Sodium-Free Semantics: The Continuing Relevance of The Concept Horse

David Liebesman

1. Concept Horse Problems in Frege

Famously, Frege hit a wall when attempting to discuss predicate reference.[[1]](#footnote-1) His exclusive distinction between concepts and objects, when conjoined with the thesis that the former are uniquely suitable for predicate reference and the latter are uniquely suitable for non-predicate reference, leads to familiar problems. Assume that we want to discuss the referent of a predicate, e.g. *horse*. In order to do this, it is natural to attempt to introduce a non-predicate that refers the predicate's referent, e.g. *the concept horse*. Unfortunately, Frege's semantic theses undermine such a move. If *the concept horse* is a non-predicate then it can't, by Frege's lights, co-refer with a predicate. It seems, then, that we are left without the terms we need in order to adequately discuss the semantics of predicates.

This problem has engendered the full range of reaction. Some think that Frege's concept/object distinction is misguided and the resultant problems are avoidable.[[2]](#footnote-2) Others think that the distinction reflects the true nature of logical categories and therefore some such problems are unavoidable.[[3]](#footnote-3) I will argue that versions of the problem arise for type-theoretic semantics in the tradition of Montague and that grappling with the problems yields insight into the empirical limits and philosophical understanding of such theories. In the remainder of this section I'll discuss concept horse problems in Frege. In section 2, I'll argue that some analogous problems arise for a simple Montague-inspired type-theory. In section 3, I'll consider various ways to complicate the theory and show how these don't obviously solve the problems. My main contention is simply that the problems remain problems for type-theoretic semantics. My secondary contention, developed in section 4, is that the most promising solution distinguishes between semantic values and ways of having those semantic values.[[4]](#footnote-4) This allows expressions with the same semantic value to be semantically differentiated by the ways they have those values.

1.1 Three Problems

Following Hale and Wright (2012), we can see concept horse problems as arising from a principle that links ontological categories with linguistic categories, along with another principle about the nature of semantic categories.

**Correlation**: an entity can, and can only, be referred to with an expression of a correlative semantic type.[[5]](#footnote-5)

**Category**: there is a way of dividing words/occurrences of words into mutually exclusive categories such that Correlation is true of that categorization. Furthermore, this categorization plays an important philosophical/explanatory role.

**Correlation** means little until we understand the notion of semantic types that it utilizes. There are myriad ways to divide words into semantic types. For instance, we could divide words into types on basis of whether they designate things I like. In this type-system, *dogs* and *cats* would be distinct types. Such a categorization, for Frege, is not a plausible basis for deriving ontological conclusions. Rather, we need a categorization of words (occurrences) on basis of predicate/argument structure, i.e. what is a predicate and what is an argument. One reason that Frege takes argument structure to be important is that he takes it to hold the key to understanding the structure of thoughts:

For not all parts of a thought can be complete; at least one must be unsaturated or predicative; otherwise they would not hold together (1997: 193).

**Category** helps us isolate the type-system relevant to **Correlation**. In fact, one may think of **Correlation** as a schema, with instances provided by different type systems. **Category** allows us to focus on the relevant instance: that in which types are determined by argument structure. I will further discuss what this means in section 3, and I discuss it in more detail in Liebesman (2015). For the remainder of the discussion, I'll use ***Correlation*** to pick out the principle on which types are determined by argument-structure.

Frege’s thoughts are composed of senses, though he also held that the typing of senses is mirrored both by referents, and by words themselves. Our semantic typing will primary concern the level of reference. In section 3.5 I’ll discuss how Frege’s concerns about the structure of thoughts can be generalized beyond sense.

The combination of **Correlation** and **Category** entails that, given some words/occurrences and the entities to which they refer, we can divide the entities into mutually exclusive ontological classes on basis of the division of those words/occurrences into mutually exclusive semantic classes (of the relevant sort). This leads to at least three problems.[[6]](#footnote-6)

First, and most familiar, is the breach of custom problem(**BOC**).

**BOC**: Frege's semantics commits him to endorsing such bizarre sentences as *The concept horse is not a concept*.

If we stipulate that *concept* picks out whatever can serve as the referent of a predicate, then we can derive the problem as follows:

1. *The concept horse* is not a predicate. (assumption about the semantics of definite descriptions)
2. Predicates refer to concepts. (from the definition of *concept*)
3. The referent of *the concept horse* is not a concept. (1, 2, and Correlation)
4. Therefore, the concept horse is not a concept. (4, disquotation)

There are numerous ways one may wish to solve **BOC**. Many of these will be discussed in detail in sections 2 and 3. However, I will not focus on **BOC** itself any further. The reason is that some obvious ways to solve **BOC** will not solve other closely related problems. In particular, one may wish to solve **BOC** by rejecting premise 1 and taking definite descriptions to be predicates, or by rejecting the disquotational principle that allows us to infer 5 from 4. Whether or not these strategies are promising for dealing with **BOC**, they do nothing to resolve the deeper underlying problems.

The other two problems I will consider are broader that **BOC**.[[7]](#footnote-7) These problems purport to show that a large class of sentences cannot be adequately analyzed given Frege's semantic commitments. The second problem is metasemantic: the class of sentences that cannot be adequately analyzed are sentences about semantics. The third problem pertains to any sentence that requires upholding intimate connections between predicates and non-predicates. Some such sentences may be about semantics (e.g. denotation specifications) but, as we'll see, there are many such sentences that aren't themselves about semantics.

We'll label the second problem Metasemantic Failure (**MF**):

**MF**: Frege's semantic theses do not allow him to adequately analyze sentences about semantics.

Before showing how Frege falls prey to **MF**, we need to clarify the problem. If we take semantic analyses to match sentences with truth-conditions (perhaps by way of translating them into another language, perhaps not), then a necessary condition on adequate analysis is truth-conditional adequacy. As we'll see, the problem for Frege is that, by his own lights, his analyses fail to meet this condition. There are surely other necessary conditions on adequate analysis—I’ll discuss one in the next section—but, for our purposes in this section, truth-conditional adequacy will suffice.

We've clarified the adequate analysis component of **MF**, what about the target of those analyses—sentences about semantics? The form of a Fregean semantic theory is familiar: we assign semantic values from a type-theoretic hierarchy to each meaningful expression and combine them using function-application. So, at the very least, a theory will be constituted by sentences that ascribe semantic values. Just which sentences are covered will depend on which relation is involved in ascription of semantic value. Some familiar candidates are reference, designation, and interpretation. In eliciting the problems, I'll begin with reference. In 3.1 I'll consider whether distinguishing these relations can help to solve the problem.

Given this, the analysandum relevant to **MF** will include sentences of the form *w refers to v* where *w* picks out a word and *v* its referent. However, **MF** shouldn't be understood as limited to such straightforward reference-specification. Metalinguistic discourse is constituted by sentences beyond those included in a semantic theory. In the course of theorizing, for instance, we will deny that words have certain values, compare the values of words, and circumscribe our overall theory by claiming that it captures all meaning-facts.

The problem is that Frege's semantic theory appears to prevent us from adequately articulating myriad reference-specifications, in addition to exhaustivity clauses, comparisons, and denials. For instance, assume we wish to correlate a predicate P with its referent. The natural way to do this is to introduce a singular term that co-refers with P. That way we can straightforwardly claim, for instance, that *horse* refers to the concept horse. Frege's views prohibit this. *The concept horse* is a non-predicate, so by **Correlation** and **Category**, it cannot co-refer with *horse*, which is a predicate.

To combat this problem, some theorists attempt to identify other constructions better suited for articulating semantic theories. I am skeptical here, for reasons familiar in the literature.[[8]](#footnote-8) However, even if we identify other constructions better suited for specifying reference, there are principled reasons to doubt that those constructions would be suited for articulating denials and comparisons. We can see this by getting more precise about the distinctive philosophical/explanatory role mentioned in Category.

However we understand the problem of the unity of the proposition it is clear that, for Frege, solving the problem is one main philosophical/explanatory roles played by the relevant division of words into semantic types and their referents into ontic types. Let's make this more explicit with Explanation.

**Explanation**: the division of words into mutually exclusive semantic types that entails correlative ontic types explains how words can combine to express thoughts. In particular, a word with a referent of a particular type can only combine with words with referents of two relevant types: those suitable to be its arguments and those suitable to take it as an argument.

