

Semantic monsters^{*}

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If I were to say to you, “I love you”, it would be true just in case the author loves the reader. But imagine we devised a clever way of speaking such that when we preface a statement with the expression “swap”, the contextual interpretation of speaker and hearer are switched. Under this supposition, my utterance of “swap: I love you”, would be true just in case *the reader* loves *the author*, i.e. just in case you love me. Are natural languages populated by linguistic devices such as “swap”? Or are such devices exceptions to the semantic norms?

In the 1970s, David Kaplan famously bracketed off such devices as linguistic freaks or what he called semantic *monsters* (Kaplan 1989a: 510). Roughly speaking, a semantic monster is an expression which when affixed to a sentence requires that the sentence be re-interpreted *as if it were uttered in a different context*. Of course, we can in theory entertain artificial languages with such operators, but Kaplan claimed that natural language doesn’t have such means of expression.¹ (It is contested whether this is supposed to be a contingent fact about natural languages or a non-contingent fact grounded in the nature of context and content.)

In this chapter, I will provide a general overview of the issues surrounding semantic monsters. In section 1, I will outline the basics of Kaplan’s framework and spell out how and why the topic of “monsters” arises within that framework. In Section 2, I will distinguish four notions of a monster that are discussed in the literature, and show why, although they can pull apart in different frameworks or with different assumptions,

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¹Strictly speaking he said this: “I am not saying we could not construct a language with such operators, just that English is not one. And such operators *could not be added to it*” (Kaplan 1989a: 510). Although the claim is in the first case only about English, the modal claim suggests the more general thesis that natural languages don’t have such operators.

they all coincide within Kaplan's framework. In Section 3, I will discuss one notion that has spun off into the linguistics literature, namely "indexical shift". In Section 4, I will emphasize the connection between monsters and the compositionality of asserted content in Kaplan's original discussion. Section 5 discusses monsters and the more general idea of re-interpretation or meaning-shift. Section 6 closes with a brief survey of where monsters may dwell, and pointers to avenues for future research.

1 Kaplan on monsters

Kaplan was initially interested in the semantics of utterances of sentences such as 'He is suspicious', where the utterance is accompanied by the speaker pointing at something (Kaplan 1978). Reflection on this case prompts various questions: What does the sentence mean? What is said by the utterance? What does the pronoun contribute to the truth-conditions of the utterance? How does the context of utterance determine what is said? What role does the accompanying pointing play in the semantics?

More generally, Kaplan was interested, not just in demonstratives such as 'he', 'she' and 'that', but in a broader class of expression that he called "indexical" expressions.

What is common to the words or usages in which I am interested is that the referent is dependent on the context of use and that the meaning of the word provides a rule which determines the referent in terms of certain aspects of the context. (Kaplan 1989a: 490)

This included 'I', 'you', 'he', 'she', 'this', 'that', 'here', 'now', 'actual', among others. Kaplan put forward two key principles about indexicals:

Principle 1. The referent of an indexical depends on the context of utterance.

Principle 2. Indexicals are *directly referential*, where a term is directly referential just in case the contribution it makes to the content of sentences that contains it is exhausted by its referent (in a context).²

²The intuitive idea of "direct reference" is that the term refers *directly* without mediation by a Fregean sense. Importantly, though, the idea is not that *nothing* mediates the relation between such an expression and its referent. Note that Kaplan thinks that the relation between an expression like 'I' and its referent is mediated by a (descriptive) rule: *find the speaker of the context*. The key claim is that whatever mediation there may be is

Taken together these principles entail that the contribution that an indexical makes to the content of utterances of sentences that contain it is fixed by the context of utterance. That is, no matter what operators an indexical is embedded under, or no matter what linguistic environment it occurs in, the contribution it makes to the content remains its referent in the context of utterance.³

Principle 1 seems harmless enough: e.g. if you and I each utter 'I' we refer to different people, or if you and I each utter 'that' while pointing at different mountains we refer to different mountains, etc. The referent of an indexical is sensitive to various features of the context of utterance, and thus the referent of an indexical can vary across different contexts. Kaplan insists that Principle 2 is also obvious, but it has controversial and contested corollaries (in fact, one of the corollaries is the prohibition of monsters). Nevertheless here are some of the obvious sorts of things that Kaplan points to in order to motivate Principle 2—the principle of direct reference.

Consider the following dialogue:

David: I love you

Richard: I love you

David and Richard have each uttered the same sentence and the sentence isn't ambiguous. That is, there is a single English sentence "I love you" with a univocal meaning. Yet, it is an important fact about David and Richard's communicative exchange that they have each said different things. If they said the same thing, then there has not been an expression of mutual love. (Contrast with Richard uttering 'You love me'.) But there has been such an exchange, so they said different things. So its not just that the *referent* of an indexical that

"off the record" with respect to the resulting content. As Kaplan says "The 'direct' of 'direct reference' means unmediated by any propositional component, not unmediated *simpliciter*" (See Kaplan 1989b: 568-582).

