

## Ambiguity Tests, Polysemy, and Copredication

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**Abstract:** A family of familiar linguistic tests purport to help identify when a term is ambiguous. These tests are philosophically important: a familiar philosophical strategy is to claim that some phenomenon is disunified and its accompanying term is ambiguous. The tests have been used to evaluate disunification proposals about causation, pain, and knowledge, among others.

These ambiguity tests, however, have come under fire. It has been alleged that the tests fail for polysemy, a common type of ambiguity, and one that is at issue in philosophically interesting cases. Furthermore, the objection that the tests fail for polysemy is often taken to be an undeniable bit of linguistic data.

We argue that this is mistaken. The objection implicitly relies on controversial assumptions about how to account for *copredicational sentences*, in which a single argument is ascribed *prima facie* incompatible properties. Furthermore, on several viable theories of copredication, the objection fails. However, our discussion also reveals that even if ambiguity tests are preserved, they may be significantly harder to execute than previously thought.

**Keywords:** Ambiguity, Polysemy, Copredication, Conjunction Reduction, Semantic Variability, Context-Sensitivity

## Ambiguity Tests, Polysemy, and Copredication

### §1. Ambiguity Tests

A number of familiar tests for ambiguity work as follows.<sup>1</sup> Begin with an allegedly ambiguous term *t*. Now construct a sentence *S* such that, if *t* is ambiguous, *S* requires us to use *t* with multiple interpretations simultaneously. Since this is impossible, *S* will be infelicitous if *t* really is ambiguous and, if *S* is felicitous then that is evidence that *t* isn't ambiguous.

Perhaps the most familiar such test is conjunction reduction:<sup>2</sup> take the purportedly ambiguous noun 'ball' that is alleged to have different senses in 'The ball is spherical' and 'The ball took place at noon'. Now conjoin the predicates to produce the complex sentence 'The ball is spherical and took place at noon'. According to the test, the fact that this complex sentence is zeugmatic is evidence that 'ball' really is ambiguous, and if the resulting sentence had not been zeugmatic, then that would have been evidence against the ambiguity of 'ball'.

(1)-(3) illustrate how we can use anaphora and elision to conduct similar tests (taking 'bank' to be ambiguous between a *terrain* and *financial institution* sense):

- (1) ? The hikers were resting along the bank when it collected the debt.
- (2) ? The mortgage-issuer is a bank and so is the terrain alongside the river.
- (3) ? I deposited my money in her bank and followed his downstream.

The oddity of (1), the thought goes, is due to the fact that the anaphoric 'it' cannot be used to designate a financial institution when its antecedent 'bank' is used in the *terrain* sense. The oddity of (2) is due to the fact that 'so is' co-designates with its antecedent 'is a bank', which

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<sup>1</sup> We follow much of the literature in calling these 'ambiguity tests', but the tests actually probe for the more general property of semantic variability, where a semantically variable expression can make different semantic contributions in different occurrences. (This can be achieved by mechanisms other than ambiguity, e.g. context sensitivity.) Sennett (2016: §4) critically surveys these tests.

<sup>2</sup> Zwicky and Sadock (1975) is the classic discussion of conjunction reduction.

uses 'bank' in the *financial institution* sense. The oddity of (3) is due to the fact that the elided constituent is 'bank' in the *financial institution* sense. In each case, the oddity of the sentence is traced to the fact that it forces the hearer to attempt to use 'bank' with two senses simultaneously.

Why care about probing for ambiguity, beyond interest in language itself? As Viebahn (2018) emphasizes, these tests are often utilized to evaluate philosophical disunity theses. To give just three examples: in metaphysics, Hall (2004)/(2006) defends a pluralistic account of causation and an accompanying ambiguity theory of 'cause'. Corkum (2022) argues against Hall's view by utilizing ambiguity tests like the conjunction reduction and elision tests. In particular, Corkum's thought is that if Hall's account is correct, then (4) should be infelicitous.<sup>3</sup> Its acceptability, then, is evidence that Hall is incorrect and 'cause' is not ambiguous.

- (4) My not watering the plants and the unusually arid conditions both caused the plants' death.