Explanation, which summarizes Frege's method of typing words and referents, places restrictions on which sentences express thoughts, i.e. are interpretable. These restrictions entail that we cannot articulate the denials and comparisons we need in order to conduct semantic discourse.

Begin with denials. For example, we wish claim that (1) and (2) are false, and that (3) and (4) are true.

(1) The denotation of *wise* is an object.

(2) The denotation of *wise* is not of predicate type.

(3) It is false that the denotation of *wise* is an object.

(4) It is false that the denotation of *wise* is not of predicate type.

Correlation, Category, and Explanation prevent us from adequately analyzing (1)-(4). The reason is that the predicates *is an object* and *is not of predicate type* require non-predicates as their arguments. This is made clear by (5) and (6)

(5) Socrates is an object.

(6) Socrates is not of predicate type.

This leaves only three options in analyzing (1)-(2). The first option is that the sentence-initial definite descriptions in those sentences designate objects. The problem with this option is that the sentences end up being true. So, the option fails to be truth-conditionally adequate. The second option is that the sentence-initial definite descriptions designate concepts. In this case, the sentences are ill-formed, and therefore don't express thoughts at all. (One may invoke type-shifting to respond to this worry; I will discuss type-shifting in detail in section 3.) Thus, they fail to be either true or false, again failing truth-conditional adequacy. The third option is that *is an object* and *is not of predicate type* do not refer to the same concepts in (1)/(2) as they do in (5)/(6). We cannot immediately fault this proposal on truth-conditional adequacy alone, given that the third view does not yet contain an account of what the predicates designate. However, such a view will fail to provide truth-conditionally adequate analyses for comparisons, such as (7) and (8) in which we use a single predicate to express the distinctions between predicates and non-predicates.

(7) The denotation of *Frege* is an object, while the denotation of *wise* is not.

(8) The denotation of *Frege* is not of predicate type, while the denotation of *wise* is.

(7) and (8), given their explicitly comparative nature, foreclose the possibility of predicate ambiguity. Thus, we are left with only the first two options, both of which fail truth-conditionally. (One could attempt some fancy semantic footwork and claim that the elided predicates in (7) and (8) receive different readings akin to sloppy interpretations of anaphoric pronouns. However, there is no precedent for changing the semantic type of the elided expression, which is what this would require.)

The reason that these problems arise is that when articulating a theory about predicate reference we do not wish to limit ourselves to mere reference-specification. We also wish to say what particular predicates do not refer to, as well as how they compare. Even at their most successful, Fregean attempts to articulate semantic theses about predicates will fail here. Such attempts consist in identification of special, peculiar expressions, which allow us to formulate those claims. Limitation to such peculiar expressions, by its nature, rules out any attempt to use ordinary expressions to express falsehoods, or true negations.

We'll label the third problem Nominalization Failure (NF).

**NF**: Frege's semantic these prevent him from adequately analyzing sentences containing predicate nominalizations.

While MF focuses squarely on discourse about semantics, NF is broader. There are several natural language constructions that, intuitively, allow us to use singular terms to refer to predicate referents, for garden-variety non-theoretical discourse. Consider the following sentences.

(9) Swimming is a fun activity.

(10) To think is to be human.

(11) Wisdom is a feature of my favorite philosophers and linguists.

None of (9)-(11) is a plausibly candidate for inclusion in a semantic theory. Nonetheless, they all look troublesome given Correlation and Category. The trouble stems from the fact that the most straightforward account takes their subject terms to refer to entities that, in other contexts, are predicate referents. Even if a theorist did the implausible and found a idioms sufficient for articulating a semantic theory in a way consistent with **Correlation** and **Category**, they may not have succeeded in giving a plausible account of the full range of discourse in which we seem to use non-predicates to refer to predicate referents.

For the Fregean to meet this challenge, they would have to give a semantics for predicate nominalizations that is consistent with Category and Correlation. Thus far, I've only mentioned a *prima facie* reason to think this can't be done. I won't discuss possible solutions for Frege in any great detail, though I will examine this problem in more detail when it discuss it in the context of contemporary type-theory.[[9]](#footnote-9)

Stepping back, we can see that there are a range of potential solutions to MF and NF. A modest solution would be to find articulate reference-specifications. A less modest solution would find a way to analyze all sorts of metalinguistic sentences, which will plausibly include generalizations, denials, as well as claims about predicates beyond merely what they refer to. A comprehensive solution will find a way to adequately analyze the full range of relevant discourse, this includes understanding claims like (9)-(11).

Seen in this light, it is reasonable to desire a comprehensive solution. After all, what's the alternative? Denying the intelligibility of a wide swath of common sentences that, axes aside, appear perfectly intelligible, seems untenable. A comprehensive discussion of these problems would require surveying the potential Fregean solutions. There's a substantial literature on just this. My aim, however, is different. I will not assess the severity of the problems for Frege. Rather, I'll turn my attention to contemporary type-theoretic semantics.

2. Concept Horse Problems in Type-Theory

My next goal is to argue that versions of **MF** and **NF** arise in contemporary type-theoretic semantics. The goal raises a worry. Type-driven semantic theories can be articulated in varied ways, with varied resources, and varied commitments. Any attempt to boil such a rich and diverse research project into a few pithy claims runs the risk of ignoring important theoretical distinctions and complications. To combat this, I'll begin with a deliberately simple type-theory of the sort familiar from introductory textbooks.[[10]](#footnote-10) I'll argue that versions of **MF** and **NF** arise for this view. I'll then consider various ways to complicate the simple theory and whether they help solve the problems.

In our simple theory, there are two basic types: <e> and <t>. Complex types are derived by ordered-pair formation: any ordered-pair of types is itself a type. More complicated type-theories add basic types for additional categories. Without delving into complications, e.g. Montague's treatment of all noun phrases as having type-identical meanings, it is natural to assign meanings of type <e> to referential terms, and type <t> to truth-apt sentences. More complex types of meanings are assigned to predicates that map entities to truth-values, and combine with non-predicates to form sentences. For example, *is swimming* is assigned a meaning of type <e,t>: those who are swimming are mapped to truth and all others are mapped to falsity.[[11]](#footnote-11) Every simple lexical item is assigned a meaning that falls in this type-theoretic hierarchy. To calculate the meanings of complexes, our type-theory contains a single rule of composition: function-application. Taking double-bracket notation to signify semantic value, our general rule of composition is [[AB]]=[[A]][[B]], for any expressions A and B. Particular instances of function-application are type-driven; i.e. which is the function and which is the argument is determined by the types of the meanings being composed, rather than the order in which they appear.

We can consider types of meanings as well as types of linguistic items. The function λx.x is swimming, which is type <e,t>, is the meaning of *is swimming*. It is also common to claim that *is swimming*—the linguistic item rather than its semantic value—has type <e,t>. Note, though, that moving freely between the types of meanings and the types of linguistic items requires a correlation between them. Since the viability of such a correlation is one of the issues being considered, I will reserve types such as <e,t> for meanings and use *non-predicate*, *predicate*, *first-order predicate*, etc. for classifying linguistic types.

Our simple theory adopts two assumptions about the type system:

**Exclusivity**: no meaning belongs to more than one type.

**Inflexibility**: each word is assigned a single meaning (from a single type) and this is its only semantic contribution.

Later I will examine these assumptions in detail. Already, though, we can see how our simple theory diverges from familiar contemporary theories. Since Partee and Rooth (1983), it has been standard to abandon **Inflexibility** by allowing type-shifting. The idea is that an expression may make different semantic contributions, depending on whether a type-shifting principle is applicable.[[12]](#footnote-12)

Now we can give a type-theoretic semantics for a tiny fragment of English. Our fragment contains the atomic predicate *wise*, and the name, *Frege*. The semantic value of *wise* is type <e,t> while the semantic value of *Frege* is type <e>.

[[*wise*]]= λx.x is wise.

[[Frege]]= Frege

In accordance with our single composition rule—function application—we can now also interpret *Frege is wise,* which is the result of applying the function designated by *wise* to the entity designated by *Frege.* Since [[wise]] is a function from entities to truth values, [[*Frege is* wise]] is type <t>, i.e. it is true or false. Until I specify otherwise, I will work with an extensional semantics for our fragment.

