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UNDERSTANDING THE LOGICAL CONSTANTS AND DISPOSITIONS

ABSTRACT: Many philosophers claim that understanding a logical constant (e.g. 'if, then') fundamentally consists in having dispositions to infer according to the logical rules (e.g. Modus Ponens) that fix its meaning. This paper argues that such dispositionalist accounts give us the wrong picture of what understanding a logical constant consists in. The objection here is that they give an account of understanding a logical constant which is inconsistent with what seem to be adequate manifestations of such understanding. I then outline an alternative account according to which understanding a logical constant is not to be understood dispositionally, but propositionally. I argue that this account is not inconsistent with intuitively correct manifestations of understanding the logical constants.

1. UNDERSTANDING THE LOGICAL CONSTANTS

One great question in the epistemology of language is how to explain speakers' understanding of the lexical items of their language: what their competence with an expression consists in.

Something which understanding or competence with an expression should help to explain is speakers' use of—or competence with—that expression.[1] For instance, an account of your understanding the word 'cow' should contribute to explaining your correct uses of it. I shall

not explore here how that explanatory connection might be accounted for. But however it is accounted for, it seems that the following minimal constraint should be met by any account of competence with an expression:

> **(CT)** An account of speakers' understanding of an expression should be consistent with their correct performances with that expression.

This is a weak constraint, since the connection between competence and performance is much tighter. But this will suffice for the purposes of this paper. This constraint is also vague: consistency could receive many interpretations, and more should be said about what counts as a correct performance with an expression. The particular interpretation of (CT) that will be relevant here will be made more precise below.

This paper is concerned with the specific question of what it is to understand a logical constant. A logical constant is an expression that plays an important role in logic, and in particular in the theory of logically valid inference, i.e. of inference that is valid because of its logical form. There is no consensus on how to define a logical constant, and I shall not attempt a definition here. But there is some sort of consensus on the sorts of expressions that are at issue, e.g. expressions such as 'and', 'if, then', 'or', 'not', 'all', and 'some'.[2]

The question of what understanding a logical constant consists in has received a lot of attention recently, and prominent new accounts have generated substantive debates. Why does this question deserve special attention? The case of the logical constants has been at the forefront of a certain picture of understanding the expressions of a language, which is that of conceptual role semantics (CRS). On such a semantics a speaker's understanding of an expression is constituted by that expression's conceptual role—i.e. by its role in the speaker's 'cognitive economy'; in particular, the inferential relations in which the expression plays a part.[3]

The logical constants play a key role in logically valid inference. And so a natural thought, which is key to the prominent accounts, is that their meanings might be defined by whatever rules govern some of these inferences. Thus, on many accounts, the meanings of the logical constants are determined by basic inferential rules; more precisely by

the introduction and elimination rules of those constants. These rules can be thought of as implicit definitions of the meanings of the logical constants or as kinds of meaning postulates. For instance, on this sort of account, the meaning of 'if, then' is fixed by its introduction and elimination rules, namely Conditional Proof (CP) and Modus Ponens (MP):[4]

> (CP) An inference of Q from the assumption P entails if P, then Q. (MP) P and if P, then Q together entail Q.

Given this picture of meaning, it is natural to think that understanding a logical constant is a matter of being competent with the inferential rules that fix its meaning. Thus, for instance, understanding 'if, then' consists in being competent with MP and CP.

This paper attacks the particular implementation of this picture of understanding an expression given by the prominent account, and not CRS in general: on this account, competence with a logical rule is to be explained in terms of dispositions. I will argue that a dispositionalist account of competence with logical rules as an account of understanding the logical constants cannot meet constraint (CT). For this reason, such an account should be rejected.

In section 2, I outline the dispositionalist account. In sections 3-5 I argue against two versions of this account. Finally, in section 6, I outline and defend an alternative in terms of a propositional account.

2. THE DISPOSITIONALIST ACCOUNT

The idea of accounting for understanding a logical constant in terms of being competent with its introduction and elimination rules of course invites the question of what being competent with such rules amounts to. A popular answer to this question is that this competence should be explained in terms of dispositions. Thus, for instance, being competent with MP is having a disposition to infer according to it, i.e. a disposition to infer Q from P and if P, then Q.[5]

If this account of being competent with a logical rule is combined with the CRS account of understanding a logical constant, the result is that understanding a logical constant is having dispositions to infer according to its introduction and elimination rules. Thus understanding 'if, then' is having both a disposition to infer according to MP and a disposition to infer according to CP.

Consider Boghossian's dispositionalist account, which is the best developed dispositionalist account of understanding a logical constant. According to him, someone's dispositions to infer according to certain logical rules fix what they mean by the logical constants that figure in them. When someone has this sort of meaning-constituting disposition, they are 'entitled' or have 'the right' to the disposition.[6] This disposition can be had independently of having any (explicit) belief about the relevant rule, e.g. that it is truth-preserving. But to have that belief at all, and be justified in having it, one ought to have the concept as fixed by the disposition. As Boghossian puts it:

> ... without those dispositions there is nothing about whose justification we can intelligibly raise a question: without those dispositions we could not even have the general belief whose justification is supposed to be in question.[7]

So the view is that to count at all as understanding 'if, then' someone must have the meaning-constituting disposition to infer according to MP, where this is a *mere* disposition (not essentially connected to any propositional attitude). This disposition in turn grounds any sort of justification which they might have for their explicit beliefs about MP. But of course they may never reach the stage of forming such beliefs.