In philosophy of mind, Liu (2021a)/(2021b) argues for a pluralistic view of pain on which it can be a bodily state or a mental state in part by arguing that 'pain' and other pain terms (such as 'sore'/'aching'/'hurting') are ambiguous between designating mental and bodily states. And like Corkum, Liu relies on our aforementioned ambiguity tests to establish her view. In Liu's case, though, she thinks the tests vindicate ambiguity (2021b: §4.1.1). She considers the following contrast:

- (5) \*Kate's leg is sore/aching/ hurting and so is John.  
(6) Kate's leg is sore/aching/hurting and so is John's arm.

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<sup>3</sup> In particular, Hall holds that 'cause' is ambiguous - designating counterfactual dependence and a relation he calls 'production', which is transitive, requires spatiotemporal continuity, and is determined by the intrinsic natures of the relata. See the first few pages of Hall (2004) for an overview.

According to Liu, the oddity of (5) is explained by the fact that pain terms like ‘sore’ are ambiguous between bodily states and mental states: the first clause of the sentence requires the bodily state sense while the second requires the mental state sense. Since elision using ‘so is’ fixes it to the previous interpretation of ‘sore’ then then (5) is unacceptable. By contrast, (6) is acceptable when we use ‘sore’ with its bodily sense in both clauses.

In epistemology, Rumfitt (2003) and Stanley (2005) use the tests to help adjudicate their debate about whether know-how is reducible to propositional knowledge. Rumfitt (2003) argues that some occurrences of ‘knows how’ express an entirely different relation than ‘knows that’ and he uses the purported oddity of (7) as evidence (2003: 165).

(7) ? John knows both how to twitch his ears and that his mother is sickened by facial tricks.

Stanley (2005: 5) argues that such sentences are not odd and thus, no evidence for Rumfitt’s claim. Intuition trading aside, Stanley and Rumfitt share a commitment to the tests—otherwise neither would think it is worth trading intuitions.

These are just three examples. Viebahn (2018: 752-3) provides a list of philosophically interesting cases in which such tests are utilized. Thus, far from being solely of linguistic interest, the viability of the tests is philosophically important.

## **§2. The Objection from Polysemy**

There’s a problem. According to numerous recent theorists including Viebahn (2018: 753-4), Asher (2011: 63), Collins (2017: 678), Abbott (2013: 8), Hawthorne and Lepore (2011: 271) and Chomsky (2000: 180), the tests fail for polysemy—an important type of ambiguity.<sup>4</sup> Polysemy

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<sup>4</sup> See Sennett (2016) for a recent overview of ambiguity, and Vicente and Falkum (2017) for a recent overview of polysemy. Note, also, that the terminology is not consistent in the literature and, as such, our usage should be taken as somewhat stipulative. Some use ‘ambiguity’ such that ambiguity and polysemy are by definition disjoint, but we use the term in a way that allows them to overlap. In addition, ‘polysemy’ is often used to cover non-lexical phenomena (e.g. pragmatic modulation) while non-structural ambiguity is usually taken to be lexical. Furthermore,

occurs when an ambiguous term has related senses,<sup>5</sup> as in ‘lunch’ which can designate midday meals as well as the food involved it, or ‘healthy’ as designating a property of people as well as of activities they engage in.<sup>6</sup> Polysemy can be contrasted with homonymy wherein a term has multiple unrelated senses, as in ‘bank’.

This allegation that the tests fail for polysemy yields its support from what might seem like uncontroversial linguistic judgments: that the relevant sentences containing polysemous terms are felicitous. Suppose, for instance, that ‘book’ is polysemous between a physical sense (that is true of particular copies) and an informational sense (that is true of abstract texts) and attempt to utilize the test:

(8) The book on the shelf is a bestseller.<sup>7</sup>

If the conjunction reduction test identifies all types of ambiguity, it seems as if it would predict that (8) is infelicitous. (8), however, is perfectly fine. Maintaining the assumption that ‘book’ is polysemous, we reach the conclusion that the conjunction reduction test does not work for all types of ambiguity. *Mutatis mutandis* for ellipses and anaphora. Moreover, this objection seems to rest solely on uncontroversial linguistic judgments. Sentences such as (8) are perfectly acceptable and they are just the sort of sentences we’d use to probe for ambiguity, so how could the test possibly succeed?

