side, however, Eklund's 'inconsistency theory' is far less radical than the options to be considered shortly. He does not hold that inconsistent statements are true or that our language is globally defective. The logical expressions which pull us to accept certain inferences do not have the inferential role we are pulled towards, and which would allow us to derive anything. This seems only reasonable, but being less radical has the downside that he can't hold that he even proposes an answer to the question of which patterns of inference are valid, and which ones are not. And he doesn't make a proposal about what in the end the rational reaction is to Curry's paradox.

Azzouni fully endorses that in English the Curry Paradox is a valid argument establishing the truth of 'Santa exists'. In fact, the Curry Paradox establishes the truth of every sentence of English. Every sentence of English is true, Azzouni says. The lesson Azzouni draws from this is that we have to give up on English when it comes to serious inquiry. English is an inconsistent language that should be replaced with a different, consistent language. Such a 'regimented language', as Azzouni calls it, should be taken to replace English. Every sentence of English is true, but not every sentence in the regimented language

will be true. The lesson from the paradoxes, Azzouni holds with Tarski, in Tarski (1983), is that we must move to a more ideal language than what we have so far.<sup>9</sup>

While Azzouni's view on the one hand might seem quite reasonable, ('let's improve our language!'), on the other hand it might seem quite insane ('every sentence of English is true'). I will argue that in his combination the insane trumps the reasonable. The problem is simply this: given that I start out in English, can it be rational for me to abandon it, and speak a different regimented language instead? If Azzouni is correct then rational change in view becomes impossible. I can establish any conclusion with the degree of confidence that comes from deductive reasoning alone, from no premises. This is generally thought to be the most certain and most compelling way to establish a conclusion, more compelling even than that  $2+2=4$ . But what rational grounds could I have to abandon my language given that I can establish with unsurpassed certainty that I should not abandon my language? And, of course, also that I should abandon my language? If Azzouni is right then the whole project of rational belief revision collapses, and it makes no sense any more to conclude that we should abandon our language.

One way to try to avoid this that might be found in (Azzouni 2007, p. 602), although I wish it was more explicit, is the thought that we can only establish that the English sentence "We shouldn't change our language" is true, but not that we shouldn't change our language. Establishing the latter would require us to use the disquotational feature of the truth predicate which is to be rejected. All that the Curry Paradox and other paradoxes show is that certain sentences are true. It shows nothing about what is the case. This way of avoiding the radical conclusion strikes me as a big mistake. The Curry Paradox is an instance of deductive reasoning. And deductive reasoning establishes conclusions not just about what sentences are true. It establishes what is the case, according to the argument. The conclusion of Curry's argument is that Santa exists. Although the argument is written in English, these sentences simply say what the argument is, step by step. It doesn't mean that arguments are only about sentences.

Furthermore, the disquotational feature of the truth predicate is used in Curry's argument. If somehow it is not a legitimate move to

make, does this not suggest a Plan A approach to the paradoxes, trying to find the inference rule that is to be rejected? If this move is essential for Azzouni I can't think of another way of understanding his proposal than as a version of a Plan A strategy that puts the burden on the alleged inferential features of the truth predicate.

I conclude that if we understand Azzouni as not advocating a Plan A strategy then he can make no sense of the claim that we should abandon our language. If he is right, then we can establish that we shouldn't abandon our language with as great a certainty as could be hoped for. This is a case where trying to endorse the radical does not in fact help with the problem, besides of the implausibilities that come with it.

Patterson formulates his inconsistency theory in Patterson (2008) not in terms of inferential role but in terms of the truth theory that governs the understanding and production of utterances in the language. Since the truth theory we in fact employ in understanding and production of utterances allows for the derivation of the instances of the naive truth schema, and allows for classical inferences, our truth theory itself can't be true. It entails anything and no true theory can do that. Communication is however still possible, Patterson argues, since we are sharing a false belief about what truth theory governs our language. In effect we have false beliefs about what the words and sentences in our language mean, but since the false beliefs are shared by everyone, communication is still possible. We take our logical expressions and the truth predicate to be tied to meanings that lead to certain inferential roles since we have false beliefs about their meanings. But they do not have these meanings and these inferential roles. For Patterson the culprits in particular are the T-sentences that are relied on when drawing inferences involving the truth predicate. He holds, for example, that in the Curry inference we implicitly rely on a premise that isn't true, and this premise corresponds to the T-sentence for the Curry conditional.