In giving this interpretation, we've assumed that the copula is semantically vacuous. This is particularly controversial when discussing the semantics of predication, as it is natural to take the copula to be a significant part of the predicate, perhaps even the part that enables predication. We'll return to this.

**Vacuity**: the copula is semantically vacuous.

Expressibility problems arise when we use these same type-theoretic methods to analyze more complicated fragments of English. Problem **MF** was that Frege's semantic theory prevents us from adequately analyzing statements about semantics, problem **NF** was that Frege's semantic theory prevents us from adequately analyzing natural language constructions that seem to require co-reference between predicates and non-predicates.

The relevant versions of **MF** and **NF** are as follows. **MF’**: our simple type-theory cannot adequately analyze all of the sentences necessary in order to express semantic theories. **NF’**: our simple type-theory cannot adequately analyze natural language predicate nominalization.

Both **MF’** and **NF’** utilize the elusive notion of adequate analysis. For the sake of this discussion, a skeletal view about semantic analysis will suffice. In particular, we'll take a semantic theory to provide an adequate analysis of a sentence only if it assigns semantic values to its sub-sentential constituents, along with general principles deriving the semantic value of the sentence built from those constituents, such that the assigned semantic value (i) truth-conditionally matches the analysandum, and (ii) captures the meaning of the analysandum. Fully understanding requirement (ii) is difficult, but some violations are obvious. For instance, if our theory takes *Snow is white* to express that snow is white and grass is green, this violates (ii) . The constraint is familiar from Davidsonian meaning-theory construction.[[13]](#footnote-13)

To make a case for **MF’** and **NF’** I'll consider two example sentences:

(12) *Wise* designates wisdom.

(13) Wisdom is a property that Frege has.

The problem comes in attempting to analyze (12) and (13) with the resources available. Our extremely simple theory is inadequate for an uninteresting reason: both (12) and (13) contain vocabulary that goes beyond our tiny lexicon (which, thus far, only contains two entries). The first thing for a type-theorist to do, then, is to give interpretations of these other elements. In other words, we need to extend our lexicon so that we can interpret “*wise*", *designates,* *wisdom,* and *a property that Frege has*.[[14]](#footnote-14) Giving interpretations for each of these words requires two things: (a) identifying the type of their meaning and (b) identifying their semantic value, i.e. exactly what their semantic value is.

Before tackling (a) and (b), note that to draw out **MF’** and **NF’** I am assuming that the same type-theoretic methods we use to analyze *Frege is wise* can be extended to (12) and (13). This is not uncontroversial: it is familiar for theorists to claim that their semantic analyses only apply to a certain subset of linguistic expressions.

**No relevant limits**: the same type-theoretic methods we use to analyze *Frege is wise* can be extended to analyze (12) and (13).

Let's now tackle (a). Here's a constraint on type-assignments: they should cohere with our already assigned types in order to make correct predictions about interpretability. Given that we analyzed *wise* as having an <e,t>-type meaning, and *“wise" is wise* is interpretable (though obviously false), we need to take “*wise*" to be assigned a meaning that can combine with an <e,t> meaning via function-application. There are only two options: <e> and <<e,t$>,$t>.[[15]](#footnote-15) Noting that “*wise*" appears to have the same sort of distribution as a proper name makes it plausible that its meaning is <e>-type. Using analogous reasoning for the other expressions, we end up with the following categorizations (using $\in $to signify category membership). On these category assignments, (12) and (13) are perfectly interpretable, as desired. I'll ignore the internal complexity of *a property that Frege has*.

[[“wise”]] $\in $ <e>

[[designates]] $\in $<<e>,<e,t>>

[[wisdom]] $\in $<e>

[[*a property that Frege has*]] $\in $<e,t>

These categorizations are not uncontroversial. One may, for instance, argue that [[*wisdom*]] should be type <e,t>. I will consider such a suggestion, in effect, in both 3.1 and 3.3. For now, it will suffice to see how versions of **MF** and **NF** arise given the above type-assignments, which are an obvious initial proposal.

To identify semantic values, we can be guided by disquotation. The following are near truisms: *Wisdom* designates wisdom and *designates* designates designation. Combining these observations with the type-assignment we get the following semantic values:

[[“*wise”]]* = *wise*

[[*designates*]] = λx.λy.y designates x

[[*wisdom*]] = wisdom

[[*a property that Frege has*]] = λx.x is a property that Frege has.

[[*Frege*]] = Frege

This reasoning utilizes a link between interpretation (as expressed by the double-bracket notation) and designation, which some may find suspect.

**Bridge** [[*x*]]= y iff *x* designates y.

To argue that this analysis of (12) fails I'll show that, given the principles articulated, the analysis predicts that (12) is false. (12), however, is true. To give the argument, I'll stipulate that *object* is a predicate true of anything that is type <e> and *concept* is a predicate true of anything that is type <e,t>. Given **Exclusivity**, no object is a concept. We can then give an argument that, according to the analysis, (12) is false:

1. *Wise* designates a concept. (From the definition of *concept* and the designation-assignment for *wise)*

2. *Wisdom* designates an object. (From the definition of *object* and the designation-assignment for *wisdom)*

3. No object is a concept. (**Exclusivity**)

4. It is not the case that *wise* designates what *wisdom* designates. (from 1-3)

5. Therefore, It is not the case that *wise* designates wisdom. (from 4 and the intersubstitution of *what “wisdom" designates* and *wisdom*)

On the proposed analysis, (12) is false. However, (12) is true. Therefore, the proposed analysis fails (i): it lacks truth-conditional adequacy.

Here is an argument that the analysis fails (ii): however (12) is analyzed, it should contain reference to the denotation of *wise.* However, it doesn't: after all it does not contain a lexical item that even has a meaning of the same type, let alone the same denotation. So, the analysis of (12) fails to capture its meaning.

This argument is quick: at least prima facie, one can resist it by denying that capturing the meaning of (12) requires reference to the denotation of *wise.* Familiarly, Montague (1974) divorced the semantic analysis of names from their referents by taking names to be generalized quantifiers. Nonetheless, Montague's analysis doesn't obviously violate (ii). I'll return to this argument in section 3.1.

These arguments have nothing to do with the particular examples chosen. Our simple type theory will generate trouble for any sentence purporting to ascribe a non-<e>, or <<e,t>,t>-type meaning to an expression. This is due to the fact that *designates* seems to require an expression in its object position that is either type <e>, or <<e,t>,t>. In all other cases, there will be a mismatch between the type of the word mentioned in the subject position of a designation-clause and the type of the word in the object-position. The generality of the problem is the basis for concluding that our simple type-theory falls prey to **MF’**: the inability to adequately analyze statements ascribing denotation.

To argue that the proposed analysis of (13) fails, I'll make two claims about (13), both concern their relationship to (14):

(14) Frege is wise.

The first is that (13) and (14) have the same truth-conditions. The second is that this holds in virtue of the meanings of the words that compose (13) and (14), along with an uncontroversial claim about property-instantiation (I'll return to this). The contrast is with pairs of sentences like *two plus two equals four* and *three times three equals nine* which have the same truth-conditions but not in virtue of meaning or form. An adequate semantic theory should underwrite the truth-conditional equivalence of (14) and (13), but the proposed semantic theory does not. Nothing in our simple semantic theory connects the semantic values of *wise* and *wisdom* they are members of different types, which cannot overlap. So, we now have an argument that our simple analysis of (13) fails (i): an analysis of (13) is truth-conditionally adequate just in case it ensures that (13) is equivalent to (14); our analysis does not; therefore, our analysis is not adequate.

The standard solution to this worry is to enrich the analysis with some sort of mechanism that ensures the truth-conditional equivalence of (14) and (13): e.g. by taking wisdom to be somehow correlated with λx.x is wise. I will critically discuss such approaches in section 3.3. Note, though, that this is not the only solution. If we abandon **Exclusivity**, we can claim that [[*wisdom*]] = [[*wise*]] while maintaining that [[*wisdom*]] $\in $ <e> and [[*wise*]] $\in $ <e,t>; this is because meanings can be members of more than one type. In and of itself this does not guarantee that (14) and (13) are truth-conditionally equivalent, but it does link them in such a way that has the potential to undergird such an explanation. I'll return to this in section 3.4

Just as we gave a crude argument that our simple theory fails (ii) in its analysis of (12), we can give a similarly crude argument that our simply theory fails (ii) in its analysis of (13). (13) and (14), the thought goes, both ascribe wisdom to Frege. This seems to require that they both contain constituents that designate Wisdom. Assuming the candidates are *wise* and *wisdom*, and that *wisdom* designates wisdom, only (13) is about the right property.