This picture is very attractive. Some even argue that it is required.[8] I will not here review all the reasons in favour of a dispositional account. I only mention a couple here, which relate to constraint (CT).

The dispositional account is attractive because it establishes a tight connection between competence and performance: being competent with a logical constant is having a disposition to use that expression in a certain way. Thus it might be thought that the account is likely to make the required explanatory connection between competence and correct performance.[9] It is also attractive because many people (e.g. young children) who seem to count as understanding a logical constant, because, for instance they reliably infer according to its introduction and elimination rules, cannot articulate these rules—e.g. cannot articulate MP and CP. Mere dispositions seem to be a good candidate to explain the sort of competence that can be attributed to such people.[10]

The simplest way of stating the dispositional account of understanding a logical constant explains understanding in terms of dispositions to infer (DI):

> **(UDI):** Understanding a logical constant is having dispositions to infer according to its introduction and its elimination rules.

The sample logical constant which I will focus on in the remainder of the paper is 'if, then', and thus, the following special case of (UDI$_{\text{'if, then'}}$):

> **(UDI$_{\text{'if, then'}}$)**: Understanding 'if, then' is having a dispositions to infer according to CP and MP.

For convenience, I am going to leave CP behind and focus only on the disposition to infer according to MP, which constitutes part of understanding 'if, then':

> **(UDI$_{\text{'if, then'-MP}}$)**: Understanding 'if, then' requires having a disposition to infer according to MP, i.e. a disposition to infer Q from P and if P, then Q.

(UDI$_{\text{'if, then'-MP}}$) seems to be the most natural account of how competence with MP might come into an account of understanding 'if, then'. However Boghossian thinks that a disposition with respect to MP should be stated in a different way—not as a disposition to *infer* according to MP, but as a disposition to *reason* according to it. As he puts it:

> Suppose that it is a fact about S that whenever he believes that p, and believes that 'if p, then q', he is disposed either to believe q or to reject one of the other propositions. Whenever this is so. . . I shall say that S is disposed to reason according to the rule *modus ponens*.[11]

Thus the disposition required to understand 'if, then', is rather the following disposition to reason (DR) according to MP:

> **(UDR$_{\text{'if, then'-MP}}$)**: Understanding 'if, then' requires having a disposition to reason according to MP, i.e. a disposition to infer Q, or reject P, or reject if P, then Q, from P and if P, then Q.

(UDI$_{\text{'if, then'-MP}}$) and (UDR$_{\text{'if, then'-MP}}$) attribute different competence to someone who understands 'if, then'. And thus it counts different sorts of performances as direct manifestation of understanding 'if, then'. For instance, the latter counts rejecting P as a manifestation of your understanding of 'if, then' but the former does not. So both accounts cannot be right. I shall discuss (UDR$_{\text{'if, then'-MP}}$) in detail in section 4. I will first discuss, in the next section, the account in (UDI$_{\text{'if, then'-MP}}$). Showing why this simple account fails will make it easier to see why the more complex account in (UDR$_{\text{'if, then'-MP}}$) also fails.

3. (UDI$_{\text{'IF, THEN'-MP}}$) AND CORRECT PERFORMANCE

In section 1, constraint (CT) was put forward as a constraint on an account of understanding an expression: it should be consistent with the ways in which we correctly exercise that understanding in linguistic performance.

Let's consider a special case of (CT), concerning 'if, then' specifically:

> **(CT$_{\text{'if, then'}}$)** An account of speakers' understanding of 'if, then' should be consistent with their correct performances with it.

I will now argue that (UDI$_{\text{'if, then'-MP}}$) is inconsistent with (CT$_{\text{'if, then'}}$), and so can't be the right account of understanding 'if, then'. To see this, consider the following example:

> **(Ice-Cream)** You form the project to buy an ice-cream and come to believe that you will buy an ice-cream. But you look at your watch and realise that if you buy an ice-cream, you are going to miss your train. You really don't want to do that. So you don't infer that you'll miss your train, and give up your project of buying an ice-cream instead.

Such kinds of examples have been made famous by Gilbert Harman who uses them to argue that ordinary reasoning—or reasoned change in view—has little to do with deductive logic.[12] The way I take the example of reasoned change in view in (Ice-Cream) is this: you are competent with MP; indeed intuitively you *exercise* or *manifest* your

competence with MP when you see what your initial beliefs (that you will get an ice-cream and that if you get an ice-cream you will miss your train) commit you to doing. But you do not *infer according* to MP (infer that you will miss your train). You give up one of your initial views *instead*. So although your competence with MP is manifested, it is not manifested by inferring according to MP.

Cases such as (Ice-Cream) are possible, indeed common: many pieces of ordinary reasoning cannot, or cannot wholly, be explained in terms of competence with deductive reasoning. Someone might reason in a perfectly acceptable way, without following a logical principle, although their competence with the principle might be in play.[13]

Before considering (Ice-Cream) and ($UDI_{\text{'if, then'-MP}}$) together, a clarification is in order about how I understand the idea of following a logical rule in reasoning. I take it that someone follows MP when they go from P, and if P, then Q, to Q, and I take it that the content of MP is roughly that P, and if P, then Q, together entail Q. Notice that this is *equivalent* to: P, and if P, then Q, and not-Q, together entail a contradiction. However, I take it that the latter does not state the content of MP, and so someone is not following MP when they reason in this way; for it is not about the consequent following the conditional and its antecedent, which is what I take the content of MP to be about. If it were a statement of MP, that is, if all of the principles equivalent to MP were taken to be MP, giving an account of knowing MP would be implausibly difficult. I shall come back to this issue in section 4, when I consider ($UDI_{\text{'if, then'-MP}}$).