Kaplan is primarily thinking about this in terms of structured propositions, so if a term is directly referential then propositions expressed by sentences containing the term would "contain" the referents directly instead of a proxy or mode of presentation. To be neutral between structured and unstructured conceptions of content I put it in terms of the *contribution* an indexical makes to the content of sentences that contain it.

³Quotation is acknowledged to be special and set aside as a harmless exception to this general claim. We can obviously make claims that require evaluating expressions in other contexts by mentioning rather than using the expression. For example, when we say "In all contexts 'I am here now' is true". Or consider the operator V , which is such that $\lceil V(\phi) \rceil$ is true iff $\lceil \phi \rceil$ is valid (see Deutsch 1989 on adding an indexical validity operator to Kaplan's logic). In the natural language setting there is much discussion of the connection between monsters and quotation—any alleged monster must be inspected to see whether or not its "sneaking in a quotation device" (Kaplan 1989a: 511). See, e.g., Maier (2007) and Maier (2016).

varies across contexts, it's also the contribution that an indexical makes to the *content* of utterances of sentences that contain it.

Furthermore there seems to be an important contrast between indexicals and other expressions in terms of their contribution to content. In particular, unlike other expressions such as definite descriptions, the contribution of an indexical never seems affected by a linguistic embedding. Trump is both the referent of 'the US president' and the referent of the personal pronoun in the mouth of the current US president, but 'the US president' and 'I' in the mouth of the current president differ in how they contribute to content. Trump is not always the contribution that 'the US president' makes to the content of sentences that contain it. If it was then both (1) and (2) would be true, but (2) is false (on its most natural reading).

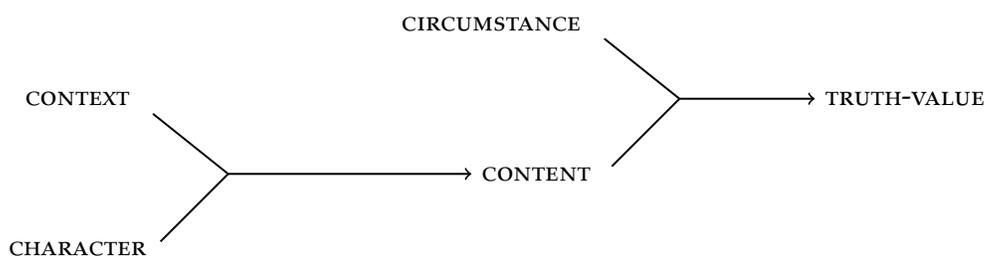
- (1) The US president is Trump
- (2) Five years ago, the US president was Trump

Whereas, in line with Principle 2, indexicals seem to contribute their referent even when embedded under shift operators. Consider Trump's utterances of the following:

- (3) I am Trump
- (4) Five years ago, I was Trump

Indexicals seem to "cling tightly" to the context of utterance, and Kaplan took this to be a general semantic feature of such expressions. Accordingly, Kaplan insisted that theorising about indexical languages calls for a distinction between two aspects of meaning. There is what is said by an utterance—its *content* in a context—but there is also the semantic rule that encodes what content an expression has across contexts—this is the *character* of the expression. A sentence like "I love you" has a univocal character, and this is the level of meaning that is known by competent language users. This character yields different contents depending on the context, e.g. depending on who utters it.

Kaplan models this idea in terms of intensional semantics as follows: A sentence is assigned a character. A character is a function from contexts of utterance to contents. The content of a sentence is itself a function from possible circumstances to truth-values. Thus, we get Kaplan's familiar two-step semantic procedure:



Although often conflated there are actually two independent reasons sometimes cited for Kaplan’s two-step procedure:⁴

- a motivation stemming from the compositional interaction of intensional operators and indexicals (i.e. double or multiple indexing)
- a motivation stemming from the notion of assertoric content (“what is said”) and its broader role in communication.

Let’s consider each in turn.

First double indexing: The motivation from the compositional interaction of intensional operators and indexicals doesn’t actually motivate the character/content distinction (cf. Lewis 1980).⁵ Instead it calls for points of reference to be “doubly indexed”, in the sense that the semantic index must contain two parameters of the same type, e.g. two time parameters, two world parameters, etc. That a semantics for languages with indexicals embedded under intensional operators requires double indexing was first pointed out by Kamp (1971) with regard to tense logic.⁶ Consider sentences such as this:

(5) Everyone now alive will be dead.

What is required to handle such cases is a time parameter t that ‘now’ is sensitive to and an additional time parameter t' that is shifted by ‘will’. Although double-indexing can handle the problematic cases of indexicals embedded under intensional operators, Kaplan insisted that “mere double indexing, without a clear conceptual understanding of what each index stands for, is still not enough to avoid all pitfalls.” (Kaplan 1989a: 510)

⁴See Stalnaker (2018) for a nice discussion of this point. Cf. Rabern (2012a).