This crude argument, like the one that came before it, relies on linking designation with subject-matter (aboutness). These links are controversial, and with the exception of Lewis (1988) and Yablo (2014), there are few worked-out theories of subject matter and none which would straightforwardly link designation and subject matter. Even so, the arguments capture the idea that type-distinctions force us to divorce semantic values that, intuitively, coincide.

3. Attempted Solutions

Our extremely simple type-theory yields problems **MF’** and **NF’**. This, in and of itself, may be unsurprising: after all, the simple theory is close to Frege's own—at least at the level of reference. More interesting and surprising results come from the examination of complications to the simple theory that may seem to solve the problems. In particular, the abandonment of **Inflexibility** may seem particularly promising given that, as a matter of fact, almost all semanticists endorse some sort of flexible typing. I'll argue, though, that abandonment of **Inflexibility**---or, for that matter, **Vacuity**, **Bridge**, or **No relevant limits**---do not solve the problems. My preferred solution requires abandoning **Exclusivity**, though it too faces empirical and philosophical challenges.

3.1 Interpretation, Denotation, Meaning, and Reference

In informally discussing semantic theories, it is tempting to take the interpretation assigned to an expression in a theory as the denotation or meaning of that expression. In our discussion, this tendency has already manifested itself. When assigning semantic values, we were guided by **Bridge**, which explicitly links interpretation and denotation.

**Bridge**: [[*x*]] = y iff *x* designates y.

**Bridge**, however, is suspect, along with other principles linking interpretation with denotation, meaning, and reference. We can generate doubts about these principles both by considering a specific example from Montague, as well as reflecting on the aims of a semantic theory.

Principles like **Bridge** are suspect because there is a plausible view on which interpretation is divorced from denotation, meaning, and reference. On the view, interpretation is a theory-internal notion. Take a given set of goals for a semantic theory and conjoin them, the interpretations of some expressions relative to those goals are the objects that play the relevant functional role in satisfying those goals. Imagine that the only goals of a semantic theory are truth-conditional adequacy and compositionality. In that case, interpretations would be whatever jointly satisfied those constraints.

Contrastively, denotation, meaning and reference are naturally taken to be theory-external notions. The idea is that we utilize and grasp these notions independently of our specific goals in constructing semantic theories, so we cannot take them to be whatever happens to satisfy a theoretically-defined functional role. For instance, *Frege* refers to Frege, and this fact seems independent of whatever goals we have in constructing a semantic theory.

One could accept this picture and argue for principles like **Bridge** by linking theory-external notions like reference with theory-internal notions like interpretation. This would require adopting a particular set of theoretical goals and arguing that, as a matter of fact, those goals ensure links between interpretation and denotation. Fortunately for us, we needn't go down this road: as I'll soon argue, versions of **MF** and **NF** arise even without linking interpretation to reference, denotation and meaning.

Another worry for **Bridge** arises from the fact that a familiar theory violates it. Montague (1974) claims that all noun-phrases are type-identical: they all are interpreted as generalized quantifiers (<<e,t>,t>). [[*Frege*]] for instance, is a function from properties that Frege instantiates to truth, and all others to falsity. However, one may still reasonably insist that *Frege* denotes Frege. This is just a case where interpretation—semantic value—doesn’t perfectly track denotation. In fact, one can even understand Montage as taking semantic value to be subject to independent constraints. In this case, the constraint is that expressions in a syntactic category are analyzed as semantically type-identical.

The upshot is that **Bridge** has been rejected, and its rejection can be reasonably supported by distinguishing semantic interpretation from more familiar notions. It may, then, be tempting to think that problems **MF** and **NF** arise due to endorsement of **Bridge** and other similar principles.

This temptation should be resisted. Versions of **MF** and **NF** arise even if we reject **Bridge**, or any other similar principles. To see that **MF** arises without **Bridge**, begin by substituting *is interpreted as* for *denotes* in our argument for the claim that the analysis of (12) was inadequate.

1) *Wise* is interpreted as a concept. (From the definition of *concept* and the designation-assignment for *wise.*)

2) *Wisdom* is interpreted as an object. (From the definition of *object* and the designation-assignment for *wisdom.*)

3) No object is a concept. (**Exclusivity)**

4) It is not the case that *wise* is interpreted as what *wisdom* is interpreted as. (1-3)

5) Therefore, It is not the case that *wise* is interpreted as wisdom.

Now, consider an interpretation-specification for *wise* that may seem to support the premises of the revised argument:

(15) *Wise* is interpreted as wisdom.

The idea would be that (15) is interpretable, and, in order to make it so, we'd have to assign *wisdom* type <e>. If that's correct, then the argument could proceed as before. However, there's a problem. We're considering a view on which the notion of interpretation is theory-internal and plays whatever role we need it to. So, we're not licensed in taking *wisdom* to be of type <e> until we know more about this role. For all that has been said, the initial proposed modification of the argument for **MF** may fail given the theory-internal conception of interpretation.

However, a novel argument can be generated utilizing these observations. Consider (15) and (16), both of which utilize the theory-internal notion of interpretation.

(16) *Frege* is interpreted as Frege.

Now, consider attempting to analyze *is interpreted as* using our familiar methodology. *Wise* is a first order monadic predicate so, by hypothesis, it will be analyzed as having semantic type <e,t>. *Frege* is a name, so it will be analyzed as having type <e>. The problem arises in analyzing *is interpreted as*. On the one hand, it seems to express λx.λy.y is interpreted as x, where x and y range over entities of type e. This is the interpretation required for (16). On the other hand, it seems to express λf.λy.y is interpreted as f, where y ranges over entities of type e and f ranges over functions of type <e,t>. However, by **Exclusivity** and **Inflexibility** these are different functions and *is interpreted by* cannot express them both. So, **MF** rears its head at another level: our theory fails to allow us to adequately analyze sentences that express interpretation. Given that these are often taken to be the basic clauses in a compositional semantic theory, this is highly problematic.

I have explicated this problem using the English *is interpreted as*. One may worry that this phrase has little to do with the usual construction of semantic theories, which utilize double-bracket notation. However, the problem has nothing to do with the means we use to express interpretation. If we adopt the usual double bracket notation, the lesson is that our type-theory is inadequate for understanding the meaning of the double brackets. Importantly, this holds both for our simple type theory and our revised version that rejects **Bridge**.

Faced with this argument, a theorist may insist that their theory was never intended to apply to the double brackets. Rather, the theory targeted only natural language, or a small fragment thereof. Note that, independently of scope of the theory, the forgoing reveals that, absent enrichment, our simple type theory cannot extend its scope to cover interpretation specifications. This is quite different from the claim that the theory does not analyze them. I'll return to discussing such potential empirical limitations when I consider the rejection of **No relevant limits**.

Another familiar maneuver is to insist that either *interprets* or the double-bracket notation is syncategorematic. In order to make sense of this view, its proponent owes an account of the meanings of sentences in which the notation occurs. It is hard to see how this could be achieved, though I don't have a principled argument for impossibility. Absent a concrete proposal, though, we have no reason to take a syncategorematic approach to be viable.

Stepping back, the lesson is straightforward. Interpretation, as we usually think of it, is a relation between any expression and its semantic value. Semantic values, however, occupy different places in the type-theoretic hierarchy. This means that interpretation must likewise be able to relate expressions with entities in different locations on the hierarchy. However, if meanings are exclusive and inflexible, there can be no such meaning. So, there is no adequate manner to analyze any expression that purports to express the interpretation relation.

