

Disquotationalism and the Compositional Principles

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... [S]emantics... is a sober and modest discipline which has no pretensions of being a universal patent-medicine for all the diseases of mankind, whether imaginary or real. You will not find in semantics any remedy for decayed teeth or illusions of grandeur or class conflicts. Nor is semantics a device for establishing that everyone except the speaker and his friends is speaking nonsense. (Tarski, 1944, p. 345)

In their paper “The Use of Force Against Deflationism”, Dorit Bar-On and Keith Simmons (2007, p. 61) helpfully distinguish three sorts of deflationary theses about truth. *Metaphysical* deflationism is a thesis about the property of truth, namely, that it is insubstantial, or that it has no essential nature, so that a theory of truth—a correspondence or coherence theory of truth, say—is both unnecessary and impossible. *Linguistic* deflationism is a thesis about the word “true”, namely, that its meaning is adequately explained by Alfred Tarski’s convention (T) or something along the same lines. *Conceptual* deflationism is a thesis about the role that the notion of truth may legitimately play in our theorizing, namely, that there are no interesting connections between truth and other concepts, such as meaning or belief. Rather, the notion of truth serves only an ‘expressive’ function, allowing us to formulate certain claims that we could not state without it, but playing no essential explanatory role (see e.g. Field, 1994, §5; Williams, 1999, p. 547).

Most deflationists seem to regard the linguistic thesis as fundamental. Exactly how the metaphysical thesis is supposed to follow from it has never been clear to me, probably because I do not understand what it is supposed to mean that truth is not a ‘substantial property’ (cf. Field, 1994, p. 265, n. 19). But the real issue, in any event, concerns the conceptual

thesis. Deflationists have generally regarded it as following from the linguistic thesis: Surely an expression that is explained in terms that make it all but redundant cannot play any essential explanatory role. In practice, the argument for this claim takes a form made familiar by Paul Horwich (1990). The work the notion of truth appears to do in various settings, it is claimed, can in fact be done entirely by a notion of truth that is stipulatively introduced in accordance with the tenets of linguistic deflationism. So the dialectic consists of the anti-deflationist's identifying some theoretical setting in which the notion of truth seems to be doing important explanatory work and the deflationist's attempting to show that the role the truth-predicate is playing in that context is, in fact, purely expressive. What it is for a use of the truth-predicate to be 'purely expressive' is a question to which we'll return.

Bar-On and Simmons's main purpose in their paper is to show that conceptual deflationism does not follow from linguistic and metaphysical deflationism. In particular, they argue that Gottlob Frege, though he was a linguistic deflationist, is not a conceptual deflationist (Bar-On and Simmons, 2007, §II) and that Robert Brandom, though he is both a linguistic and a metaphysical deflationist, is not a conceptual deflationist, either (Bar-On and Simmons, 2007, §III). More precisely, Bar-On and Simmons argue that the notion of truth plays an essential role both in Frege's account of assertion and in Brandom's account of 'commitment', and that in neither case is truth's role merely expressive. They do not, however, actually defend Frege's claim that assertion is the presentation of a thought as true,¹ nor Brandom's account of commitment in terms of taking to be true, so it is open to a deflationist simply to reject those accounts. Deflationists hold that truth's only *legitimate* role is expressive. They need not deny that less enlightened philosophers have tried to make other uses of it.

Frege's own attitude toward truth is nonetheless instructive. On the one hand, Frege famously insists that "... the sentence 'The thought that 5 is a prime number is true' contains... the same thought as the simple '5 is a prime number'" (Frege, 1984c, op. 34). On the other hand, truth plays an absolutely central role in Frege's thought about language and,

¹ For a nice historical discussion of this aspect of Frege's position, see Textor (2010). My own view is that there is something profoundly right about that position but that, to understand it properly, we need to see it as expressed through Frege's thesis that the reference of a sentence is its truth-value and, therefore, that the sense of a sentence—the thought it expresses—is its truth-condition (Heck and May, 2018, 2019). Which brings us to the next paragraph.

in particular, in the semantics that he develops for his formal language in Part I of *Grundgesetze der Arithmetik* (Frege, 2013). For Frege, the most fundamental linguistic unit, from a logical point of view, is the sentence; the most basic semantic fact about a sentence is its being true or false; and the sense of a sentence—the thought it expresses—is its truth-condition. How can Frege hold all these views? What explains the apparent tension is the fact that Frege’s deflationary remarks always concern ascriptions of truth to what he called ‘thoughts’ (that is, to propositions, more or less).² There is no reason to think that Frege was a linguistic deflationist about *sentential* truth. Frege never expresses a view about the meanings of sentences like “‘Snow is white’ is true”, probably because, as Sir Peter Strawson (1950, pp. 129–31) makes clear, attributions of truth to sentences (let alone to utterances) are extremely uncommon in ordinary language. In so far as Frege was a deflationist at all, then, he was a deflationist about *propositional* truth, not about sentential truth. And, in the context of Frege’s semantics, the notion of truth that is in play is one that applies not to thoughts but to sentences. So Frege is no kind of deflationist about the notion of truth that plays a role in his semantic theory, that is, in the theory of truth he develops for his formal language.

A semantic theory of the sort Frege was the first to develop is a theory of truth, however, only in Tarski’s sense, not in the sense in which the coherence theory is a theory of truth. But one need not think it is possible, or even desirable, to have a theory of truth in that sense—the sense relevant to metaphysical deflationism—to think that the notion of truth might do interesting and useful work (see e.g. Davidson, 1990).³ Truth-conditional semantic theories are *about* truth just as they are about sentences and other linguistic items, and if the role truth plays in such theories cannot be revealed as purely expressive, then conceptual

² It’s also important to appreciate the true purpose of Frege’s deflationary remarks: to undermine the view that the relationship between a thought and its truth-value is that of subject to predicate rather than, as Frege thinks, that of sense to reference. For discussion, see Heck (2010), Heck (2012, Part I), and Heck and May (2018, esp. §5).

³ The opponent of deflationism also does not need an alternative to linguistic deflationism. If there is no simple explanation of what the word “true” means, then that simply shows that it is like most other words. That said, from a Davidsonian perspective, the correct axiom for sentential “true” would seem to be something along the lines of (see Heck, 2004, §4):

“*x* is true” is true of *S* iff *S* is true

The case of propositional “true” is more complicated only because of the presence of intensional language. But that is a separate problem.

deflationism is false. Now, questions about the role that truth plays in semantic theory are, as we have already said, questions about the truth and falsity of *sentences*,⁴ so what we need to ask is whether linguistic deflationism about *sentential* truth provides us with the resources to unmask the use of truth in semantics as purely expressive. To put it differently, the question is whether deflationism about sentential truth is consistent with taking semantics seriously.⁵

I shall henceforth use the now common term ‘disquotationalism’ for deflationism about sentential truth. The term comes from W. V. O. Quine:

By calling [“snow is white”] true, we call snow white. The truth predicate is a device of disquotation. . . . We need it to restore the effect of objective reference when for the sake of some generalization we have resorted to semantic ascent. (Quine, 1986, p. 12).

The linguistic part of the disquotationalist thesis is thus that the two sentences

- (1) Snow is white.
- (2) “Snow is white” is true.

are not just materially equivalent but equivalent in some much stronger sense that makes the truth-predicate “dispensable when attributed to sentences that are explicitly before us” (Quine, 1987, p. 214).⁶ Quine would never call such pairs of sentences ‘synonymous’, of course, and he denies that (1) and (2) are *necessarily* equivalent (Quine, 1956, p. 187). What he says instead is that “[a]scription of truth just cancels the quotation marks” (Quine, 1990, p. 80). Hartry Field (1994, p. 250) expresses a similar idea when he says that (1) and (2) are “fully cognitively

⁴ Or, in a more developed setting, sentences and contexts, or utterances, or something of the sort. This complication will not be relevant here, so I will continue to speak of sentences. Indeed, disquotationalism famously has serious problems with context-dependence (Heck, 2004, §4), so ignoring it can only help my opponent.

⁵ It seems clear that deflationism about *propositional* truth is consistent with taking semantics seriously. Soames (1988; 1999) holds precisely such a combination of views. Semantics, as he sees it, assigns propositions to sentences (relative to contexts). Truth simply does not enter the picture. It’s a more interesting question whether propositional deflationism is compatible with *truth-conditional* semantics.

⁶ Gupta (1993, esp. §III) spends a good deal of time emphasizing just how strong this equivalence needs to be. Much of what follows simply reinforces that point.

equivalent”, and, unlike Quine, Field (1994, p. 258) explicitly regards their equivalence as a “conceptual necessity”.⁷

This is an extremely strong claim, and one that has some very odd consequences. As Field (1994, §9) both notes and emphasizes, for example, the following is true if the truth-predicate is read disquotationally:⁸

- (3) Even if “snow” had meant *grass*, the sentence “snow is white” would still have been true.

That is because it is equivalent to:

- (4) Even if “snow” had meant *grass*, snow would still have been white.

And that is because, as Field (1994, p. 266) remarks, echoing Quine, “to call ‘Snow is white’ disquotationally true is simply to call snow white. . .”, whether or not we are inside a modal context.⁹ But surely (3) is false.¹⁰

This is not a dispensible feature of the truth-predicate as a disquotationalist understands it. It is, in fact, central to conceptual disquotationalism, that is, to how disquotationalists understand the ‘expressive’ function of the truth-predicate. Suppose, for example, that I were to say:

- (5) The axioms of Euclidean geometry are not all true, but they might have been.

One might think that (5) is true for the boring reason that the sentences that express the axioms of Euclidean geometry might have meant something else. But, or so Field (1994, p. 265) argues, if “true” as it occurs in (5) is understood in accord with the tenets of disquotationalism, then (5) says that Euclidean geometry is contingently false. In particular, (5) is supposed to express exactly what:

⁷ Strictly speaking, as Field (1994, pp. 250–1) notes, the latter sentence seems committed to the existence of the sentence “Snow is white”, whereas the former sentence does not. So, officially, Field’s view is that they are fully cognitively equivalent modulo that commitment. But Field himself tends to disregard this aspect of the view, and I will tend to do so as well. That said, Marian David (2005, §IV) argues that it is a more serious problem than is usually acknowledged.

⁸ If one is worried about the use of “means” in the antecedent, replace it by: Even if “snow” had been used the way “grass” is used, and conversely.

⁹ Hilary Putnam (1994) famously made a very similar objection to Tarski’s claim to have defined the notion of truth. But that is a different issue altogether.

¹⁰ Some philosophers think sentences have their meanings essentially (see e.g. Simchen, 2012). I find the conception of ‘sentence’ on which such views are based to be incompatible with any plausible theory of human language comprehension. But we can set that issue aside here and simply reformulate (3) in terms of a particular utterance made by me at some fixed time of a sentence specified purely syntactically: The claim is then that *that* utterance would have been false had “snow” meant *grass*.

