

Replies

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Abstract

In this paper I provide five separate responses, one for each of the contributed papers, in order to clarify some crucial aspects of the view defended in my book.

Keywords

Co-reference, formalization, logical form, logical knowledge, validity.

In what follows I reply to the critiques of Mario Gómez-Torrente, Mark Sainsbury, Zoltán Gendler Szabó, Manuel García-Carpintero, and Gil Sagi. I would like to thank all of them for their acute, penetrating, and provocative comments, and I hope that the responses provided below will help to elucidate aspects of my view that had previously been underdeveloped or insufficiently clear.

1 Reply to Gómez-Torrente

In my book I argue that logical form, in the sense of ‘logical form’ that matters to logic, is determined by truth-conditions. In order to substantiate this view—the *truth-conditional view*—I reason on the assumption that logical form is definable in terms of adequate formalization. More precisely, I claim that a sentence s has logical form α in an interpretation i if and only if s is adequately formalized as α in i (p. 60). Gómez-Torrente questions this claim. He contends that the idea of adequate formalization is highly indefinite, while the pretheoretic notion of logical form is appreciably more definite.

I agree that the idea of adequate formalization is highly indefinite. But I don’t see how the pretheoretic notion of logical form can be more definite. The left-to-right direction of the biconditional above is clearly true, and probably Gómez-Torrente is willing to accept it:

if s has logical form α in i , then s is adequately formalized as α in i . But the right-to-left direction seems plausible as well: if s is adequately formalized as α in i , how can one deny that s has logical form α in i ? It is hard for me to think about a formalization that is adequate yet does not display logical form.

To articulate my response, I will focus on two cases discussed by Gómez-Torrente. The first is an example that I use to address a possible objection to the truth-conditional view (p. 64):

- (1) Not all martians are green
- (2) Some martians are not green

What Gómez-Torrente finds puzzling about this example is that I grant the objector that (1) and (2) have the same truth-conditions, so they can be represented by means of the same formula. According to him, (1) and (2) clearly do not have the same logical form.

The fact, however, is that it is not essential to my view that (1) and (2) have the same logical form. I take the notion of sameness of logical form to be just as vague as the idea of adequate formalization. Sameness of logical form is stricter than logical equivalence, but it is hard to say how strict exactly. On the one hand, there are cases in which logically equivalent formulas definitely instantiate the same logical form. For example, two alphabetic variants such as $\forall xPx$ and $\forall yPy$ definitely instantiate the same logical form. On the other hand, there are cases in which logically equivalent formulas definitely fail to instantiate the same logical form. For example, Pa and a formula obtained by conjoining Pa with a long tautology definitely fail to instantiate the same logical form. In the middle, there is a grey area of cases in which it is not so clear whether the difference between logically equivalent formulas should count as a difference in logical form. I think that the case of (1) and (2) falls in that area. Frankly, I don't have firm intuitions about this case, although in the book I grant for the sake of argument that (1) and (2) instantiate the same logical form.

But suppose Gómez-Torrente is right: (1) and (2) have different logical forms because they have different truth-conditions. Then, my view predicts that (1) and (2) are not adequately formalized by the same formula, which is plausible. Of course, as Gómez-Torrente and

I agree, in some contexts it seems fine to use the same formula to represent both sentences. But this does not necessarily mean that the formalization is adequate in the sense predicted. Such contexts can be described as contexts in which, for pragmatical reasons, it is acceptable to use a formalization that is not entirely adequate. In other words, no matter whether it is correct to say that (1) and (2) have different logical forms, as Gómez-Torrente contends, it is not obvious that this example shows that logical form and adequate formalization are not connected in the way suggested in the book.

The second case is an example that I use to illustrate the rationale behind the rule of formalization that I call (N2), the rule according to which distinct names must denote distinct objects (p. 74). I describe a situation in which, in order to formally explain the validity of an argument exposed in a book on ancient philosophy, it seems plausible to assign the same individual constant to 'Aristotle' and 'the Stagirite', as in the following sentences:

(3) Aristotle admired Plato

(4) The Stagirite admired Plato

Gómez-Torrente is not convinced, though. He says that, in the situation described, what makes it seem appropriate to formalize 'Aristotle' and 'the Stagirite' by means of the same individual constant is the fact that the author of the book and its readers know well that the two names denote the same individual. He contrasts this case with one in which no such knowledge is presupposed. Imagine a book about theoretical arithmetics written in 1987, just after it became known that Euler's sum of powers conjecture has counterexamples for the power 4 but before it was known that the sum of powers of 4 that provides the smallest counterexample is 31.858.749.840.007.945.920.321. Gómez-Torrente supposes that the author of the book uses a constant e to designate this smallest counterexample, whose identity was unknown, and still use 31.858.749.840.007.945.920.321 as a name for the same number in some other part of the book. Then he says:

It is clear that no one can fault the author of the book for formalizing inadequately the sentences in which reference to this number is made; her formalization of the number by means of both e and '31.858.749.840.007.945.920.321' is perfectly acceptable. Furthermore, if she had rea-

soned without further ado that ‘since e is a counterexample to Euler’s conjecture, so is 31.858.749.840.007.945.920.321’, she would intuitively not be reasoning validly, and her book would have been rejected.

Gómez-Torrente’s point is that the following sentences have different logical forms:

- (5) e is a counterexample to Euler’s conjecture
- (6) 31.858.749.840.007.945.920.321 is a counterexample to Euler’s conjecture

According to him, the intuitive difference between the case of the Stagirite and the case of Euler’s conjecture shows that adequate formalization can vary in ways which are independent of logical form.

I disagree. Certainly, the case of Euler’s conjecture differs from the case of the Stagirite, due to the fact that the author of the book and its readers do not know that the two names refer to the same object. But this does not show that there is something wrong with (N2), because the difference between the case of the Stagirite and the case of Euler’s conjecture can be explained in accordance with the truth-conditional view. (N2) is consistent with the possibility that we formalize two co-referential names by using distinct individual constants because, *as far as we know*, the two names refer to distinct objects. If one rationally believes that two names refer to distinct objects, or has no reason to believe that they refer to the same object, it is rational for one to formalize them by means of distinct individual constants in accordance with (N2). Nonetheless, one’s belief can be false, and the formalization inadequate.

The same goes for logical form: one may rationally believe that two sentences have distinct logical forms, even though in reality they have the same logical form. Thus, the case of Euler’s conjecture can be described in accordance with the truth-conditional view as follows: although e and ‘31.858.749.840.007.945.920.321’ are adequately formalized by using the same individual constant, and consequently (5) and (6) have the same logical form, it is rational for the author of the book and for its readers to use distinct individual constants, because they have no reason to believe that e and ‘31.858.749.840.007.945.920.321’ refer to the same number. One thing is what is the logical form of a sentence, quite another thing is what

it is rational to believe in a certain context about the logical form of that sentence.

2 Reply to Sainsbury

Sainsbury's paper contains many sharp and accurate historical remarks that reveal the complexity of the development of the idea of logical form. In particular, the first part of the paper shows that there are several subtleties about Frege and Russell that I do not take into account in chapters 2 and 3 of my book. However, here I will not discuss that part. I will focus instead on the remarks that concern the implications of the truth-conditional view.

First of all I would like to draw attention to one important point raised by Sainsbury about the formalization of the following argument (p. 62):

(7) This is different from this

(8) There are at least two things

Sainsbury notes that it is overdemanding to require logical form to relate to content. What matters in this case is not really the content of (7), but the *structure of its content*: as long as we know that the two occurrences of 'this' refer to two distinct objects, we can formalize the argument in the way suggested. It is not essential to know that, say, the first occurrence refers to Plato and the second refers to Aristotle.

I think that this point is well-taken and would deserve careful consideration. Adequate formalization does not require full knowledge of the content of the sentences that occur in an argument. In my book I focus on content because my main dialectic goal is to question the view that logical form is determined by syntactic or semantic structure. But what I say there about adequate formalization could equally be phrased in terms of structure of content, assuming that knowing the structure of the content of a sentence that contains distinct occurrences of a demonstrative pronoun involves knowing whether those occurrences refer to different objects.

Now I will try to dispell some doubts expressed by Sainsbury about the implications of the truth-conditional view. First, Sainsbury

affirms that this view entails that logic is not a priori:

Logic will not be an apriori discipline, despite being generally understood to be one. This understanding is more than a merely arbitrary stipulation. It affects how the subject is taught (conventionally, no astronomy course is required to enable a student to formalize “Hesperus is Phosphorus”), and how arguments in it are conducted. Turning it into a partly non-apriori subject would require a very powerful reason.

However, the truth-conditional view does not entail that logic is not a priori. What it entails is that knowledge of logical form is not a priori, and this is consistent with the apriority of logic, as long as it is not assumed that knowledge of logic includes knowledge of logical form. As I explain in chapter 6, ignorance of logical form is consistent with logical knowledge. One may fail to know that an argument instantiates a given valid form even if one knows that that form is valid. This is why logic courses normally do not include astronomical matters.