Patterson's account invites two questions: first, if the truth theory we believe to govern our language is false, which is the true one? Or to put it differently, if the words and sentences do not mean what we take them to mean, what then do they mean? Second, what about

the inferences we make in deductive reasoning, say in the reasoning that leads to the Curry paradox? Although we believe every step to be valid, at least in isolation, they can't all be valid. So, which step is invalid? In general Patterson has two options in answering these questions: first, he could fall back to a Plan A option, aiming to show which one is the correct truth theory, and which step in the Curry reasoning consequently is invalid. This would make the approach rather conservative, compared to, say, Azzouni's, and on par with Eklund's in how radical it is. And it would face the same revenge problems that Plan A approaches face. Patterson does not take that option. Instead he takes the second, more radical, option: there is no correct truth theory for English that meets minimal conditions of 'empirical adequacy'. And from this, as he puts it, "we should draw the obvious conclusion: sentences of English *have no truth conditions*" (Patterson 2009, p. 414) [emphasis in the original]. And this option can be seen as even more radical than Azzouni's. For Azzouni, sentences of English at least have truth conditions, and all of them are true, and also false. For Patterson, sentences of English are not even false, since they are defective at a more basic level. This is a consequence that is hard to stomach. Patterson's approach is based on a truth theoretic approach to meaning: language understanding is tied to the (false) belief in what a truth theory says for your language. But since there is no true truth theory for your language, and since thus sentences in your language have no truth conditions, they also have no meaning. This should make clear what Patterson's answer must be to our second question from above: which inferences in the Curry reasoning are invalid? Since the sentences in the Curry argument don't have truth conditions the question of validity doesn't apply. It is a notion that should be reserved for things that at least can be true or false, and questions about whether the transition from one sentence to another is valid are just as misplaced as the question whether the transition from a cup to a glass is valid. The notions of valid inference among English sentences and its cousins can't have a place in a language as defective as ours is taken to be by Patterson. Without truth conditions there can be no preservation of truth in inference, and thus the question of which inferences in that language are valid is besides the point. But when questions of valid inferences don't apply the worry is that questions of rational inference don't apply ei-

ther. How can it be rational for me to accept a certain conclusion that doesn't have truth conditions? How can it be rational for me to accept Patterson's conclusions, assuming he is right?

Patterson, like Azzouni, can't rely on a distinction between the contents and truth conditions of beliefs and other mental states, and those of sentences in English, to save themselves from this radical conclusion. But they can't coherently hold, I maintain, that although all English sentences are either true or meaningless, our beliefs have perfectly fine truth conditions, with some being true and some being false. All the relevant issues that arise for sentences will carry over to thoughts and their contents. Thoughts have truth conditions, and they apparently can have just the truth conditions that give rise to paradoxes. Instead of the Curry conditional I could start out with the Curry thought, which has the content that if this thought is true then Santa exists. I can reason from this thought to the conclusion that Santa exists, using exactly the inferences in the Curry Paradox, modified for thoughts. Here, too, one either has to say which step is invalid, and why no revenge paradox will arise, or go all the way and hold that all our thoughts have no contents, or all of our thoughts are both true and false. The former is Plan A, and the latter can't be thought or said coherently.

I can't see how Azzouni and Patterson can avoid *The Great Collapse*: the view that our notions of truth and justification have to go out the window, since they do not apply properly to our beliefs and sentences. If the Great Collapse obtains then all rational inquiry is at a dead end. There is no place to go from here. But at the same time Azzouni and Patterson's own actions convey that there is a place to go from here, and we are arguing about which one is the reasonable one to occupy. The Great Collapse is not the answer.