⁵See Stalnaker (2018), Santorio (2019), and Rabern (2012b: chapter 0).

⁶The ancestor to the 1971 paper on ‘now’ is Kamp (1967) “The treatment of ‘now’ as a 1-place sentential operator”, 1967. This is stored in the Prior Archives at the Bodleian Library Oxford (Box 15). A copy is available here: <http://semanticsarchive.net/Archive/Tk3ZmEyN/>

The other, more fundamental reason, for Kaplan's insistence on the two-step procedure concerns the relationship between semantics and the contents of assertion. Essential to Kaplan's two-step picture is a particular view about the division of theoretical labor between the parameters that make up the semantic index. There's a context, and there's a circumstance. We need both, according to Kaplan, because we need our semantic theories to be able to capture the two different ways in which, when somebody says (for example), "I love you", the truth of their utterance depends on the context in which they say it—roughly, that the situation in which they say it influences both what was said, and whether whatever was said is true. Contexts play a content-generating role—resolving context-dependence in order to determine what's said—and circumstances play a content-evaluating role—they're the things of which what's said is either true or false.

index = ⟨content-generating parameters, content-evaluating parameters⟩

In its content-generating role, the context provides all the various contextual parameters for the resolution of indexicals and other context-sensitive expressions—different people say different things, depending on who's speaking and who's being spoken to, with "I love you". In its content-evaluating role, the circumstance provides various parameters appealed to in the semantics of intensional constructions. For example, in the evaluation of an utterance of "Necessarily, I love you" the modal operator "Necessarily" checks whether, in every circumstance, things are as that particular utterance of "I love you" represents things as being. If there is a circumstance of evaluation differing with respect to whether things are as the utterance, in context, represents things as being, then the utterance of the modalized sentence is false (and it's true otherwise). According to Kaplan the two-step procedure is crucial, since a central task of a semantic theory is to tell us what sentences *say* in various contexts—what propositions or pieces of information do they express in a given context.⁷

Kaplan takes the motivations for double indexing to be in harmony with the division of parameters into content-generating and content-evaluating. Indexicals are sensitive to the first sort of parameter, while intensional operators shift the second sort. The role of context is to generate content. The role of circumstance is to be the sort of object that content is true or false of. When a shifty operator O is applied to a sentence χ the character of χ first uses the context to generate the content of χ in context, and then the shifty operator looks

⁷"The idea of Content—the what-is-said on a particular occasion—is central to my account." (Kaplan 1989: 568)

at the profile of the content of χ across various circumstances. Given this sort of picture it could never be that the content of ϕ in context c is the same as the content of ψ in context c , while for an operator O , $O(\phi)$ and $O(\psi)$ have different contents in context c .⁸

For example, assume that in context c , Richard says to David “I love you”. In this case, “I love you” and “Richard loves David” have the same content in c . Now consider embedding those sentences under the “swap” operator:

(6) swap: I love you

(7) swap: Richard loves David

If the prefix “swap” worked so that the contextual roles of speaker and addressee were swapped, then (6) would be true in c just in case David loves Richard, while (7) would be true in c just in case Richard loves David. So (6) and (7) would have different truth-values, and thus different contents in c , in spite of their embedded sentences (‘I love you’ and ‘Richard loves David’) having the same content in c .

Notice that it follows from this that an operator such as “swap” has to be sensitive to the *character* of its embedded sentence, not merely its content. Such an operator doesn’t work by shifting a content-evaluating parameter, instead it works by shifting a content-generating parameter—that is, it shifts the *context*. This situation would destroy the elegant division of parameters into content-generating and content-evaluating. Most importantly, such operators would violate Kaplan’s principle 2: since the contribution that ‘I’ makes to the content of (6) is not the referent of ‘I’ in c (namely, Richard), indexicals would thereby not be *directly referential*. For these reasons Kaplan bans such operators from his system: “My liberality with respect to operators on content. . . does not extend to operators which attempt to operate on character” (Kaplan 1989a: 510).

In spite of Kaplan’s ban, theorists have pointed to various potentially monstrous constructions of English. Consider some examples:

(8) Never put off until tomorrow what you can do today. [See Kaplan 1989a, fn. 34]⁹

⁸What is assumed by this picture is that content in a context is *compositional* (cf. Kaplan 1989a: 507). See §4, for discussion of the connection between compositionality of content and the monster prohibition. See also Rabern (2012a) and Westerståhl (2012).

⁹From Lewis Carroll we find a related example: “You couldn’t have it if you did want it,” the Queen said. “The rule is, jam tomorrow and jam yesterday—but never jam *today*.” “It *must* come sometimes to ‘jam today’,” Alice objected. See *Through the Looking-Glass, and What Alice Found There*, 1871, Chapter 5.

