

# Against logical form

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Conceptions of logical form are stranded between extremes. On one side are those who think the logical form of a sentence has little to do with logic; on the other, those who think it has little to do with the sentence. Most of us would prefer a conception that strikes a balance: logical form that is an objective feature of a sentence and captures its logical character. I will argue that we cannot get what we want.

What are these extreme conceptions? In linguistics, logical form is typically conceived of as a level of representation where ambiguities have been resolved. According to one highly developed view—Chomsky’s minimalism—logical form is one of the outputs of the derivation of a sentence. The derivation begins with a set of lexical items and after initial mergers it splits into two: on one branch phonological operations are applied without semantic effect; on the other are semantic operations without phonological realization. At the end of the first branch is phonological form, the input to the articulatory–perceptual system; and at the end of the second is logical form, the input to the conceptual–intentional system.<sup>1</sup> Thus conceived, logical form encompasses all and only information required for interpretation. But semantic and logical information do not fully overlap. The connectives “and” and “but” are surely not synonyms, but the difference in meaning probably does not concern logic. On the other hand, it is of utmost logical importance whether “finitely many” or “equinumerous” are logical constants even though it is hard to see how this information could be essential for their interpretation. Logical form in a broadly Chomskyan sense would be more appropriately called “semantic form.”

In philosophy, logical form is often thought of as belonging primarily to formulae of ideal languages. These languages have been designed by us, and hence there is no mystery how their expressions are built and interpreted. Logical form can be ascribed to sentences of natural languages indirectly, through a translation usually referred to as “formalization.” According to Quine—an influential proponent of this view—formalization is more art than science: selection of the ideal language is largely arbitrary,

<sup>1</sup> Cf. Chomsky (1993) and (1995).

and no matter what choice we make, the outcome of the procedure remains highly indeterminate.<sup>2</sup> Some formalizations may abstract from the difference in meaning between “and” and “but,” though others will not. And while Quine thought that formalizations which treat “finitely many” or “equinumerous” as logical constants dress up set theory in sheep’s clothing, he had no principled objection to such a masquerade. By and large he preferred conservative regimentations into standard first-order languages, but he did not think that these are somehow forced upon us. Given a broadly Quinean picture, talk of *the* logical form of a sentence is misleading at best: depending on our interests and aims, we can arrive at a variety of different “regimented forms” for any given sentence.

Neither the Chomskyan nor the Quinean conception is objectionable. The former is articulated in the context of a scientific hypothesis which, of course, may turn out to be mistaken. Perhaps there are no covert semantic operations, perhaps there is no derivational stage where all ambiguities are eliminated, and perhaps there is not even such a thing as the language organ whose workings the theory is supposed to explain. Still, the idea of a single representation for all semantically significant features of a sentence is a sensible one. The Quinean conception is closely related to how scientists view the formalism they employ: as tools selected freely for the explanatory job at hand. Many of us object to the thesis that translation is radically indeterminate, but in practice we tend to be happy with a lot of flexibility. We all recognize that there are different ways to formalize a sentence, and that there is no way to select one that serves best all our aims.

But again, neither of these unobjectionable conceptions is what we really want. The notion of logical form inherited from the early days of analytic philosophy is different: it is supposed to capture the logical (as opposed to semantic) character of a sentence, and it is supposed to be inherent in the sentence (not ascribed to it as a result of formalization).

There is a long tradition of seeing formality as the essence of logic. Its central thesis could be called—with a nod to Aristotle—*logical hylomorphism*.<sup>3</sup> The thesis is put forth succinctly by De Morgan: “Logic inquires into the form of thought, as separable and independent of the matter thought of.”<sup>4</sup> Thoughts are typically investigated indirectly in logic—through sentences that express them. Thus the thesis of logical hylomorphism becomes that sentences inherit in some fashion matter and form from the thoughts they express and that sentences have their logical properties solely in virtue of the latter.<sup>5</sup>

<sup>2</sup> Cf. Quine (1960) and (1968).

<sup>3</sup> The term was introduced in this context by MacFarlane (2000).

<sup>4</sup> De Morgan (1858), p. 75.

<sup>5</sup> To what extent the arguments I will present could be applicable to views that ascribe logical forms exclusively to propositions or thoughts is not entirely clear. Strictly speaking, everything I say presupposes that sentences are bearers (although not necessarily primary bearers) of logical properties, such as validity, logical truth, consistency, and so on.

One way to get a handle on this thesis is to compare it with an analogous claim about geometry. According to geometrical hylomorphism, geometry studies ordinary physical objects, not objects in some abstract Platonic realm. What is distinctive of geometry is not the class of objects with which it is concerned, but the class of properties. Geometrical properties—extension, symmetry, constructability, and so on—are properties that belong to physical objects solely in virtue of their form, and have nothing to do with their matter. According to logical hylomorphism, doing logic is like doing geometry in the sense that we must abstract away from a certain aspect (the matter) of the objects of study and focus on what is left (the form). Of course, geometrical form and logical form are different: when we talk of logical form we mean structure, not shape.<sup>6</sup> The logical form of a sentence would be a characteristically logical arrangement of its parts; what gets arranged would be the sentence's extra-logical matter.<sup>7</sup> The central thesis of this paper is that such a separation is impossible unless it is made actual by *fiat*. That is, except for artificial languages designed so as to have formulae factorable into logically significant form and logically insignificant matter, the separation cannot be made.

Historically, logical hylomorphism has been associated with the claim that the grammatical form of a sentence is misleading with respect to its logical form.<sup>8</sup> In the early days of analytic philosophy, following the paradigm set by Russell's theory of definite description, this view was wildly popular. It is less popular today because we have become accustomed to the idea that grammatical form may itself be different from what traditional grammar suggests, and because we no longer see the formalism of classical first-order logic as the only admissible one for displaying logical forms.<sup>9</sup> My concern in this paper is not with this associated claim but with the prior commitment that sentences have *some* structure or other in virtue of which they have their logical properties.

Denying the existence of logical form sounds radical, and in a way it is. But given the amorphousness of the current use of this term, we need to be cautious not to overstate things. So, here are some important caveats before I begin. Like Chomsky, I think sentences of natural languages have semantic forms—representations that encompass all and only information relevant for their interpretation. What I deny is that there is a way to turn these into genuine logical forms—representations that encompass all and only logically pertinent information. Quine would agree with this, and would further argue that there is no fact of the matter about which sentences of a natural language are

<sup>6</sup> Sentence types have no shape, and the only thing about the shape of a sentence token that is of any potential interest to logic are the spaces between words. These give us a hint about the constituents from which the sentence is built. But the hint is rather slight, because the spaces are not correlated with pauses in speech and because the smallest meaningful units are not all separated in writing.

<sup>7</sup> While I think this is the standard way to understand talk of logical form, I do not deny that there are other ways of thinking about the formality of logic; cf. MacFarlane (2000).