Consider now ($UDI_{\text{'if, then'-MP}}$) together with (Ice-Cream). In (Ice-Cream), you start off with P, the project of buying an ice-cream and if P, then Q, the thought that if you buy an ice-cream, you will miss your train. At this point, the condition of manifestation of the disposition stated in ($UDI_{\text{'if, then'-MP}}$) obtains. So you should manifest the disposition—i.e. infer Q, that you will miss your train. But you do *not* do that and give up buying the ice cream *instead*.

The problem is that, given ($UDI_{\text{'if, then'-MP}}$), a case where you have the relevant initial beliefs but fail to infer (the condition of manifestation obtains but there is no manifestation) is a case in which it has a *falsifying exception*; for dispositions cannot fail to manifest when their conditions of manifestation obtain. That is the point of dispositions.[14]

What should we say? The problematic consequence of this is that it appears that you have lost the disposition stated in ($UDI_{\text{'if, then'-MP}}$): it was destroyed when you formed the belief not-Q. And since having the disposition is required for understanding 'if, then', your understanding too has been destroyed.

That any such thing has been destroyed when you came to believe not-Q is of course absurd. But it also entails that constraint ($CT_{\text{'if, then'-MP}}$) is not satisfied if ($UDI_{\text{'if, then'-MP}}$) is part of an account of understanding 'if, then': in (Ice-Cream) you manifest your understanding of 'if, then' when you see what your initial views commit you to do (i.e. infer that you will miss your train). But according to ($UDI_{\text{'if, then'-MP}}$) you *do not* manifest your understanding of 'if, then' at all because you do not infer according to MP. Thus this account of understanding 'if, then' is not consistent with this kind of manifestation of your understanding of 'if, then'. It counts your understanding as being destroyed in the process. More precisely: performance with 'if, then' of the sort displayed in (Ice-Cream) is inconsistent with what an account of understanding in terms of ($UDI_{\text{'if, then'-MP}}$) says manifesting understanding of 'if, then' ought to be like. One way to put it is by saying that this account makes the wrong prediction of what performance with 'if, then' might count as adequate—it counts correct uses as incorrect.

Also it might be that *typically* people revise their views rather than infer according to logical rules. There would be nothing wrong with this. So (Ice-Cream) cannot be dismissed as an atypical case, which would not obviously violate constraint ($CT_{\text{'if, then'-MP}}$).

A proponent of ($UDI_{\text{'if, then'-MP}}$) will no doubt have a lot to say about how to avoid these consequences. And she is likely to want to move to a more complex account or less stringent dispositions in order to avoid them. Indeed what would seem to be required here is something written into the statement of the disposition which entails that the disposition is not destroyed when the condition of manifestation (intuitively) obtains but there is no manifestation—there ought to be permissible exceptions to the disposition. The way Harman, who endorses a dispositionalist account, puts it is by saying that the disposition should be such that it 'may be overridden by other considerations'.[15] I shall not review here the possible things dispositionalists might say to

achieve this.[16] However, I now briefly address one thing which they might want to say here as an immediate reaction to the problem.

A dispositionalist might just go *stubborn* here, and argue that you really *do* infer Q (that you will miss your train) in (Ice-Cream): you first infer Q from your initial beliefs P, and if P, then Q; then you also come to believe not-Q, see that something has to go, and eventually reject P. The dispositionalist could even make the stronger claim that you *have to* infer Q *in order* to revise one of your initial beliefs: in order to give up buying an ice-cream because you do not want to miss your train, you have to believe that you will miss your train. That is, you have to reach an outright contradiction; for only then can you really see the conflict between this and believing that you will not miss your train.

However, going stubborn is not going to help the dispositionalist. I outline five problems with this move.

1. Firstly, there does not seem much by way of a motivation for insisting that you infer Q in (Ice-Cream), except that it is required by ($\text{UDI}_{\text{'if, then'-MP}}$). We would at least need some independent reason as to why we always have to reach explicit contradictions—something like an irrational commitment—in order to revise our views.

2. Secondly, going stubborn just seems to amount to denying the phenomenon of reasoned change in view: it amounts to denying that *instead of* inferring according to MP, you could revise your beliefs. But again, reasoned change in view seems possible.

3. Thirdly, it does not seem right to say that if you believe a conditional and its antecedent, any action on these beliefs will involve believing the consequent. It seems possible to appreciate or see the commitment of your beliefs without embracing them: considering your beliefs' commitments does not amount to believing those commitments.

4. Fourthly, if you really always infer Q once you believe that P and that if P, then Q, that means that sometimes you will form the belief that Q for an extremely short time - perhaps a nanosecond. But that might not be enough time to form a belief or a proper propositional attitude: it is unclear that propositional attitudes such as a belief could kick in for a nanosecond (say). So the outputs of the disposition stated in ($\text{UDI}_{\text{'if, then'-MP}}$) for instance might not be fully-formed propositional attitudes. Thus, dispositionalists at least owe us a story about what these outputs would be and how they would relate to such attitudes.

5. Fifthly, a big problem with going stubborn is that sometimes you might do nothing whatsoever once you believe P and if P, then Q: you might leave the matter there, get distracted or interrupted, or do something completely unrelated. The stubborn dispositionalist would also have to say that you do infer in such cases—otherwise we'd have a falsifying exception to the disposition with the destructions that this entails. However, it seems wrong to say that somehow you come to believe Q, and only after, perhaps, revise that belief to form no further belief.