I thus conclude that inconsistency theories in fact do not help in solving the problem that the paradoxes pose, besides their radical consequences. Although it is very plausible that the logical notions and the truth predicate are tied to a certain inferential role, the inconsistency theories don't help in making sense of how that can be. If meaning is tied to inferential role in the cases of the logical expressions and truth then the connection has to be understood in a different way. It must

be said that inconsistency approaches do carry the promise of making sense of the connection between meaning and inferential role in the case of the logical expressions, something that at least initially has a great deal of plausibility associated with it. But besides this appeal the inconsistency approaches discussed above either don't meet the challenge the paradoxes pose, as in Eklund's case, or they give the game away, as in Azzouni's and in Patterson's case. There must be a better option.<sup>10</sup>

Our options for something better, however, are limited. It seems that either Plan A has to work, or an inconsistency theory has to be right. What would be an alternative to both? It turns out that the correct reaction to the paradoxes is an alternative to both. In the following I will outline what I take that to be and how it understands the relationship between meaning and inferential role for the logical expressions and truth. The sweet spot in dealing with the paradoxes should, somehow, account for all of the following:

- Meaning and inferential role are tied together in the special cases of logic and truth.
- It is not a Plan A approach.
- It does not hold that every sentence of English is true or meaningless.
- It takes valid rules to be truth preserving.

All this is in fact the case, and here is why I think so. The crucial error that makes all this seem impossible is an error in the philosophy of logic, one about what deductive logic is. Once we see how deductive logic itself should be understood we will see that our problems have a nice solution.

## 5. THE IDEAL OF DEDUCTIVE LOGIC

### 5.1. *Default reasoning*

Before we can see how to understand deductive logic it will be helpful to briefly consider the kind of reasoning that deductive reasoning

is generally contrasted with: default reasoning. Default reasoning is what we engage in when we draw conclusions in reasoning in ordinary everyday situations like the following. Suppose I know that

(6) Bears are dangerous

and I learn that there is a bear in the hallway. From that I conclude that I am in danger. And this conclusion is one that I am entitled to draw, by default, even if I realize that not each and every bear is dangerous. However, when I get more information this entitlement might go away. If I learn that the bear in the hallway is a cute baby polar bear, declawed, etc., then I will lose my entitlement to believe that I am in danger, even if I really was entitled to believe it before. Default reasoning is non-monotonic: more information can take away entitlement to a conclusion that one was entitled to draw before. Deductive reasoning, so the main line goes, is contrasted with default reasoning in that it is monotonic: any conclusion that you are entitled to draw in deductive reasoning can never go away if you get more information.

Default reasoning is tied, somehow, to the truth of some, but not all, generic statements. Take for example (6). It has two readings, a *strict reading* and a *generic reading*. The strict reading is:

(7) Each and every bear is dangerous.

whereas the generic reading can be triggered by restating (6) as:

(8) Bears, in general, are dangerous.

In the generic reading (6) is tied to default reasoning. Default reasoning in turn is generally sharply contrasted with deductive reasoning. The former is non-monotonic, whereas the latter is monotonic: in default reasoning I can reason perfectly, but an established conclusion can be undermined in light of more information. In deductive reasoning, the standard story goes, this can never happen. But is this sharp division between deductive and default reasoning justified? I think it is not. I hold that deductive reasoning is a kind of default reasoning.

### 5.2. Two conceptions of formal validity

Deductive reasoning is tied to reasoning in accordance with formal rules which are the subject matter of deductive logic. Such rules are

schematic, as discussed above, for example “A and B, thus A”. The schematic rules by themselves are neither true nor false, but their instances are true or false. Valid schematic rules should be truth preserving in the sense that instances of the rules lead from truth to truth. And if deductive reasoning is reasoning in accordance with such truth preserving formal rules then deductive reasoning will be truth preserving as well. However, there are two ways of understanding all this that are tied to two ways of understanding formal validity, i.e. what it is for a schematic form to be valid. Above we stated formal validity as:

[(VAL)] A schema is valid just in case instances of the schema are truth preserving.

But the right hand side of this statement has two readings, a strict and a generic one. And correspondingly we can take each of these readings to specify a different notion of formal validity. We should therefore distinguish:

(9) A schema is *strictly valid* just in case each and every instance is truth preserving.

from

(10) A schema is *generically valid* just in case instances of the schema are truth preserving (understood as a generic statement).

And these two conceptions of formal validity lead to two ways of understanding deductive logic. First there is the standard way of thinking of deductive logic as being concerned with strictly valid schemas. I will call this *the ideal of deductive logic*:

(11) *The ideal of deductive logic*: the formal rules that are in the domain of deductive logic are strictly valid rules

It should be contrasted with the alternative conception of deductive logic, which I will propose is to be put in its place:

(12) *The default conception of deductive logic*: The formal rules that are the subject matter of deductive logic are default valid.