<sup>8</sup> Strawson (1952), p. 51.

<sup>9</sup> Sainsbury (1991), pp. 291–2, provides a good list of alleged differences between the grammatical and logical forms of English sentences.

logical truths and which inferences are logically valid. I think this further step is unwarranted: it presupposes logical hylomorphism. I suggest that we should give up the idea that being a logical truth or being logically valid is to be characterized in terms of logical form. I am not sure with what the hylomorphic conception can be replaced: my inclination would be to leave the core notions of logic undefined and seek analyses of metaphysical and epistemic notions in terms of it. This seems to put my view on a collision course with Tarski's, for he defines logical truth and consequence in terms of variation of truth across interpretations that hold logical form fixed. But there is no conflict: I accept Tarski's definition for the formal languages for which it was intended. Tarski never said that his definition can carry over to all languages, and I think he was right to resist that idea: sentences of natural languages lack logical forms.<sup>10</sup> What my view is really incompatible with is the broadly Davidsonian idea that we can squeeze genuine logical forms out of a compositional semantics for natural language.<sup>11</sup> That, I think, is a hopeless project.

## 1 The doctrine of logical form

What proponents of logical form—as distinct from both semantic and regimented form—believe is that each sentence has a unique form that captures its logical character. Since the logical character of a sentence is exhausted by its inferential properties, the thesis is often presented as the claim that logically valid inferences are valid in virtue of their form—that is, in virtue of the fact that their premises and conclusion have the logical form they have. But this formulation is incomplete. To have bite, the thesis must also include the claim that non-logical validities are *not* valid in virtue of logical form. The heart of the doctrine of logical form is an attempt to identify formality as the hallmark of logical validity.

Tradition says that valid inferences come in three broad categories. There are no settled labels for them; I will use “factual,” “lexical,” and “formal” because these hint at the underlying rationale for the categorization. (Non-formal validities are sometimes called “material,” and non-factual ones “analytic.”) The three categories give rise to disciplinary divisions: factual validities are investigated empirically, lexical ones are laid bare in dictionaries, and formal ones are the subject matter of logic. The categorization is supposed to be exclusive (no valid inference belongs to more than one category), exhaustive (all valid inferences belong to at least one category), and non-trivial (none of

<sup>10</sup> If the objects of logical inquiry are propositions, then my view is that only *some* propositions have logical forms—the ones that are expressed by sentences of formal languages. Propositions we express speaking natural languages may well have some sort of propositional structure, but they do not have logical form.

<sup>11</sup> Davidson thought that logical form is relative to a background logic, and in this limited sense he came close to a Quinean view. Some of his followers, however, have sought to eliminate this relativity by moving in the direction of the Chomskian view. Unless a delicate balance between these two tendencies can be maintained, the idea that compositional semantics can say something substantive about which inferences are logically valid falls by the wayside. I will say more about this matter in §3.

the categories is empty). The borderlines of the categories are contested. It is debatable, for example, whether the inference from “Snow is white” to “Snow is not red” is factual or lexical (its validity appears to be *a priori* but not a matter of definition), or whether the inference from “The problem is unsolved” to “The problem is not solved” is lexical or formal (in our standard dictionaries there is no entry for “un-,” but maybe there should be). Despite the problem cases, by and large we tend to know which inference belongs in which category. What we need is a better grip on the basis for the classification.

Let us begin with some clear examples. Each of (1), (2), and (3) is a valid inference: it is necessary in the broadest non-epistemic sense that if its premise is true, so is its conclusion. But the validity of these inferences apparently calls for different explanations.

- (1) Alex is a father; therefore Alex has a Y-chromosome.
- (2) Alex is a father; therefore Alex has a child.
- (3) Alex is a father; therefore Alex is a father or a mother.

Why is (1) valid? Because fathers are males, and males have Y chromosomes. That fathers are males is a matter of *definition*; that males have Y-chromosomes is not—it is a mere *fact*. Having a Y-chromosome is an essential property of males, but it is not the sort of essential property ascription which could plausibly be called part of the definition of “male.” In explaining the validity of (2) we do not need to appeal to a fact, only to a definition: the inference is valid because “father” means male parent of a child. And if we try to answer the question of why (3) is valid, it seems otiose to appeal to either facts or definitions. Instead, we might say that it is valid because of the general *form* it exhibits.

Although the explanations for the validity of (1) and (2) say nothing about the form of these inferences, the silence is misleading. The fact and definition to which these explanations appeal can be made explicit as additional premises, and without explaining the validity of the resulting expanded arguments the original explanations themselves would remain incomplete:

- (1') Alex is a father, every father is a male parent of a child, every male has a Y-chromosome; therefore Alex has a Y-chromosome.
- (2') Alex is a father, every father is a male parent of a child; therefore Alex has a child.

Further appeal to facts or definitions seems pointless. Like (3), these inferences are valid in virtue of their form. In pursuit of an explanation for validity appeal to form always serves as the final step. Unlike facts and definitions, the form of an inference cannot be expressed, only exhibited, and thus, appeal to form cannot be absorbed into the inference as an extra premise.<sup>12</sup>

<sup>12</sup> Of course, the fact that the inference *has* a certain form may well be expressed by a sentence. But adding a new premise saying that all inferences of such-and-such form are valid leads us to the path down which the Tortoise sent poor Achilles in Carroll (1895).

In light of these explanations we might say that (3) is valid in virtue of its form alone, that the validity of (2) is due to its form as well as the definition of one of its words, and that (1) is valid because of its form, a definition, and a fact. In general, formal validity can be explained without appeal to facts and definitions, lexical validity can be explained without appeal to facts but not without appeal to definitions, and factual validity cannot be explained without appeal to facts. This, I suggest, adequately captures the idea behind the usual three-fold classification of valid inferences.

It has been traditionally thought that adding definitions as premises to an argument is quite different from adding necessary factual truths. The former is supposed to be making explicit what is already there, while the latter is supposed to add something new. Accordingly, lexically valid inferences are often called logically valid (in a broad sense) along with the formally valid ones (which are logically valid in a narrow sense). Those who believe in logical form must defend the three-way classification if they wish to have the resources to demarcate logic narrowly as well as broadly. I will call the view according to which the division of valid inferences into factual, lexical, and formal along the explanatory lines suggested above is exclusive, exhaustive, and non-trivial *the doctrine of logical form*.

Explanation is a murky notion, so it is not surprising that those who believe in logical form often try to shy away from it. But it is hard to see how an inference could be legitimately described as valid *in virtue of* logical form if having that form plays no explanatory role in accounting for its validity.<sup>13</sup> To say that logically valid inferences all exhibit certain forms is interesting if true. But if the correlation between form and validity were merely accidental it would hardly deserve a prominent place in our textbooks of logic. The same is true if explanatory dependence went the other way: if logically valid inferences all exhibited certain forms *because* they were logically valid then we should understand what logical validity consists in before we embark on discussions pertaining to form. The doctrine of logical form cannot be a humble footnote or coda if it is to deserve its place in our thinking about logic.