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as discussed in the Vicente and Falkum (2017) survey, many theorists have distinguished among types of polysemy. See. Recanati (2017) for a recent discussion of some of the different aspects of polysemy.

<sup>5</sup> This is not a completely uncontroversial gloss of polysemy, but it is as close to neutral as we can find. The nature and scope of polysemy are highly contested. As Carston (2021) puts it in the conclusion of her paper: ‘This is an area in which just about everything is up for grabs...’

<sup>6</sup> We’re being purposely vague on just what relationship suffices for polysemy. Note, though, that the fact that two senses of an expression are etymologically related doesn’t guarantee polysemy rather than ambiguity. In fact, the two senses of ‘bank’ are etymologically related though the word is ambiguous not polysemous.

<sup>7</sup> ‘The book is on the shelf and a bestseller’ demonstrates the same point as (8) and has a more explicitly conjunctive structure. However, we find that explicitly conjunctive sentence a bit awkward so we shifted to (8).

This sense that the failure of the tests is established by nothing more than some uncontroversial linguistic judgments is evident in the literature. Here, for instance, are Hawthorne and Lepore (2011: 271) on the difference between homonymy and polysemy:

... by and large, anaphora and ellipsis work differently for [homonymy] and polysemy. We say, 'He opened the window and went through it' (where 'it' is anaphorically tied to 'window' even though the two occurrences have slightly different meanings—physical object versus frame); similarly, we say, 'He is healthy and so is the food he prepares for his family,' but we do not say (except as a pun), \*'He put some money in a bank and then swam to one,' or \* 'After losing forty pounds, he is light and so is the color of his hair.'

Collins (2017: 678) writes of a sentence much like (8): 'No problem arises here although clearly two different construals of *book* are in play'.<sup>8</sup>

Or, as Abbott (2013: 8) pithily puts it: 'in other cases of polysemy, a single occurrence of a lexical item may often be construed with two different senses'.

If these theorists are correct that the ambiguity tests fail for polysemy, that would have serious implications for the philosophical applications of the tests. Recall our philosophically interesting allegations of ambiguity: 'cause', 'pain', and 'know'. In each of these cases, the would-be ambiguity would be polysemy.<sup>9</sup> After all, the alleged senses are highly related. In fact, this is a feature of philosophically interesting disunity theories more generally. If a phenomenon is disunified and its designating term is ambiguous, then that ambiguity will be polysemy. After all, were the senses completely disconnected then the disunity theory would be

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<sup>8</sup> Collins is discussing the sentence 'Bill memorized and (then) burnt the book'. The semantic treatment of his particular example is discussed in Liebesman and Magidor (ms.).

<sup>9</sup> Corkum (2022: 10) is clear about this: "Polysemy is the kind of ambiguity presumably intended by those who claim that 'cause' is ambiguous." Liu (2021b: 466) is similarly clear that if pain terms are ambiguous then they are polysemous.

uncontroversial and philosophically uninteresting. Nobody can make a splash by arguing for a disunity theory of banks.

So, if the tests fail for polysemy, then they fail us just where we need them. Consider, again, Corkum's argument against the ambiguity of 'cause'. He argues that the acceptability of (4) is evidence against the ambiguity of 'cause'. However, the objector claims that polysemous terms do not reliably give rise to infelicity when we utilize the tests. If that's correct, Corkum's argument fails: the felicity of the relevant sentence is no evidence against polysemy. In the debate between Rumfitt and Stanley, Stanley is thinking that the felicity of (7) would guarantee the non-ambiguity of 'knows', but, if the objector is to be believed, the felicity of (7) is perfectly compatible with polysemy.