At this stage a theorist could simply insist that there is not a single interpretation function and the double-bracket notation is ambiguous between relations for every type (or at least every type attested in our target language). This would preclude comparing semantic values, e.g. *“Frege" is interpreted as an object, while “wise" isn't*. This would also preclude the straightforward statement of composition rules, like the one given above—our statement of function application crucially utilized double-bracket notation. On the theory envisioned, that notation is many-ways ambiguous, so it would need to be disambiguated. We would then be left with myriad composition rules, just as we had myriad interpretation functions. While this isn't incoherent, it would be resisted by most theorists who take there to be very few composition rules.

Again, I won't offer anything like a decisive consideration against taking the double bracket notation to be infinitely ambiguous. I'll simply offer some skepticism and the observation that it would be quite surprising if this infinite ambiguity--and the attendant theoretical complications--were the inevitable result of attempting to generalize type-theoretic analysis to semantic discourse.

What about problem **NF’** and **Bridge**? Here matters are more straightforward. Merely abandoning **Bridge** does nothing to ensure that the truth-value of (13) matches the truth-value of (14). The initial problem was that our semantic theory did nothing to guarantee that match, and weakening the theory certainly doesn't help!

As straightforward as this argument is, it illuminates the shortcomings of rejecting **Bridge**. The motivation for rejecting **Bridge** was the thought that concept horse problems arise by misconstruing semantic interpretation as intimately related to more familiar notions. The mistake is brought out by realizing that the mutual entailments between (14) and (13) have nothing to do with how we construe interpretation. Insofar as these entailments are within the purview of a semantic theory, then however we understand interpretation, the entailments will have to be guaranteed by our interpretations of (14) and (13).

3.2 The Copula

Thus far, we've been assuming that the copula is semantically vacuous. This can be contested for a number of reasons. Most obviously, one could take the copula to semantically mark the present. For our purposes, however, the more important worry is that *wise* is not itself a predicate: it only becomes a predicate by combining with the copula.[[16]](#footnote-16) The function of the copula, in turn, can be understood as transforming a referential general term (that refers to a property or kind) into a predicate. On this view, **Vacuity** is rejected.

**Vacuity**: the copula is semantically vacuous.

Rejecting **Vacuity** is unhelpful for two reasons. The first is that it is empirically suspect, and the second is that it does not solve problems **MF’** and **NF’**.

If *wise* can serve as a predicate without the copula then the copula is not always responsible for predication. In fact, there are occurrences of *wise* in which it can serve as a predicate without the copula.

(17) I consider Frege wise.

In (17), the complement of *consider* is the small clause *Frege wise*. Here, despite the absence of the copula, *wise* is functioning as a predicate: it ascribes wisdom to Frege.[[17]](#footnote-17) In order to account for examples like (17), proponents of the view that the copula is the locus of predication must claim that such sentences contain tacit constituents performing the same semantic function that they take the copula to perform (14). In fact, there may be some support for this view, at least in sentences like (17). Bowers (1993) and Baker (2003) argue that sentences contain a tacit pred operator that has the semantic function of creating predicates. Whether such a hypothesis is plausible in all cases is an open issue. So, at the very least, those who take *wise* to be a non-predicate that is transformed into a predicate by some other linguistic item are making a controversial empirical hypothesis.

More importantly, even if the predicate in (14) is *is wise* rather than *wise,* problems **MF’** and **NF’** remain. Taking **NF’** first, note, again, that taking the copula to be the locus of predication again does nothing to guarantee truth-conditional match between (13) and (14). Regarding **MF’**, note that we can simply substitute *is wise* for *wise* in our initial argument for **MF’**.

3.3 Type-Shifting

In deriving **MF’** and **NF’** I assumed **Inflexibility**: that semantic typing is fixed. This is now routinely rejected. Just about every theorist thinks that at least some words may be flexibly typed, in the sense their type is shifted within a particular context, usually in order to preserve interpretability. Given that flexible typing is part of the standard toolkit of semanticists, it is natural to utilize it in accounting for sentences like (12) and (13).[[18]](#footnote-18)

The relevant question is whether type-shifting mechanisms can be utilized to provide adequate analyses of (12) and (13). I'll now argue that they cannot for two reasons. The first reason is empirical: no independently-motivated type-shifting principle is suitable for the job. The second reason is conceptual: even if a type-shifting principle could provide adequate truth-conditions it would give rise to problems just as severe as those it was invoked to solve.

Before I argue that no independently-motivated type-shifting principle can provide adequate truth-conditions for sentences like (12) and (13), it is worth explaining why this conclusion is important in the first place. A skeptic, for instance, my claim that independent-motivation is irrelevant, as solving the problems at hand is motivation enough![[19]](#footnote-19)

The reason it is illuminating to seek independently-motivated type-shifting principles is that, without constraint, we could introduce a type-shifting principle to generate whatever truth-conditions we wish by reverse-engineering the principle from the desired truth-conditions. Such an engineered type-shifting principle leads to two worries. The first worry is that allowing this method would result in a gerrymandered and ad hoc semantic theory. There should be some constraint on invoking type-shifting, and the sort of independent motivation to which I allude is a plausible constraint. The second worry is that each type-shifting principle brings with it a risk of overgeneration. For instance, if we can freely shift <e,t> meanings to <e> meanings—without any limitation—we'd predict that any complex expression containing two words with <e,t> meanings is interpretable and can express a truth-value. This prediction, however, is implausible: *wise rich* can no more express a falsehood than any arbitrary combination of like-typed expressions, e.g. *all some.*

There is certainly more to be said about whether the proponent of a type-shifting approach to **MF’** and **NF’** can reasonably introduce a novel type-shifting mechanism. For now, suffice it to say that the fact that no independently motivated principle does the job is a significant strike against a type-shifting approach.

The initial analyses of (12) and (13) failed (ii) because, on the analyses, their sub-sentential constituents didn't designate to the proper entities. Focusing on (13), the problem was that *wisdom* referred to something of type <e>, while, in order for it to be an adequate analysis, it must designate something of type <e,t>. Arguing that (12) fails (ii) is more straightforward than arguing that (13) fails (ii) since the semantic function of predicate nominalizations is complicated and controversial.[[20]](#footnote-20) Nonetheless, in what follows I'll focus on (13) for the simple reason that it makes the problems more vivid. If one is convinced that an alternative account of nominalization is superior, note that the same problems arise with (12), they are just a bit more complicated to discuss.

Just how could type-shifting mechanisms help? Recall that our initial type assignment for *wisdom* was dictated by the constraint that we make correct predictions about interpretability. These predictions, in turn, were constrained by the inflexibility of our type assignments. Whatever type is assigned in the lexicon is the only type available for interpretation. Type-shifting principles relax this constraint. A term can have a particular type in a lexicon and appear in an interpretable structure as long as a type-shifting mechanism is available to ensure interpretability. That means that we can assign *wisdom* type <e,t>, and give it the following semantic value.

[[wisdom]] = λx. x is wise

This semantic entry for *wisdom* initially seems superior. After all, *wisdom* is assigned the same semantic value as *wise,* which is what our initial intuitions about nominalization dictated.

Now, consider our analysis of (13). It consists of two sub-sentential constituents, both of which are of type <e,t>. Therefore, we cannot apply function-application. Rather, a type-shifting principle must shift the type of one of the constituents. The first question is which? Insofar as there are such mechanisms at all, they must be available in the nominal domain. The reason is that we can freely conjoin predicate nominalizations with definite descriptions, and combine the conjunctive NP with a single predicate, as in (18).

(18) Wisdom and the number four are both abstract entities.

In fact, there has been a substantial literature regarding type-shifting within the nominal domain, so we are in a good position find candidate mechanisms that suffice. Before critically surveying such mechanisms, let me express some general worries about type-shifting mechanisms.

First, there is the overgeneration worry I already mentioned: if our hypothesized type-shifting mechanism operates whenever we attempt to compose two expressions with <e,t> meanings, then we'd predict that any complex expression formed of such entities is interpretable. The natural thing to do is to try and limit the application of the mechanism. However, a limitation can't be type-driven given that the mechanism operates in some cases of composition with the same types. Thus, it looks like our quest for type-driven interpretation straightforwardly fails. Type-assignment, and thus, the semantic values of occurrences of terms, are a product of additional considerations.