Is the standard classification exclusive, exhaustive, and non-trivial? Exclusivity of the three-way classification comes for free: lexically valid inferences cannot be formally valid, and factually valid inferences cannot be either lexically or formally valid. Exhaustiveness and non-triviality, on the other hand, require argument. I am not familiar with such arguments, but in the case of exhaustiveness one might try reasoning as follows.

Call the premises and conclusion of an inference its *immediate constituents*, and the words from which those sentences are built their *ultimate constituents*. The argument for

<sup>13</sup> Etchemendy (1983), p. 320, says that the doctrine of logical form is the thesis that “[t]wo sentences cannot differ logically if they do not also differ formally or structurally.” He rejects the thesis as *prima facie* implausible and ultimately unsupported by two theories about the nature of logic that are often cited in support of it. While I am generally sympathetic to Etchemendy’s view, I think that by construing the doctrine as a more substantive explanatory thesis we can better see both its appeal and the reasons for its failure.

exhaustiveness rests on two respectable principles. According to the first, the validity of an inference depends on two factors only: its subject matter, and the meanings of its immediate constituents. According to the second, the meaning of a sentence depends on two factors only: the meanings of the words it contains and the way those words are combined. Combining the two, by transitivity of determination, we obtain that the validity of an inference depends on three factors only: its subject matter, the meanings of its ultimate constituents, and the way the ultimate constituents are combined. The two principles ensure the existence of a *canonical explanation* for any validity: first account for the meanings of the immediate constituents on the basis of ultimate constituents and their mode of composition, then account for the validity of the inference on the basis of the meanings of immediate constituents and the relevant facts of the subject matter. Assuming that the terminology lines up (that is, that talk of “facts” and “subject matter,” talk of “definitions” and “the meanings of ultimate constituents,” and talk of “the way the ultimate constituents are combined” and “form” come to the same), the two principles guarantee that all validities can be (canonically) explained by appeal to facts, definitions, and form. In other words, the three-way categorization of valid inferences is exhaustive.

Unfortunately, this argument is inconclusive. The second principle is a standard formulation of the principle of compositionality, and as such it might be thought to be beyond dispute. In fact it is not. The most obvious problem is that standard arguments for compositionality are based on considerations of productivity and systematicity, which in turn presuppose that we are dealing with sentences that belong to a language we can understand. The doctrine of logical form, on the other hand, is not supposed to be restricted in this way. It is supposed to tell us in virtue of what valid inferences are truth-preserving and, on the face of it, such a question has nothing to do with what sorts of inferences can be expressed in languages we can comprehend. In other words, we have no reason to believe that compositionality holds for all conceivable languages.

Even if we set aside inferences cast in languages beyond our cognitive capacity, compositionality remains problematic.<sup>14</sup> We need to distinguish between two notions of meaning: what a certain expression means as it is used in a particular context (what Kaplan called its *content*), and what it means in itself, out of context (what he called its *character*). Somewhat surprisingly, the usual arguments from productivity and systematicity simply do not go through for content.<sup>15</sup> The trouble is with context: compositionality of content demands that contextual effects must be anchored to the lexicon; that is, that the content of a sentence depend on the context only insofar as the contents

<sup>14</sup> Note that there is a special problem here for those who think grammatical and logical form diverge: they need to insist that we can understand sentences by grasping their *logical* structure and the meanings of their constituents. This might be why they tend to characterize logical form as the “real” or “underlying” form of a sentence, disguised by its “apparent” or “surface” grammar.

<sup>15</sup> Cf. Szabó (2010).

of its constituent words do.<sup>16</sup> This is far from a platitude; at best it is a bold empirical hypothesis. If you think that the content of “It is raining” as uttered in New Haven on 18 June 2010 is the proposition that it is raining in New Haven on 18 June 2010, and you think that the sentence contains no hidden constituents (unpronounced words, hidden indexicals, and so on), you reject the compositionality of content for English. So, perhaps we should opt for reading “meaning” as “character” in the argument. This makes the second principle quite safe—but it turns the first into a contentious one. It is not crazy to say that the validity of the inference “It is raining; therefore it is raining in New Haven on 18 June 2010” depends on the context of utterance: it is valid relative to New Haven and 18 June 2010, but invalid relative to many other pairs of places and times. The fact that the inference is valid thus depends on the fact that it was made in New Haven on 18 June 2010. But this is not part of its subject matter (although New Haven and 18 June 2010 themselves are), and is not settled by the character of its ultimate constituents.

Setting aside incomprehensible languages and troubles with context, the two principles employed in the argument are in good standing. So, while the argument for the exhaustivity of the three-way categorization of valid inferences is not conclusive, it does carry real weight. The remaining question is whether the categorization is non-trivial. It might seem obvious that it is: it seems that the validity of (1) depends on its subject matter (specifically, on the fact that males have Y-chromosomes), the validity of (2) depends on the meanings of its ultimate constituents (specifically, that “father” means male parent of a child), but the validity of (3) depends on nothing beyond the way the words within its premise and conclusion are combined. But there is serious doubt regarding the reliability of this intuition.

## 2 The triviality objections

There is a pair of well-known objections to the doctrine of logical form which aim to show that both distinctions it seeks to draw collapse: there are no formal or lexical validities.

The validity of non-factual inferences appears to depend on matters of fact also: for example, the validity of the inference from “Alex is a father” to “Alex has a child” depends on the fact that every father has a child, and the validity of the inference from “Alex is a father” to “Alex is a father or a mother” depends on the fact that every father is a father or a mother. It would, after all, be absurd to say “Never mind whether every father in fact has a child, the inference ‘Alex is a father; therefore Alex has a child’ is valid simply because of the definition of ‘father’,” or “No matter

<sup>16</sup> I am assuming that the way the words of a sentence are combined does not depend on the context. Weaker formulations of the compositionality principle allow that the manner of combination should make different contributions to content in different contexts.

whether every father in fact is a father or a mother, the inference ‘Alex is a father; therefore Alex is a father or a mother’ is valid simply because of its form.”<sup>17</sup> The oddity of these locutions cannot be explained away by pointing out that they ask us to forget about obviously necessary truths. For one most certainly could ask someone to disregard such truths if they are truly irrelevant to the validity of the inference.<sup>18</sup> But these facts *are* relevant, and validity *does* seem to depend on them.<sup>19</sup> Call this the *first triviality objection*.

A very similar worry arises in connection with the distinction between lexical and formal validities. The validity of formal inferences seems to depend on definitions too: for example, the validity of the inference from “Alex is a father” to “Alex is a father or a mother” depends on the definition of “or.” You cannot say “Never mind how ‘or’ is defined, the inference ‘Alex is a father; therefore Alex is a father or a mother’ is valid simply because of its form.” The definition of logical connectives is crucial to the validity of many formally valid inferences.<sup>20</sup> Call this the *second triviality objection*.