In Corkum's and Stanley/Rumfitt's discussions, the inference is from the acceptability of a conjunction to non-ambiguity of the probed term. If, as the objection alleges, polysemous terms can simultaneously be used with multiple interpretations, it is easy to see that this inference fails. Interestingly, the objection from polysemy also puts pressure on the inference from infelicity to ambiguity. Liu, for instance, argued for the polysemy of pain terms from the infelicity of (5). Her argument is also weakened by the objection. If polysemy doesn't reliably give rise to infelicity, then we have diminished reason to think polysemy is at the root of the unacceptability of (5)—after all, unacceptability can have many different sources (including ones that have nothing to do with semantic variability).<sup>10</sup> And since (as Liu 2021a: 466 stresses), if pain terms are ambiguous, they are polysemous, then the infelicity of (5) would give us at best a weak reason to think that pain terms are ambiguous.<sup>11</sup>

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<sup>10</sup> Consider, for instance, 'My sister is on my mind as is eating lunch' or 'War and Peace is well-written as is my last e-mail'. Both of these sentences are quite odd, but there is little temptation to trace their oddity to ambiguity. Rather, a simpler explanation is at hand: it is odd to discuss such different objects in a single breath. This is just one bit of support of an independently plausible claim: that judgments of infelicity are answerable to a wide range of factors beyond ambiguity.

<sup>11</sup> Viebahn (2018) focuses his attention solely on the thought that polysemy undermines the claim that if the relevant sentence is acceptable then the probed term isn't ambiguous. However, as we just made clear, severing the link between polysemy and the tests also undermines the inference from infelicity to ambiguity. (Of course, even those who reject the ambiguity tests for polysemous terms might nevertheless accept that *some* instances of

### §3. Defanging the Objection

The sense that some straightforward linguistic judgments can undermine the ambiguity tests is false, as we'll now argue. The path from the judgments to the failure of the tests is based on controversial assumptions. To bring them out, consider the following series:

- (9) The book is fascinating.
- (10) The book is sad.
- (11) The book is sad and fascinating.

(11) is, of course, perfectly acceptable. Nobody, however, would take this to provide evidence against the claim that 'book' is polysemous. The reason is straightforward: even assuming that 'book' is polysemous, (9) and (10) plausibly disambiguate 'book' in the same way (as an abstract text). Thus, an important observation: for a sentence to be properly utilized in our ambiguity tests, the probed expression must purport to be used in different senses in that sentence.

Now return to (8) ('The book on the shelf is a bestseller'). While it is uncontroversial that (8) is perfectly acceptable in many contexts, (8) is only relevant to the polysemy of 'book' if the predicates 'bestselling' and 'on the shelf' really do force different resolutions of 'book'. This assumption, however, is controversial.

Another way to see that the non-oddity of examples like (8) is not immediate evidence that the conjunction reduction test fails is to realize that, in general, sentences like (8) are *copredicational sentences*. A copredicational sentence is a sentence that can be perfectly true in many contexts despite the fact that, *prima facie*, it ascribes categorically mismatched properties that cannot be jointly instantiated.

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polysemy in the context of the tests can result in infelicity. Our point, though, is that such views at the very least make the hypothesis that the source of infelicity is completely different much more likely.)

Many have found copredicational sentences like (8) puzzling, precisely because it is assumed that ‘book’ needs to express its physical sense relative to the predicate ‘is on the shelf’ and its informational sense relative to ‘is a bestseller’. This puzzling aspect of copredication makes the link between copredication and ambiguity tests clear. Ambiguity tests attempt to force a single term to be used with two different senses. In copredicational sentences, some have assumed that this is just what happens. Since copredicational sentences are often perfectly acceptable, then, if they utilize two senses of a single term at once, this shows that it is possible to do so without infelicity.

The problem is that the analysis of copredicational sentences is controversial. There are radically different accounts in the literature.<sup>12</sup> But according to several prominent views, the truth of copredicational sentences does not require a single term to be used with two senses simultaneously.