- (6) It is not the case that EG, but it might have been the case that EG.

expresses, where “EG” abbreviates the conjunction of the axioms of Euclidean geometry. As it happens, there are infinitely many such axioms,¹¹ so we cannot actually write that conjunction down. But that, say disquotationalists, is precisely what makes the disquotational truth-predicate so useful: It allows us to express what (6) does without having to write out an infinite conjunction (see e.g. Quine, 1970, pp. 11–3).

Similarly, if I were to say:

- (7) It is sometimes possible to see objects behind the sun because the axioms of Euclidean geometry are not all true.

then that is supposed to be a way for me to affirm that the non-Euclidean character of space is responsible for the somewhat surprising behavior of photons, not to make the absurd claim that optics is beholden to the semantics of English. But if that is to be so, then “The axioms of Euclidean geometry are all true” must simply express what the axioms of Euclidean geometry jointly do and, in particular, must not have any extra, ‘semantic’ content (Field, 1994, p. 266). If “ $\ulcorner A \urcorner$ is true” *did* have some content beyond that of A itself, then that extra content might figure in causal explanations that invoked the notion of truth. It would not yet follow that truth *did* have some explanatory role to play (i.e., that conceptual disquotationalism was false), but the usual strategy for showing that truth doesn’t play such a role would fail.¹²

Consider, for example, the standard response to the so-called success argument. We often explain people’s ability to satisfy their desires in terms of the truth of their beliefs, so it looks as if truth is playing an explanatory role here. For example, we might explain how Alex managed to satisfy their desire for a beer in terms of the truth of their belief that there were beers in the cooler. Deflationists regard the mention of truth here as gratuitous: If what allowed Alex to satisfy their desire was the fact that their belief that there were beers in the cooler was true, then what allowed them to satisfy their desire was really just the fact there were beers in the cooler: The truth-involving explanation reduces to an object-level explanation. But if A and “ $\ulcorner A \urcorner$ is true” are not intersubstitutable inside the scope of “because”, then this reduction

¹¹ Assuming we are working in a first-order language. But, in the second-order case, the logic itself is not finitely axiomatizable.

¹² Here again, this point is essentially due to Gupta (1993).

fails.¹³ Of course, there might be other ways of resisting the success argument. But the most common strategy for doing so will have failed.

To summarize, disquotationalists have generally regarded A and $\ulcorner \text{“}A\text{” is true} \urcorner$ (where “true” is read disquotationally) as equivalent in some sense strong enough to license intersubstitution in modal and causal contexts. That view flows from their commitment to conceptual disquotationalism, since, if $\ulcorner \text{“}A\text{” is true} \urcorner$ had some content beyond that of A itself,¹⁴ that would open up the possibility that truth might have some important theoretical role to play. In that sense, disquotationalism is an heir to the redundancy theory: As we have already seen Quine put it, “true” would be *dispensable* were it not for our need to make certain kinds of generalizations.

Now, one might have wanted to say instead that the reason (5) expresses the contingency of what the axioms express is because the ‘axioms’ are not sentences but what those sentences express. That is, truth is being predicated not of sentences but of propositions (Heck, 2004, §2). But this is not a line that a disquotationalist can take, since invoking propositions threatens to commit us to a substantial notion of representational content, which is part of what disquotationalism opposes (Field, 1994, pp. 266–7). A disquotationalist precisely does not want to understand attributions of truth to sentences in terms of the truth of the proposition the sentence expresses. Propositions (in anything but a pleonastic sense) are anathema to disquotationalism. The disquotationalist view, rather, is that attributions of truth to sentences are primitive, and they are to be understood in terms of disquotation.¹⁵

Still, it is often useful, when one is trying to understand what a disquotational truth-predicate is supposed to be, to compare it to a propositional truth-predicate. The claim that A and $\ulcorner \text{It is true that } A \urcorner$ are equivalent in some very strong sense seems reasonable.¹⁶ For that

¹³ Gamester (2018) discusses this sort of strategy at length and argues that it fails even if the substitution is granted.

¹⁴ As mentioned in note 7, $\ulcorner \text{“}A\text{” is true} \urcorner$ may have *some* additional content, but, if anything, that fact already poses problems for the disquotationalist’s favored reading of (5) and (7). But I’m setting that issue aside here.

¹⁵ I do not wish to argue about labels here. If anyone does, then what I am arguing in this section is that the sort of view I am describing is particularly important, and it seems obvious that it is reasonably called ‘disquotationalism’. Why that view that is my focus here is part of what I am in the process of explaining.

¹⁶ Modulo, as David (2005, p. 387) points out, following Moore (1953, p. 276), the commitment to the existence of the proposition that A . Compare note 7, again. I’ll now stop pointing out this kind of caveat. Consider it included throughout in what follows.

reason, this sentence:

- (8) Even if “snow” had meant *grass*, it would still have been true that snow was white.

is unproblematically true. But the disquotationalist’s (3) is intended to be equivalent to (8), though it uses a sentential truth-predicate rather than a propositional one, so as to avoid the commitment to propositions. When “true” is read disquotationally, then, $\ulcorner A \urcorner$ is true $\urcorner$ is supposed to be just as obviously, and just as strongly, equivalent to A as $\ulcorner$ It is true that $A \urcorner$ is.¹⁷

As noted above, the underlying point is that, if $\ulcorner A \urcorner$ is true $\urcorner$ had some content beyond that of A itself, then that content could well be essential to putative explanations in which attributions of truth appeared. It would not follow that conceptual disquotationalism was false, but the typical strategy for establishing it would no longer be available. Uses of the truth-predicate could not simply be eliminated in the way disquotationalists propose, even when truth was ascribed to a single, explicitly specified sentence, let alone when it was used in generalizations, as it is in semantics.

A simple example of such a generalization is:

- (9) $\ulcorner A \text{ and } B \urcorner$ is true iff A is true and B is true.

Following Field (2005), I shall call such generalizations ‘compositional principles’. And the main question I want to discuss in the remainder of this chapter is how disquotationalists should understand the use of the truth-predicate in such principles, which are central to certain sorts of semantic theories.¹⁸ Even in (9), the use of the truth-predicate is supposed to be ‘purely expressive’. The first question we shall consider below is: How so exactly?

I shall argue in §1 that the truth-predicate is not being used in (9) to express an infinite conjunction, as is often suggested. I shall then

¹⁷ I hope it is clear that whether the verbal string “Snow is white is true” (or the written one, with or without extra quotation marks) can be understood, in colloquial English, as equivalent to “That snow is white is true” is wholly irrelevant. We are not doing ordinary language philosophy here but are discussing the status of “true” as a predicate specifically of sentences.

¹⁸ I will focus here on truth-theoretic semantics, but it should be clear, I hope, that nothing depends upon this restriction. The disquotationalist’s task would only be harder if we were discussing a semantic theory that made use of more complex sorts of semantic values.

turn, in §2, to a prior question, namely, what right disquotationalists even have to compositional principles. As we shall see, Field (2005) has offered an answer, one that also yields an answer to the question what expressive role a disquotationalist should regard truth as playing in those principles. I shall show in §3, however, that Field’s method for generating compositional principles *over-generates* and then argue, in §4, that this reveals a deeper problem, which is that what Field’s method yields simply are not compositional principles as they are understood in semantic theory. In particular, part of what (9) is typically understood to express is that conjunction is truth-functional, and Field’s account would apply whether or not “and” was truth-functional. I will further reinforce this point in §5 by looking briefly at corresponding issues concerning quantification.

Let me acknowledge something in advance. I shall be arguing that disquotationalism is committed to claims that may seem so absurd that no one could possibly accept them. This is worrying. But they are no more absurd than (3), in the end, and they flow from exactly the same source: the insistence that the primary function of “is true” is simply to erase quotation marks. That, obviously, is the very core of disquotationalism.

1 What Expressive Role Does “True” Play in Compositional Principles?

As mentioned above, disquotationalists regard the truth-predicate as merely an ‘expressive’ device. People sometimes put this point by saying that the truth-predicate allows us to make generalizations we could not make without it. But the slogan can’t just mean that. *Every* predicate allows us to make generalizations we could not make without it. For example, the predicate “blue” allows us to express the generalization “All pigs are blue”, which we could not express if we did not have the word “blue” in our language (or a synonym). So the disquotationalist slogan must mean something else. Which, of course, it does.

When disquotationalists characterize the truth-predicate as a ‘device of generalization’, what they mean is that it gives us a way to express generalizations all of whose instances we can already assert. It’s just the generalization that we can’t assert. That distinguishes the cases involving “true” from the case of “All pigs are blue”. Not even the instances of “All pigs are blue” can be asserted without the use of “blue”. More precisely still, the truth-predicate is supposed to act as a ‘device

of infinite conjunction’ (Field, 1994, §5; Halbach, 1999). In the cases of interest, we shall be able to assert the various instances of some generalization, but, because there are infinitely many such instances, we cannot actually assert them all, absent some mechanism for forming infinite conjunctions, which is exactly what the truth-predicate is supposed to give us—much as in the cases of (5) and (7) above.

Consider, for example, the law of excluded middle:

(10) Every sentence of the form $A \vee \neg A$ is true.

The disquotationalist’s suggestion is that (10) means no more and no less than that either Bill smokes or Bill does not smoke, and either Fred runs or Fred does not run, and so forth. The individual instances—“Either Bill smokes or Bill does not smoke”, “Either Fred runs or Fred does not run”—have nothing to do with truth. To express the generalization, of course, what we need to do is quantify over these instances. What we seem to want to say is thus something like:

(11) For all S , if S is of the form $A \vee \neg A$, then S .

But that, familiarly, is ill-formed, since S is occupying both term and sentence positions. What the truth-predicate does, according to disquotationalists, is to solve this syntactic problem by converting the position occupied by a sentence into one occupied by a term: “Fred runs or Fred does not run” is replaced by “‘Fred runs or Fred does not run’ is true”, and our generalization can then be expressed as:

(12) For all S , if S is of the form $A \vee \neg A$, then S is true.

All we’re trying to do here, or so disquotationalists say, is to wrap the instances of $A \vee \neg A$ into a neat package and affirm them, all at once. The role the truth-predicate is playing is thus purely grammatical, and (12) means no more than what (11) was supposed to mean: It simply expresses the infinite conjunction that either Bill smokes or Bill does not smoke, and either Fred runs or Fred does not run, and so forth. In particular, (12) has no more to do with truth, semantics, or logic than would that infinite conjunction, if only we could write it down.

There are several difficulties with this idea. First of all, it is a delicate matter just how we should understand the claim that such sentences as (10) ‘express’ infinite conjunctions. As Anil Gupta (1993, §III) argues, “express” here has to be understood in a very strong sense—which makes it surprising that so little effort has been made to articulate what that

sense is.¹⁹ The only serious attempt to do so, which is due to Volker Halbach (1999), cannot be regarded as successful (Heck, 2004, §3). Worse, as Gupta also notes, this sort of proposal appears to conflate the truth of a generalization with the joint truth of its instances. The statement that all sentences of the form $A \vee \neg A$ are true has nothing to do with which instances of that form happen to be present in the language. On the contrary, excluded middle is supposed to be a law: It is supposed to be, in the usual sense, ‘projectible’. Even if new sentences are added to our language, so that $A \vee \neg A$ comes to have new instances, those too are required to be true.