The simple response to both objections is to reject the existence of the relevant facts and definitions. If there is no such thing as the fact that every father has a child or that every father is a father or a mother, the first objection does not get off the ground; if there is no such thing as the definition of “or,” the second is stalled. The reason why the “Never mind . . .” locutions sound bad is then simple presupposition-failure: the speaker appears to take it for granted that certain non-existent facts or definitions exist and asks the hearer to ignore them, which leads to infelicity. (It is sort of like “Never mind whether the king of France has shaved today. . . .”) While the

<sup>17</sup> This particular way of putting the difficulty is in Williamson (2007), pp. 58–9. He uses it to argue that analytic truths (lexical and formal truths) depend on facts. See also Boghossian (1997), pp. 335–6.

<sup>18</sup> Cf. “Never mind whether every bachelor is in fact unmarried, the inference ‘Alex is a father; therefore Alex has a child’ is valid simply because of the definition of ‘father’,” or “No matter whether Hesperus is Hesperus, the inference ‘Alex is a father; therefore Alex is a father or a mother’ is valid simply because of its form.”

<sup>19</sup> The objection generalizes beyond these particular examples. Every valid inference is correlated with a necessarily true conditional whose antecedent is the conjunction of its premises and whose consequent is its conclusion. Call this the *conditional correlate* of the inference. One cannot very well say “Do not worry whether the conditional correlate is true, the inference is valid simply because of . . .”

<sup>20</sup> There are a number of exceptions in natural languages. For example, the inference “Alex is a young man; therefore Alex is a man” or the inference “Alex ran quickly; therefore Alex ran” are typically seen as formally valid despite the fact that they contain no logical constants. (This is where the claim that grammatical form is misleading proves useful; it is typically claimed that at the level of logical form these inferences really do contain logical constants.) There are formally valid inferences in *any* language whose validity does not depend on the definition of any logical constant: to wit, inferences whose conclusion occurs among their premises. Etchemendy (1983), p. 329, claims that as long as we employ the substitutional account of logical validity “if no terms are held fixed, then in general *no* sentence will be logically true, *no* argument logically valid.” The first claim may be true (depending on how the substitution classes are set), but the second is definitely false. Under the substitutional account the sentence “If Alex is a father then Alex is a father” does not come out as a logical truth unless “if” and “then” are held fixed, but the inference from “Alex is a father” to “Alex is a father” is logically valid even if no term is held fixed.

simple response sounds promising, I think it is ineffective in defending the doctrine of logical form.

Substantive theories of facts abound. One might reject the existence of the facts that every father has a child and that every father is a father or a mother by rejecting universal or necessary facts altogether. This, unfortunately, is not a good option for the defender of the doctrine of logical form: the move would get rid of the fact that every father has a Y-chromosome as well, thereby undermining the canonical explanation of the factually valid inference from “Alex is a father” to “Alex has a Y-chromosome.” Rejecting the existence of *a priori* knowable facts would be undesirable for a different reason: it would make purely mathematical inferences formal. The theory of facts needed for the simple response to work is one that rejects lexical and formal facts only.

Such a theory can be had: it would say explicitly that “the fact that *p*” is an empty definite description whenever “*p*” is a lexical or formal truth. However, from the perspective of a principled defense of the doctrine of logical form this would be a non-starter. Consider the dialectic. The doctrine offers an account for the intuitive distinction between factual validities on the one hand and lexical and formal ones on the other. The account is challenged: it is argued that given the characterization offered, all valid inferences are factual. In response, the defender of the doctrine appeals to a substantive metaphysics of facts—a theory which presupposes a classification of that-clauses into those that express lexical or formal truths, and those that do not. But these are correlates of the respective validities: a lexical truth is the lexical consequence of the empty set of premises, and a formal truth is a formal consequence of the empty set of premises. Thus the circle closes: to defend the doctrine of logical form we already need to distinguish lexical and formal validity from the rest, which is exactly what the doctrine is supposed to do.

Insisting on the non-existence of the definition of “or” seems less of a desperate *ad hoc* maneuver. When you look up a word like “father” in the dictionary, you find some information about what a father is. But when you look up a word like “or,” you find some information about the word itself (for example, “used to indicate an alternative, usually only before the last term of a series”). There is a well-established distinction between content words (nouns, verbs, adjectives, and so on) and function words (prepositions, pronouns, auxiliaries, conjunctions, particles, and so on), and it is a fairly common thing to say that the latter are not lexically defined. This is not to say that they have no meaning at all: that would be absurd. Rather, the idea is that their meaning is absorbed in the grammar and hence it does not give rise to a definition. This could be explicated by following the thread of a long tradition in logic, which has treated various expressions—primarily the logical ones, but sometimes also the mereological, modal, and temporal ones—syncategorematically. Syncategorematic expressions were thought not to signify anything by themselves, but to modify the manner in which other expressions signify.

One worry is that treating all and only functional words syncategorematically leads to a demarcation of formal validities that does not line up with the intuitions we seek to

capture. The inference “Alex is on the table; therefore Alex is not under the table” is normally categorized as lexical, and so is “Alex is very happy; therefore Alex is happy,” despite the fact that the words “in,” “under,” and “very” are functional. By contrast “Alex has an even number of children; therefore Alex does not have an odd number of children” or “Alex fell asleep repeatedly; therefore Alex fell asleep more than once” are typically seen as formal, even though “even,” “odd,” and “repeatedly” are pretty clearly content words. But perhaps we should not expect a perfect alignment between our pre-theoretical intuitions and what a systematic theory delivers. A modest amount of revisionism may be acceptable.

A more serious concern is that even if one denies that functional words have *lexical* definitions, they still seem to have definitions. If the definition of “father” is that *a* is a father if and only if *a* is a male parent of a child, why not say that the definition of “or” is that *p* or *q* just in case it is not the case that not *p* and not *q*? One may complain that the latter is arbitrary because we could just as well have defined “or” saying that *p* or *q* just in case if *p* then *q* then *q*. But surely we could just as well have defined “father” saying that *a* is a father just in case *a* is an animal’s non-female immediate ancestor. Selecting one from the *prima facie* eligible alternatives may be simpler in the case of “father” than in the case of “or,” and this probably explains why dictionaries choose to define the former but not the latter. But what ends up in dictionaries makes no difference in the context of the triviality objection.

I conclude that the simple responses fail: there is no disciplined and credible way to deny the existence of facts and definitions to which the triviality objections appeal. Defenders of the doctrine of logical form must argue that their existence is compatible with their view. To do so, they can highlight the difference between saying that the validity of an inference *depends* on something and saying that the inference is valid *in virtue of* that thing. The latter is a stronger claim than the former. “In virtue of” (as its cognate “because”) designates an asymmetric relation. If something is the case in virtue of something else, then the latter is prior to the former in the order of explanation. Dependence, by contrast, is not asymmetric, which is made plain by our regular talk of mutual dependence, co-dependence, and interdependence. Of course, neither is it symmetric. Within an explanatory context, dependence is best construed as *explanatory relevance*, and the in-virtue-of relation as *explanatory sufficiency*.<sup>21</sup> When we try to explain something we must appeal to something explanatorily relevant. But this is not enough: what we appeal to must be sufficient to account for everything that is explanatorily relevant to the explanandum.