Second, there is a philosophical worry. Type-shifting mechanisms were intended to help by allowing us to claim that *wise* and *wisdom* co-designate. However, given that a type-shifting mechanism shifts the type of *wisdom* in (13), it is hard to see just how, even on such a view, (13) satisfies (ii). After all, the meaning ultimately utilized in calculating the truth-conditions of (13) will not be that of *wisdom,* but, rather, a shifted variant. In order to argue that (ii) is satisfied, these variants must be closely connected to their correlative unshifted meanings.

On to the particular type-shifting mechanisms. There are two options: we can shift *wisdom* to the higher-type <<e,t>, t>, or the lower type <e>. In fact, both mechanisms have been hypothesized to exist in the nominal domain. Let me first focus on the mechanisms for shifting *wisdom* to a higher-type. These mechanisms fail (i): they deliver incorrect truth conditions for (13).

Here are two standard mechanisms for shifting from <e,t> to <<e,t>,t>:

A(P<e,t>) = λQ<e,t>$∃$x(Px • Qx)

THE(P<e,t>) = λQ<e,t>$∃!$x(Px • Qx)

If we shift [[*wisdom*]] using A, the truth conditions of (13) is taken to be true just in case a wise thing is a property of Frege. If we shift [[*wisdom*]] using THE, (13) is true just in case the wise thing is a property of Frege. Both of these truth-conditions are incorrect.

The more promising type-shifting strategy shift from <e,t> to <e>. Intuitively, such a type-shift will produce an entity correlate for each property. This mechanism is motivated by the existence of kind-designating occurrences of plurals and mass nouns.

(19) Dinosaurs are extinct.

(20) Water is plentiful.

If we take *dinosaurs* and water to be assigned <e,t>-type meanings in the lexicon, then we'll plausibly need to shift them in order to interpret (19) and (20). (19), for instance, expresses that a particular kind of thing is extinct. These constructions motivate the existence of an <e,t> to <e> type-shifting mechanism that maps properties to kinds.[[21]](#footnote-21)

The first reason that this type-shifting mechanism does not help is that it does not yield truth-conditionally adequate interpretations. We can see this once we are a bit more careful about the ontological distinctions between kinds and properties.[[22]](#footnote-22) Kinds, it seems, have features more closely tied to their instances. Kinds can go extinct, be invented, evolve, etc. Properties, however, don't seem to have such properties. They are ordinarily conceived-of as necessarily existing entities that cannot change in these ways. Nominalization and interpretation-specification seem to require reference to properties--the semantic values of predicates--rather than kinds. So, it seems as if the <e,t> to <e> type-shifting mechanism invoked to make sense of kind-reference will not generate the correct truth conditions for nominalization or metalinguistic discourse.

An adequate understanding of the distinction between kinds and properties is far beyond the scope of this discussion. Rather than further pursuing the issues, I'll now turn to the conceptual problem for a type-shifting approach to **MF’** and **NF’**.

Even if we could identify a type-shifting principle that gives rise to adequate truth-conditions for (13) and (12), problems remain. Invoking such type-shifting principles gives rise to revenge problems, which are just as severe as the problems they set out to solve. Let us introduce the name *Sam* with the stipulation that its interpretation is the type-shifted interpretation of *wisdom.* Using *Sam* to discuss the proxy-object itself, we will want to claim that the following is false:

(21) Sam is a concept.

The problem is that according to the semantic version of the strategy under consideration, (21) is true. *Sam,* by stipulation, co-designates with *wisdom.* As such, intersubstitution of the two will not affect the thought expressed. Since, by hypothesis, *Wisdom is a concept* is true—after all *wise* designates wisdom, and *wise* designates a concept—then *Sam is a concept* will also be true, given that the two express the very same thought. This reasoning generalizes to every context in which we wish sentences intuitively about the objects that result from type-shifting themselves to truth-conditionally diverge from sentences in which those objects are playing the role of mere representatives.

Solving this problem would require distinguishing Sam in its role as the referent of *Sam* and Sam in its role as the type-shifted meaning of *wisdom.* This, however, requires much more than type-shifting. It requires understanding how a single meaning can play two different roles in two different occurrences. In fact, my favored view, which rejects **Exclusivity** does make sense of this. However, once we adopt that view, there is no need to invoke type-shifting principles.

The upshot of all of this is that no independently motivated type-shifting principles can allow us to adequately analyze (12) and (13) and that we have a principled reason to think that no type-shifting principle could be adequate. The reason is that if a type-shifting principle provides adequate truth-conditions it seems to give rise to an expressibility problem just as bad as **MF’** or **NF’**: we cannot provide adequate truth-conditions for sentences about the type-shifted meanings themselves.

3.4 Empirical Limitation

According to **No relevant limits**, we can straightforwardly apply our methods of type-theoretic analysis to (12) and (13). This can be reasonably doubted. Perhaps, as has been commonly held since Tarski, we should hold that we cannot utilize our methods to apply to the metalanguage itself. Rejection of **No relevant limits** can be evaluated as a strategy for undermining **MF’**, **NF’**, or both. I'll address them in turn.

Begin with **MF’**, where rejecting **No relevant limits** seems well-motivated, given that **MF’** explicitly deals with metasemantic discourse. Rejection of **No relevant limits**, however, doesn't solve a variant of **MF’**, which requires no analysis of metalinguistic vocabulary. The idea is that we can directly argue that, for the type-theorist, it is false that *thinks* designates thinking. Here's the argument:

(1) *Thinks* designates something of type <e,t>.

(2) *Thinking* designates something of type <e>.

(3) Nothing of type <e> is also of type <e,t>

(4) Therefore, it is not the case that *thinks* designates thinking.

Note that this argument does not require applying our type-theoretic methods to any metalinguistic vocabulary. The support for the premises of the argument does not come from some particular analysis of those premises or the terms used in their articulation, rather, the motivation comes from from the tenets of the type-theory itself. Another way of putting this is that the type-theorist will endorse the premises even if he/she rejects the possibility of analyzing *designates* with type-theoretic methods. So, the rejection of **No relevant limits** is of no help. Furthermore, the problem can be easily generalized to any specification of predicate designation (interpretation/reference/etc.) that purportedly utilizes a non-predicate to specify that designation. This shows that merely restricting our type-theoretic analyses such that they fail to cover metalinguistic vocabulary does not solve the underlying problem.

When it comes to **NF’**, the rejection of **No relevant limits** doesn't help at all. The reason is that **NF’** does not concern metalinguistic notions. Rather, it concerns any non-predicate that, intuitively, co-designates with predicates. These are perfectly familiar natural language expressions like gerunds and infinitives. To argue that type-theoretic methods cannot be used to understand gerunds and infinitives is to take there to be limits to our type-theory that aren't motivated by the object language/metalanguage distinction.

Given these shortcomings, I'll set aside the rejection of **No relevant limits** as a method for solving MF’ and NF’. A second reason to do this is that, as far as I know, no actual theorists have approached the problems in this way.

3.5 Type Overlap

According to **Exclusivity**, no meaning can be a member of more than one type. This is precisely what forced us to take *wisdom* and *wise* to have different meanings. The reasoning was that *wisdom* has an <e>-type meaning while *wise* has an <e,t>-type meaning, and since no meaning can be a member of both types, the meanings must be distinct. If we abandon **Exclusivity**, we can reject this reasoning and claim that the terms have the same meaning, though the former has it in an <e>-ish way while the latter has it in an <e,t>-ish way.

Abandoning **Exclusivity** raises a number of questions. First, how can we make sense of non-exclusive types? Second, what is it to have a meaning in a way? Third, what becomes of type-driven interpretation? Fourth, what does an **Exclusivity**-denying compositional semantics look like? Fifth, how do we ensure that the resulting theory does not succumb to the property version of Russell's paradox. I won't address the last question—which is a topic for another paper (book?). In the remainder of this subsection, I'll address the first two questions and in the last section of the paper I'll turn to the third and fourth.

We can begin to make sense of non-exclusive types by considering categorization more generally. I can divide objects into categories in a number of ways. For instance, my colleagues could be categorized by height: those above 6' tall are in one category and the rest are in the other. This would yield categories with no overlap. I could also categorize my colleagues by their taste in music with categories for jazz, classical, rock, and EDM. This categorization would allow overlap: lots of jazz lovers also like classical music. In this latter case we can make sense of overlapping categories by making sense of the principle on which the categorization is based.