I shall not pursue these complaints further here, however, as sympathetic with them as I may be. There is a more important point in the vicinity: Compositional principles simply are not statements in which the truth-predicate is plausibly being used as a device of infinite conjunction.²⁰

The problem is very simple. The only ‘infinite conjunction’ we might plausibly take (9) to express is far too weak to have any chance of being what it actually does express. Formalize (9) as:

$$(13) \quad \forall x \forall y [\top(\ulcorner x \wedge y \urcorner) \equiv \top(x) \wedge \top(y)]$$

Which sentences not involving the truth-predicate are supposed to count as instances of the infinite conjunction allegedly expressed by (13)?²¹ It is hard to see what they might be if not sentences of the form: $A \wedge B \equiv A \wedge B$, so that (13) expresses the infinite conjunction of such claims as “Fred runs and Bill walks iff Fred runs and Bill walks”, that is, the infinite conjunction of a bunch of instances of $p \equiv p$. That might sound like music to the disquotationalist’s ears. But it should not.

Consider these two generalizations:

$$(14) \quad \forall x \forall y [\top(\ulcorner x \wedge y \urcorner) \equiv \top(\ulcorner x \wedge y \urcorner)]$$

$$(15) \quad \forall x \forall y [\top(\ulcorner x \wedge y \equiv x \wedge y \urcorner)]$$

¹⁹ Of course, if such generalizations as (10) are supposed to ‘express’ claims that do not really involve truth, then attributions of truth to single sentences must do so as well: I.e., $\ulcorner A \urcorner$ is true must really ‘express’ a claim that does not involve truth. The only candidate is what is expressed by A itself. Hence, again, the redundancy of disquotational truth.

²⁰ I have made this point before (Heck, 2004, pp. 331–2), but in a somewhat different context, and without sufficient emphasis. Halbach (2001, p. 192, fn. 26) seems to agree with it.

²¹ One might think that (13) should express an infinite conjunction of infinite conjunctions, but this does not evade the problem, since the terms of that conjunction are the same as in the cases we shall discuss, and the difference is only one of grouping.

If (13) is supposed to express an infinite conjunction, then presumably these do, as well. And there appears to be no option but to take them, too, to express the conjunction of all sentences of the form: $A \wedge B \equiv A \wedge B$. But these are all very different. For example, (14) is logically valid. And, while (15) is not itself logically valid, it follows from any set of principles entailing that all instances of a truth-functionally valid schema are true (for example, that very principle).²² But (13), together with similar principles, at least, has significant logical strength (Heck, 2015, 2018a).

The point, then, is that (13), (14), and (15) have very different logical properties. It follows, or so it seems to me, that they cannot all express the same infinite conjunction. On the contrary, at most one of them can express the infinite conjunction of sentences of the form: $A \wedge B \equiv A \wedge B$. But if any of these expresses that infinite conjunction, then surely it is (15), which does so in precisely the sense in which $\forall x[\top(\ulcorner x \vee \neg x \urcorner)]$ expresses the conjunction of instances of the law of excluded middle. But then (13) does *not* express that infinite conjunction, and there is no other infinite conjunction that it plausibly does express.

The point applies to other compositional principles as well, such as:

$$(16) \quad \forall x[\top(\ulcorner \neg x \urcorner) \equiv \neg \top(x)]$$

If (16) expresses an infinite conjunction, it can only be the conjunction of all sentences of the form: $\neg A \equiv \neg A$. But, if so, then that infinite conjunction seems equally to be what is expressed by these two generalizations:

$$(17) \quad \forall x[\top(\ulcorner \neg x \urcorner) \equiv \top(\ulcorner \neg x \urcorner)]$$

$$(18) \quad \forall x[\top(\ulcorner \neg x \urcorner) \equiv \neg x]$$

Once again, (16), (17), and (18) have very different logical properties, and at most one of them can express the infinite conjunction of all sentences of the form: $\neg A \equiv \neg A$. But (18) expresses that conjunction if anything does, so (16) does not express it.

I have heard it said in conversation that disquotationalists do not really mean that ‘true’ is *always* used to express infinite conjunctions, but that this is its ‘purpose’ or ‘role’ in our language. But I have no idea what to make of such teleological claims. Most words do not have ‘purposes’, except to allow us to express whatever concepts they are used to express, and I see no reason to regard “true” as different from other words in

²² The notion of a tautology is definable in PA, so we can interpret a theory containing that principle in one with, say, just the $\top$ -sentences by re-interpreting $\top(x)$ to mean: $\top(x)$, in the old sense, or x is a tautology.

this respect.²³ Moreover, even if the truth-predicate had been explicitly introduced so as to allow us to express infinite conjunctions, it would not follow that, once we had it, we could not use it for quite different purposes, including ones that involved truth's playing a significant explanatory role.²⁴ The disquotationalist therefore owes us an answer to the question what 'purely expressive' role the truth-predicate plays in compositional principles, if it is not to allow us to formulate infinite conjunctions.

2 Disquotationalist Derivations of Compositional Principles

Disquotationalists often seem to be of two minds about compositional principles. On the one hand, for example, Field (1994, p. 269) insists that "... compositional principles have no interest in their own right". On the other hand, however, Field is of course aware that there are those who find such principles as:

(9) $\ulcorner A \text{ and } B \urcorner$ is true iff A is true and B is true.

to be of substantial interest. So he wants to be able to explain both why such principles are true, when they are, and why they are nonetheless insubstantial and can do no explanatory work.

There is a history here. In his book *Truth*, which helped launch contemporary deflationism, Horwich (1990) suggested that we can get everything we need to know about truth from the 'minimal' theory that consists just of the T-sentences.²⁵ It is obvious, however, that a theory of truth containing just the T-sentences is very, very weak.²⁶ Without such principles as (9), it's hard to see how such a truth-predicate could be of

²³ J. L. Austin (1950, p. 122) famously regarded "true" as an "extraordinary word". But it has never been clear to me on what ground. Words are words.

²⁴ I owe this point to Jamie Tappenden, who remarked in 1995 or so that, even if the extension of the truth-predicate is fixed by something like convention (T), it does not follow that we cannot go on to theorize about the set of true sentences and formulate possibly significant generalizations about it. McGee (2005, p. 144) has since made essentially the same point.

²⁵ Horwich's discussion proceeds in terms of propositional truth, and so his position in *Truth* is not obviously disquotationalist. But Horwich is, in fact, committed to disquotationalism, since he is also committed to a deflationist view of meaning (Horwich, 1998).

²⁶ Formally speaking, if we take a theory $\mathcal{T}$ and add to it all T-sentences for sentences in the language of $\mathcal{T}$, then the resulting theory is locally interpretable in $\mathcal{T}$ (Heck, 2018a, Theorem 2.1).

much use at all. It certainly could not be used for the sorts of purposes for which the truth-predicate is typically used in logic.²⁷

One might well think, however, that the compositional principles can be derived from the T-sentences—or, better, from the ‘T-scheme’, thought of as an axiom scheme having the T-sentences themselves as instances. The argument proceeds as follows:²⁸

- (i) “ A and B ” is true iff A and B .
- (ii) “ A ” is true iff A .
- (iii) “ B ” is true iff B .
- (iv) “ A and B ” is true iff “ A ” is true and “ B ” is true.

The first three steps are delivered by the T-scheme; the last then follows by simple propositional reasoning.

Prima facie, this argument has two serious problems. First, it does not appear to be an argument at all. An argument consists of a sequence of claims allegedly related in some relevant way (e.g., deductively). But this ‘argument’ does not consist of a sequence of claims, and it is not at all obvious how to interpret it. This leads to the second problem: In so far as one does have some idea how to interpret this argument, one wants to regard “ A ” and “ B ” as variables. But then these variables appear both inside and outside quotation marks, something that is usually regarded as problematic.

One charitable way to interpret the ‘argument’ is to regard it not as an argument but as an argument schema. So understood, however, the argument fails to show what its proponents claim it shows. What the schematic argument shows is that we can prove every instance of (9). That, as Gupta (1993, p. 67) emphasizes, is not at all the same thing

²⁷ Here’s an example. Let $\mathcal{T}$ be a theory. Suppose we have a theory of truth for $\mathcal{T}$ that allows us to prove the T-sentences. Then, if $\mathcal{T}$ is finitely axiomatized, we will also be able to prove, pretty trivially, that all of $\mathcal{T}$ ’s axioms are true. But what if $\mathcal{T}$ is not finitely axiomatized or not even finitely axiomatizable? In that case, we cannot, in general, prove that *all* of $\mathcal{T}$ ’s axioms are true, though we can prove that *each* of them is. To prove the stronger claim, we typically need to appeal to compositional principles (Heck, 2015, §3.4).

²⁸ This sort of argument is outlined by Field (1994, pp. 258–9), who actually discusses the case of disjunction. I’ll discuss conjunction, for reasons that will become clear below. There are similar arguments to be found in the writings of many others. I learned of such arguments as a student from Sir Michael Dummett, who discusses something similar in *The Logical Basis of Metaphysics* (Dummett, 1991, pp. 56ff).

as being able to prove (9) itself. Indeed, if our background logic is first-order logic, or some other logic for which the compactness theorem holds, the generalization (9) cannot follow from its infinitely many instances. Otherwise, it would have to follow from finitely many of them, which it obviously does not (Shapiro, 1998, p. 496).

One might think the disquotationalist can simply concede this point.²⁹ What the disquotationalist needs to show is that an ‘insubstantial’ theory of truth can do the work for which a ‘substantial’ theory of truth is supposed to be needed. The suggestion, then, in response to the foregoing, would be that what needs amending is just the proposed content of that ‘insubstantial’ theory: It should not contain just the T-sentences, or something of the sort, but also the sorts of generalizations we’ve been discussing. That is: The disquotationalist should just claim the compositional principles as their own.

This reply begs the question whether the disquotationalist actually has a right to the compositional principles. Worse, it is utterly *ad hoc*. The suggestion is that we should add generalizations like (9) to the ‘minimal’ theory containing just the T-sentences. But which generalizations are ‘like’ (9)? Discussion of these issues tends to idealize by taking the language to which the truth-predicate applies to be a formal (usually first-order) language. And, in that case, we know well enough which compositional principles will be needed to allow us to make the generalizations the truth-predicate typically allows us to make.³⁰ But disquotationalism isn’t a view about truth as applied only to the sentences of formal languages.³¹ Truth, at least as it is used in semantics, applies to sentences of natural language. But then there is no clear limit to the sorts of compositional principles we will need to add. Indeed, if we take the case of first-order languages as our model, then, in that

²⁹ This sort of suggestion was made during the discussion period when I presented related material at Princeton in 2009. Cieśliński (2010, p. 412) comes close to making it in print in his discussion of the conservativeness argument against deflationism. He seems simply to assume, however, that the deflationist is entitled to the compositional principles when he adopts that he calls $PA(S)^-$ as his base theory. That entitlement is precisely what I am questioning here.