The claim that an inference is valid in virtue of form and definitions is fully compatible with the claim that its validity depends on facts as well—as long as those facts obtain in virtue of the same form and definitions. Similarly, the claim that an

<sup>21</sup> “In virtue of” is sometimes understood as standing for an even stronger relation: namely, explanatory necessity and sufficiency. I am not convinced that anything is ever explanatorily necessary and sufficient for anything, so I will adhere to the less ambitious notion.

inference is valid in virtue of form alone is fully compatible with the claim that its validity depends on definitions—as long as those definitions hold in virtue of the same form. If the fact that every father has a child obtains in virtue of the definition of “father,” and if the fact that every father is a father or a mother obtains and the definition of “or” holds in virtue of the form of the inference “Alex is a father; therefore Alex is a father or mother,” the triviality objections have no teeth against the doctrine of logical form.

Such claims of dependence are prone to misunderstanding. Take the first one: that the fact that every father has a child obtains in virtue of the definition of “father.” One might be inclined to dismiss this as obviously false because it asserts that a non-linguistic fact obtains in virtue of a linguistic one. Surely, had the word “father” been defined differently (or had it not been defined at all) it would still be the case that every father has a child. But such a rebuttal assumes, implausibly, that obtaining in virtue of the definition of a word is obtaining in virtue of the fact that the word is associated with that definition. A more charitable reading would construe the explanatory base more broadly as including *the definition itself*. The definition of “father” is that *a* is a father if and only if *a* is a male parent of a child. Given the more charitable construal, what is being claimed is that the fact that every father has a child obtains in virtue of the definition that *a* is a father if and only if *a* is a male parent of a child and the fact that this is the definition of “father.” Such a claim is not obviously true, but neither is it an absurdity.<sup>22</sup> The other two claims can also be restated in a similar fashion. It is not absurd to think that the fact that every father is a father or a mother obtains in virtue of the form that *a* is an *F* entails *a* is an *F* or *a* is an *M* and in virtue of the fact that this is the form of “Alex is a father; therefore Alex is a father or a mother” and it is palatable to maintain that the definition of “or” holds in virtue of the same things.<sup>23</sup>

For this line of response to work against the first triviality objection, it is crucial that definitions and forms should not be facts. If they are, explanations of validity making appeal to definitions or forms all appeal to facts, and hence, all valid inferences are factually valid. Now, it is fairly obvious that the expressions “that *a* is a father if and only if *a* is a male parent of a child” and “that *a* is an *F* entails *a* is an *F* or *a* is an *M*” do not designate anything like facts. If they designate at all, they pick out a property and a three-place relation, respectively. But this alone does not show that there are no facts correlated with this property and this relation. Consider the expressions “the fact that

<sup>22</sup> Boghossian and Williamson cash out the claim that “Bachelors are unmarried” is true in virtue of its meaning as the absurd claim that the sentence is true because it means what it does: that is, that “Bachelors are unmarried” is true because “Bachelors are unmarried” means that bachelors are unmarried. A more charitable account would be “Bachelors are unmarried” is true because of the definition that *x* is a bachelor if and only if *x* is an unmarried man and because of the fact that this is the definition of “bachelor.”

<sup>23</sup> Note that I am not saying that it is credible that the form that *a* is an *F* entails *a* is an *F* or *a* is an *M* and the fact that this is the form of “Alex is a father; therefore Alex is a father or a mother” are *necessary* to explain the fact that every father is a father or a mother or the definition of “or.” What I am saying is that it is credible that they are *sufficient*.

everything is such that it is a father if and only if it is a male parent of a child” and “the fact that everything is such that its being something entails its being that thing or something.” These expressions presumably do designate facts, and these facts could easily play the explanatory role of the definition and the form. So, a defender of the doctrine of logical form must reject the existence of such facts. In general, she needs a substantive theory of facts, according to which whenever “*p*” is a lexical or logical truth “that *p*” is correlated with something other than a fact. And this leads us back straight to the problem that sank the earlier attempt to respond to the first triviality objection.

Could we scale back the doctrine of logical form, conceding that it fails to demarcate logic in the broad sense, but insisting that it still succeeds in characterizing logic in the narrow sense? Suppose we gave up on the idea that lexical and formal validities can be explained without appeal to facts, but held on to the idea that formal validities can be explained without appeal to definitions. This would amount to bowing to the first triviality objection, but not to the second.

Is this feasible? I think not. One would need to argue that the definition of “or” holds in virtue of the form of the inference “Alex is a father; therefore Alex is a father or mother.” Since “or” has many definitions—in terms of “and” and “not,” in terms of “if . . . then,” in terms of “neither . . . not,” etc.—this should be rephrased as making a universal claim about any acceptable definition of “or.” But the definition of “or” given in terms of “and” and “not” depends on a definition of “and”, and surely no definition of “and” holds in virtue of the form of an inference that does not contain that word. The logical form of the inference from “Alex is a father” to “Alex is a father or mother” is thus explanatorily insufficient for the definition that *p* or *q* just in case it is not the case that not *p* and not *q*. This is so because the form fails to account for something explanatorily relevant to that definition: to wit, a definition of “and.”

This argument rests on the claim that the definitions of “or” and “and” are interdependent, and one might worry whether we can make sense of this claim. After all, is it not obvious that we could change the definition of any word without changing the definition of any other? A definition, as I understand this term, is not a schema of a language but what the schema semantically expresses. There is no obstacle in principle to changing the definition of a word independent of the definition of any other; we could, for example, redefine “or” to mean what “if and only if” does and leave the definition of “and” the same. But note that this alone does not undermine the claim of interdependence—the mere fact that it is possible for one thing to change without the other does not show that these things do not depend on each other. To show lack of dependence we would need to argue that if the definition of “or” were to change the definition of “and” would remain the same. And this counterfactual seems false. If the definition of “or” were to change, so would the definition of “and,” because ordinary semantic changes respect the sorts of connections in meaning that exist in English between “or” and “and.” To use the language of possible worlds, the worlds where “or” changes its meaning and “and” does not are extremely remote, and

thus fail to undermine the truth of the counterfactual. Arguably, part of what makes a definition a definition is just this robustness: if “father” changed its meaning so would “child,” but not “Y-chromosome.”