Second, Sainsbury raises some questions about my treatment of Kripke’s puzzles of ‘Londres’ and ‘Paderewski’. On the truth-conditional view, both Pierre and Peter have contradictory beliefs, that is, beliefs which are adequately formalized as Fa and $\sim Fa$. Sainsbury is not satisfied with this result, which according to him elides a potential distinction between the two cases:

Peter’s case has struck some people as more challenging than Pierre’s. Suppose Pierre represents one belief in French (“Londres est jolie”) and another in English (“London is not pretty”). By conventional standards, these are inconsistent but not contradictory (contradictories are a proper subset of inconsistencies: inconsistencies having the form “ $p \& \neg p$ ”). This is what explains the possibility of rational Pierre having inconsistent beliefs: their inconsistency is not revealed by their logical form, and rationality would always deliver knowledge of logical form. By contrast, it’s hard not to convict Peter of irrationality, since his beliefs are apparently contradictory.

Unlike Sainsbury, I don’t see how Pierre’s case can coherently be described as a case of inconsistency without contradiction. First of all, note that there would be no point in arguing against the truth-conditional view by simply defining contradiction in terms of a certain form and insisting that Pierre’s beliefs lack that form. In order to mo-

tivate the claim that Pierre's case is a case of inconsistency without contradiction, one should rather rely on some informal and independently grounded understanding of inconsistency and contradiction. As far as I can see, the most plausible options are the following:

(DI) A set of sentences is inconsistent if and only if it is impossible that all the sentences in the set are true.

(DC) Two sentences are contradictory when it is impossible that they are both true and it is impossible that they are both false.

If one relies on (DI) and (DC), one can coherently hold that, although every pair of contradictory sentences forms an inconsistent set, not every inconsistent set includes a contradiction. For example, the following sentences are inconsistent but not contradictory, because they can both be false:

(9) Pierre is 30 years old

(10) Pierre is 35 years old

If (DI) and (DC) are granted, however, Pierre's case is not correctly described as a case of inconsistency without contradiction, for the following sentences, unlike (9) and (10), are contradictory according to (DC):

(11) Londres est jolie

(12) London is not pretty

More generally, although it seems correct to hold that some cases of inconsistency do not involve contradiction, there seems to be no reason to think that Pierre's case is one of them.

A second worry concerns the explanatory value of the hypothesis that Pierre and Peter have beliefs of the form Fa and $\sim Fa$:

Peter failed to recognize the inconsistency of his beliefs because he didn't realize that Londres and London were the same city, a geographical matter. Peter failed to realize that his Paderewski beliefs were contradictory because he didn't realize that Paderewski the musician and Paderewski the politician were the same person. Any explanation that omitted these facts would be inadequate. But once the facts are in place, nothing else is needed for a fully satisfying explanation.

Here I do not fully agree. It is certainly true that Pierre and Peter fail to recognize the inconsistency of their beliefs because they lack the relevant factual information. This is definitely the most important part of the story, and therefore is the part of the story that any reasonable account of Kripke's puzzles should grant. But there is another bit that can be added to complete the story, and that my account does add, namely, a formal explanation of the inconsistency of Pierre and Peter's beliefs. The difference between my account and other accounts—such as that suggested by Sainsbury and Tye 2012—lies precisely in this extra bit. Instead of saying that Pierre and Peter's beliefs are inconsistent in spite of not being of the form Fa and $\sim Fa$, I say that Pierre and Peter's beliefs are inconsistent just *because* they have that form.

A third worry is that my account of Kripke's puzzles is unable to accommodate some more nuanced facts about reference and attribution. Consider the sentences (13)–(16):

(13) Pierre believes that London is pretty and believes that London is not pretty

(14) Pierre believes that London is pretty and that London is not pretty

(15) Pierre believes that London is pretty and that it is not pretty

(16) Pierre believes that London is pretty and not pretty

Sainsbury notes that my account seems to entail (13), that (14) seems to follow from (13), that (15) seems to follow from (14), and that (16) seems to follow from (15). The problem, according to him, is that (16) is not entailed by the original puzzle.