It is important to note that the difference between the default conception of deductive logic and the ideal of deductive logic is tied to what it is for a schema to be valid. Both conceptions can agree on what it is for instances of a schema to be valid or truth preserving, and what it is for a particular sentence to imply another one. So, both can agree on that in this particular case “Grass is green and snow is white” implies “Snow is white”, while they may disagree on what it is for the schema “A and B. Thus A” to be valid. The difference is one at the level of schemas, about formal validity, not necessarily at the level of instances, about truth preservation or (non-formal) validity. One might expect, of course, that a believer in the default conception will hold that some instances of a valid schema are not truth preserving. This however does not have to be so. A believer in the default conception of deductive logic might hold that the relevant notion of validity for schemas is that of default validity, even though conjunction elimination, say, is also strictly valid. The real difference is one in the philosophy of logic: what the subject matter of deductive logic is. Is it strictly valid schemas, or default valid schemas? Even though they might disagree on the subject matter of deductive logic, they might nonetheless have an interest in which schemas are valid in the other sense. The relationship between the two conceptions of deductive logic is worked out in more detail in [Hofweber](#).

The two conceptions of deductive logic correspond to two conceptions of deductive reasoning. On the ideal of deductive logic deductive and default reasoning are fundamentally different. One is monotonic, the other is non-monotonic. On the default conception of deductive logic, on the other hand, deductive reasoning is just a special case of default reasoning. When we reason deductively we are by default entitled to the conclusions we draw when we reason in accordance with a valid rule. However, this entitlement can go away in light of new information, just as in the case of ordinary default reasoning. We should look at how deductive reasoning is to be understood on the default conception more closely in the following section.

### 5.3. *Deductive reasoning on the default conception*

When properly reasoning deductively on the default conception of deductive logic one is entitled to the conclusions one draws with such reasoning, even, we can assume, to the degree one is entitled to the premises one reasoned from. If one reasons from no premises then one is entitled to the conclusions to the highest degree. So, whatever conclusion can be drawn from no premises when reasoning in accordance with valid forms of reasoning are conclusions one is entitled to hold to the highest degree. However, contrary to deductive reasoning according to the ideal of deductive logic, such entitlement can go away in light of further conclusions or evidence. To make this perfectly clear, the entitlement is at first there, but when further premises are added, when further information is gathered, or when further conclusions are drawn, the entitlement can go away. But when does the entitlement go away more precisely? Here there are different options that believers in the default conception of deductive logic can explore. On the strictest of such conceptions you lose the entitlement gained by carrying out an argument when you realize that the same argument could have allowed you to conclude any other conclusion as well. (There are also other options available, which I won't discuss here, but see [Hofweber](#).) So, if I reason a certain way, each step in accordance with a valid rule, and with this reasoning I draw a certain conclusion, C, then I am entitled to believe C to be the case. However, if I realize that the same argument would have allowed me to conclude also D, or E, or not C, or anything else, then the entitlement I had gotten for C through that reasoning goes away. It really was there in the first place, but now it went away.

This is exactly what happens, I hold, in the case of the Curry paradox. I reason step by step in accordance with valid rules, and I conclude that Santa exists. At this point I am entitled to the conclusion. I have established it with deductive reasoning alone, each step in the argument being flawless. But then I realize that the argument does not rely in the least on anything about Santa or existence. I could replace that with “Santa doesn't exist” or “ $2+2=5$ ” or anything else, and it would still work. Once I realize this I lose all my entitlement that I indeed had before to hold that Santa exists. Entitlement gained through deductive reasoning can go away.