So the dispositionalist cannot just be stubborn. She has to come up with a statement of the relevant disposition that is not falsified by the fact that you might manifest your understanding of 'if, then' but not by inferring according to MP, i.e. by inferring P once P, and if P, then Q are in place.

As I said, Boghossian's ($\text{UDR}_{\text{'if, then'-MP}}$) is meant to address these problems faced by ($\text{UDI}_{\text{'if, then'-MP}}$)—its inconsistency with reasoned change in view. So let's see whether he succeeds.

4. ($\text{UDR}_{\text{'IF, THEN'-MP}}$)

As we have seen in section 1, Boghossian gives the following as a partial account of understanding 'if, then':

> **($\text{UDR}_{\text{'if, then'-MP}}$)**: Understanding 'if, then' requires having a disposition to reason according to MP, i.e. a disposition to infer Q, or reject P, or reject if P, then Q, from P and if P, then Q.

($\text{UDR}_{\text{'if, then'-MP}}$) is a so-called 'multi-track' disposition, which allows several types of manifestation of the disposition, as opposed to a 'single-track' one, such as ($\text{UDI}_{\text{'if, then'-MP}}$), which only allows for one type of manifestation.[17] Interestingly, it allows for the rejection of P as a manifestation of the disposition, which seems to be exactly what we should be looking for in the case of (Ice-Cream).

Now, as stated, ($\text{UDR}_{\text{'if, then'-MP}}$) will not do; and this for two reasons:

Firstly, inferring Q, or rejecting either P or if P, then Q, are not the only things you might do once you're committed to both P and if P,

then Q. As said in section 2.5, you might also do nothing whatsoever: neither infer nor reject. Thus to capture the different things you might do once you believe both P and if P, then Q, doing nothing ought to be included as a possible manifestation of the disposition.

Secondly, there isn't one general reason why you might not infer Q given that you believe both P and if P, then Q. There are many different ones: P and if P, then Q, are not *as such* going to equally bring about inferring Q or rejecting P or rejecting if P, then Q or doing nothing. In particular, P, and if P, then Q is not, just like that, going to bring about rejecting P. To reject P as a manifestation of your disposition, types of stimuli different from P and if P, then Q have to be factored in. If anything, it is rejecting Q and believing if P, then Q that can bring about rejecting P. That is, if the disposition is really going to be multi-track, it should be by factoring different types of stimuli which explain the different types of manifestation.

I will set aside the first point, and look at how to modify ($UDR_{\text{'if, then'-MP}}$) so that it takes care of the second one. So there is no attempt to completeness here. Boghossian's (UDR'if, then'-MP) should really look like ($UDR_{\text{'if, then'-MP}}$)*, which states a disposition with different types of manifestation for different types of stimuli:

> **($UDR_{\text{'if, then'-MP}}$)***: Understanding 'if, then' requires having a disposition to reason according to MP, i.e.
>
> **(DI_1)** Being disposed to infer Q from P and if P, then Q.
> **(DI_2)** Being disposed to reject P from if P, then Q and not-Q.
>
> **(DI_3)** Being disposed to reject if P, then Q from P and not-Q.
> .....

I look at this account together with (Ice-Cream) in the next section. Before doing so, it is worth considering whether ($UDR_{\text{'if, then'-MP}}$)* can really be a serious contender as a partial account of understanding 'if, then'. I mention two difficulties.

(i) Firstly, it is unclear in what sense ($UDR_{\text{'if, then'-MP}}$)* gives a characterisation of competence with MP. The standard way of stating MP says nothing about rejection. Intuitively, rejecting propositions goes beyond the exercise of that competence, and it goes beyond manifestation of understanding 'if, then'. Activities of rejection may be closely

related to one's competence with MP, and might even require such competence. Still it does not seem that it is part of what it is to understand 'if, then'.

That rejection should be part of one's understanding of 'if, then' is especially implausible given the claim that the meanings of the logical constants is determined by their introduction and elimination rules (see again section 1.). For these rules say nothing about rejection. In particular MP and CP say nothing about rejection.

Other sorts of accounts of understanding of 'if, then' would be better at accommodating the idea that rejection is part of understanding it. Consider for instance an account of the meanings of the logical constants, not in terms of introduction and elimination rules, but in terms of truth-tables. Consider the truth-table for 'if, then'. It not only tells you what happens with Q, when you have P and if P, then Q being true, but it also tells you what happens with respect to Q with every other combination of truth-values for P and if P, then Q. When you look at this truth-table at a line where Q is false, you see that either P is true and if P, then Q is false, or that P is false and if P, then Q is true. That is to say, you see that there is a way for Q to be false, i.e. not-Q. So maybe on a truth-table account of the meanings of the logical constants, you could argue that something like rejection is part of your understanding of 'if, then'.

However, this truth-table account is not what dispositionalists about understanding 'if, then' have argued for. Also, this account will look problematic to many, and certainly to dispositionalists and conceptual role semanticists. This is because a truth-table account makes no connection between understanding 'if, then' and deductive reasoning, in particular, it makes no connection between understanding 'if, then' and inferring according to MP. And this is a connection which dispositionalists aim to capture.

(ii) Given ($UDR_{\text{'if, then'-MP}}$), understanding 'if, then' requires having a fairly sophisticated disposition, which involves not just inferring but also rejecting. The worry here is that it is perhaps too sophisticated and thus too demanding to be required for understanding MP.[18]

To see this, consider for instance (DI_2). (DI_2) looks very much like a disposition to infer according to Modus Tollens (MT); MT can be stated as follows:

(MT) From not Q, and if P, then Q, not-P follows.