However, it must be noted that my account entails (13) only insofar as (13) admits a non-transparent reading of 'believes', that is, only insofar as (13) is consistent with the observation that Pierre does not know that (11) and (12) have the form Fa and $\sim Fa$. As I explain in chapter 6, logical form is not transparent: having a belief of a certain form does not entail knowing that the belief has that form. If (13) is true on a non-transparent reading of 'believes', then the same goes for (14)–(16). But this does not mean that (16) is true on a transparent

reading of 'believes', that is, it does not entail that Pierre consciously ascribes a contradictory property to one and the same city. The reading of (16) that Sainsbury seems to have in mind, and that makes (16) unpalatable, is the latter. In other words, as long as (16) strikes as counterintuitive, it does not follow from my account.

I will conclude with a final note on Sainsbury's skepticism about the explanatory value of logical form. Towards the end of the paper, Sainsbury suggests that logical form as I understand it plays neither of the two theoretical roles that I distinguish in the book: it does not display the logically relevant features of natural language sentences, and it does not bring to the fore their compositional structure. He considers one of the examples that I use in the book (p. 61):

(17) Plato is different from Aristotle

(8) There are at least two things

I assume that the validity of this argument is explained by formalizing (17) as $a \neq b$ and (8) as $\exists x \exists y x \neq y$. Sainsbury, instead, doubts this assumption. He says that if we were not already convinced of the validity of the argument, we would not accept the formalization, so the latter provides no more of an explanation that had we translated the original into French.

Here I disagree. Clearly, the argument is valid according to the informal definition of validity as necessary truth preservation: it is impossible that Plato differs from Aristotle and there are less than two things. But that definition is not rigorous. When we formalize the argument, we replace (17) and (8) with formulas of a language for which we have a rigorous definition of logical consequence, and it is reasonable to assume that there is an interesting explanatory relation between validity informally understood and logical consequence. In this respect, a first-order language is better than French.

Note that I say 'in this respect' because I grant that there is another respect in which a first-order language is *not* better than French: the formalization of the argument above does not provide a deeper understanding of the meaning or semantic structure of (17) and (8). Had we translated the argument into French, we would be exactly in the same situation. But understanding the meaning or semantic

structure of the sentences that occur in an argument is definitely not part of the logical role as I understand it.

3 Reply to Szabó

Szabó's paper provides a compelling and thought-provoking discussion of my book. On the one hand, Szabó agrees on the main negative point that I make in chapter 4: in the sense of 'logical form' that matters to logic, logical form is not an intrinsic property of sentences. So he is willing to reject *intrinsicism* understood as follows:

(I) There is a unique intrinsicist notion of logical form that fulfils both the logical role and the semantic role.

On the other hand, Szabó is unwilling to reject what I call the *uniqueness thesis*:

(UT) There is a unique notion of logical form that fulfils both the logical role and the semantic role.

In chapter 5 I recognize that, although a denial of (I) does not entail a denial of (UT), the fact that (I) is ungrounded provides a reason to doubt (UT), for it is not clear how an extrinsicist notion of logical form can fulfil the semantic role (p. 66). Szabó claims instead that (UT) can be maintained, for an extrinsicist notion of logical form can fulfil both the logical role and the semantic role. To motivate this claim, he sketches a proposal that "allows a much more conservative revision of the traditional picture" than the one I suggest.

The core idea of Szabó's proposal seems in line with Sainsbury's distinction between content and structure of content: what adequate formalization requires is not really content, but some logically relevant structural feature of content. Thus, for example, all we need to know in order to adequately formalize the following sentence, which is analogous to (7), is whether the two occurrences of 'that' refer to the same object:

(18) That is that

Szabó uses indices to identify this structural feature, but not exactly in the way they have been used by other advocates of (UT). In chapter 4 I discuss two ways of using indexed syntactic structures. One

option is to assume that indices simply number the occurrences of an expression in a sentence, so that the syntactic structure of (18) includes two distinct items ‘that₁’ and ‘that₂’ because (18) includes two distinct occurrences of ‘that’. The problem with this option is that it is unable to explain the difference between a case in which the two occurrences of ‘that’ refer to different objects and one in which they refer to the same object. Another option is to assume that indices stand for the objects to which the corresponding expression refers, so that the syntactic structure of (18) includes two distinct items ‘that₁’ and ‘that₂’ when, and only when, the two occurrences of ‘that’ refer to different objects. The problem with this option is that it leads to a radical view according to which context sensitivity reduces to a non-standard form of ambiguity which involves infinitely many syntactic structures. This view cannot be invoked to defend (I), as it implies that syntactic structure in the relevant sense is not an intrinsic property of sentences. Szabó suggests a third option. He assumes that the source of the indexing is semantic, but that indices do not stand for the objects denoted. Rather, indexed structures—hence logical forms—are individuated in terms of “obligatory co-reference”. For example, in the case of (18) we can distinguish two possible structures: one where the two occurrences of ‘that’ are co-indexed, and one where they are not. Sameness of indices represents obligatory co-reference. What determines whether the two occurrences of ‘that’ are obligatorily co-referential is the speaker’s communicative intentions, in accordance with the relevant semantic constraints.