Consider, for instance, our own property versatility (PV) view of copredication.<sup>13</sup> On the PV view ‘on the shelf’ and ‘bestselling’ do not designate incompatible properties. Rather, ‘on the shelf’ designates a property that can be true of physical things like particular copies, as well as abstract things like bestselling informational books.<sup>14</sup> We call such a property ‘versatile’ since it can be instantiated by different sorts of things in different ways. Since, on the view, ‘on the shelf’ and ‘bestselling’ do not pick out incompatible properties, it will be unsurprising—and irrelevant to polysemy—to observe that (8) is felicitous: in (8) ‘book’ can simply be used throughout with its informational sense. The felicity of (8) will have no more bearing on the polysemy of ‘book’ than the felicity of (11).<sup>15</sup>

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<sup>12</sup> Asher (2011), Pietroski (2005), Gotham (2017), Liebesman and Magidor (2017), and Ortega-Andrés and Vicente (2017) (among others) all give different theories of copredication.

<sup>13</sup> See Liebesman and Magidor (2017), (2019), and (ms.).

<sup>14</sup> It bears emphasis that our view does sharply distinguish between particular physical books and abstract informational texts. Our key claim is that some of the relevant properties, e.g. *being on the shelf*, can apply to both.

<sup>15</sup> Liebesman and Magidor (2017) also defend the view that ‘book’ is not polysemous but is, rather, context-sensitive. However, that view is irrelevant to the point being made here. Even if ‘book’ is polysemous, it remains

Or consider the view developed by Gotham.<sup>16</sup> On this view, ‘book’ designates mereological sums of informational and physical entities. These sums have many of the same properties as their components. Consider a particular volume on my shelf  $v_1$  that expresses the abstract text War and Peace (WP). The sum  $v_1+WP$  is, for Gotham, a book. So he can interpret ‘book’ univocally in (8): it designates a single sum which instantiates both ascribed properties.

To stress, the key issue is not whether ‘book’ is polysemous on either of the views in question. Rather, the point is that on both views, the particular occurrence of ‘book’ in the copredicational sentence (8) does not simultaneously utilize more than one sense—whether or not ‘book’ has more than one sense. Given that only one sense is utilized in (8), its felicity cannot be used to demonstrate that the conjunction reduction test fails for polysemous expressions. All of this is compatible with the polysemy of ‘book’, as long as its multiple senses aren’t utilized in (8).

What is the status of ambiguity tests on theories of copredication that take ‘book’ in (8) to simultaneously express multiple senses, such as that of Ortega-Andrés and Vicente (2019)? On such a theory the ambiguity tests do genuinely fail for polysemy, as alleged. However, polysemy-centric theories of copredication are theoretically contentious and require substantial defense.<sup>17</sup> Our key point stands: the claim that ambiguity tests fail for polysemous terms is not supported by mere linguistic observation but, rather, requires settling contentious theoretical claims regarding copredication.

We’ve been discussing these points with regard to the conjunction reduction version of the test, but they all also apply to the anaphora and ellipses versions of the test. For instance, (12)

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possible that ‘on the shelf’ and ‘bestseller’ designate versatile properties that can be co-instantiated by many types of entities. Furthermore, Liebesman and Magidor (ms.) do hold that some of the nouns that give rise to copredication, like ‘lunch’, are polysemous.

<sup>16</sup> See Gotham (2014), (2017), and (2022).

<sup>17</sup> See Liebesman and Magidor (ms.) for arguments against their view, as well as Viebahn (2020) for examples of copredication without polysemy.

and (13) provide no evidence whatsoever against the ambiguity of 'book'. Each of these sentences is perfectly felicitous, but each can be perfectly well interpreted with a single sense of 'book': the informational sense in (12) and the physical in (13).

(12) The book is moving and it is fascinating.

(13) There is a book on my shelf, and another in her backpack.

Just as with conjunction, for anaphora and ellipses to probe for ambiguity there must be independent evidence for the claim that the acceptability of the sentences requires the term to be used in both senses simultaneously, and in (12) and (13) we lack this evidence.

And just as with conjunction, when there is a *prima facie* case that the term in question must be used in both senses, the sentence will almost always be a copredicational sentence. Here are examples of sentences that may be used to test for ambiguity using anaphora or ellipses, and each is a copredicational sentence.

(14) I picked up the book and found it fascinating.

(15) I memorized her book and then burned his.