³⁰ Actually, it is not entirely clear that generalizations ‘like’ (9) would suffice, anyway. See, for example, the wide variety of truth-involving principles discussed by Friedman and Sheard (1987, 1988).

³¹ It isn’t always clear whether disquotationalism is supposed to be a ‘revolutionary’ or ‘hermeneutic’ view. The point to be made next makes that moot in the present context. Still, my sense is that many disquotationalists have overlooked the importance of the issues I am discussing here because they have tended to focus on formal languages.

case, what we need to add to the minimal theory, to make it do the work we need it to do, is a full-blown Tarski-style theory of truth, as Field (1999, pp. 534–5) himself has noted. That makes me suspect that, in the case of a natural language, what would be needed is what, from a different point of view, would be regarded as constituting a full semantic theory for the language in question. That makes the question what right a disquotationalist has to compositional principles pressing once again.³² Compositional principles are the very principles that semantic theories articulate, and truth appears to play a substantial role in such theories. If so, then “Disquotationalism doesn’t work without the compositional principles, so we’d better add them” looks worryingly like another way of saying “Disquotationalism doesn’t work, so we shouldn’t be disquotationalists”.

If something like the schematic argument rehearsed above could be resuscitated, however, then the problems we have been discussing would vanish. In light of our discussion in §1, however, the disquotationalist must abandon the claim that the compositional principles express infinite conjunctions; in light of Gupta’s criticisms, they must also abandon the claim that compositional principles simply follow from their instances. But the possibility is still open, at least in principle, that the compositional principles should follow from certain general principles about truth that the disquotationalist anyway accepts. In particular, compositional principles might follow from the T-scheme, itself understood as having a certain kind of generality, rather than simply as a convenient way of summarizing the infinite list of its instances. And a form of this proposal has been developed by Field (2005).

The contrast to which I have just alluded, between two ways of understanding the T-scheme, is one that has been of significant interest to philosophers of logic and mathematics. Consider, for example, the induction scheme of Peano arithmetic:

$$(19) \quad A(0) \wedge \forall x(A(x) \rightarrow A(Sx)) \rightarrow \forall x A(x)$$

There are two ways of understanding this scheme. One is to take it as simply a convenient shorthand for the infinite list of ‘induction axioms’ of PA. The other is to regard it as having a kind of generality, so that the scheme itself is, in some sense, the real axiom.

³² It is of course open to a disquotationalist to reply that semantics should be done in other terms, e.g., in terms of inference-rules. But surely it is an empirical question how semantics should be done. It would be odd if disquotationalism, a view defended entirely on a priori grounds, had such empirical implications.

The contrast emerges when we consider what ought to happen when we expand the language of PA, say, by adding a function-symbol for exponentiation.³³ If we understand the induction scheme in the first way, so that it is just a compact way of summarizing the real axioms, of which there are infinitely many, then it is of no significance that the expansion of the language introduces new sentences of the same form as the induction axioms we already accept. That the axioms we accept have a common form is of no interest beyond the fact that it permits such a compact summary of them. We might call such a conception of the induction scheme *static*.

On the other way of understanding the scheme, (19) is not just a compact way of listing a bunch of axioms. The common form of those axioms is precisely what is of interest. The fact that the expanded language contains new sentences of that form then *does* provide us with new axioms. The scheme is thus *dynamic* or, as it is more often put, ‘open-ended’.

It is the static conception that is usually regarded as the ‘official’ one in mathematical logic, but Solomon Feferman (1996) has shown that the dynamic conception can be made to do mathematical work.³⁴ The dynamic conception has also been put to philosophical work by Vann McGee (1997) and to joint philosophical and technical work by me (Heck, 2011, 2018b). It is probably fair to say that the dynamic conception remains controversial. But it is also fair to say, or so it seems to me, that it is actually the more natural of the two. And it is, I think, pretty clearly what the founders of modern logic (e.g., Zermelo) had in mind.

Moreover, it is the dynamic conception that articulates how a disquotationalist should, and most disquotationalists do, understand the role of the T-scheme. The T-scheme is not supposed to be a static summary of a bunch of principles that apply only to our language as we now have it, so that the introduction of a new expression would give us no reason to accept the new instances of the T-scheme that then arise. On the contrary, disquotationalists understand the T-scheme as a general principle—indeed, as *the* general principle—that governs the use of the

³³ The usual language of PA includes only function symbols for succession, addition, and multiplication, and exponentiation is then defined as a *relation* which can be proven (in PA, or in IS_1 , but not in ID_0) to satisfy existence and uniqueness conditions.

³⁴ Feferman introduces the notion as a ‘more natural’ way of developing ideas which with he was, in one form or another, concerned throughout his career (Feferman, 1962, 1991). The underlying idea has its roots in early work by Turing (1939) on what he called ‘ordinal logics’.

truth-predicate (Field, 1994, p. 266, n. 20). To put the point in terms of conceptual role semantics, which many disquotationalists seem happy to adopt,³⁵ the T-scheme summarizes a disposition that competent users of the truth-predicate must have, namely, to infer a sentence from an attribution of truth to that sentence, and conversely (or, more strongly, to substitute one for the other). So the T-scheme, as disquotationalists understand it, is ‘open-ended’, generating new instances of itself as the language evolves.³⁶

Given this understanding of the T-scheme itself as a general principle, it is natural to wonder if there isn’t some way of reasoning with it *as* a general principle so as to establish other general principles from it. Such reasoning is precisely what the schematic argument on behalf of (9) was attempting. As we saw, there are several problems one might have with that reasoning. But something like this reasoning is, in fact, quite common. I’ve come to realize, in fact, that I have sometimes given arguments of the same sort myself.³⁷

The argument I have in mind is a well-known argument for the claim that the T-scheme fixes the extension of the truth-predicate.³⁸ Here is the argument. Suppose that $\top(x)$ and $\tau(x)$ both satisfy the T-scheme. Then:

- (i) $\top(\ulcorner A \urcorner) \equiv A$, since $\top(x)$ satisfies the T-scheme.
- (ii) $\tau(\ulcorner A \urcorner) \equiv A$, since $\tau(x)$ satisfies the T-scheme.
- (iii) $\top(\ulcorner A \urcorner) \equiv \tau(\ulcorner A \urcorner)$, by propositional logic.

³⁵ Just to be clear: I have no interest in conceptual role semantics myself.

³⁶ Gupta (1993, §5) expresses some doubt about whether disquotationalists can understand the T-scheme as any kind of generalization. I think this is at best a stand-off and so shall not pursue the issue.

³⁷ There’s another interesting question in this same vicinity, namely, whether schematic reasoning might help explain what justification we have for regarding all the axioms of PA as true. There is no problem about why we regard *each* of the axioms as true: We accept the axiom, we accept the T-sentence for it, and we make a simple inference. But it is much less obvious with what right we regard *all* the axioms as true. In the context of an axiomatic theory of truth for the language of arithmetic, the proof is by induction, and the instance of induction we need necessarily involves semantic vocabulary. One might wonder if there is a different story to be told, however, along the lines we are discussing.

³⁸ A corollary of this argument is that any predicate that satisfies the T-scheme will be extensionally correct, in the sense that its extension will agree with the ordinary truth-predicate “...is true” on the sentences to which they both apply. This is because the ordinary truth-predicate itself satisfies the T-scheme.

Since this holds for any sentence A , $\top(x)$ and $\tau(x)$ have the same extension (on their common range).

It's a nice question how such arguments should be understood. One might suspect that the argument tacitly uses the notion of truth. I would not be unsympathetic. But, dialectically, I doubt this sort of worry will get much traction. The argument just rehearsed does not seem to employ the notion of truth, but to make perfectly good sense in its own right. And Field (2005, §3) offers a detailed account of the sorts of principles that might govern such arguments, principles that suffice, he claims, to allow for proofs of all the compositional principles comprising a full truth-theory for any first-order language. In the case of the schematic argument for (9), the thought is that the various steps of the argument are, as Field puts it, "part of the language", in perfectly good order as they are. They just contain free schematic variables. And once we have reached the conclusion:

(iv) " A and B " is true iff " A " is true and " B " is true.

we may infer

(v) For all sentences S and T , $\lceil S$ and $T \rceil$ is true iff S is true and T is true.

by a principle allowing for the replacement of schematic letters that are everywhere within quotation marks by objectual variables ranging over sentences. The details are a little messy, but not that bad.³⁹

For our purposes, the more important point is that Field's interpretation of such arguments also yields an answer to the question how disquotationalists should understand the expressive role played by the truth-predicate in compositional principles: It is 'syntactic sugar' that allows what is really substitutional quantification to appear as objectual quantification.⁴⁰ Indeed, Field (1994, p. 259) suggests that the

³⁹ Long after this paper was completed, Leon Horsten and Graham Leigh (2017) showed that the compositional principles can be derived from so-called reflection principles. Unfortunately, I cannot consider their paper in any detail here. But many of the points to be made below apply *mutatis mutandis*. From the present point of view, what they observe is simply that reflection principles allow one to move from the observation that all instances of a scheme are provable to an assertion of that very scheme. (So their reflection principles are, in essence, an ω -rule for sentences, as the editors remarked to me.) The arguments below largely concern restrictions on and presuppositions of that sort of move.

⁴⁰ This is a fairly common idea in deflationist writing (see e.g. Hill, 2002), so it is no surprise that it should surface here.

logic of schematic arguments “corresponds to a very weak fragment of a substitutional quantifier language. . .”.

The problem, then, is not that ‘schematic reasoning’ cannot be used to establish principles like (9). The problem, as we shall see in the next section, is that this kind of argument works too well.⁴¹

3 Schematic Reasoning Over-generates

There is another argument that Field might have given for (9):

- (i) “ A and B ” is true iff A and B .
- (ii) “ A and B ” is true iff “ A ” is true and “ B ” is true.
- (iii) For all sentences S and T , $\ulcorner S$ and $T \urcorner$ is true iff S is true and T is true.

The first two steps are justified by the disquotational character of the truth-predicate; the last, by principles governing schematic reasoning.

Once one notices this sort of argument, however, it becomes apparent that it can equally well be used to prove all sorts of other things, e.g.:

- (20) For all sentences S and T , $\ulcorner S$ because $T \urcorner$ is true iff S is true because T is true.

Thus:

- (i) “ A because B ” is true iff A because B .
- (ii) “ A because B ” is true iff “ A ” is true because “ B ” is true.
- (iii) For all sentences S and T , $\ulcorner S$ because $T \urcorner$ is true iff S is true because T is true.