On this conception of deductive logic, based on generic validity for forms of inference, and deductive reasoning as a special kind of default reasoning, I am entitled to the conclusions I reach with deductive reasoning, but the entitlement goes away once I realize that I could have reasoned to any conclusion with the same reasoning. So, in the Curry reasoning I am entitled to conclude that Santa exists, until I realize that I could have established anything with that argument, and then my entitlement goes away. This is the key to the proper reaction to the paradoxes. Since valid rules are default valid, but not necessarily strictly valid, classical logic and the naive truth rules can be valid, as I hold they are. These rules allow you to derive anything, in the sense that you can instantiate them with grammatical sentences and lead them to any conclusion whatsoever. But this doesn't mean that the rules aren't valid, and it doesn't mean that, all things considered, one should draw any conclusion whatsoever. We are entitled to the conclusions we draw, by default, but that entitlement can, and in the cases of the paradoxes, will go away once we reflect some more on our reasoning. I take this approach to the paradoxes to be a defense of classical logic and the truth rule. The mistake that lies behind our temptation to pursue a Plan A strategy is one at the level of theory. It is a mistake that occurs when philosophers try to deal with the paradoxes, not one that occurs when regular reasoners are confronted with them. Regular reasoners don't take the Curry reasoning to be any evidence whatsoever for the existence of Santa, even though they normally reason in accordance with the rules that are instantiated in the Curry reasoning, and they do take themselves to be entitled to the conclusions that are established in those cases. I think this is perfectly rational on the default conception of deductive reasoning. Since we realize that the argument would have worked for anything the entitlement goes away in these cases, but it remains in other cases where we couldn't have established anything, even while using the same rules. Philosophers have made the mistake of thinking that valid rules must be strictly valid. Thus that if you can instantiate rules to derive anything then one of the rules must not be valid. This is correct on the ideal of deductive logic, but false on the default conception of deductive logic. The mistake that gives rise to the trouble with the paradoxes is one in the philosophy of logic. And once it is avoided everything is fine. If the subject matter of deductive

logic is what forms of inference are default valid then there are no obstacles to the intuitively correct view that classical logic and the 'naive' truth rules are the valid rules. Of course, one can believe in the default conception of deductive logic and hold that other rules are valid instead, but nothing from the paradoxes shows that classical logic and the 'naive' truth rules are not valid, if the default conception of deductive logic is correct. On this conception of deductive logic we can see why the problems that arose with Plan A are not problems any more. We can see why we are entitled to the conclusions we establish when we reason classically, including the truth rules, and why the paradoxes are not a problem. That this account of the paradoxes does not give rise to revenge paradoxes is discussed in Hofweber (2008).

To think of deductive reasoning as a case of default reasoning seems to some philosophers to be unacceptable since it gives up the idea that deductive reasoning is indefeasible. Wouldn't we abandon our certainty in mathematics on such a conception of deductive reasoning? Wouldn't we just give up what seems to be special about deductive logic? I think these worries are misplaced. The conception of deductive reasoning as being absolutely certain, beyond any possibility of error, has to be given up on any conception of deductive reasoning. Clearly we can err in our reasoning, and clearly we can err in what we take to be valid reasoning. This should be beyond dispute. What is up for dispute is this: given that we reasoned in accordance with valid rules from true premises, could the conclusion nonetheless be false? The answer is 'no' on the ideal of deductive logic, and 'yes' on the default conception of deductive logic. However, this is not a difference in certainty or anything on an epistemic dimension. When we try to understand the certainty that we think we have when it comes to, for example, mathematical results then the two conceptions of logic will not differ significantly. On the ideal of deductive logic we can be certain that if the premises are true and the rules are valid then the conclusion is true. But we won't be able to be certain that the premises are true nor that the rules are valid. So, we won't be able to be certain that the conclusions are true. What matters is not certainty, but entitlement to the conclusions to a high degree. This we can have on both conceptions, and so I do not think that the default conception of

deductive logic takes away what we hoped deductive logic would give us, or at least what we could reasonably expect deductive logic to give us. Entitlement we can have, certainty we could never hope for.

I hold that the default conception of deductive logic and the ideal of deductive logic should not be seen as differing in the degree of entitlement one achieves with deductive reasoning. The difference is one in the stability that this entitlement has in light of new information. On the default conception one can be maximally entitled to a conclusion one has established with deductive reasoning, even though that entitlement can go away. How such dynamics is to be understood more precisely is of course an open question given what we have seen so far. However, I do not think that the difference in the stability of the entitlement in light of new information should be taken as engendering a difference in the degree of entitlement that is achieved with proper deductive reasoning. On the default conception of deductive logic the 'rational dynamics', how belief should be changed and how entitlement is passed along, is less dependent on the degree of entitlement we have for our beliefs than on the ideal of deductive logic, even if we restrict ourselves to strictly deductive reasoning.