Szabó’s proposal provides a coherent alternative to the line of thought that I advance in my book, and I see no principled reason to question its tenability. In what follows, I will spell out some significant implications of this proposal that show how it differs from the truth-conditional view. In particular, I will address the question of how conservative is the revision of the traditional picture suggested by Szabó.

First, there is a sense in which Szabó’s proposal is just as radical as the second of the two options outlined above, namely, the sense in which it contemplates infinitely many syntactic structures. Of course, when (18) is considered in isolation, only two syntactic structures can be associated with it, depending on whether the two

occurrences of 'that' are co-indexed. But when (18) occurs within a larger linguistic context, we need to consider cross-sentential indexing as well. For example, as Szabó explicitly recognizes, if 'that' occurs four times in a set of sentences which includes (18), twelve possible syntactic structures can be ascribed to that set. More generally, for any linguistic context which includes (18) and contains n occurrences of 'that', there will always be a larger linguistic context that includes (18) and contains $n+1$ occurrences of 'that'. So, the number of indices is potentially infinite. The truth-conditional view, instead, does not entail that there are infinitely many syntactic structures in this sense. The hypothesis that logical form is determined by truth-conditions is consistent with any standard syntactic analysis of (18).

Second, the syntactic structures postulated by Szabó are extrinsic properties of sentences, in that they depend on the context of utterance. What is being indexed are occurrences of expressions, rather than expressions themselves. Moreover, being co-indexed is not a property of individual occurrences, but of collections. Since Szabó thinks that syntactic structures so understood can play the semantic role, hence verify (UT), to fully assess his proposal we should see the details of the theory of meaning he has in mind. Whether such a theory can be provided is a question that I do not address in my book, and for which I have no answer. But in any case, a substantial revision of traditional semantics would be needed, as Szabó himself recognizes:

The best option is probably to relax the traditional formulation of the compositionality principle and allow that the meaning of a complex expression can depend not only on its syntactic form and the meanings of its constituents, but also on obligatory co-reference relations among occurrences of those constituents.

The truth-conditional view is not revisionary in this respect. When I suggest that the rejection of (I) provides a reason to doubt (UT), I take for granted the traditional formulation of the compositionality principle.

So far we have seen that Szabó's view is less conservative than the truth-conditional view in at least two respects. But there is indeed one crucial respect in which it is more conservative, that is, it preserves the idea of transparency that is traditionally associated with

the notion of logical form. In my book I suggest that it may easily happen that one does not know the logical form of a sentence because one lacks full knowledge of its truth-conditions. According to Szabó, instead, this sort of ignorance cannot occur because logical form is individuated on the basis of the speaker's communicative intentions. To illustrate the difference, consider the case of 'Aristotle' and 'the Stagirite'. Szabó agrees that, in the situation described, it is plausible to assign the same individual constant to the two names. But his motivation differs:

if we assume that the speaker presumes that it is common ground that Aristotle is identical to the Stagirite we can allow co-indexing and derive a logically valid interpretation for the passage.

For Szabó, the formalization of (3) and (4) that I suggest is justified by the fact that the author of the passage takes for granted that 'Aristotle' and 'the Stagirite' co-refer, not by the fact that 'Aristotle' and 'the Stagirite' actually co-refer. Therefore, this kind of formalization is not an option when the presumption of co-reference is absent. For example, Szabó says that in the case of Paderewski it would be wrong to use the same individual constant to formalize the following sentences:

(19) Paderewski is a politician

(20) Paderewski is not a politician

Peter clearly does not intend the two occurrences of 'Paderewski' to co-refer, so the logical forms of (19) and (20) contain different indices.

Unlike Szabó, I doubt that logical form can be individuated in terms of the speaker's intentions. The reason is that such a criterion of individuation makes logical form relative to speakers in a way that I find hard to accept, at least in the case of proper names. Suppose that a speaker A uses (3) and (4) interchangeably, taking for granted that 'Aristotle' and 'the Stagirite' refer to the same philosopher, and that another speaker B, who lacks the factual information possessed by A, utters (3) and (4) without such presumption. According to Szabó's criterion, (3) and (4) should be represented by the same formula in the first case and by different formulas in the second case.