None of this is clear in the case of artificial languages. It is not clear whether they can change at all, or if they simply become obsolete and are replaced with newly designed languages that may fit our needs better. Accordingly, it seems impossible to assess the claim that definitions of different expressions in these languages depend on each other. Thus my argument against the second triviality objection has no teeth when it comes to the formal languages employed by logicians. All I have said is that these might contain inferences whose validity can be explained without appeal to definitions.

Let me summarize. There are two triviality objections against the doctrine of logical form, and I have argued that both withstand criticism. According to the first one, the validity of all inferences depends on facts. The simple response to this was to try to deny the existence of the facts upon which the validity of lexical and formal inferences depend; the not-so-simple one was to claim that these facts obtain in virtue of definitions and forms, respectively. I argued that both responses require a substantive theory of facts that cannot be motivated independent of the doctrine of logical form they seek to prop up. According to the second triviality objection, the validity of many formally valid inferences depends on definitions for logical words. The simple response again was to deny the existence of such definitions; the not-so-simple one was again to claim that the definitions hold in virtue of the forms of inferences in which the logical words occur. I argued that the existence of definitions for logical words is to be reckoned with, and that due to the interdependence of logical words appeal to particular logical forms is insufficient to explain their definition. The argument is limited to natural languages, for only these contain counterfactually robust dependencies between the ways their words are defined. Artificial languages cannot contain inferences valid in virtue of logical form alone (since this is ruled out by the first triviality objection), but they may contain inferences valid in virtue of logical form and certain logical facts.<sup>24</sup>

### 3 The appeal to competence

The doctrine of logical form fails. But since it has considerable attraction and a long pedigree we should see whether it could be modified, rather than simply discarded. What gives rise to triviality is that the explanations of validity the doctrine presupposes rely on everyday terms—fact, definition, and form—and these terms cannot bear the weight of substantive theorizing. For the doctrine to hold we would need a *theory* of

<sup>24</sup> For example, the inference from “father (Alex)” to “father (Alex)  $\vee$  mother (Alex)” cast within a classical first-order language containing “father (x)” and “mother (x)” as one-place predicates and “Alex” as an individual constant may be valid in virtue of its logical form (that is, its syntactic structure) and the logical fact that everything is such that its being something entails its being that thing or something.

facts and definitions for which no independent evidence is in the offing. It might be better to turn things around: start with distinctions that already have theoretical standing, and see whether they can be brought to mesh with the intuitive explanations of validity.

There is a reasonably clear distinction between subjects who are *linguistically competent* with a sentence and those who are not. The usual way to draw the distinction is to say that some people understand the sentence and others do not, but I think it better to opt for a less colloquial term. You can come to understand a poem better and better as you read it over and over again. Linguistic understanding is not such an open-ended process; whether one understands a sentence in this sense is a fairly straightforward matter. We can thus idealize and obtain the notion of linguistic competence.

Among those who are linguistically competent with a sentence there is another reasonably clear distinction between those who are *grammatically competent* with it and those who are not. Linguistic competence with a sentence requires competence with its constituent words and with the way those words are combined. The two components are quite distinct, and the latter is in a sense more fundamental: we keep acquiring words throughout our lives, but our ability to construct sentences is fully formed during early childhood. Given another sensible idealization, an adult's grammatical grip of her native tongue is fairly stable. This idealization leads to the notion of grammatical competence.

We can employ the notions of grammatical and linguistic competence to distinguish among factual, lexical, and formal validities. Consider again our pet examples, repeated here:

- (1) Alex is a father; therefore Alex has a Y-chromosome.
- (2) Alex is a father; therefore Alex has a child.
- (3) Alex is a father; therefore Alex is a father or a mother.

It is easy to imagine a linguistically competent person who rejects (1) due to ignorance of biology. The situation is different with someone who rejects (2). It would be entirely natural to regard such a person as not understanding the inference—most probably because he lacks competence with the word “father” or with the word “child.” When it comes to (3), the incompetence is almost certainly of a different kind. Someone who thinks Alex could be a father but not a father or mother presumably fails to grasp the way the conclusion is built, and thus exhibits grammatical incompetence.

To say that valid inferences are factual, lexical, or formal depending on the typical deficiencies of those who reject them is rather like categorizing insects by the phobias they typically elicit. Of course, if we could say that it is essential to being a certain type of insect that people react to them in a certain way, that would be a different story. Those who wish to amend the doctrine of logical form this way need to argue that failure to reject certain valid inferences is not merely *evidence* for lack of a certain type of competence, but that acceptance of those inferences is *constitutive* to that type of

competence. If so, formally valid inferences would be those that can in principle be recognized as such by anyone who is a grammatically competent in the language in which the inference is cast, and lexically valid inferences would be those that can be in principle be recognized as such by anyone who is linguistically competent with the sentences that make up the inference. To recognize the validity of a factual inference would require more than mere linguistic aptitude. Call this the *linguistic version* of the doctrine of logical form.

The linguistic version saves the core intuition behind the doctrine of logical form and avoids many of its obvious pitfalls. First of all, by explicitly relativizing the distinctions between factual, lexical, and formal validities to the language in which they are cast, it abandons the pretension of the original doctrine, which tried to classify all inferences.<sup>25</sup> Factual and lexical validities can all be formally valid inferences with tacit premises. To say that the former has missing factual premises would be a slightly misleading way to say that its validity may remain unrecognized by subjects who are linguistically competent with those premises. To say that the missing premises of lexical inferences are definitions could be charitably construed as saying that linguistic competence with the inferences is enough to recognize them as valid, although grammatical competence alone is not. The intuitive explanations of validity offered are clumsy attempts to explain something related—the possibility of recognizing these inferences as valid. Finally, and most importantly, the proposed explanations are unlikely to be spurious. They are immune to the triviality objections discussed above: even if the validity of all inferences depends on facts, definitions, and form, there are still inferences whose validity can be recognized on the basis of linguistic competence alone, and among these inferences whose validity can be recognized on the basis of grammatical competence alone.

This last point has been forcefully contested recently by Timothy Williamson.<sup>26</sup> He argues that logical deviance of even the most radical sort is fully compatible with linguistic competence. There are logicians who reject the validity of *modus ponens* on the basis of McGee-style counter-examples, and others who reject conjunction-introduction on the basis that it leads to the Lottery Paradox. Such radical views may well be mistaken: the point is not whether they are correct, but whether they reveal linguistic incompetence. Once we reflect on the fact that deviant logicians acquired their native tongue in the usual way, that they can smoothly communicate with others, and that they can rationally defend their unorthodoxy in the very language whose logic they contest, it becomes hard to believe that they can be excised from the community of competent speakers. Not only do these logicians fit in linguistically with the rest of us, they actually outdo most of us when it comes to reflective understanding of various

<sup>25</sup> As I mentioned in §1, the pretension is problematic, for the only argument for the exhaustivity of the three-fold distinction seems to rely on compositionality—a principle we have no reason to believe holds for languages we cannot understand.

<sup>26</sup> Cf. Williamson (2003) and (2007).

inferences. Their role in the division of linguistic labor is that of an expert, albeit an expert with heterodox views.