That is (DI_2) might really be stated as follows:

(DI_2)*: Being disposed to infer not P from if P, then Q and not-Q.[19]

In this case, having a disposition to reason according to MP requires having a disposition to infer according to MT. Thus understanding 'if, then' requires understanding 'not', where understanding 'not' requires being disposed to infer according to the introduction and elimination rules for 'not'.

If understanding 'not' is part of understanding 'if, then', the worry is indeed that the account is too demanding. It may be that in the neighbourhood of understanding 'if, then' there is understanding 'not' or that there is a very tight connection between understanding 'if, then' and understanding 'not'. Maybe you even want to say that you could not understand 'if, then' if you didn't understand 'not'. But that doesn't mean that it's got to be part of understanding 'if, then'. By analogy, consider understanding 'red'. Perhaps we want to say that we should grant understanding 'red' only to people who are fairly good at applying 'red' to red things, and, perhaps as a consequence, not applying 'red' to things that are not red. That's fine, but that doesn't entail that understanding 'not red' is part of understanding 'red'.

Also, from a logical standpoint, MP is more basic than MT; MT is typically a derived rule (derived using MP). It would be a bit quick to infer from this that there is a conceptual priority of MP over MT. Still, it seems more likely that, if there is any kind of priority, it goes from understanding MP to understanding MT.

One might attempt to address this objection by denying that the move from (DI_2) to (DI_2)*, which presupposes that rejecting P is the same as coming to believe not-P. I.e. it presupposes the following parity principle:

(Parity) Rejecting a proposition isdf. coming to believe its negation.[20]

However, if rejecting a proposition is not defined in terms of believing its negation, the following view is open to the dispositionalist:

having a disposition to reason according to MP requires having dispositions to reject as well as to infer, where the former is not conceptually more demanding than the latter. Thus in particular a disposition to infer according to MT is not part of understanding 'if, then'.

Ian Rumfitt thinks that the meanings of the logical constants are given by their introduction and elimination rules; but he rejects (Parity).[21] So it is worth briefly considering his view. He thinks that there are two primitive speech acts, acceptance and rejection, where rejection is not defined in terms of acceptance and negation: rejecting a proposition need not be accepting its negation. Someone might reject a proposition and thereby not want to accept that it is false: for instance they might want to reject the proposition that they have not stopped beating their wife without wanting to assert that they have stopped beating their wife - because of its presupposition.

Rumfitt offers an account of the meanings of the logical constants in terms of basic logical rules which involve both acceptance and rejection as primitive speech acts (represented by different primitive symbols in the object language). In particular, some of the rules that characterise negation are stated using rejection (e.g. one of the rules for negation introduction says that from the rejection of a proposition acceptance of its negation can be inferred).

One might worry that rejecting (at least) involves holding not true (even if not being true indeed falls short of being false), i.e. accepting as not true. However, according to Rumfitt, a rejection of a proposition, written ' - P', should be understood as a question (i.e. 'P?') with a negative answer appended to it ('P? No'). Questions are not the sorts of things that are true of false; they rather have correctness and incorrectness conditions. So rejections are really correct or incorrect rather than true or false.[22] So there is not a conceptual connection between rejection and falsity.

Thus, given this framework, understanding 'not' is not part of understanding 'if, then', even if (DI_2) is in place, and so a disposition to infer according to MT is not part of understanding 'if, then'.

Going to this would be a bit quick however; for the way Rumfitt sets things up, there is no natural connection between rejection and MP. He characterises MP purely in terms of the speech act of acceptation: to paraphrase, if someone accepts both premises, they can accept

the conclusion. In his system, some of the other rules of proof that characterise material implication involve the rejection sign, but not MP. There is also no suggestion that competence with them is required to be competent with MP. Being competent with these rules is, according to him, necessary to understand aspects of the meaning of 'if, then'; but they do not connect with MP. So Rumfitt's rules are not the sorts of rules that a defender of ($UDR_{\text{'if, then'-MP}}$)* is looking for: although they involve a primitive, undefined, act of rejection, they are strictly rules of deductive reasoning: rules that say how to go from a set of premises to a conclusion. They give no instruction about giving up premises in a given application of MP.

There may be ways to use Rumfitt's notion of rejection in an account of ($UDR_{\text{'if, then'-MP}}$)*. That would require developing a—probably fairly complicated—proof-system, where each rule is stated both in terms of acceptance and rejection. But at this point the onus is really on the dispositionalist to show us how that might be possible and whether it would really be worthwhile. But as things stand it looks like ($UDR_{\text{'if, then'-MP}}$)* is really too demanding to be required for understanding 'if, then'.

5. ($UDR_{\text{'IF, THEN'-MP}}$)* AND PERFORMANCE

I now consider (Ice-Cream) together with ($UDR_{\text{'if, then'-MP}}$)*, and argue that the latter does not meet constraint ($CT_{\text{'if, then'}}$).

When (Ice-Cream) is considered, it is easy to see that an account of understanding 'if, then' in terms of ($UDR_{\text{'if, then'-MP}}$)* faces the exact same problem as that in terms of ($UDI_{\text{'if, then'-MP}}$).