Whether the acceptability of these sentences bears on polysemy will depend on one's favoured view of copredication. On various theories of copredication, such as the property versatility theory and Gotham's theory, we can interpret 'book' in (14) and (15) as expressing a single sense.<sup>18</sup> The upshot, then, is the same. The mere fact that (14) and (15) are felicitous does not show that the ambiguity tests fail for polysemy. Rather, whether the tests fail will depend on whether there is anything in the sentences which requires the probed term to be used in more than one sense, and this in turn depends on one's account of copredication.

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<sup>18</sup> According to PV, (12) has an acceptable reading on which 'book' is used in its informational sense throughout, and (13) an acceptable reading where it is used on its physical sense throughout. According to Gotham's theory, both sentences have acceptable readings where 'book' is used to denote sums of physical and informational books throughout.

#### §4. Where Does this Leave the Tests?

So where does this leave ambiguity tests? A general lesson is that properly determining whether the tests work for polysemous terms is not a mere matter of linguistic observation but, rather, a highly theoretically-laden issue. On several relevant theories, the objection fails. In addition, there are more specific lessons to be drawn. Suppose one adopts a view of copredication on which the relevant tests do not fail for polysemy. Even against this background, care must be taken in order to successfully execute the tests. When the relevant conjunction is felicitous this at best establishes that the target expression is not used in multiple senses *on the particular occasion of use*, but leaves it open whether the targeted expression has multiple senses more generally. We can demonstrate this point with ‘book’. Consider the hypothesis that ‘book’ has multiple senses – one designating a type of physical object and the other a type of informational object. One might attempt to test this hypothesis by considering the felicity of the conjunction:

(16) The book is on the shelf and a bestseller.

The felicity of (16) establishes that ‘book’ is used in a single sense in this particular sentence. But, crucially, this observation does absolutely nothing to rule out that ‘book’ is used in multiple senses on other occasions, and thus is insufficient to rule out the ambiguity of ‘book’.

Nevertheless, we needn’t be overly pessimistic about the prospects of testing for the presence of multiple senses. For one thing, additional considerations can bear on the issue.<sup>19</sup> For example, relative to a scenario where there are three copies of *War and Peace* on the shelf, there is both a true reading and a false a reading of ‘Exactly one book is on the shelf’. This suggests that the noun ‘book’ really does have multiple readings.

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<sup>19</sup> See Sennett (2016) for a survey. Also, note that Viebahn and Vetter (2016) give a series of diagnostics for polysemy. Wallace (2021) use these to argue that ‘part’ is polysemous.

Furthermore, while the felicity of a relevant conjunction fails to establish that the target expression has a single sense in all its uses, the infelicity of a relevant conjunction does provide evidence that the target expression has multiple senses, even if this evidence is defeasible.<sup>20</sup> For example, a different application than (16) of the conjunction reduction case for ‘book’ suggests the noun does have multiple readings: when there is a single red volume of *War and Peace* on the shelf, there is a true readings of ‘The book on the shelf is red’ and ‘The book on the shelf was printed in millions of copies’, but their conjunction is nevertheless infelicitous:

(17) # The book on the shelf is red and was printed in millions of copies.

This point also carries over to some of the philosophical applications of the tests. For example, given the background theories of copredication, Liu is right to think that the infelicity of (5) is evidence that ‘pain’ has multiple senses.

Finally, for some purposes, even the weaker claim that the target expression is used with a single sense in the particular sentence under consideration is philosophically significant in its own right (whether or not the expression has multiple senses more generally). For example, if the felicity of (16) is sufficient to establish that there is at least some sense of ‘book’ on which a single book can be both a bestseller and on the shelf, that tells us something significant and surprising about the metaphysics of books. And if Corkum’s argument (discussed in §2) establishes that there is some single sense of ‘cause’ on which causation can hold both in cases of production and of counterfactual dependence, this tells us something significant about the metaphysics of causation (and is arguably in tension with Hall’s view of causation).

This brings us back to our more general lesson: the viability, scope, and execution of the ambiguity tests ought to be sensitive to our theories of copredication.

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<sup>20</sup> The evidence is defeasible because, as noted in fn. 10, there are multiple different possible sources of infelicity, including ones that have nothing to do with semantic variability.

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