Similarly, the following sentence should be formalized as $a=a$ in the first case and as $a=b$ in the second:

(21) Aristotle is the Stagirite

This is to say that the sentences considered have one logical form relative to A, or to the context of A's utterance, and another logical form relative to B, or to the context of B's utterance. Even though Szabó's proposal strictly speaking does not entail that logical form is determined by private mental states, given that he talks about communicative intentions, which are public, it seems that the logical form of the sentences considered turns out to depend on what A and B believe about the meaning of 'Aristotle' and 'the Stagirite', rather than on the meaning itself. I'm inclined to think that logical form is not relative in this sense.

Note that any intrinsicist would agree with me on this point. Intrinsicists believe that an adequate formalization of an argument in which (3) and (4) occur requires that distinct individual constants are assigned to 'Aristotle' and 'the Stagirite', independently of what A and B have in mind. Similarly, they believe that (21) is adequately formalized as $a=b$ in both cases, so that its logical form does not vary depending on what A and B have in mind. In this respect, Szabó differs both from intrinsicism and from the truth-conditional view. So there is a further aspect in which his proposal is not as conservative as he suggests.

4 Reply to García-Carpintero

García-Carpintero's discussion of the central chapters of my book hinges on the notion of anaphoric dependence, which he takes to be essential to the understanding of logical form. Apparently, García-Carpintero agrees on most of what I say about the formalization of context-sensitive sentences, hence he grants my main point about relationality in formal explanation (pp. 46-49). However, he seems to think that the examples that I use to motivate the truth-conditional view—or at least most of them—can be explained in terms of what he takes to be relations of *de jure* (or internal) co-reference.

Let me summarize García-Carpintero's view. On the assumption that logical form is definable in terms of adequate

formalization—assumption which he does not question in the paper—his idea is that whenever two expressions internally co-refer, they are adequately formalized by using the same individual constant. Internal co-reference as he understands it is not a merely syntactic matter, that is, it is not merely a matter of type identity, but may involve pragmatic factors. This is why he explicitly rejects (I), and says that what counts as an adequate formalization depends on contextual matters.

On the background of this view, García-Carpintero raises two questions. The first is why should we reject (UT), given that the negation of (I) does not entail the negation of (UT):

Certainly, like most contemporary semanticists, I think we need a distinction [...] between what is nowadays usually called *semantic content* (meaning ascribed by grammar to linguistic types) and *assertoric content* (meaning determined in context by semantic content plus required contextual elements). Features of natural language like systematicity or productivity that are supposed to be explained by compositionality depend on the former, while logical validity depends on the latter, because it is truth-preservation under certain constraints, and typically only assertoric contents get truth-values. But I suppose this is not enough to reject (UT), otherwise we wouldn't need Iacona's arguments based on his cases. Besides, assertoric contents, the way I have characterized them, crucially depend on semantic contents, which in my view provides support for some sort of unicity—or at least *robust metaphysical connections*—between the logical and the semantic notions of logical form.

García-Carpintero, like Szabó, seems unwilling to give up (UT), even though he agrees on the rejection of (I). However, unlike Szabó, he does not directly argue that an extrinsicist notion of logical form can play the semantic role. His point seems to be instead that the logical role and the semantic role are closely related. This makes me wonder whether we really disagree. I'm ready to subscribe to the following claims: (a) some distinction must be drawn between semantic content and assertoric content; (b) features of natural language like systematicity or productivity depends on semantic content; (c) validity and other logical properties depend on assertoric content; (d) semantic content and assertoric content are closely related, and this might imply that there are "robust metaphysical connections"

between the logical and the semantic notion of logical form. As far as I can see, (a)–(c) suffice to reject (UT). As long as we formalize a sentence on the basis of its assertoric content, the formal representation that we obtain significantly diverges from one that is based on its semantic content, and does not suit a compositional theory of meaning *unless* is supplemented by an account of semantic content. (d) is consistent with the negation of (UT), and certainly does not contradict the truth-conditional view.

The second question raised by García-Carpintero concerns the issue of transparency. Although he agrees that logical form may not be transparent in some respects, he does not see why we should go along the non-transparency line as far as the truth-conditional view goes. Consider the following sentences:

(22) Hesperus is itself

(23) Hesperus is Phosphorus

On his view, (22) has the form $a=a$, in spite of the occurrence of distinct expressions. But there is a substantive epistemic difference between (22) and (23): the truth of (22) is immediately obvious to any linguistically competent speaker, and does not require the kind of factual information that we need to accept (23). If one acknowledges this epistemic difference, and recognizes that internal co-reference plays a crucial role in our understanding of logical form, one should not treat (22) and (23) alike. This is why he finds reasonable to say that (23) has the form $a=b$.