Here again, the first two steps are justified by the disquotational character of the truth-predicate; the last, by principles governing schematic reasoning.

One might think it obvious that this last argument should fail. Consider the adaptation of the original schematic argument to the case of “because”:

⁴¹ A somewhat different worry is that this sort of reasoning works only when the object language is part of the meta-language. We cannot, for example, use schematic reasoning to establish that $\ulcorner A$ und $B \urcorner$ is true (in German) iff A is true (in German) and B is true (in German). But disquotationalism privileges the homophonic case anyway, so I shall do not pursue the point. Still, this does illustrate the central role that translation must play in disquotationalism, and that does cause serious problems elsewhere (Heck, 2019).

- (i) “ A because B ” is true iff A because B .
- (ii) “ A ” is true iff A .
- (iii) “ B ” is true iff B .
- (iv) “ A because B ” is true iff “ A ” is true because “ B ” is true.

That certainly does fail, since substitution of material equivalents is not permitted inside intensional contexts. Of course, for the disquotationalist, the first three biconditionals all hold “of conceptual necessity. . . in virtue of the cognitive equivalence of the left and right hand sides” (Field, 1994, p. 258). But conceptual necessity, by itself, would not necessarily justify the inference to (iv). It is not even clear whether cognitive equivalence would justify it.⁴² But, as we saw earlier, the whole point of a disquotational truth-predicate is to allow us to make certain sorts of generalizations we could not make without it. This includes such cases as

- (7) It is sometimes possible to see objects behind the sun because the axioms of Euclidean geometry are not all true.

and related sentences that occur in the success argument. But (7) will not mean what the disquotationalist wants it to mean unless A and “ A ” is true are intersubstitutable within the scope of “because”. This intersubstitutability principle is what is driving the argument for (20), so it ought to be acceptable to a disquotationalist.

This will no doubt seem odd, but it is a familiar oddity. One might equally well have thought that substitution of “ A ” is true for and by A itself should not be permitted in modal contexts. But, as we saw earlier, Field (1994, p. 265) is explicit that it must be, and for good reason. So we can also prove a compositional principle for necessity:

- (21) For all sentences S , “Necessarily, S ” is true iff, necessarily, S is true.

⁴² As Schneider (2011, pp. 445–6) notes, if ‘cognitive equivalence’ means that “a speaker who understands [two sentences] normally has to adopt the same epistemic stance towards them”, then it may not support substitution within the scope of “because”. One might think, in particular, that “It is true that snow is white because snow is white” is true, but the converse false, even though “Snow is white” and “It is true that snow is white” are cognitively equivalent. But we have already seen that disquotational truth-predicates behave in sometimes surprising ways. We are simply seeing that again. (Special thanks here to Johannes Stern.)

Thus:

- (i) “Necessarily, A ” is true iff, necessarily, A .
- (ii) “Necessarily, A ” is true iff, necessarily, “ A ” is true.
- (iii) For all sentences S , $\lceil$ “Necessarily, S ” is true iff, necessarily, S is true.

Again, that the first step of this argument is legitimate, if “true” is read disquotationally, simply follows from what Field himself argues is required if “true” is to play the generalizing role he thinks it plays: $\lceil$ “ A ” is true” must be substitutable for and by A , even when it occurs in a modal context, lest

- (5) The axioms of Euclidean geometry are not all true, but they might have been.

not mean what it is supposed to mean.

The same point emerges if one reflects on the fact, mentioned at the end of the last section, that, for a disquotationalist, the truth-predicate functions essentially as syntactic sugar sprinkled over an underlying substitutional quantifier. On that interpretation, (9) amounts to

$$\Pi S \Pi T \Pi U [\lceil U \rceil = \lceil S \text{ and } T \rceil \rightarrow U \equiv (S \text{ and } T)]$$

and (20) amounts to:

$$\Pi S \Pi T \Pi U [\lceil U \rceil = \lceil S \text{ because } T \rceil \rightarrow U \equiv (S \text{ because } T)]$$

There is nothing whatsoever wrong with either of these—other than that they are trivialities, facts not of semantics but of orthography.⁴³

Field (2005, pp. 23–4) discusses a closely related point in connection with the question whether his schematic treatment extends to belief attributions. The particular question at issue there is whether schematic reasoning can be used to prove:

- (22) For all sentences S and names N , $\lceil N$ believes that $S \rceil$ is true iff N believes that S is true.

⁴³ Much the same point can be made about Horwich’s attempt to deflate compositionality for meaning (Heck, 2013).

Field offers various reasons to doubt that (22) can in fact be proven schematically and expresses some doubt about (22) itself. But, for the reasons already given, I find Field's discussion hard to align with his disquotationalist commitments.⁴⁴ From a semantic point of view, (22) is extremely dubious. But from the disquotational point of view, surely (22) ought to be correct. It has to be correct if the truth-predicate is to play the expressive role disquotationalists think it plays. Suppose I want to affirm John's belief in the Euclidean character of space. Then I might say, "John believes that the axioms of Euclidean geometry are all true". If that is not to be a comment on John's beliefs about the semantics of English, then $\ulcorner \text{"A" is true} \urcorner$ has to be equivalent to A ,⁴⁵ even inside hyperintensional contexts (cf. Field, 1994, pp. 265–6). So (22) seems to be provable in the usual way:

- (i) "S believes that A" is true iff S believes that A
- (ii) "S believes that A" is true iff S believes that "A" is true
- (iii) For all sentences S and names N, $\ulcorner N \text{ believes that } S \urcorner$ is true iff N believes that S is true.

Obviously, this strategy is going to generalize.

Field (2005, p. 24) also expresses concern about the last step of the argument, since it "seems to depend for its plausibility on the assumption that we can unproblematically quantify into" the appropriate sort of context. But there is nothing wrong with quantifying into intensional or even hyperintensional contexts. We do so all the time in ordinary

⁴⁴ I am independently puzzled by this remark:

... [I]n order for [(22)] to be usable in a full compositional semantics, we'd also need other applications of substitutivity that are likewise dubious; e.g., we'd need that S believes that ' p or q ' is true if and only if S believes that ' p ' is true or S believes that ' q ' is true. (Field, 2005, p. 24)

I'm not sure what Field is thinking here—he doesn't explain further—and I cannot think of any reason myself that one would need such a principle in a compositional semantics, whether it was based upon (22) or not. In any event, the issue is whether Field is committed to (22), not what work (if any) it might do. (Possibly, what Field meant to write was: ... we'd need that S believes that ' p or q ' is true if and only if S believes that ' p ' is true or ' q ' is true. But that is unproblematic.)

⁴⁵ As I mentioned in note 7, these are not entirely equivalent: The former commits one to the existence of the sentence A. But it is not obvious that this commitment has to be the believer's, as opposed to the attributor's. To assume it did would be to make strong assumptions about how the content of the complement clause has to be related to the content of the belief attributed.

language.⁴⁶ If ‘quantifying-in’ seems puzzling, it is because of other theoretical commitments we have. Specifically, the problems connected with quantifying-in arise *because of our commitments regarding the semantics of quantification*: We want to regard the quantified variable as ranging in such cases over ordinary objects (people and planets) rather than intensions or modes of presentation. Even more fundamentally, the reason that quantifying-in is a problem is simply that we think of variables as having values. If one thought of the truth of a quantified statement in terms of the truth of its instances, then, as Ruth Barcan Marcus (1972) was fond of pointing out, there would be no problem.⁴⁷ Field cannot have it both ways. He cannot both suggest that we regard questions about the semantics of attitude attributions as “misguided” and then invoke the very problems that motivate such questions when trying to avoid unwelcome consequences of his own view.

But whatever the status of (22), it should be clear that few of Field’s worries about it carry over to (20) and (21). There is no obstacle whatsoever to quantifying into causal or modal statements. And the suggestion—which we did not discuss—that (22) might fail because *N* “may have peculiar beliefs about truth” (Field, 2005, pp. 23–4) has no analogue in those cases. While my own view, then, is that disquotationalists are committed to (22) as well as to (20) and (21), it is enough for what follows if they are committed only to the latter two. Indeed, it is enough if they are committed just to (21), though I shall focus in what follows on (20).

4 Truth-functionality

4.1 Compositional Principles and Truth-Functionality

Friends of semantics will have greeted

- (20) For all sentences *S* and *T*, ‘*S* because *T*’ is true iff *S* is true because *T* is true.

⁴⁶ There is someone Superman knows can fly that Lois does not, because Superman knows that Clark Kent can fly, and Lois does not. But there may well not be anyone that Lois knows can fly that Jimmy does not, even though Lois knows that Superman can fly, and Jimmy does not know that Clark can fly.

⁴⁷ The fact that there are objects without names need not be an obstacle. One can always consider expanded languages, in which new names have been introduced. And one need not consider a single language in which every object has a name. It suffices to consider, for each finite set of objects, a language in which each of them has a name. That makes for rather a lot of languages, but each of them is just a finite extension of the base language.

with bemusement. But what exactly is supposed to be wrong with it? Why does it feel so different from

(9) $\lceil A \text{ and } B \rceil$ is true iff A is true and B is true.

and related principles? As (9) is generally understood by friends of semantics, what it says, in part, is that the truth-value of a conjunction is entirely determined by the truth-values of its parts, i.e., that conjunction is truth-functional. It is the truth-value of *the conjuncts* that matters, but what the conjuncts contribute is just their truth-value and nothing else. Similarly, then, (20), as understood by friends of semantics, would tell us that the truth-value of “ A because B ” is wholly determined by the truth-values of A and B and the causal relationship between those truth-values (e.g., by whether the True because the False). That is barely coherent, but never mind. What the provability of (20) really shows us is that the proof of (9) goes through whether or not “and” is truth-functional. So, if (9) is understood in the sense in which it is schematically provable, it does not affirm the truth-functionality of conjunction; so understood, then, it is not the compositional principle for “and” as friends of semantics would understand it; *that* principle is *not* schematically provable.

That went by pretty quickly. Let me fill in some details.

Strawson (1952, pp. 79–82) famously denied that “and” is truth-functional, on the ground that there is a temporal aspect to its meaning.⁴⁸ A sentence like

(23) They got married, and they had a baby.

could be true, Strawson claimed, even though

(24) They had a baby, and they got married.

was false. But how this issue is decided has no effect whatsoever on whether (9) is true when the truth-predicate is read disquotationally. If truth is disquotational, then $\lceil “A” \text{ is true and } “B” \text{ is true} \rceil$ just means what $\lceil A \text{ and } B \rceil$ means which is just what $\lceil “A \text{ and } B” \text{ is true} \rceil$ means, and that is the end of it, no matter what “and” actually means. If that were not so, then the truth-predicate could not be used, in the context of a conjunction, for the expressive purposes for which the disquotationalist thinks we need it. It follows that the sorts of arguments we have been examining do not allow the disquotationalist to prove the compositional

⁴⁸ The issue remains controversial. Relevance theorists, in particular, often deny that “and” is truth-functional (see e.g. Carston, 1988).

principles in the sense that friends of semantics understand them. In particular, this sort of reasoning cannot be used to demonstrate the truth-functionality of conjunction, which I take to be one of the central semantic facts about it—if, indeed, it is a fact about it.