To see this, consider (DI_1), which is one of the dispositions stated in ($UDR_{\text{'if, then'-MP}}$). ($DI_1$) is of course required as one of the dispositions that counts towards understanding 'if, then'; if anything it covers the paradigmatic way of manifesting understanding of 'if, then' on a CRS account of the meaning of 'if, then'. However it creates the exact same problem as ($UDI_{\text{'if, then'-MP}}$)—indeed it states the same disposition—when (Ice-Cream) is considered. Thus, in (Ice-Cream), you start with P and if P, then Q. Given ($UDR_{\text{'if, then'-MP}}$)*, ($DI_1$) is activated—you should infer Q. However, you do not do this. You come to believe not-Q and reject P instead.

It thus appears that ($UDR_{\text{'if, then'-MP}}$)* has a falsifying exception in the exact same way as before. And so it appears that (DI_1) would have been destroyed in the process—when you formed the belief not-Q. And that means that your disposition to reason according to MP has been destroyed, and given that on ($UDR_{\text{'if, then'-MP}}$)*, possession of this disposition is necessary for counting as understanding 'if, then', you have ceased understanding 'if, then' too. It was destroyed when you came to believe not-Q.

That any such thing has been destroyed when you came to believe not-Q is again absurd. And it entails that given ($UDR_{\text{'if, then'-MP}}$)* as part of an account of understanding 'if, then', constraint ($CT_{\text{'if, then'}}$) is not satisfied; for again, in (Ice-Cream) you manifest your understanding of 'if, then' when you see what your initial views commit you to do (i.e. infer that you will miss your train). On ($UDR_{\text{'if, then'-MP}}$)* however you do not manifest it, since you do not reason according to MP. Thus this account of understanding 'if, then' too is not consistent with this kind of manifestation of your understanding of 'if, then': your understanding is destroyed in the process. Again, performance with 'if, then' of the sort displayed in (Ice-Cream) is inconsistent with an account of understanding in terms of ($UDR_{\text{'if, then'-MP}}$)*.

One way of thinking of ($UDR_{\text{'if, then'-MP}}$)* is as an attempt to make your competence with MP dynamic by covering the different things you might do once P and if P, then Q are in place. The only advantage of ($UDR_{\text{'if, then'-MP}}$)* over ($UDI_{\text{'if, then'-MP}}$) is that it can in some sense capture aspects of a reasoning similar to that involved in (Ice-Cream) in terms of your disposition to reason according to MP: you start with P, and if P, then Q. (DI_1) gets activated. You infer Q. You then also form the belief not-Q. You reach a contradiction; you have to give up something. You want to give up Q. So that leaves you with believing P, if P, then Q and not-Q. Something else has to go. You want to hold on to if P, then Q and not-Q. (DI_2) gets activated and that enables you to reject P.[23]

But this is not the reasoning in (Ice-Cream). This is not a case of reasoned change in view. And there is no taking away the fact that (DI_1) is violated in (Ice-Cream). Thus ($UDR_{\text{'if, then'-MP}}$)* is ill-suited to track your reasoning in that very piece of reasoning.

So it seems that both ($UDI_{\text{'if, then'-MP}}$) and ($UDR_{\text{'if, then'-MP}}$)* make the wrong prediction about which performances with 'if, then' count as

adequate. They both fail to meet constraint ($CT_{\text{'if, then'}}$). They give us the wrong picture of how understanding 'if, then' connects with competence with 'if, then'.

Many other accounts of dispositions would have to be considered before it would be possible to reject dispositionalist accounts of understanding 'if, then' in general. But notice that any such account will have something like (DI_1) in place—if, perhaps, in a weaker or more complicated form. It is thus really the core of the dispositionalist accounts that is problematic. As I said, I will not review all the possible moves dispositionalists could make at this point. And no doubt there are many. Rather, I will turn to the question of whether a propositional account could handle (Ice-Cream) better and meet constraint (CT).

6. THE PROPOSITIONAL VIEW

In this section I outline briefly an alternative account of understanding the logical constants. I am not claiming that this is the only non-dispositional account that would be available, but this is one that does well in the context of reasoned change in view. I will not challenge here the assumption that understanding 'if, then' requires being competent with both its introduction rule CP and its elimination rule MP or the general picture of understanding given by CRS (even if I ultimately would be inclined to reject it). However I will challenge the idea that such competence should be accounted for dispositionally. Rather, I think it should be understood propositionally.

The failure of the dispositional account suggests the following two conditions for being competent with a logical principle, such as MP:

A. One's competence with MP shouldn't *bind* one to infer Q once they believe both P and if P, then Q.

B. An account of one's competence with MP should make good sense of the fact that you can *exercise or manifest* your competence with MP *without inferring according to* MP.

So here is a proposal, which meets these conditions: being competent with a logical principle is knowing a proposition—it is having propositional knowledge of that principle. In particular, being competent with MP is knowing a proposition.

So, the general initial propositionalist proposal is this:

(UP): Understanding a logical constant is knowing its introduction and elimination rules.

The special case of 'if, then':

($UP_{\text{'if, then'}}$): Understanding 'if, then' is knowing both CP and MP.

I again leave CP behind:

($UP_{\text{'if, then'-MP}}$): Understanding 'if, then' requires knowing MP, i.e. it requires knowing that P and if P, then Q together entail Q.

Given ($UP_{\text{'if, then'-MP}}$), a situation in which you believe both P and if P, then Q but do not infer Q, such as (Ice-Cream) is not one in which your response is inadequate. If you know the proposition that P and if P then Q together entail Q, that might of course give you a good reason to infer in a certain way, but that need not bind you to infer in that way. There is nothing binding about a bit of propositional knowledge—it will count as a consideration that might have some influence on your reasoning, but it is not going to bind you to infer Q, once you believe P and if P, then Q. This is to say that the fact that you do not infer according to MP in (Ice-Cream) is not going to be something that is inconsistent with your understanding of 'if, then'.