Someone who thinks that a child must be a human being but a father could be the male parent of any animal will reject the inference from “Alex is a father” to “Alex has a child”—but he may nonetheless be competent with the words “father” and “child.” Someone who believes that a disjunction is of indefinite truth-value when one of its disjuncts is will refuse to accept the inference from “Alex is a father” to “Alex is a father or mother,” because Alex might be a woman who gave birth to a stillborn child—but she may still be a competent speaker of English. Williamson’s argument is based on the idea that linguistic competence is a matter of holistic fit into the pattern of linguistic behavior of speakers of a public language. Speakers can compensate for their deviance in a few respects by compliance in most others, and consequently there cannot be many inference schemata such that acceptance of their instances is constitutive of linguistic competence.<sup>27</sup>

These examples do not show that the linguistic version of the doctrine of logical form is mistaken. This is because the view does not entail that lexically and formally valid inferences *must* be accepted by all who are linguistically competent, only that they *can* be. Linguistic competence with the sentences making up these inferences is supposed to be sufficient for recognizing their validity (and hence, for their acceptance) but the view is compatible with the possibility that other factors—such as consciously held theoretical commitments—undermine such recognition. Logical deviance would then be a form of performance error, which distorts the manifestation of underlying competence. This sort of view sits well with the Chomskyan tradition that tends to see linguistic competence as a matter of an internally characterizable state of the language organ.

Williamson thinks that this response to his argument is implausible. He points out that we routinely judge glaring fallacies as valid, that logical appraisal tends to be highly sensitive to subject matter, and that our ability to perform correct deductive reasoning is correlated with our formal training. By contrast, our linguistic judgments tend to be reliable, insensitive to subject-matter, and largely independent of level of education. It is hard to reconcile these facts with the view that our logical competence is part of our linguistic competence.

This is an important point but not a conclusive one, especially in the light of the apparent relevance of logical features of linguistic expressions to their grammaticality. Williamson discusses briefly the case of negative polarity, and raises some objections to the current orthodoxy that claims that in order to know whether an occurrence of words like “any,” “ever,” “yet,” and so on, is grammatical one must know a logical

<sup>27</sup> “No given argument or statement is immune from rejection by a linguistically competent speaker” Williamson (2007), p. 97. I doubt there is a convincing example of a linguistically competent speaker rejecting the inference that “There are vixens; therefore there are vixens.” (Williamson does have an example of someone linguistically competent with the sentence rejecting “If there are vixens then there are vixens,” but that turns on taking “There are vixens” to be devoid of truth-value and assuming strong Kleene truth-tables for “if-then.” This does not justify rejecting the validity of the related inference.)

feature: namely, whether the occurrence is within a downward entailing environment.<sup>28</sup> But negative polarity is not an isolated phenomenon; there is much more apparent intermingling of logic and grammar to be reckoned with. The so-called definiteness effect, the distribution of exception phrases, and predicative uses of indefinites, all seem to correlate with logical properties.<sup>29</sup> The extent of the interconnectedness of grammar and logic is subject to some of the liveliest research today in semantics. It would be better to criticize the linguistic version of the doctrine of logical form without taking a stand on wide-open empirical issues.

To do so we need to say more about linguistic competence. Given the most prevalent conceptions, linguistic competence is a propositional attitude—more precisely, tacit knowledge of a theory of meaning. Within the Davidsonian tradition such a theory is identical to (or at the very least contains as the central component) a Tarski-style theory of truth that is interpretive for the language in question. Such a theory yields interpretive T-sentences: that is, biconditionals where the sentence mentioned on the left is synonymous with the sentence used on the right. The meaning of an individual sentence is not given by its associated T-sentence, but rather by the way that that T-sentence is derived. The derivations show how the truth or falsity of the sentence is determined “by a finite number of applications of some of a finite number of devices that suffice for the language as a whole, out of elements drawn from a finite stock (the vocabulary) that suffices for the language as a whole.”<sup>30</sup> The meanings of sentences thus depend on a finite number of recursive rules (marking the semantic contributions of steps in their syntactic composition) and a finite number of base axioms (marking the semantic contribution of their constituent lexical items). This allows us to speak of grammatical competence in abstraction of linguistic competence: it amounts to tacit knowledge of the theory minus its base axioms.<sup>31</sup>

*How* can tacit knowledge of a theory be sufficient for the recognition of the validity of an inference? Presumably by entailing that if its premises are true, so is its conclusion. But it is crucial what sort of entailment is at stake. It can surely not be mere necessitation, as any theory necessitates the validity of all valid inferences. It can also not be logical entailment, as any theory logically entails the validity of all logically valid inferences. The relevant notion of entailment must be that of *proof*, not consequence. Tacit knowledge of a theory is then sufficient for the recognition of the validity of an inference if one can derive within the theory (using the rules of inference available within the theory) that it is valid. Lexically valid inferences in a language would be those whose validity can be derived from the interpretive truth theory for that

<sup>28</sup> Williamson (2007), pp. 107–8.

<sup>29</sup> See Barwise and Cooper (1981), von Fintel (1994), and Landman (2004), respectively.

<sup>30</sup> Davidson (1968), p. 94.

<sup>31</sup> Without base axioms the theory cannot derive any interpretive T-sentence. It could, however, derive conditionals whose antecedents are conjunctions of base axioms and whose consequents are T-sentences that are interpretive in a language whose vocabulary consists of items mentioned in the antecedent.

language; formally valid inferences those whose validity can be derived from the interpretive truth theory without the base axioms.

The obvious concern with this suggestion is that it makes the notion of lexically and formally valid inference relative to the inference rules employed by the truth theory. This consequence was embraced by Davidson, who said that logical form, on his account, is “relative to the choice of a metalanguage (with its logic).”<sup>32</sup> Take, for example, the question of whether the inference “Alex is a father; therefore Alex is a father or a mother” is formally valid. An interpretive truth theory for English (using English as the meta-language) must derive (4) and (5):

- (4) “Alex is a father” is true if and only if Alex is a father.  
 (5) “Alex is a father or a mother” is true if and only if Alex is a father or a mother.

From these one can derive (6), assuming we have a substitution rule (which allows us to substitute  $\phi$  for  $\psi$  if we can prove that  $\phi$  if and only if  $\psi$ ) and a rule for *or*-introduction that allows us to derive the right-hand side of (5) from the right-hand side of (4).

- (6) “Alex is a father” is true only if “Alex is a father or a mother” is true.