I am assuming, of course, that whether “and” is truth-functional is an important semantic issue, one that will affect the form of the compositional principle we accept for it. Foes of semantics might not agree, but my goal here is not to convince them of the virtues of semantics. My goal is to argue that the notion of truth, *as it appears in semantics*, is not playing the merely expressive role that a disquotational truth-predicate plays: One cannot understand the use of the truth-predicate, *in semantics*, as purely disquotational, as just a tool of ‘semantic ascent’. Rather, the notion of truth is doing serious theoretical work, and that work is nowhere more visible than in disputes over truth-functionality. The fact that “and” is truth-functional (if, again, it is a fact) is supposed to explain certain aspects of the behavior of that word, and the fact that “because” is not truth-functional is supposed to explain some of the ways in which it is unlike “and”. So truth has a robust, explanatory role to play in semantics.

A disquotationalist might respond that truth-functionality is, to be sure, an important phenomenon,⁴⁹ but that it is not a semantic but a logical phenomenon, one that has to do with what sorts of inferences are valid, not with whether (9) is true. Presumably, the inferences in question would be something like:

- (i) A and B
- (ii) B if, and only if, C
- (iii) Hence, A and C

Call these ‘inferences constitutive of truth-functionality’.

Even at first sight, one ought to be suspicious of this sort of inferential characterization of truth-functionality. If the biconditional is not itself truth-functional, then it may license such substitutions in cases where the connective under discussion is not truth-functional.⁵⁰ For example, if the biconditional expresses necessary equivalence, then it will license

⁴⁹ More radically, one might deny that truth-functionality is an important phenomenon at all. But, again, my claim, at present, is just that disquotationalism cannot make sense of compositional principles *as friends of semantics understand them*. So we are faced with a choice between semantic theory and disquotationalism.

⁵⁰ As is often noted, this sort of inference is valid in many logics in which the connectives

substitutions inside modal contexts. It is rarely held nowadays that the natural language conditional is truth-functional, so this sort of inference, formulated in natural language, almost certainly does not capture truth-functionality.⁵¹ But, even if we set that worry aside, the offered condition is easily seen to be both too weak and too strong.

To see that the condition is too weak, consider the conditional itself. Then the inference in question takes the form:

- (i) If A , then B .
- (ii) B if, and only if, C .
- (iii) Hence, if A , then C .

This will be valid so long as the conditional is transitive, whether or not it is truth-functional, and the same goes for the case in which we substitute in the antecedent. The inferential conception would thus count any transitive conditional as truth-functional.

One might suggest, in response, that the inference should not be stated in terms of “if and only if”, but in some other terms. One idea, for example, would be to take the second premise to be:

- (ii') Either B and C , or it is not the case that B and it is not the case that C .

which is disquotationally equivalent to:

- (ii'') Either “ B ” is true and “ C ” is true, or “ B ” is false and “ C ” is false.

But this proposal has similar flaws. As mentioned earlier, it is controversial whether “and” is truth-functional.⁵² If it is not, then (ii') is not truth-functional, either, and the possibility will again arise that it will support inferences it should not.⁵³

But however the inference is formulated, requiring it to be valid if a connective is to be truth-functional is too strong a condition. I

are not truth-functional. For example, such inferences are valid in intuitionistic logic, in supervaluational systems, and so forth, and not just for conjunction but for the other connectives, as well, even though those connectives are not truth-functional in such systems.

⁵¹ And, of course, the English phrase “if, and only if” may have different readings in different occurrences, which will complicate matters further.

⁵² Strawson (1952, pp. 90–3) goes so far as to deny that even “or” is truth-functional.

⁵³ Even an inference with premises B and C runs into similar problems, since “They had a baby. They got married.” can seem relevantly similar to (23).

have mentioned several times now that it is controversial whether “and” is truth-functional. That question is *not*, however, decided simply by considering the truth-values of such sentences as (23) and (24). Even if those two sentences can have different truth-values, it does not follow that “and” is not truth-functional. The reason for the difference in truth-value might lie not in the meaning of “and” but in the interaction of the tenses on the verbs with each other and with other elements of the syntactic structure of the sentence. Such an account was developed by Barbara Partee (1984, §IV) in the context of Discourse Representation Theory, but similar accounts can be developed in other frameworks (see e.g. King and Stanley, 2004, §V).

Ultimately, of course, it is an empirical question what accounts for the temporal reading of conjunctions; that is, it is an empirical question whether “and” is truth-functional. But the point here is conceptual: One cannot read off from the truth-values of sentences in which “and” occurs whether it is truth-functional. There is too much else going on in such sentences for such an inference to be legitimate. If so, however, no inferential test of the sort we are considering can work. To steal from Hilary Putnam: Truth-functionality just ain’t a matter of inference.⁵⁴

One might respond that, if Partee is right, then (23) and (24) aren’t, on the readings in question, actually conjunctions. They have some more complex structure. So, if we consider sentences that really are conjunctions, then the inferential test will work. But then the question is how we are supposed to tell which sentences ‘really are’ conjunctions. The point is not just that it is hard to know. The point is that, in practice, claims about what the structure of a sentence ‘really is’ are evaluated by considering how that sentence’s having a given structure would affect its meaning. One can’t even discuss this sort of question unless one has some sort of idea how structure-facts affect meaning-facts.⁵⁵ But how structure affects meaning is what semantics is about—one of the things it is about, anyway. So the question whether (23) and (24) are ‘really

⁵⁴ Note that the same point disposes of the suggestion that a connective $*$ is truth functional just in case whether $A*B$ is completely determined by whether A and whether B . Even if whether they got married and whether they had a baby does not completely determine whether they had a baby and they got married, it could yet be that “and” is truth-functional.

⁵⁵ This is true even in simple cases like “He saw John in the mirror”. The usual claim is that “He” cannot be bound by “John”. But that claim makes little sense absent the background assumption that facts about binding imply facts about meaning, in this case, that such binding implies *de jure* co-reference. As is often pointed out, “He” can perfectly well be *de facto* co-referential with “John”.

conjunctions’ is one that makes no clear sense outside the semantic project.

This sort of point is perhaps easiest to understand in connection with quantification. Consider, for example:

(25) Most professors know some student who hates every class.

There are several possible readings for this sentence, but it seems to me that (25) cannot mean that every class is hated by some student that most professors know.⁵⁶ Why not? The familiar answer is that, while the three quantifiers in (25) can take different scopes, not every possible ordering of the scopes is available. And surely something along those lines must be right.⁵⁷ But it is only a partial explanation, and it would be no explanation at all if we did not understand how scope affects meaning: (25) has the readings it does, and not others, because certain scope relationships are possible, and a sentence in which the quantifiers take *these* scopes has *this* meaning; one in which they take *those* scopes has *that* meaning; and to get *this other* (unavailable) meaning, the quantifiers would have to take *these other* scopes which, for some reason, they can’t.

4.2 Schematic Reasoning and Compositional Principles

Toward the end of his paper on schematic reasoning, Field makes two suggestions:⁵⁸

First, it may simply be misguided to look for compositional truth or meaning principles for attitude constructions. Second. . . , the fact that compositional principles of truth or meaning are straightforward for some constructions but not others is not fundamentally a fact about the application of the notion of truth or meaning to different constructions, but is simply a

⁵⁶ Whereas it can mean, I think, that every class is such that most professors know some student who hates it. (This reading is more natural if “*every*” is stressed.) Even the question why that reading is less natural wants answering, and the explanation also adverts to structure.

⁵⁷ Variable-free semantic theories would explain the phenomenon differently (see e.g. Jacobsen, 2014). But the remarks to follow also apply to them. Perhaps even more so, since syntax does so little work in such frameworks.

⁵⁸ Field (2005, p. 21) also conjectures that schematic reasoning can be used to prove compositional principles about meaning, as well as about truth. I suspect he is right, but in that case the vacuity of the resulting claims is even more obvious than it is in the case we are discussing here (Heck, 2013).

fact about the underlying logic of those constructions. Facts about the logic of these constructions explain the facts about how the notions of truth and *meaning that* apply to them, rather than the other way around. (Field, 2005, p. 24)

The logic of “and” and “or” permits a simple derivation of the compositional principles for them, but the logic of attitude constructions, Field thinks, does not. Now, as I have said, if the truth-predicate is disquotational, then that is wrong. But set that aside. Suppose we accept, as almost anyone would,⁵⁹ that A and $\ulcorner“A” \text{ is true} \urcorner$ are materially equivalent. Then it looks as if schematic reasoning will permit the derivation of the compositional principle for “and”, if it is true (i.e., if “and” is truth-functional), though it will not then permit the derivation of the compositional principles for “because” and “necessarily”. That is, it looks as if (9) will be *provable* by schematic reasoning (if it is true), just given the very weak assumption just mentioned. How then can (9) be regarded, as friends of semantics want to regard it, as an empirical hypothesis?

I do not mean to attribute this line of thought to Field, but it is naturally suggested by his paper, and it took me a while to formulate an answer to it. So it seems worth considering, at least briefly.

To see the response, consider:

(26) “Alex swims and Tony runs” is true iff Alex swims and Tony runs.

Friends of semantics would regard (26) as one of the empirical claims in whose explanation (9) figures. But (26) is just an instance of the T-scheme. How can it need explaining at all? There seems to be a way of knowing that (26) is true that simply involves reflecting on the meaning of the word “true”. But even if (26) can, in this way, be known by reflection, or even *a priori*, it does not follow that (26) is not empirical, nor that it does not stand in need of explanation. I can know by reflection that I am here now, but it is an empirical fact nonetheless, and one that can be explained.

Moreover, my own view is that the full story about how one might come to know (26) on the basis of reflection is significantly more complicated than: ‘true’ disquotes (Heck, 2004, §5). The complications matter. In particular, one cannot come to know (26) by this sort of reflection unless one already understands the embedded sentence “Alex swims

⁵⁹ Modulo concerns about the paradoxes, of course, though those will affect this entire discussion and so may be set aside for the moment.

and Tony runs”. That understanding, on my view (see Heck, 2007), partially consists in knowledge of (26). That need not make the reflective knowledge circular. It just means that, once one has come to know (26) in one way—by learning to speak the fragment of English of which the sentence it mentions is a part—and one has also come to understand the word “true”, then another, more ‘reflective’ way to know (26) also becomes available (Heck, 2004, §3).