I think that this question discloses a potential tension between two desiderata that seem vitally important for García-Carpintero. The first is that internal co-reference may depend on pragmatic factors, so is not definable in terms of strict linguistic constraints. This desideratum guarantees that the individuation of logical form is context-dependent, and thereby justifies the rejection of (I). In the case of (22), of course, there are strict linguistic constraints requiring that ‘itself’ be interpreted as anaphoric relative to ‘Hesperus’, and these constraints make the co-reference evident to any competent speaker. But this does not hold in general. García-Carpintero provides examples in which internal co-reference obtains without such constraints, and says that my example of ‘Aristotle’ and ‘the

Stagirite' can be treated as a case of internal co-reference.

The second desideratum is that internal co-reference is characterized by some special epistemic property:

What manifests the presence of the relation of *de jure* or internal co-reference is rather an epistemic property, certainly not easy to explain but clearly in the vicinity of the properties that Frege mentioned, which different writers have tried to capture in slightly different terms.

García-Carpintero does not offer a definition of the epistemic criterion that he takes to characterize internal co-reference, but assumes that there is such a criterion. A competent speaker who fully understands an utterance that involves a relation of internal co-reference, in some suitably defined sense of 'fully understands', should be able to see that the relation obtains.

The potential tension between these two desiderata lies in the fact that any theory that aims to fulfil both of them must imply some sort of trade-off. Consider the case of the Stagirite, where the relation of co-reference clearly involves facts concerning the names 'Aristotle' and 'the Stagirite' that must be known to the utterer and to the reader. On the one hand, if one pushes the first desideratum along the line of the extra-linguistic sources of assertoric content, so as to include this case in the realm of internal co-reference, then one must relax the second desideratum so as to make the epistemic criterion of internal co-reference open to factual information. On the other hand, if one wants to have a stricter epistemic criterion, defined in terms of linguistic competence, or rationality, one must not go too far with the first, and exclude the case of the Stagirite from the realm of internal co-reference. For clearly it does not suffice to be linguistically competent or rational to understand that 'Aristotle' and 'the Stagirite' refer to the same philosopher.

I don't know García-Carpintero's exact position on this matter. But what seems clear to me is that if he wants to treat the case of the Stagirite as a case of internal co-reference, and so adopt a sufficiently loose epistemic criterion, then he needs further arguments to show that the case of Hesperus and Phosphorus is *not* a case of internal co-reference. There seems to be no substantive epistemic difference between (21) and (23), given that they involve the same kind of factual information. Instead, if the contrast that best illustrates

García-Carpintero's worry is that between (22) and (23), then he can easily draw a line that leaves out the case of Hesperus and Phosphorus. But in that case I suspect that he should give up the case of the Stagirite as well. The truth-conditional view is not affected by this dilemma because it draws no line. On this view, logical form is not individuated in terms of some special epistemic property. I take this to be the main source of disagreement between us.

5 Reply to Sagi

Sagi's paper focuses on the notion of formalization, which plays a key role in my investigation of logical form. According to Sagi, formalization involves explicit commitments on behalf of a reasoner, which serve as the normative grounds for the evaluation of arguments. To give substance to this idea, she adopts her framework of "semantic constraints", elaborated in previous works, and extends it to include "formalization constraints". I will raise no objection against Sagi's account of formalization, which I find original and interesting. My main concern here is to show that, contrary to what she suggests, it is not clear that we significantly differ on logical form.

The first and most important point to be noted is that Sagi accepts the central thesis of my book, namely, that there is no unique notion of logical form that fulfils both the logical role and the semantic role. This is definitely not a widely accepted thesis, so Sagi's position is far from orthodox. Many people nowadays assume (I), so they take (UT) for granted. Moreover, even those who share my doubts about (I) may resist the step from the rejection of (I) to the rejection of (UT). As we have seen, Szabó and García-Carpintero reject (I), but they are unwilling to give up (UT).

In spite of this basic agreement, Sagi suggests that we significantly differ on logical form because I take the logical role to be merely descriptive, while she ascribes normative aspects to it. According to Sagi, these aspects are essential to the logical role as it is understood in the "traditional project" initiated by Frege and developed by Carnap, Tarski, and Quine. In that project, the use of formal languages is intended to provide a ground for a set of explicit norms and a standard by which the fulfilment of these norms is measured, and the use of formal systems is viewed as an explicit commitment to

their axioms and rules of inference. Moreover, Sagi observes that the traditional project is characterized by a revisionary tendency, which in some cases leads to a complete break from natural language.