This means that conditions A and B are met. Although knowing MP might count towards inferring according to it, it seems that that knowledge would be manifested if you merely considered what knowledge of that proposition would commit you to do if you believed both P and if P then Q, without having to believe it.

And this also means that ($UP_{\text{'if, then'-MP}}$) meets constraint (CT): there need not be any suggestion that any knowledge or competence or understanding has been destroyed in (Ice-Cream): for the account is silent about what ought to happen once you believe P and if P, then Q. So there is no inconsistency there between your understanding of 'if, then' and you rejecting one of your initial views rather than inferring.

($UP_{\text{'if, then'}}$) says that understanding 'if, then' is having propositional knowledge of logical rules. Let me address some initial worries one might have about this.

Firstly, what matters here, when the issue concerns how competence coheres with performance, is the propositional aspect of the proposal. This is the aspect of the proposal that helps meeting ($CT_{\text{'if, then'}}$), not the fact that it is propositional knowledge that is talked about. So those who worry about whether understanding an expression could really involve propositional knowledge (e.g. because understanding does not seem to require justification, but propositional knowledge does) are so far free to drop talk of knowledge.[24] The key to the proposal is that understanding 'if, then' is having a propositional attitude to CP and MP. The knowledge bit is not what is doing the work.

Secondly, one might worry about the propositional aspect itself. The objection would be that raised in section 2, that a propositional account is conceptually too demanding. Having propositional knowledge of MP would require you to possess the relevant concepts (e.g. 'imply') that figure in MP. So the objection here is that that might be conceptually too demanding—e.g. young children might not have these concepts. This objection will have force only if the following assumptions are in place: first, that young children, for instance, reason according to MP or understand 'if, then'; second, that it is necessary to have an exact grasp of the concepts used to state MP to count as having propositional knowledge of MP—for instance the concept of implication.

Concerning the fact that a propositional account might be conceptually too demanding: it may well be that reasoning according to MP actually takes some hard learning and only arises at a relatively late stage. This is especially the case if we are talking here of reasoning according to MP in the sort of reliable or safe way needed to count as being competent with MP. If reasoning according to MP takes some learning, it is acceptable to say that young children and some other people may not count as knowing it.

Concerning grasping the exact concepts used in stating MP: suppose we subscribe to the division of linguistic labour. On this picture people with partial or shallow grasp of (meta-) logical concepts could still count as understanding 'if, then' on a propositional account (just like Putnam understands 'elm' and 'beech' but cannot tell elms and beeches apart). They would understand it deferentially. Maybe they would not be very good at explaining the rule, at telling a valid inference from one that's not, and they would sometimes commit fallacies. But on

that picture of understanding, which seems to be otherwise widely accepted, there would be no obstacle to saying that someone who does not exhibit a great deal of conceptual sophistication when it comes to logical concepts could count as understanding them. And if they understand them in this way, there would be no obstacle of principle to saying that they have propositional knowledge of logical principles.

This is just to say that a propositionalist has the resources to address the charge that appealing to propositional knowledge here is too demanding conceptually.

In closing I briefly discuss Boghossian's view on the connection between having a disposition to reason according to MP and having a propositional attitude towards MP. As mentioned in section 2, Boghossian thinks that having a disposition to reason according to MP is required in order to have any belief about MP or its status. When he states the relevant belief he states it thus:

> '...If p is true and that 'if p, then q' is true, then q has to be true.'[25]

This might come as a surprise, and one might have expected that he would have something about rejection here too, given that this belief is grounded in the multi-track disposition ($UDR_{\text{'if, then'-MP)}}$*.

However, one might also think that facts about rejections are somehow implicit in this statement of the propositional attitude involving MP. Now one worry which I raised with ($UDR_{\text{'if, then'-MP)}}$* was that, if (Parity) holds, it entails that one has to be competent with MT in order to count as understanding 'if, then'. Thus one question that arises here is whether Boghossian's statement of the belief about MP, or any kind of propositional account, would entail that understanding 'if, then' requires being competent with MT. If that turned out to be the case, then ($UDR_{\text{'if, then'-MP)}}$* and ($UP_{\text{'if, then'-MT}}$) would be equally bad in that they would require that one has to understand 'not' in order to understand 'if, then'.

The worry would arise if for instance knowing that a logical rule is truth-preserving required understanding negation. For instance one could argue that understanding that if P, and if P then Q are both true, then Q is true requires understanding that if Q is not true, either P or if P, then Q is not true. Perhaps knowing that the premises necessarily

entail the conclusion is just the same as knowing that it is impossible for the premises to be true and the conclusion false.

I cannot address this point in full here. But I think that it would certainly take some argument to show that believing or knowing that MP is truth-preserving requires understanding negation. For instance, it seems possible to know that the truth of both P and if P then Q entails that of Q while leaving it open what the falsity of Q would entail with respect to the truth-values of P and if P, then Q. It also seems possible that one might understand truth-preservation, but have non-orthodox views about falsity and its interaction with negation, so that there is no analytic connection between the former and the latter. Part of what is at issue here is the interaction between understanding 'is true' on the one hand, and understanding 'is false' on the other. It seems to me that it is not at all clear that understanding the truth of a sentence or the fact that a certain inference pattern preserves truth requires understanding the circumstances in which the sentence would be false (or not true) or the inference pattern would be non-truth-preserving. If truth, falsity and negation can be understood relatively independently of each other, a propositional account of knowing (or being competent with) MP will not require knowing (being competent) with anything like MT. So in this sense too it will be superior to an account in terms of multi-track dispositions such as ($UDR_{\text{'if, then'-MT}}$).