Something similar is true of compositional principles. The semantic view is that principles like (9) are more fundamental than such T-sentences as (26): Part of the reason (26) is true is because a conjunction is true just in case both its conjuncts are, but it is no part of why (9) is true that (26) is true.⁶⁰ It is no threat to this position if, once such T-sentences are in place, one can do ‘reverse semantics’ and derive the more fundamental compositional principle for conjunction from the less fundamental T-sentences it partly explains by reflecting on the pattern exhibited by such T-sentences generally.⁶¹

It is no doubt an interesting question why such schematic derivations seem to be available in some cases but not in others. But there is an obvious sense in which Field’s schematic arguments simply piggyback on genuine semantics: Field introduces deflated versions of whatever machinery is required by genuine semantics and then treats it schematically.⁶² I suspect that such mimicry is also possible in other sorts of cases. The difference is simply that, in those other cases, more sophisticated sorts of semantic machinery will be involved. In many cases, there is, as yet, no semantic theory to mimic. If there were, then I’m sure Field could mimic it, too.

4.3 A Brief History of Truth-Functionality

I argued in §4.1 that truth-functionality cannot be characterized in terms of the validity of inferences. It is, rather, a semantic phenomenon, one that can only be characterized in terms of the notion of truth, which thus plays a role in semantics that is not simply expressive. The history of

⁶⁰ Indeed, (9) could be true even if (26) was not true: “Alex swims and Tony runs” might be an idiom.

⁶¹ There is a program in the foundations of mathematics known as ‘reverse mathematics’ (Simpson, 2009). It is sometimes said to involve deriving axioms from theorems.

⁶² See, for example, Field’s deflationary treatment of quantification (Field, 2005, §5), for more on which see §5.

the notion of truth-functionality teaches us the same lesson.⁶³

I used to think that the notion of truth-functionality was due to George Boole, but I was wrong. Boole does think of (what we would call) sentence-letters as having ‘values’, and he thinks of conjunction and the like as corresponding to operations on those values, with the values and the operations together forming (what we now call) a Boolean algebra. So Boole does think of conjunction as a *function*. But he does not think of it as a *truth*-function, because he does not think of the values of sentence-letters as truth-values. They are, rather, classes, subsets of the ‘universe of discourse’, which he originally regards, in *The Mathematical Analysis of Logic*, as comprised of ‘cases’ or ‘circumstances’: The value of a sentence-letter is the set of circumstances in which it is true (Boole, 1847, pp. 48ff).

By *The Laws of Thought*, Boole (1854, ch. XI, §16) had become dissatisfied with this view, because it requires “a definition of what is meant by a ‘case’”, which he thinks will involve us in matters beyond the bounds of logic. In this later book, then, he regards the universe of discourse as consisting of times—apparently, these are within the bounds of logic—and the value of a sentence-letter becomes the set of the times at which it is true. Other Booleans made yet other choices. But almost all the Booleans take the values of sentence-letters to be subsets of some universe of discourse.⁶⁴ The crucial advantage of this view, as the early Booleans saw it, is that hypothetical judgements can thereby be unmasked as universal affirmative propositions, relations between classes. Thus, we find Boole writing:

Let us take, as an instance for examination, the conditional proposition “If the proposition *X* is true, the proposition *Y* is true”. An undoubted meaning of this proposition is, that the *time* in which the proposition *X* is true, is *time* in which the proposition *Y* is true. (Boole, 1854, ch. XI, §5, emphasis original)

More generally, the ‘calculus of judgements’ (sentential logic) can, in this way, be reduced to the ‘calculus of classes’ (Aristotelian logic, more or

⁶³ For defense of the interpretive claims made here, and some caveats, see Heck and May (2018, 2019).

⁶⁴ Ernst Schröder (1972, p. 224) expresses this sort of view in his review of Frege’s *Begriffsschrift* (Frege, 1967). Hugh MacColl (1877, pp. 9–10) comes closest to the modern conception, but his official view is that the sentence-letters denote ‘statements’.

less), thus unifying what might otherwise have looked like unrelated parts of logic.

The question what comprises the universe of discourse has proved not to be the crucial point. Boole's great insight was precisely that, no matter what we take the universe to comprise, if we treat the sentential connectives as expressing set-theoretic operations on its power set, then the (Boolean) algebra so determined will validate the laws of classical logic. And the flexibility inherent in Boole's approach has proven a great advantage. His original view, that the universe comprises 'cases', inspired some of the earliest work on modal logic. His later view, that it comprises times, had a similar influence on tense logic.⁶⁵

Boole does regard the case in which the universe contains just one element as special. Then we have a two-element Boolean algebra, with elements Boole would have denoted "1" and "0". But, even in this case, Boole does not interpret 1 and 0 as truth and falsity: They are the universe and the empty set, as they always are in his work.⁶⁶ Boole regards this case as especially important because it makes the calculations in which he is interested especially easy.⁶⁷ But—and this is the point—none of this affects Boole's *theory* of those calculations, that is, his attempt to axiomatize the structure of a Boolean algebra, i.e., his attempt to formalize sentential logic. What I earlier called 'inferences constitutive of truth-functionality' were well-known to Boole. Identity, which functions like the biconditional, features prominently in Boole's calculations, as do the substitutions that it licenses. But the notion of truth-functionality simply is not present, because Boole does not, as we have seen, think in terms of truth-values.

The notion of truth-functionality is not present in Frege's *Begriffsschrift*, either, though Frege does there present a complete formalization of sentential logic, and 'inferences constitutive of truth-functionality' are frequently made. Indeed, one of the rules governing the sign for 'identity of content', which acts much like the biconditional (and is written: $\equiv$),

⁶⁵ The general tendency towards abstraction was probably even more important. What Boole was really doing was founding what we now know as abstract algebra.

⁶⁶ In *The Laws of Thought*, Boole sometimes treats "true" as meaning "true throughout the whole of the time to which our discourse refers" (Boole, 1854, ch. XI, §11) and false as meaning "that within those limits there is no portion of time for which it is true". That essentially collapses us into the two-element case, but it is not the official understanding, and it is a puzzling view, anyway, since it seems to leave out propositions that are true sometimes and false others.

⁶⁷ These are the calculations that would now be done with truth-tables. Boole does not have those, however. His calculations are, instead, manipulations of algebraic formulae.

is proposition (52), which is a form of Leibniz's Law and which permits precisely the substitutions embodied in the 'inferences constitutive of truth-functionality'.

The striking fact, though, is that, in *Begriffsschrift*, Frege simply does not explain the conditional in terms of truth and falsity. His explanation reads, rather, as follows:⁶⁸

If A and B stand for contents that can become judgements. . . ,
there are the following four possibilities:

- (1) A is affirmed and B is affirmed;
- (2) A is affirmed and B is denied;
- (3) A is denied and B is affirmed;
- (4) A is denied and B is denied.

Now

$$\begin{array}{l} \vdash A \\ \vdash B \end{array}$$

stands for the judgement that the third of these possibilities does not take place, but one of the other three does. (Frege, 1967, §5, emphasis removed)

Frege does not think of the conditional as expressing any kind of function in *Begriffsschrift* (Linnebo, 2003), let alone a truth-function. He seems to get the idea that it expresses a function a few years later, from Boole. The idea that it expresses a *truth*-function, however, is Frege's own, and it does not appear until 1891, in his lecture *Function and Concept* (Frege, 1984b, opp. 20ff). The crucial innovation Frege has made at that point is to introduce the notion of a truth-value—and with it the idea that sentences denote their truth-values. Then the way is open to regarding the conditional as, quite literally, expressing a truth-function: a function whose arguments and values are truth-values.⁶⁹

⁶⁸ Frege himself would eventually come to realize that the language of affirmation and denial is inappropriate: When one asserts a conditional, one is not thereby affirming or denying its antecedent or consequent. This is of course what Peter Geach (1965) famously called "the Frege point".

⁶⁹ There is a complication in the fact that Frege regards the truth-values themselves as being objects among the other objects, so the arguments of the conditional include other objects besides the truth-values, such as 2 and the null class. But, in practice, we can regard the conditional as a truth-function, because of how the 'horizontal' works, and Frege himself tends to treat it that way.

The notion of truth-functionality did not emerge, then, either from the algebraic manipulations we find in Boole nor from the codification of inference presented in *Begriffsschrift*. Though these earlier efforts no doubt help prepare the way, truth-functionality appears only within, and as a central part of, the semantic perspective that Frege embraces in his later writings.

I would suggest, in fact, not only that truth-functionality cannot be explained in terms of inference, but that even compositional principles like (9) do not really capture it. Properly to capture it, we need to follow Frege and think of sentences as having truth-values as their ‘semantic values’ and of connectives like “and” as operating on those values.⁷⁰ That, in fact, is often how things are done in developed presentations of truth-theoretic semantics for natural languages (e.g., Larson and Segal, 1995). The possible semantic values for sentences, truth and falsity, form a two element Boolean algebra, and the semantic values of conjunction, disjunction, and the like are the operations of that algebra. In such a treatment, it is not just the particular clause for conjunction that expresses its truth-functionality, but the semantic framework in which that clause is stated. Semantic notions then play an even more fundamental role than they do if the theory is formulated simply using compositional principles.

5 Quantification

To this point, we have mostly been considering compositional principles for sentential connectives that are plausibly truth-functional. We have seen that the tools Field and other deflationists have provided for deriving such principles work too well. This reveals that what disquotationalists are able to prove—e.g., (9), in its disquotational reading—is simply not the same principle that plays an important role in (a certain sort of) semantic theory. Moreover, truth plays a role not only in the formulation of compositional principles, but in the statement of more general principles like truth-functionality. And that role is not one that disquotationalists can acknowledge. These same sorts of issues arise with respect to quantification.

Field (2005, §5) argues that schematic reasoning can also be used to

⁷⁰ This point is argued in detail by Dummett in the early chapters of *The Logical Basis of Metaphysics*. He expresses it by saying that a “meaning-theory must... incorporate a semantic theory” (Dummett, 1991, p. 63).

derive disquotational versions of such principles as Tarski's clause for the existential quantifier. But the principle Field derives is no more the one Tarski stated than the schematic version of (9) is Tarski's clause for conjunction. There is nothing in the sort of schematic argument that Field gives that requires the open formula into which we are quantifying to be extensional. This is unsurprising since, as was said above, the expressive role the truth-predicate plays in compositional principles, according to the disquotationalist, is that of a substitutional quantifier, and you can quantify, substitutionally, into any context without difficulty. This leads to a question about the "objects" that Field takes "assignment functions" to pair with variables. What are these objects? Field appears just to assume that they are ordinary, everyday objects. But if we make that assumption, then the uniform schematic treatment no longer works, unless we have some reason to set intensional contexts aside for special treatment (cf. Dummett, 1981, pp. 152–7).

The more important point, however, is the one made earlier: The usual reason to be suspicious about quantification into intensional contexts is bound up with common, but nonetheless substantial, assumptions about the semantics of quantification. This point emerges with particular clarity if one reflects on the dispute between Marcus (1961) and Quine (1961) over quantification into modal contexts and, in particular, on Marcus's emphasis on the role played by 'extensionalizing principles'.⁷¹ Indeed, I would have thought that the obvious way for a disquotationalist to think of the truth of a quantified formula was in terms of the truth of its instances, not in terms of assignments.⁷² To think of variables as having values, and of the truth of a quantified formula in terms of satisfaction, is already to think semantically.