(9) *Said by a condemned prisoner:* I am traditionally allowed to order whatever I like for my last meal. [See Nunberg 1993: 20]¹⁰

(10) *Said by an amnesiac who thinks he's a Scottish philosopher:*
I might be Hume [See Santorio 2012 for related examples]

(11) Only I ordered a drink I liked (no one else did). [See Partee 1989, footnote 3]¹¹

Focus on the last example. Assume three people walk into a pub (*A*, *B*, and *C*). They each order a pint of the local beer. *A* likes the beer, but *B* and *C* don't. *A* then says "Only I ordered a drink I liked". On one reading he'd be saying "I'm the only *x* such that *x* ordered a drink that I liked".

(11a) $\forall x(x \text{ ordered a drink } A \text{ liked} \rightarrow x = A)$

That reading is false. They all order the local beer, which *A* liked, so *B* and *C* also ordered a drink that *A* liked. But, in the situation, the naturally intended reading is "I'm the only *x* such that *x* ordered a drink that *x* liked".

(11b) $\forall x(x \text{ ordered a drink } x \text{ liked} \rightarrow x = A)$

And this is true, since *A* liked what he ordered but no one else liked what they ordered. Importantly, on this reading the second occurrence of 'I' in (11) does not refer to the speaker of the context. It seems that Principle 2 has been violated; it seems that there is a monster present. But it depends on how the construction is analysed, and also on background issues concerning the operative notion of "monster".

2 Different notions of monsters

Kaplan describes monsters in various ways, sometimes focusing on their formal properties, sometimes on the sorts of effects they'd have on indexicals, context, or content. There are at least four notions of a monster found in Kaplan that are discussed in the literature.

¹⁰Other examples from Nunberg (1993) include "Tomorrow is always the biggest party night of the year".

¹¹Also from Oscar Wilde's poem *Easter Day* we find the following: "Foxes have holes, and every bird its nest, I, only I, must wander wearily, And bruise My feet, and drink wine salt with tears".

Even though these notions all coincide within Kaplan's particular framework, they can pull apart within different frameworks or with different background assumptions.¹²

Initially the banned operators are glossed as *character-operators*, i.e. operators that are sensitive to the character instead of the content of their embedded sentence.

- "... operators which attempt to operate on character" (p. 510)
- "Operators. . . which attempt to meddle with character" (p. 511)

Consider 'swap: I love you' uttered in context c . The 'swap' operator takes the character of 'I love you' and evaluates it at c^* , where the speaker and hearer are swapped. Importantly, to work in the intended way 'swap' must operate on character not content—its object must be the level of meaning that is unsaturated by context.¹³

A second pass glosses them as *context-shifting operators*:

- "such operators as 'In some contexts it is true that' . . ." (p. 510)

In the example above 'swap' shifts the context c to the context c^* . Just as standard intensional operators "shift" various parameters such as world and time, monstrous operators shift context parameters.

Monsters are also described as *indexical-shifting devices* in the sense of operators that shift the referent of "indexicals" and therefore violate the principle of direct reference.

- "... indexicals always take primary scope" (p. 510)
- monsters violate Principle 2 (p. 510)
- "... no operator can control the character of the indexicals within its scope" (p. 510)

Given that indexicals are understood as expressions whose content varies with context, then if monsters shift the context they can thereby shift the content (and thus referent) of indexicals. In the presence of monsters, the contribution an indexical makes to the content of sentences that contain it is not exhausted by its referent (in a context). Thus monsters violate principle 2: the principle of direct reference.

¹²See Rabern (2012b: chapter 6, "Semantic monsters"), Rabern and Ball (2019), and Yalcin (forthcoming).

¹³Monstrous constructions are character-compositional but not content-compositional. See Rabern (2012a), Westerståhl (2012), and McCullagh (2017). In certain frameworks, this is encoded in the compositional rule called *monstrous functional application*.

Finally, monsters are described as devices that would alter the content of their embedded sentence:

- “[an operator], which when prefixed to a sentence yields a truth if and only if in some context the contained sentence . . . expresses a content that is true in the circumstances of that context?” (p. 510)

If there was such an operator O , then what a sentence ϕ contributes to what is said by an utterance of $O(\phi)$ in a context c might not be ϕ 's content at c . Instead the contribution to the content of $O(\phi)$ in c may be the content of ϕ in some shifted context c^* . Monsters then are operators that can shift the contribution that an expression makes to what is said—in other words, a monster is a shifter of a content-fixing parameter.

Thus we have the following four notions of a monster:

Characterological operator: An operator that operates in the character of its operand.

Context-shifting operator: An operator that shifts a parameter of the context.

Indexical-shifting operator: An operator that shifts the referent of indexicals in its scope.

Content-shifting operator: An operator that shifts a content-fixing parameter.