I don't think that we differ in this respect, though. In my book I say that it would be misleading to distinguish the semantic role from the logical role by calling 'descriptive' the former and 'revisionary' the latter, for the logical role is essentially descriptive (p. 43). But this is not intended to mean that the logical role is *merely* descriptive, although the adverb 'essentially' might suggest otherwise. The truth-conditional view does not imply that, when we formalize an argument, the formulas that we assign to its sentences merely describe their content. The formulas display some properties of their content—the "part" of their content—that we take to be logically relevant, given our aim of formal explanation, and what we take to be logically relevant clearly depends on the formal language we adopt and the formal principles we endorse. So I agree with Sagi that formalization involves commitment to a set of explicit norms.

I also agree on the revisionary implications of the logical role. Once it is granted that formalization is based on content, that is not a mechanical process, and that does not function as part of a theory of meaning, there is no reason to expect that it should be constrained by syntactic or semantic structure. The analysis of quantified sentences advanced in chapters 8 and 9 of my book may be regarded as a detailed illustration of the divergence between linguistic considerations and logical considerations about logical form. I take this analysis to accord perfectly well with the revisionist line that characterizes the traditional project.

To conclude, I will focus on a specific example discussed by Sagi, namely, (23). Sagi is unwilling to grant that (23) has the form $a=a$ in virtue of the fact that 'Hesperus' and 'Phosphorus' co-refer, and takes this to show how her approach to formalization differs from mine:

Formalization, on the present approach, is not a descriptive procedure that reveals a pre-existing logical form. Formalization is an interpretive endeavour, highly underdetermined, which is governed by commitments of the interpreter (or the reasoner). Whatever constrains the formalization of a specific locution must be expressed as a commitment on behalf of the interpreter. [...] Thus, the formalization function will

be forced to assign the same target expression to e_c and e'_c only if the interpreter carrying out the formalization is ready to commit to the formalization constraint $F(e_c)=F(e'_c)$, and presumably they would do so only on the basis of the presumption that e_c and e'_c co-refer. Logical form, on this conception, is always accessible to the reasoner carrying out the formalization—indeed, it is imposed by the formalization.

It is not entirely clear to me that there is a substantial disagreement here. First of all, the hypothesis that formalization is an interpretive endeavour governed by commitments, by itself, does not entail the transparency condition desired, namely, that logical form “is always accessible to the reasoner”. One way to understand the formalization constraint at issue is the following: one is committed to this constraint when one is disposed to formalize in such a way that $F(e_c)=F(e'_c)$ whenever e_c and e'_c co-refer. This understanding is consistent with the possibility that the reasoner, on a given occasion, has a false belief about e_c and e'_c . Being committed to a rule does not entail knowing, for every case, whether the rule applies. So we get that (23) has the form $a=a$ no matter whether the reasoner believes that ‘Hesperus’ and ‘Phosphorus’ co-refer. The constraint so understood does not substantively differ from my rule (N2), the rule that distinct names must denote distinct objects.

Perhaps what Sagi has in mind is that the constraint at issue is itself defined in terms of the reasoner’s beliefs: one is committed to this constraint when one is disposed to formalize in such a way that $F(e_c)=F(e'_c)$ whenever one believes that e_c and e'_c co-refer. In this case we obtain the transparency condition desired, because what matters is not whether e_c and e'_c co-refer, but whether the reasoner believes that they co-refer. However, it must still be granted that (23) is adequately formalized as $a=a$ when the reasoner knows that ‘Hesperus’ and ‘Phosphorus’ co-refer. If this is Sagi’s position about (23), then she agrees with me on a quite unorthodox point. For traditional intrinsicism implies that (23) is *not* adequately formalized as $a=a$, even for those, like us, who know that ‘Hesperus’ and ‘Phosphorus’ co-refer.

Of course, Sagi can add that, when the reasoner believes that e_c and e'_c do not co-refer, or has no reason to believe that they do co-refer, (23) is adequately formalized as $a=b$. Here we differ, because the truth-conditional view entails that (23) is adequately formalized

as $a=a$ even in this case. But note that, as observed in connection with the case of Euler's conjecture described by Gómez-Torrente, in such a case the truth-conditional view leaves room for the claim that it is reasonable to formalize (23) as $a=b$. So the only difference between Sagi's view and the truth-conditional view seems to be that the latter, but not the former, entails that adequacy and reasonableness do not always coincide.

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