Making sense of overlap in the type-system is similar. Overlapping categories can be made intelligible by providing a principle on which an overlap-allowing categorization could be based. The principle will be motivated by consideration of the role of types. Following Frege, I will take typing to be determined by function/argument structure. Recall that Frege took this to be the key to understanding the unity of thoughts. Of course, Fregean thoughts are composed of senses and we’ve been considering an extensional semantic theory thus far, so we need to transpose his ideas to the present context. We can begin to understand semantic typing by posing questions about the semantic values of sentences. Unlike Frege, the contemporary type-theorist often does not take structured entities to be the semantic values of sentences. So, we cannot pose unity questions in terms of the structure of propositions/thoughts. However, we can ask a similar question that does not presuppose that sentence-level semantic values are structured.

**Q**: What is the nature of the relation that obtains between some entities in virtue of which they generate a proposition?

**Q** lacks presuppositions about the structure of propositions, so it is compatible with the standard view among contemporary type-theorists that propositions are unstructured sets of worlds.[[23]](#footnote-23) The idea is that in answering Q, we can make use of distinctions among semantic values.

In posing **Q** we are taking sentence-level semantic values to be propositions. So, we’re moving to the intensional. Of course, taking the extensions of sentences to be truth-values, we can pose an analog of **Q** that asks what relation obtains between some entities in virtue of which they generate a truth-value.

One may be tempted to say that the answer to **Q** is entirely straightforward: function-application. However, in the present context a full answer to **Q** requires not merely naming the relevant relation but characterizing it—giving its nature—this, in turn, will require characterizing its adicity and relata.

We can distinguish between **Q** and what I'll call *instances of* ***Q***, which ask what enables specific groups of entities to generate a proposition. Also, we shouldn't take *generate* particularly seriously, lest we be saddled with a rejection of the view that propositions necessarily exist. Rather, we should focus on the distinction between groups of entities that correspond to propositions and those that don't. I'll use *generate* to cover the former groups.

An example makes this vivid. Suppose we want to answer **Q** for a specific set of intensional semantic values of constituents of *Frege is wise*. In that case, we'll invoke the nature of the function [[*wise*]] along with the nature of the object, [[*Frege*]], and finally, a relation between them: that [[*Frege*]] is the argument of [[*wise*]].

From this example, we can extract categories that are important for answering Q. The category of being able to play the role of an argument is one category. The category of being able to play the role of a propositional function is another. My view is that some entities are in both of these categories. The rejection of **Exclusivity** follows.

In sum, categorization is—at least to a first approximation—determined by the explanatory roles invoked in answering **Q**. In our type-theory, these are just the familiar function/argument roles handed down by Frege. My thesis is that single entities can play different roles in different circumstances. This is intuitive: it seems as if wisdom plays a predicative role in the meaning of *Frege is wise* but a non-predicative role in the meaning of *Wisdom is a virtue*.

All of this answers our first question: we can make sense of type-overlap in terms of the explanatory role of types. Categorizing entities in terms of answers to instances of **Q** allows that an entity can play one role in one answer, and another role in a different answer. We can now move to the second question: what is it to have a meaning in a way?

Crucial to the view being developed is the thought that the same entity can play different roles. Which role is played by an entity is, in turn, determined by the way in which that entity is picked out by its corresponding linguistic item. Again, in *Frege is wise*, *wise* picks out wisdom in a predicative way, whereas in *Wisdom is a virtue*, *wisdom* picks out wisdom in a non-predicative way. These ways are simply different designation relations. *Wisdom* refers to wisdom, while *wise* ascribes that property to Frege. Making sense of the view requires making sense of these different relations--reference and ascription.

In Liebesman (2015), I articulate, develop, and defend two contrasts between reference and ascription. The first distinction between reference and ascription is that the latter is fundamentally triadic whereas the former is fundamentally dyadic. The idea is that occurrences of predicates ascribe properties to their arguments whereas occurrences of non-predicates simply refer. Notice that this distinction takes occurrences to be more semantically fundamental than words themselves, at least in terms of answering **Q**. The second distinction between reference and ascription is that the former is wholly unconstrained--any entity can be a referent--while the latter is constrained. Only predicables, most familiarly properties and relations, can be ascribed to things.

We can distinguish reference and ascription by their adicity and relata. However, we can also distinguish them by considering the different roles they play in answering **Q** and its instances. This, in turn, is displayed by incorporating them into a compositional semantic theory, which is the topic of the next section.

4. Sodium-Free Semantics

Rejecting **Exclusivity**, along with distinguishing multiple semantic relations, sits uneasily with familiar type-theories. Not only do they standardly make use of just one interpretation relation, but composition is type-driven in the sense that function-argument structure is determined by the types of semantic values being composed. If a single semantic value can belong to more than one type, we cannot take composition to be type-driven. This problem is exhibited by (22) and (23).

(22) Being nice is intelligent.

(23) Being intelligent is nice.

On the theory under consideration [[*being nice*]] = [[*nice*]] and [[*being intelligent*]] = [[*intelligent*]]. Given this, the meanings of (22) and (23) are derived by composing the same meanings. If composition is wholly type-driven, it seems that we have no means to distinguish the semantic values of the sentences. What we need is some way to ensure that [[*nice*]] plays an argument role in (22) and a predicate role in (23). My next step is to sketch a semantics that allows us to make sense of this.

We can begin by incorporating into our semantics the claim that there are multiple interpretation relations. In particular, we'll take there to be three interpretation functions. The first two are are partial: ref and asc. The former, intuitively, is for argument-type expressions while the latter is for predicative type expressions. So, ref(*being* nice) = asc(*nice*). We'll also continue to use double-bracket notation for the more general interpretation relation, which, so understood, is a deteminable that has ref and asc as its determinates. Composition, in turn, is sensitive to whether an expression is in the domain of ref or asc. To capture this, we add the following composition principle, where dom is is a function from a relation to its domain:

If w$ \in $ dom(ref) and y $\in $ dom(asc) then [[wy]] = [[y]]([[w]])

This principle allows us to interpret simple atomic sentences in which we have a single predicate and a single non-predicate. So, for instance, (22) is easily interpretable because *being nice* is in dom(ref) and *intelligent* is in dom(asc). The result is that asc(*intelligent*) takes ref(*being nice*) as its argument. The meaning of (22) will then differ from the meaning of (23) because the latter has the reverse function/argument structure: ref(*being intelligent*) is the argument of asc(*nice*)

This view works well for familiar atomic sentences, but hits a snag as soon as we consider sentences that contain higher-order predicates.

(24) All dogs bark.

In order to interpret (24), we wish to compose the meanings of *all* and *dogs.* There's a problem: they both seem to be predicative expressions and, therefore, are in the domain of asc. Our single composition rule does not allow us to compose their meanings. To make sense of such cases, we introduce a second composition rule that allows us to compose predicates:

If w $\in $dom(asc) and y $\in $ dom(asc) then [[wy]] = [[y]][[w]]

Notice that the composition rule does not specify which of [[y]] and [[w]] is the function, and which is the argument. This is because when we are composing predicates, composition can remain type-driven. In the case of *all* and *dogs,* [[*all*]] can take [[*dogs*]] as its argument, but not vice-versa.

That our second rule remains type-driven is a key philosophical contrast between these rules. It is motivated by the following thought: any entity (of any type) can be named and can serve as an argument. We can mark this by the way in which it is picked out; it is in the domain of ref. Predication, however, is limited to predicables. Furthermore, when an entity functions predicatively, it must do so in accordance with its type. This guarantees that interpretation can remain type driven when we combine two predicates.

The theory just sketched is extremely skeletal. A full evaluation of its merits would require the attempt to extend it to a much larger fragment of natural language. However, it should already be clear that it has the merits both of avoiding MF’ and NF’, and remaining fairly elegant: it just has two composition principles. My conclusion is that rejection of **Exclusivity** allows us to construct a semantic theory that doesn't require us to request, as Frege did, a grain of salt.[[24]](#footnote-24)

References

Baker, Mark 2003: *Lexical Categories*, Cambridge: Cambridge University Press.

Barker, Chris. and P. Jacobson (eds) 2007: *Direct Compositionality*. Oxford: Oxford University Press.