7. CONCLUDING REMARKS

A propositional account of understanding the logical constants can meet constraint (CT). Moreover it can do so while avoiding the charge that it is conceptually too demanding. By contrast dispositionalist accounts run into difficulties. An account of understanding ought to connect attributions of understanding of an expression with manifestations of understanding of that expression. The dispositionalist account fails in this despite at first sight promising to make a tight connection between competence and performance. However, as cases such as (Ice-Cream) reveal, although there ought to be an explanatory link between understanding and manifesting that understanding, it is not as tight as the dispositionalist requires: it is not a link such that understanding prescribes specific ways in which it ought to be manifested, as the dispositionalist suggests. It is better captured by the loose relation that typically obtains between knowing a proposition and what counts as manifesting that knowledge.[26]

Notes

[1] I of course borrow the distinction between linguistic competence and linguistic performance from Chomsky (1965)

[2] See for instance Mac Farlane (2009) for a review of the different ways in which the logical constants could be characterised.

[3] See for instance Block (2000), and Fodor (2008), pp. 34 ff. for a critical assessment of. CRS. CRS is really first a theory about concepts, which are defined by their roles in one's cognitive economy. Then the meanings of linguistic expressions are in turn defined by these concepts. (See Harman (1982)). Here, I focus on expressions, but the argument of the paper of course easily translates to concepts.

[4] See Harman (1986), Appendix 1 for a discussion of CRS for the logical constants. In what follows I shall make two assumptions that are generally made in such accounts of the meanings of the logical constants: their semantics can be given truth-functionally and the relevant proof system that adequately expresses these introduction and elimination rules is some kind of system of natural deduction.

[5] See for instance Ryle (1946) and (1946), Priest (1979), Harman (1986)), Boghossian (1996a), (2000) and (2001), Rumfitt (2001) and Devitt (2006) for endorsements of this view.

[6] Boghossian (2000), p. 230. Here I do not go into the details of what exactly makes a logical rule meaning-constituting according to him. See Boghossian (2000).

[7] Boghossian (2000), p. 250.

[8] Many think that it is required because of Carroll's regress argument in (1895). See for instance Ryle (1949) and (Boghossian 2004, p. 215). But see my 2010 for arguments that Carroll's regress gives no support to a dispositional account of being competent with a logical rule.

[9] Many philosophers, after Ryle (1949), think that competence with a logical rule is a kind of knowing how which is to be understood dispositionally. One feature of an account in terms of knowing how is that it is supposed to be better than one in terms of knowing that at explaining the (tight) connection between competence and action.

[10] Thus Boghossian has argued recently (see his 2003) that logical reasoning can be, as he puts it, 'blameless but blind'. On the one hand, such reasoning can be the manifestation of competence with a logical rule, but this competence is not explicitly articulated. According to him, dispositions are well suited to account for blameless but blind reasoning, given that they do not require you to have the relevant concepts needed to articulate the rule.

[11] Boghossian (2003), p. 230; see also (2001), p. 633 n. 10. The way Boghossian states it, a disposition to reason according to MP only has *beliefs* as inputs and outputs. But of course, one can have a disposition to infer according to MP with propositional attitudes different from belief (e.g. suppositions), and perhaps less than fully formed propositional attitudes (e.g. suppositions). I do not pursue this issue here.

[12] See Harman (1986), esp. chs 1&2.

[13]This is not meant as a definition of reasoned change in view, just an initial characterisation to fix ideas.

[14]I shall not consider specific accounts of dispositions. However it is implicit in the discussion here that dispositions connect in some way with some sort of would-conditional. If you are disposed to infer according to MP, (other things being equal) if you believed both P and if P, then Q, you would infer/come to believe Q.

[15]See (Harman 1986, p. 19)

[16]See my (forthcoming) for a discussion of possible dispositionalist moves to address the problem of falsifying exceptions (e.g. in terms of masks or habitual or weaker accounts). In that paper, I argue that none of these moves can handle the problems posed by (Ice-Cream). Here, I only discuss Boghossian's attempt.

[17]See Bird (2007) for a good discussion of multi-track dispositions.

[18]This objection would also apply to the truth-table account mentioned above.

[19]Here, I ignore complexities that arise from the fact that if MP is going to be multi--track, then presumably MT is going to be multi-track too. If part of being competent with MP is being competent with MT, that means that the disposition will really be more complex than that stated in ($UDR_{\text{'if, then'-MP}}$). For instance, for ($DI_2$)*, there will be three sub-dispositions, depending on whether one infers the conclusion or rejects one of the premises.

[20]There is no need here to insist on a precise formulation of (Parity). It could be stated in terms of assertion or judgement rather than in terms of belief; it could be stated not as a definition between mental states/events, but as a weaker condition.

[21]See Rumfitt (2000). Rumfitt's motivation in the paper is to offer an account of the basic rules of classical logic that satisfy specific formal requirements such as harmony and stability. These need not concern us here.

[22]Thus for him the primary speech act is that of questions; and to understand the proposition that P, i.e. its truth-conditions, someone has to understand the question whether P, i.e. its correctness-conditions.

[23]Notice here that this sort of reasoning might in some sense mimic a proof of not-P in natural deduction from the assumption that if P, then Q. In that case, one would assume P, derive a contradiction (Q and not-Q) and then conclude not-P.

[24]See Pettit (2002) for discussion.

[25]Boghossian (2000), p. 250.

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