It is quite plausible that such a derivation of (6) can ultimately discharge the base axioms we need to derive (4) and (5) and thus show the inference to be formally valid. It is also plausible that any truth theory must have a substitution rule if it is to derive (4) and (5) from its base axioms. But whether the theory has the rule for *or*-introduction is up for grabs.<sup>33</sup>

There is no question that this relativity is undesirable; it makes Davidson’s conception of logical form a version of “regimented form.” Followers of Davidson have sought to shore up the theory in order to return to the idea that logical form is inherent in sentences of natural language and does not depend on ephemera, such as the inference rules available within the theory employed in interpretation. The natural way to do so is to generalize across theories and devise a notion of logical form that captures what *all* proofs of interpretive T-sentences have in common.<sup>34</sup> But in doing so one inevitably abstracts away from the deductive resources of these theories and arrives at a conception of logical form that is a version of “semantic form.”<sup>35</sup>

<sup>32</sup> Davidson (1973), p. 71.

<sup>33</sup> Richard Larson and Gabriel Segal have argued persuasively that the inference rules needed to derive interpretive T-sentences are very weak indeed. For a language of the propositional calculus, for example, the only rules required are universal instantiation and the rule of substitution of equivalents. Larson and Segal argue for a sharp separation between linguistic and logical competence, and thus for the rejection of the linguistic version of the doctrine of logical form. See Larson and Segal (1995), pp. 74–6.

<sup>34</sup> For the most detailed proposal along these lines, see Lepore and Ludwig (2007), pp. 289–99.

<sup>35</sup> Lepore and Ludwig often call their conception of logical form “semantic form.” They are well aware of the fact that their theory cannot support the linguistic version of the doctrine of logical form: “The notion of logical form we have articulated is neutral on the question of what structures to count as logical.” Lepore and Ludwig (2007), p. 302. They provide some further suggestions for identifying the logical structures (without committing themselves to a particular line), but they do not claim that knowing which inferences are formally or lexically valid is part of grammatical or even linguistic competence.

Davidsonians who are willing to sever the link between semantics and logic lose some of their favorite arguments for specific proposals about logical form. Take Davidson's own argument for the claim that the logical form of action sentences involves existential quantification over events. Postulating this type of logical form is supposed to explain why (7) entails (8), but not the other way around:

- (7) Jack quickly shaved in the bathroom.
- (7')  $\exists e$  (shaved, (Jack, e)  $\wedge$  quickly(e)  $\wedge$  in the bathroom(e))
- (8) Jack quickly shaved and Jack shaved in the bathroom.
- (8')  $\exists e$  (shaved, (Jack, e)  $\wedge$  quickly(e))  $\wedge$   $\exists e$  (shaved, (Jack, e)  $\wedge$  in the bathroom(e))

But even if we grant the assumption that this pattern of inference needs a semantic explanation, it remains unclear why we should think that the explanation must come at the level of logical form. Why not say that the validity is lexical, due to the meaning of "quickly" and "in"? Of course, the relevant semantic feature is not idiosyncratic; it is shared by manner adverbs and prepositions across the board. But this in itself is no reason to hypothesize that the feature is grammatical and not lexical. Resistance to building the appropriate meaning postulate to the lexicon is based on nothing more than the intuition that inference from (7) to (8) is *logically* valid. If semantic theory fails to legislate about which inferences are logical, the inferential behavior of manner adverbs and prepositional phrases fails to provide theoretical reason to ascribe Davidsonian logical forms to action sentences.<sup>36</sup>

In sum, appeal to linguistic competence fails to save the intuition underlying logical hylomorphism. There are general reasons to doubt that logical competence (whether it is construed narrowly or broadly) can be part of linguistic competence. The combination of linguistic mastery and logical deviance seems possible (arguably even actual), in large part due to the fact that the capacity for deductive reasoning is acquired and employed in ways quite different from the capacity for speech. Moreover, as long as linguistic competence is seen as tacit knowledge of a theory, attempts to demarcate logical validities from the rest must rely on the deductive resources of the theory. Since we have no independent grounds for deciding what sorts of inference rules are constitutive of linguistic competence or for deciding whether a particular inference rule should be lexically or grammatically encoded, there is no hope for defending the linguistic version of the doctrine of logical form.

<sup>36</sup> Davidsonians do have *other* reasons for advocating quantification over underlying events. But these reasons are tied to parsimony and explanatory success: tacit event-quantification has been successful in accounting for a wide range of otherwise confusing and disconnected data in semantics. (The data come from perception reports, aspect, plurals, causatives, focus, secondary predication, and qualification.) There are no simple arguments that *show* that logical form must be such-and-such because the logical properties of the sentence are so-and-so.

## 4 What is left?

The doctrine of logical form is false, and appeal to linguistic competence will not save it. Given how deeply talk of logical form is ingrained in contemporary philosophical discourse, we should ask what accounts for its lure.

Inferences can be subtle, and audiences can be dull. Either way, validity is sometimes in need of explanation. The first thing to do is to knock out expressions that contribute nothing to truth-preservation. We can distinguish them from the rest by checking whether replacing them uniformly with something else can ever result in true premises and false conclusion. If the answer is no, the expressions are idle and can be replaced uniformly with a schematic letter. In this way the inference is shown to be an instance of a pattern, and if the pattern is valid so is any inference that fits it. Let us call this *explanation by abstraction*.

When it comes to explanation by abstraction, the more abstract the better. The fact that (3) is an instance of (3') goes some distance towards explaining its validity, the fact that it is an instance of (3'') goes further, and the fact that it is an instance of (3''') is as good as it gets. This is as it should be—eliminating more and more clutter we obtain a clearer and clearer view of how the truth of the premises guarantees the truth of the conclusion.

- (3) Alex is a father; therefore Alex is a father or Alex is a mother.
- (3') a is a father; therefore a is a father or a is a mother.
- (3'') a is F; therefore a is F or a is M.
- (3''') p; therefore p or q.

Explanation by abstraction is just a step away from no explanation at all. It is roughly akin to saying “The validity of this inference is *self-explanatory*—you will see it for yourself as soon as I remove the irrelevant details that obscure your insight.” It is an attractive view that the limits of logic are set by the scope of adequate explanation by abstraction. Logical validity is epistemically fundamental; to explain it all we can do is clear the dust and hope that validity will shine through. Other validities are not self-evident; to explain them we have to appeal to necessary truths.

I endorse this view. I will not call it a theory, for obvious reasons: short of a serious account of what it is for a validity to be self-explanatory, it explains nothing. It certainly does not tell us why logical validities are valid or how we know that they are. When we seek to embellish this view, we are prone to making a fatal mistake. The fact that we have identified various expressions as explanatorily idle encourages us to conclude that what is left—the bare structure of the inference combined with the special word “or” which perhaps can be seen as making a contribution to the structure—does all the explanatory work. But the move takes the metaphor of self-explanation far too literally. To say that something is self-explanatory does not mean that we can provide

a real explanation for it that relies on nothing beyond itself. Rather, it means that no substantive explanation is needed.<sup>37</sup>

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<sup>37</sup> Thanks are due to participants of a faculty seminar at Yale where a version of this essay was discussed. Special thanks are extended to George Bealer for his many insightful comments and objections. Needless to say, he does not agree with my conclusions.