To be clear, this conception of deductive logic and its role in the proper answer to the paradoxes needs to be spelled out more. I have done some of this in Hofweber (2008) in particular in relation to the paradoxes, and why on this view of the paradoxes we can be sure that revenge paradoxes are not a problem. I focus on issues in the philosophy of logic in Hofweber, and other work in progress. I won't attempt to spell this approach to logic and the paradoxes out in any more detail here. What is crucial for us now is to see what this means for the connection between meaning and inferential role for logical expressions, the main topic of this paper.

## 6. MEANING, INFERENCE, AND THE DEFAULT CONCEPTION OF DEDUCTIVE LOGIC

What then should be our conclusion about the connection between the meaning of logical expressions and their inferential role? In light of the above distinctions we can now distinguish two conceptions of inferen-

tial role, just as we had two conceptions of valid forms of inference. On the *strict conception of inferential role* the inferential role of an expression is captured by a schematic pattern of inference which is assumed to be strictly valid. In this sense the inferential role of 'and' will in part be captured by the pattern 'A and B, thus A', where this is supposed to be truth preserving for each and every instance. Strict inferential role corresponds to strict formal validity. On the other hand, the *default conception of inferential role* corresponds to generic formal validity. On this alternative conception of inferential role the inferential role of a logical expression is not tied to strict validity, but to the role the expression has in deductive reasoning as default reasoning. According to this conception the inferential role of an expression corresponds to a default valid inference. If 'and' has the inferential role listed above then by default I am entitled to infer 'A' from 'A and B', where 'A' and 'B' are replaced by grammatical instances in my language.

On the strict conception of inferential role it can't be that the logical expressions, including 'true', have the inferential role we take them to have, unless the Great Collapse obtains. At least one of these expressions can't be tied to the valid pattern of inference that we feel compelled it is tied to. But on the default conception of inferential role this isn't so. Each of the expressions, including 'true', can be tied to the inferential role we think it has, and these roles correspond to valid patterns of inference. When inferential role is properly understood then the connection between the meaning of the logical expressions and their inferential role is unproblematic, and this holds even when we include 'true' among these expressions for which such a connection between meaning and inferential role seems to hold. Furthermore, these inferential roles can be just the ones we take them to be: classical logic and the 'naive' truth rules. What gave rise to the view that this was impossible is nothing about our ordinary practice of reasoning. Ordinary reasoning is reasoning according to classical logic and the truth rules. The source of the trouble is in the philosophy of logic. It is the view that valid rules are strictly valid. This is an error at the level of the theorist, not the ordinary reasoner. The paradoxes do not give rise to any trouble for the ordinary reasoner. They give rise to trouble for the theorist who has the wrong view in the philosophy of logic. And similarly for the connection of meaning and inferential role. This intu-

itively plausible connection for the relevant cases can be maintained. It is an error at the level of the theorist, in this case the philosopher of language, that it can't be. The mistake here was to think of inferential role being captured by the strict conception of inferential role. That inferential role should be understood this way is a mistake. If we understand it according to the default conception of inferential role then the paradoxes pose no threat to the connection between meaning and inferential role for the standard logical expressions as well as the truth predicate.<sup>11</sup>

### Notes

<sup>1</sup>See, for example, Schiffer (1987) or Pettit (2002) for some of the issues in this debate.

<sup>2</sup>See Patterson (2008).

<sup>3</sup>See Hofweber (2008) and Hofweber.

<sup>4</sup>As is common, I restrict myself to sentential conjunction, i.e. uses of 'and' that combine sentences to form a sentence.

<sup>5</sup>For an opinionated overview of a good part of the debate, see Field (2008).

<sup>6</sup>See Beall (2007) for a discussion of revenge paradoxes from many different angles.

<sup>7</sup>Graham Priest suggests this in his Priest (1979).

<sup>8</sup>Eklund specifically also discusses paradoxes of vagueness, which we won't discuss here.

<sup>9</sup>See Azzouni (2006), especially sections 4 and 5.

<sup>10</sup>For more criticism of some, or all, of Azzouni, Eklund, and Patterson, see Scharp (2007), Patterson (2009), Bueno (2007), and Armour-Garb (2007), amongst others. Scharp's positive proposal in Scharp (2007) seems to me to suffer from the same problem as Azzouni's. Scharp proposes that we replace our inconsistent concept of truth with a better one. But if our concept of truth indeed allows us to infer anything then such a replacement can't be rational. The reasons available to us then wouldn't favor replacement since I can deduce deductively that I should replace, and that I shouldn't replace, leading to a rational dead end.

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