Clearly these notions all coincide in Kaplan's framework given that the key terms are inter-defined: Character is a function from contexts to contents; a context is a sequence of content-fixing parameters; and indexicals are expressions whose content (and thus referent) varies across contexts. So an operator shifts the referent of an indexical in its scope iff it shifts a parameter of context iff it operates on the character of its operand¹⁴ iff it shifts a content-fixing parameter.¹⁵

¹⁴Some common assumptions are in the background here. For example, of course one could construe negation as an operation on character, but we want to say that *genuine* character operators are the ones that could only be specified as taking characters as argument. One might also worry about strange character operators such as Fav, where Fav(ϕ) is true iff the character of ϕ is the speaker's favorite character. On a first pass this doesn't look like a context-shifter at all, but with some ingenuity it can fit the mold.

¹⁵Predelli (2014) claims that Kaplan fails to “provide a univocal definition of a monster and vacillates

3 Indexical shift

In connection with the notion of an indexical-shifting operator the phenomenon of “indexical shift” has become a topic of its own in empirical linguistics. The primary focus in this literature is on variations in the interpretation of certain indexicals embedded under certain attitude verbs.¹⁶ Indexicals are paradigmatically understood as expressions such as ‘I’, ‘you’, ‘here’, and ‘now’, whose interpretation depends on the context of utterance.

A paradigm case of “indexical shift” would be a case when the first personal pronoun is embedded under an attitude verb and can be interpreted as referring to the subject of the attitude verb instead of to the speaker of the context (for early discussion see Anderson and Keenan 1985, p. 304 and Partee 1989, footnote 2). Consider a case where a man named Hesen says that he himself is rich, that is he utters the sentence “I am rich”. In English, if we wished to report what Hesen said we can’t do so by uttering (12), since it can’t be interpreted as (12b)—it can only be interpreted as (12a).

(12) *Hesen said that I am rich.*

- a. Hesen_j said that I (the speaker_i) am rich.
- b. # Hesen_j said that he (himself_j) is rich.

But some languages have been reported to differ on this score. That is, in some languages the counterpart of (12) could be used to report what Hesen said. For example, it has been claimed that such readings are permissible in the language Zazaki—an Indo-European language spoken primarily in Eastern Turkey (Anand and Nevins 2004). Consider (13), a Zazaki counterpart to (12) after transliteration. (Note that ‘*εz*’ is the personal pronoun.)

between at least three non-equivalent alternatives” (389). See McCullagh (2017) for critique of Predelli’s claim. The first two notions Predelli discusses—“context shifters” and “global shifters”—fall under the definitions of a context-shifting operator provided here. Global shifters are just a certain kind of context-shifting operator that also shifts the circumstance—such operators are monstrous in virtue of their context-shifting aspect. The third alternative Predelli detects is what he calls “character shifters”. These are operators that change the character. These are not what I’ve called characterological operators – “character shifters” are something more extreme, and I don’t see them in Kaplan. But see §5 for discussion.

¹⁶It would seem to be an empirical hypothesis that indexical shift can only occur in speech and attitude reports, but some in this sub-literature seem to take it as definitional that indexical shift could *only* occur in speech and attitude reports. For example, I once put forward the example “Only I got a question I understood (no one else did)” as a clear example of indexical shift, and a linguist present protested that it can’t be such a case given that there is no attitude verb involved! Of course Kaplan’s concern with monsters was not restricted to embedding under attitude verbs, cf. his original “In some contexts it is true that I am not tired now” (Kaplan 1989a: 510). Theorists are of course free to use terminology as they like, as long as they are explicit about it.

(13) *Heseni va ke ez dewletia.*

- a. Heseni_j said that I (the speaker_i) am rich.
- b. Heseni_j said that he (himself_j) is rich.

Anand and Nevins maintain that (13) can be read as (13b), and in this case the referent of the personal pronoun 'εz' is shifted (by the attitude verb 'vano') from the speaker to the subject of the report.¹⁷ Moreover, this sort of optional shiftability in speech reports applies to indexical expressions more generally.

All indexical expressions in Zazaki are in principle shiftable. That is, the Zazaki counterparts to English *I, you, here, and yesterday* all have the option of shifting when within the scope of the verb *vano* (meaning 'say'). (Anand and Nevins 2004)

This sort of phenomenon of indexical shift has been documented in various language around the world. Deal says that "the phenomenon has been reported for languages spanning five continents and at least ten language families" (Deal 2020: 3-4). Just to get a sense of how widespread this is it includes the following languages: Amharic, Navajo, Slave, Tamil, Korean, Japanese, Farsi, Zazaki, Nez Perce, Turkish, Uyghur, and many more. (See Deal 2020, footnote 3, for references.)

There is by now a library full of empirical data concerning indexical shift. This data doesn't just involve a list of languages where shifting is observed; there is also detailed descriptions of the sorts of variation found. For example: which indexicals can be shifted in a given language, which attitude verbs can induce the shift, whether the shifting is optional or required, and what constraints are involved (e.g. if one indexical in a given clause is shifted is every other indexical also shifted, see Anand and Nevins 2004 on Shift Together). A goal here would be to systematise the wide array of cross-linguistic data and to then put forward an overarching syntactic/semantic package that best covers the data. See, e.g. Deal's new manuscript *A theory of indexical shift*.