Moreover, just as the truth-functionality of "and" fails to be captured by the disquotational reading of (9), so there are general claims about the semantics of quantification that no schematic derivation can yield. It is generally accepted nowadays that natural language quantifiers are, in some appropriate sense, 'binary', so that (roughly speaking) one forms a sentence from two open formulae—the appropriate form is something like $Qx(Fx; Gx)$ —not from just one, as in familiar presentations of first-

⁷¹ Marcus goes so far as to deny, in the discussion that followed her exchange with Quine, that, in the strictest sense, nine *is* the number of planets (Marcus et al., 1962, p. 136).

⁷² This does cause problems, however, for the interpretation of such non-first-order quantifiers as "most" (Heck, 2018b, p. 148).

order logic. That, of course, is just a matter of syntax.⁷³ The fruitful semantic idea is that quantifiers in natural language express certain sorts of comparisons between the extensions of the two formulae involved. And there are important hypotheses about what these comparisons must be like. John Barwise and Robin Cooper (1981) noticed, for example, that natural language quantifiers are ‘conservative’, in the sense that the following are equivalent for every natural language quantifier Q :

$$\begin{aligned} Qx(Fx; Gx) \\ Qx(Fx; Fx \wedge Gx) \end{aligned}$$

Thus, every girl is smart iff every girl is a smart girl; most boys are funny iff most boys are funny boys; and so forth. This suggests, in turn, that the first component of the quantifier serves to restrict the domain of the second, so that the comparison is not between the extension of Fx and that of Gx , but between the extension of Fx and that of $Fx \wedge Gx$. A yet further suggestion is that the comparison between these must always concern cardinality, something that would follow from the more general claim that the truth of a quantified sentence is always insensitive to permutations of the domain (see e.g. Sher, 1991).

Of course, the proper formulation of these various generalizations remains a matter of dispute, and my own formulations are not only vague but probably out of date. The point is simply that, except for conservativity, these sorts of generalizations, which figure prominently in actual work on quantification in natural language, essentially involve the notion of truth and related semantic concepts, such as that of the extension of a formula. One might propose that these generalizations should be reconceived in terms of the acceptability of certain inferences. But this does not seem very plausible. It is not at all clear to me how one might formulate the corresponding inference in the case of the generalization concerning cardinality. It would presumably have to involve complex inferences involving equinumerosity. In the case of the generalization involving permutations, it would involve *really* complex inferences involving one-one functions on the universe. Neither seems to be within the ken of everyone who understands such constructions, and yet (or so

⁷³ In fact, a more common approach nowadays is to regard quantifier words, like ‘some’ and ‘most’, as combining with a noun phrase to form a determiner phrase, so that the appropriate logical form is more like: $(Qx : Fx)(Gx)$. But the discussion here does not turn upon such issues. For the details, see any decent textbook on semantics (e.g., Heim and Kratzer, 1998).

the hypothesis is) everyone's use accords with such generalizations. That wants explaining.⁷⁴

The deeper point is that it is an important question *why* such inferences are, in general, valid.⁷⁵ This question is not to be compared to the question why conjunction elimination is valid.⁷⁶ Conservativity purports to be a general fact about natural language determiners. It entails, for example, that there *cannot* be (even, *could not* be) a natural language determiner "Quap" such that "Quap *F*s are *G*" is true just in case there are fewer *F*s than *G*s: "There are fewer *F*s than *G*s" does not imply "There are fewer *F*s than there are *F*s that are *G*", because the latter can never be true.⁷⁷ The obvious question is then *why* there cannot be such a determiner, and it is hard to imagine what the answer could be if it did not involve general principles concerning the semantics of such words. In Barwise and Cooper (1981, §4.4), for example, conservativity is derived from what they call the "Determiner Universal", which states a general, and purportedly universal (in the sense of universal grammar), condition on the semantics of determiners. And Barwise and Cooper suggest several other such constraints, as well, almost all of which are semantic.

The history of quantification is instructive here, as well. It is often said that Frege introduced the notion of quantification in *Begriffsschrift*, but this is misleading. Frege does use notation in *Begriffsschrift* that is trivially inter-translatable with modern quantifier-variable notation, and his formal theory in *Begriffsschrift* is all but equivalent to a modern axiomatic presentation of second-order logic, with its first-order fragment being sound and complete. The *syntax* of what we now call quantifiers is thus made reasonably clear in *Begriffsschrift*.

Nonetheless, there are no quantifiers in *Begriffsschrift*. What corresponds to our universal quantifier is what Frege calls the "concavity", but he does not think of it as expressing universal generality. Its purpose,

⁷⁴ This is not unrelated to the fact that there seems to be no reasonable inferentialist treatment of generalized quantifiers like "most", which in turn is related to the fact that they have no complete axiomatization.

⁷⁵ The same question might be raised about inferences related to truth-functionality, but the distinction I am about to make is harder to maintain in that case.

⁷⁶ It is perhaps worth saying explicitly that nothing in this paper is meant to address this issue. The issue here has not been how we are to explain the *concept* of conjunction, but only how we should think about the semantics of "and". It is one of the many disadvantages of disquotationalism that it essentially deprives us of this very distinction.

⁷⁷ Similarly, conservativity implies, perhaps surprisingly, that "only" is not a quantifier: "Only *F*s are *F*s that are *G*" is trivial and so cannot be equivalent to "Only *F*s are *G*".

rather, is simply to “delimit[] the scope that the generality *indicated by the letter* covers” (Frege, 1967, §11, my emphasis). What expresses generality is thus not the quantifier but the “letter”, that is, the variable.⁷⁸ The concavity has no meaning at all, but is pure syntax. In the strict sense, then, there could not have been an existential quantifier in *Begriffsschrift*. That is not to deny, of course, that Frege could have defined an abbreviation for $\neg\forall x\neg$, which is his version of $\neg\forall x\neg$ (as we would write it), if he had wished to do so. But he could not have treated the existential quantifier as primitive and defined the universal as an abbreviation. Generality is expressed by the variable, and that generality is always universal.⁷⁹

It is not until the 1890s, by which time Frege had fully embraced the semantic perspective, that quantifiers really appear in his work. Now he regards “ $\neg\forall\phi(a)$ ” as referring to a ‘second-level concept’—the letter ϕ here is marking the argument place—a higher-order concept that is true or false of first-order concepts and that is, specifically, true only of those concepts under which all objects fall (Frege, 2013, v. I, §8). Though Frege continues to treat the universal quantifier as primitive, and the existential as defined, this is now a matter of convenience, not of principle. Generality, then, is no longer expressed by the variable. The purpose of bound variables becomes purely syntactic, as the concavity’s was before: They help indicate which concept is the argument to the quantifier by marking the argument-places of the complex predicate that occurs in the quantifier’s own argument-place.⁸⁰ This new account also yields an

⁷⁸ Frege makes this clear at the beginning of the book:

I... divide all signs that I use into *those by which we may understand different objects* and *those that have a completely determinate meaning*. The former are *letters* and they will serve chiefly to express *generality*. (Frege, 1967, §1)

The emphasis is Frege’s. He uses such emphasis throughout *Begriffsschrift* when he is articulating the central features of his new conception of logic.

⁷⁹ The costs of this way of thinking are especially visible in Russell’s discussion of variables in the *Principles* (Russell, 1903, ch. VIII). Russell regards such phrases as “a man”, “every man”, and “some man” as each denoting a variable (rather than a particular) man, a different kind of variable man in each case. This aspect of Russell’s view changes in “On Denoting” (Russell, 1905), which opens with a general discussion of how ‘denoting phrases’ should be understood—*not* as names of different kinds of variables—and then continues with a discussion of why descriptions should be treated similarly. It seems not to be widely appreciated how important this change in Russell’s view of quantification was.

⁸⁰ See Frege’s explanation of what he calls the “corresponding function” (Frege, 2013, v. I, §8).

answer to perhaps the most pressing semantic issue concerning quantification: What is the significance of scope? Relative scope turns out, on Frege's account, to be a matter of the order in which certain functions are applied: The difference between " $\forall x \exists y (Rxy)$ " and " $\exists y \forall x (Rxy)$ " turns out to be not unlike the difference between " $f(g(x))$ " and " $g(f(x))$ ".

6 Closing

Donald Davidson (1984) famously takes the task of semantic theory to be the construction of a compositional theory of truth that delivers such theorems as:

(27) "Snow is white" is true iff snow is white.

Ironically, though, given how frequently (27) is used to illustrate the goals of semantic theory, we do not actually know how to formulate a theory that will generate it without getting a great deal else wrong. That is, we do not have a (widely accepted) semantics for mass terms. Field (1994, p. 269) thinks there may well be none to be had and so that it is a virtue of disquotationalism that it relieves us of the need to look for one. And Field (2005, p. 24) would further deny that any explanation of the truth of (27), of the sort that semantic theory purports to provide, is required, going so far as to suggest that "it may simply be misguided to look for compositional truth or meaning principles" in such cases. After all, if disquotationalism is true, then (27) is just a verbose way of writing:

(28) Snow is white iff snow is white.

and surely no deep explanation is needed of the truth of (28). So, ultimately, it seems unsurprising that disquotationalism cannot make good sense of such compositional principles as (9), or of semantic theory more generally.

It is of course open to a disquotationalist simply to insist that the use that semantic theory makes of the concept of truth, since it is not 'merely expressive', is illegitimate. And it is not my purpose here to convince anyone of the interest of natural language semantics, nor of linguistic theory more generally. My goal has simply been to force a choice between conceptual disquotationalism and semantics by showing that the work that the notion of truth does in semantic theory cannot be regarded as 'merely expressive', even in the simplest cases. As it happens, my own view is that the insights gained over the last few

decades more than suffice to demonstrate the fruitfulness of the semantic enterprise and of the central role that the thesis of compositionality has played in shaping it. To be sure, there is no *a priori* guarantee that there are compositional principles to be found for mass terms, attitude constructions, and the like. But that is simply a reflection of the fact that the compositionality of natural language is an empirical hypothesis, and a strong one (which is part of why it has proven so fruitful).⁸¹ Quite generally, though, the difficulty of formulating a semantic theory for mass terms, or attitude constructions, or generics, or what have you, should be no more surprising than is the difficulty of formulating conditions on the use of resultatives, in syntax.

I choose, then, to embrace natural language semantics and to reject conceptual disquotationalism. But I have not argued for that choice here.⁸²

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⁸¹ Indeed, the precise formulation of the principle of compositionality is controversial, and it is easy to find non-compositional treatments of various constructions in the literature (cf. Dever, 2006; Szabó, 2012). But these still make serious use of notions like reference and truth.

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