Beaney, Michael 1997: *The Frege Reader*. Oxford: Blackwell.

Bowers, John 1993 ‘The Syntax of Predication’. *Linguistic Inquiry*, 24, pp. 591-656.

Burge, Tyler. 2007: ‘Predication and Truth’. *Journal of Philosophy*, 104, pp. 580-608.

Burgess, John. 2005: *Fixing Frege*. Princeton: Princeton University Press.

Chierchia, Gennaro. 1998: ‘Reference to Kinds Across Languages’. *Natural Language Semantics*, 6, pp. 339-405.

Dummett, Michael 1973: *Frege: Philosophy of Language.* London: Duckworth.

Frege, Gottlob 1892: ‘On Concept and Object’. In Beaney 1997, pp. 181-193.

Furth, Montgomery 1968: ‘Two Types of Entity Designated’. In Rescher (ed.), 1968, pp: 9-45.

Hale, Bob and Crispin Wright 2012. ‘Horse Sense’. *Journal of Philosophy*, 109, pp. 85-131.

Lepore, Ernest and Kirk Ludwig 2007: *Donald Davidson's Truth-Theoretic Semantics*. Oxford: Oxford University Press

Liebesman, David 2011: ‘Simple Generics.’ Noûs, 405, pp. 409-42.

--- 2015: ‘Predication as Ascription’. *Mind,* 124, pp. 517-69.

MacBride, Fraser. 2011: ‘Impure Reference: A Way Around the Concept Horse Paradox’. *Philosophical Perspectives*, 25, pp. 297-312.

Moltmann, Friederike 2013: *Abstract Objects and the Semantics of Natural Language.* Oxford: Oxford University Press.

Partee, Barbara 1986: ‘Noun Phrase Interpretation and Type-Shifting Principles’. Reprinted in Partee 2004.

--- 2004: *Compositionality in Formal Semantics. Selected Papers by Barbara H. Partee*. Malden, MA: Blackwell.

Partee, Barbara and Mats Rooth 1983: ‘Generalized Conjunction and Type Ambiguity’. In Bäuerle et al. 1983, pp. 361-383.

Potter, Michael and P.Sullivan (eds.) 2013: *Wittgenstein's Tractatus: History and Interpretation*. Oxford: Oxford University Press.

Proops, Ian 2013. `What is Frege's Concept Horse Problem?' In Potter, Michael and P.Sullivan (eds.) 2013, pp. 76-96.

Rescher, Nicholas 1968: *Studies in Logical Theory*, American Philosophical Quarterly Monograph Series 2, Oxford: Blackwell.

Rieppel, Michael. forthcoming. ‘Being Something: Properties and Predicative Quantification’. *Mind*.

Rothstein, Susan 2001: *Predicates and their Subjects*. Dordrecht: Kluwer.

Strawson, P.F. 1974: *Subject and Predicate in Logic and Grammar*. London: Methuen.

Trueman, Robert. 2015: ‘The Concept *Horse* With No Name.’ *Philosophical Studies*, 172, pp. 1889-1906.

Wiggins, David. 1984: ‘The Sense and Reference of Predicates: A Running Repair to Frege's Doctrine and a Plea for the Copula’. *Philosophical Quarterly*, 34, pp. 311-28.

Winter, Yoad 2007: ‘Type Shifting With Semantic Features: A Unified Perspective’. In Barker, Chris. and P. Jacobson 2007, pp. 164-90.

}Wright, Crispin 1998: `Why Frege Did Not Deserve His *Granum Salis*: A Note on the Paradox of ‘The Concept Horse’ and the Ascription of Bedeutungen to Predicates'. *Grazer Philosophische Studien*, 55, pp. 239-63.

Yablo, Stephen 2014. *Aboutness*. Princeton: Princeton University Press.

1. The most famous and relevant passage is pg. 182-185 of his (1892). [↑](#footnote-ref-1)
2. E.g. Burge (2005) pg. 19-21. [↑](#footnote-ref-2)
3. E.g. Burgess (2005), Proops (2013), and Trueman (2015). [↑](#footnote-ref-3)
4. My favored version of this view is developed in Liebesman (2015). Other versions of the view are considered in Furth (1968), Strawson (1974), Wright (1998), Burge (2005), Hale and Wright (2012), MacBride (2011), and Rieppel (forthcoming). [↑](#footnote-ref-4)
5. **Correlation** differs slightly from the principle on which Hale and Wright focus. Hale and Wright swap *semantic* for *logico-syntactic* in their articulation of the principle. For their purposes, and perhaps for Frege's, we can make inferences directly from logical category and syntactic category to ontological category. By contrast, I will remain agnostic about whether there are syntactic categories/distinctions which are semantically inert. [↑](#footnote-ref-5)
6. My taxonomy is inspired by Proops (2013), though it differs as it is tailored for my purposes. [↑](#footnote-ref-6)
7. This overview of the concept *horse* problem in Frege is both brief and biased. It is brief because my main aim is not to consider the problem in Frege, it is to argue that analogous problems arise for contemporary theorists. It is biased because in discussing Frege I focus on problems which have contemporary analogs. There are lots of other problems for Frege in the vicinity that I do not discuss. For instance, one may hold not merely that Frege couldn't adequately analyze certain metalinguistic sentences, but that he was left without the resources to express metalinguistic facts altogether. Frege may well run into this problem, but I don't see how it would straightforwardly generalize so I set it aside. [↑](#footnote-ref-7)
8. Dummett (1973) is the most discussed proposal. See Wright and Hale (2012) for a litany of objections. [↑](#footnote-ref-8)
9. Liebesman (2015) contains a more detailed critical discussion of Fregean attempts to analyze predicate nominalization. [↑](#footnote-ref-9)
10. Heim and Kratzer (1998) is the most familiar example. [↑](#footnote-ref-10)
11. This example is just a toy. There are all sorts of complexities that may affect which type we assign to the meaning of *is swimming*; I ignore them here. [↑](#footnote-ref-11)
12. There's a complication: one may reasonably regard type-shifting principles as shifting between different meanings rather than shifting single meanings between types. This complication won't matter for my purposes. What's important is that our simple theory disallows flexibility. Partee (1986) discusses the status of type-shifting principles, though, as noted by Geurts (2006), there are a number of different views one may have about such principles. [↑](#footnote-ref-12)
13. See Lepore and Ludwig (2007) for discussion. [↑](#footnote-ref-13)
14. Though I'm primarily using italics to mention expression, I use quotes when I need to mention a mention, as in “*wise*” which refers to the word *wise.* [↑](#footnote-ref-14)
15. As a matter of fact, none of the arguments I give will depend on assigning “*wise*” and <e> meaning rather than an <<e,t>,t> meaning. [↑](#footnote-ref-15)
16. Wiggins (1984) defends this view. [↑](#footnote-ref-16)
17. Rothstein (2004) take small clauses to be the ideal construction for studying predication, her idea being that they do not contain other potentially distracting syntax/semantics. [↑](#footnote-ref-17)
18. Type-shifting has been prominently used to account for kind-designating NPs and plurals, among many other types of expressions. See Winter (2007) for a recent discussion and references. [↑](#footnote-ref-18)
19. Thanks to Dag Westerståhl for pushing this. [↑](#footnote-ref-19)
20. Moltmann (2013) is one recent example of a defence of a view on which nominalizations do not co-refer with their corresponding predicates. Note, however, that even if Moltmann is correct about particular predicate nominalizations, it remains plausible that there are certain argument-type expressions that co-refer with predicates. Property names that are stipulated to so-refer are a particularly vivid example. [↑](#footnote-ref-20)
21. See Chierchia (1998) and (2011) on such mechanisms. [↑](#footnote-ref-21)
22. See Liebesman (2011) on the differences between kinds and properties. [↑](#footnote-ref-22)
23. It would take a bit more work to find a similar question that doesn't presuppose the existence of sentence-level semantic values at all. However, it can be done. We can ask, for instance, what relationship there must be between some meanings such that the sentence that expresses them is truth-apt. [↑](#footnote-ref-23)
24. Thanks to an audience at University of Stockholm, as well as Matti Eklund, Ali Kazmi, Mark Migotti, and two anonymous referees. [↑](#footnote-ref-24)