The issue of indexical shift is clearly relevant to the broader discussion of semantic monsters. But sometimes it is unclear what the theoretical upshot is, given that the

¹⁷The are tests that are supposed to rule out the hypothesis that these case involve tacit quotation. See Deal (2020), sec. 2.1.1; but see Maier (2016) for disagreement.

relevant frameworks don't always align with Kaplan's original framework. For example: Are the questions being asked under the assumption of a *character* and *content* distinction? Is it assumed that the role of the context parameter is to be a package of content-fixing parameters? Is it assumed that an *indexical* is the sort of expression that has different contents in different contexts? Given that the indexical shift literature makes different assumptions on these sorts of questions there may be some misalignment between their claims and Kaplan's original ban.¹⁸

Here is one sort of tangle one can get in here: If monsters are understood as operators that shift the reference of indexicals or context-sensitive expressions in particular, one might then think that the definition of a monster is something like this:

Contextual reference shift. For a construction $\Sigma\phi_\alpha$, which contains a context-sensitive expression α , Σ is a monster iff Σ semantically shifts parameter z and the extension of α varies across different values for z .

This seems to line up well with what theorists in the literature say, and is in line with Kaplan's discussion. But the definition prompts a further question: what is a context-sensitive expression? One idea would be the following:¹⁹

Type 1 context-sensitivity. α is context-sensitive iff there are contexts c and c' such that $\llbracket \alpha \rrbracket^{c,i_c} \neq \llbracket \alpha \rrbracket^{c',i_{c'}}$.

Given this definition, context sensitivity is a matter of extension varying with context. The definition of contextual reference shift construed along these lines seems to be in accord with what Schlenker's calls the *Fixity Thesis*: The referent of an indexical is fixed solely by the context, and cannot be affected by any logical operators (Schlenker 2003: 29). To define the class of "indexicals" Schlenker appeals to a definition in terms of context-dependency:

At this point one might be tempted to plead terminological ambiguity. In what sense is [an expression] an 'indexical' in Kaplan's sense? Let us use context-dependency as a Definition: *an expression qualifies as indexical if its semantic value is determined by some feature of a context of utterance.* (Schlenker 2003: 31)

¹⁸von Stechow (2004) expresses some worries along these lines. The sort of issue presented here mostly follows Rabern and Ball (2019).

¹⁹In what follow I use the bracket notation $\llbracket \cdot \rrbracket^{c,i}$ to indicate the denotation of an expression at a context c and index i (cf. Scott 1970). I also use i_c for *the index of the context*, the index that has coordinates that match the appropriate features of the context (cf. Lewis 1980).

If by “semantic value” Schlenker means referent then his notion of indexicality is in accord with *type 1 context-sensitivity*. But then too many expressions will count as “indexicals” (e.g. non-rigid expressions such as “the president” or contingent sentences such as “Obama is a democrat” vary in extension across contexts; cf. Lewis who says “contingency is a kind of indexicality” (Lewis 1980: 82)). And it is uncontroversial that there are operators that shift the referent of expressions that are type 1 context-sensitive.²⁰

Context-sensitivity is usually understood to involve more than mere variability of reference—it is usually understood as a claim about the variability of the *content* of an expression across contexts. (So perhaps by “semantic value” Schlenker intends *content*.) A more standard definition would go as follows (where $|\alpha|^c$ provides the content of α in context c).²¹

Type 2 context-sensitivity. α is context-sensitive iff there are contexts c and c' such that $|\alpha|^c \neq |\alpha|^{c'}$.

This definition is good as far as it goes, but since the definition of contextual reference shift employs a notion of context sensitivity which appeals to “content”, the definition must build in certain assumptions about the operative notion of content (see Rabern and Ball 2019). Are contents supposed to be objects of the attitudes? Or are they just sets of indices? Is there a character/content distinction?

Those who wish to avoid issues concerning character and content and the definition of indexicals might just list a certain class of expressions: {I, you, . . . }. Then replace mention of context-sensitivity in the definition with an appeal to expressions in that class. It seems that the linguistics literature on indexical shift leans in this direction.

²⁰von Stechow (2004) complains that Schlenker’s (2003) semantics is not actually monstrous since “attitudes quantify over triples that are composed of the same components as context, but they are not contexts of utterances but rather indices” (2004: 479-480). On Schlenker’s “monster-friendly” semantics (see Schlenker 2003: 104ff) the attitude operators never shift the context parameter c . Instead they modify the assignment function s , and the personal pronoun is essentially treated as a variable that is sensitive to the assignment. Thus, von Stechow’s complaint is that Schlenker’s semantics shifts indices, and not contexts: “ $I_{Amharic}$ ” is sensitive to the index and “says” is an index-shifting operator. Of course, Schlenker’s semantics has operators that shift the referent of the personal pronoun “ $I_{Amharic}$ ” (or its analog in the formal system “ $agent(c_i)$ ”), so this is why Schlenker insists that it is monstrous. But since Schlenker says nothing about how to define assertoric content in his system it isn’t clear whether the attitude operators in Schlenker’s system merely shift type 1 expressions or whether they also shift type 2 expressions.

²¹The distinction here between type 1 and type 2 context sensitivity tracks the distinction between nonindexical and indexical context-sensitivity (see MacFarlane 2009). If α is type 1 but not type 2 context-sensitive, it is nonindexically context-sensitive, if α is type 2 context-sensitive, then it is indexically context-sensitive.

“Indexical” reference shift. For a construction $\Sigma\phi_\alpha$, which contains an expression $\alpha \in \{I, you, \dots\}$, Σ is a monster iff Σ semantically shifts parameter z and the extension of α varies across different values for z .

But the set $\{I, you, \dots\}$ is stipulative. Why is it interesting that there are operators that shift the extension of expressions in *that* class? We need to be told something about the expressions in that class in order for the ban on monsters to have any substance. One way to flesh out the definition is to say that the interesting class of expressions are the ones whose *content* varies with context, but this again raises the spectre of *content*. Another idea would be to just insist that *pronouns* are clearly a natural class of context-sensitive expression. And while third person pronouns are easy to bind there is a subset of the pronouns (i.e. the first and second person pronouns) that are notable in that they are difficult to bind in English.²² If in certain languages attitude verbs can easily shift first and second person pronouns that is certainly interesting and important. While the issues here lead to various difficulties everyone can at least agree with the following: If there are cases where a genuine first personal pronoun is being used in a sentence and it doesn’t refer to the speaker of the context, that would seem to be a “monster”, if anything is.

4 Monsters and content compositionality

In Kaplan’s original discussion the existence of monsters and the compositionality of content are intimately related. If the language is compositional at the level of content, then there are no operators that shift content-fixing parameters, and thus there are no monsters (cf. Rabern 2013 and Westerståhl 2012). Kaplan is explicit that he endorses the compositionality of content: “The Content of the whole is a function of the Content of the parts” (Kaplan 1989a: 507).

Monsters are operators that shift the parameters upon which semantic interpretation depends in a way that alters the assertoric content of their embedded clauses. They require reinterpretation of their operands, in the the sense that they dissociate the context of interpretation from the context of utterance: this is the feature that Kaplan found so objectionable. But this relies on a certain picture of semantic metatheory. On Kaplan’s picture contents, i.e. sets of circumstances, play two roles: in addition to being “what is said”, the content of a sentence (in context) also plays the compositional role of being

²²Perhaps this is how Santorio (2019) sees things. See also Yalcin (forthcoming).

the object of shifty operators; contents are constrained depending on the operators of the language, to be the type of semantic entities that enter into compositional relations with those operators.

Rabern (2013) argues that there is an inherent tension in Kaplan’s system stemming from the semantics of pronoun binding or variable binding (see also Rabern and Ball 2019).²³ Briefly: Consider (14) which embeds under a quantifier to form (15).

(14) He_i is mortal.

(15) Every man_i is such that he_i is mortal.

The Tarskian semantics for quantifiers treats them as an assignment-shifting operator as follows:²⁴

$$\llbracket \text{Every } man_i \text{ is such that } \phi \rrbracket^{g,w} = 1 \text{ iff } \forall x \in man, \llbracket \phi \rrbracket^{g[i/x],w} = 1$$

Since the content of (14) in a context c is,

$$\llbracket He_i \text{ is mortal} \rrbracket^c = \{w : \llbracket He_i \text{ is mortal} \rrbracket^{g_c,w} = 1\}$$

the quantifier, which shifts the assignment, shifts a parameter upon which the content of its complement depends. The semantic value of “ he_i is mortal” relevant for the compositional semantics of (15) is not the proposition it expresses at c , and the content of “ he_i ” at c doesn’t enter into the content of (15). Thus, quantificational phrases such as “every man”, or the binders associated with them, are monstrous.

This conclusion relies on the assumption that the assignment of values to variables is a content-fixing parameter. This is explicitly endorsed by Kaplan (1989a) (see p. 546). Since for Kaplan the distinction between content-fixing and content-evaluable parameters just is the distinction between context and circumstance, Kaplan suggests that the assignment

²³For related worries see Zimmerman (1991), Dever (2004), and Yli-Vakkuri (2013).

²⁴Of course, standardly the roles of quantification and variable-binding are separated, such that strictly speaking variable binding is done by a covert abstraction operator, λ (see Lewis 1970b: 45 and Heim and Kratzer 1998: 186). On this construal (15) is actually composed out of the following constituents: “every man” + λ_1 + “ he_1 is mortal”, and λ_1 first composes with “ he_1 is mortal” to provide a predicate meaning to compose with “every man”. To simplify I treat [every man λ_1] as an atom which composes with sentence types. This doesn’t impact the key point—what we say about the variable-binding operator “every man_1 is such that” can instead be made by focusing on the lambda-binder alone (see Rabern 2013: §4)

be understood as a parameter of context (see Kaplan 1989b: 591). Those wishing to avoid the conclusion while retaining Kaplan's alignment between the objects of assertion with compositional values could instead abandon direct reference. That is, one could insist that the assignment is not a content-fixing parameter, so that the contents of assertion are sets of world-assignment pairs (cf. Zimmermann 2012).

Instead one could follow Lewis (1980) and insist on a distinction between the objects of assertion and compositional values. Such a framework could have it that some content-fixing parameters live in the index. And this opens up space for expressions whose content varies with these shiftable parameters: their content varies across index parameters.²⁵ In such a framework, given that the context is no longer the package of content-fixing parameters quantifiers are not context-shifting operators but nevertheless come out as monsters in the sense of a content-shifting operator (see Rabern 2013).

Yet once we respect the distinction between the objects of assertion and compositional values, and consider the roles they play with our linguistic theories, this feature of language appears absolutely mundane and expected.²⁶ It is only when one is in the grip of the Kaplanian picture, where "what is said" has a privileged compositional role, that operators on character would appear to be exceptions to the semantic norms.

5 Meaning-shifting operators

Monsters are understood to require "reinterpretation" of their embedded clause, and thus they are sometimes described as meaning-changing operators. For example, Predelli describes what he calls "character shifters":

Because character is semantically primitive, the idea of (non-trivial) operators on character informally provokes a sort of 'meaning change', one unobjectionably expressible in English only with the appeal of pure quotation. (Predelli 2014: 392)

The devices Predelli has in mind are ones that might change the linguistic meaning of their complement, e.g. an operator that results in 'dog' meaning what 'cat' means. Predelli detects this notion in Kaplan, but when Kaplan talks about "operations on character" he

²⁵See Lewis (1980). Ninan (2010) discusses this under the label "shiftable contextualism", and Yalcin (forthcoming) under the label "parametric context-sensitivity".

²⁶See Lewis (1980), and for further discussion Ninan (2010) and Rabern (2012a).

seems to just mean a context-shifting operator. Kaplan contrasts an operator on character with an operator on content. The notion of a “character operator” here is clearly of one that is sensitive to character and looks at its profile across various contexts—on analogy with a content operator that takes the intension of its complement and looks at its profile across circumstances—not an operation that reassigns the complement a *different* character.²⁷

The notion of a “meaning shifting” operator, however, is interesting and is at least suggested in connection with diagonal operators of other two-dimensional frameworks (cf. Stalnaker 1978). Monsters are at least content-shifters and the connection between monsters and the more extreme “meaning shifters” has certainly been made before (see, e.g., Israel and Perry 1996). In setting out his prohibition of monsters Kaplan seems to also ban all hyperintensional operators. Given that he says “all operators that can be given an English reading are ‘at most’ intensional”, it seems he would have viewed all object-language hyperintensional devices as exceptions to the semantic norms. But there are various hyperintensional devices that are not context-shifting devices, such as quotation, or perhaps attitude reports. When the monster prohibition is understood in this more general way, a “meaning shifting” operator, would certainly be a violation of that prohibition.

This accords with the standard view that the expressions of a language are associated with a fixed linguistic meaning. According to this view, there is long-term meaning change but the linguistic meaning of a word doesn’t shift as the result of some meaning-shifting operator. This view, however, makes it difficult to accommodate various linguistic phenomena.

For example, given that ‘eye doctor’ and ‘optometrist’ are synonymous how can it be that the following sentences might differ in truth-value?

(16) Rebecca believes that all eye doctors are optometrists.

(17) Rebecca believes that all optometrists are optometrists.

Assuming compositionality it follows that sentences (16) and (17) must always have the same truth-value.

²⁷Given that Stalnaker’s 1978 *propositional concepts* track variations in linguistic facts, operators that shift the Stalnakerian “context” could result in ‘dog’ meaning what ‘cat’ means—it is a contingent fact what words mean. But Kaplan’s characters are importantly different—they capture the way the content of an *expression-of-English* (with its fixed linguistic meaning) varies with context, they are not concerned with the variation of metalinguistic (or presemantic) facts and the contingent connections between expressions and linguistic meanings.

A natural explanation for why Rebecca doesn't believe that all eye doctors are optometrists is that she has a false belief about the *meaning* of 'optometrist' (or 'eye doctor'). If the meaning of 'optometrist' could be shifted when it was within the belief context, this would provide a mechanism by which sentences (16) and (17) could differ in truth-value. In this way, meaning-shifting operators might provide useful resources for the semantics of various constructions of epistemic discourse (e.g. indicative conditionals, epistemic modals, and attitude reports).²⁸

There are already treatments of attitude verbs that treat them as operators that shift the assignment of values to variables (e.g. Cumming 2008, Ninan 2018, Santorio 2012, Rabern forthcoming). Shifting the assignment is tantamount to shifting the "interpretation" of the variables, and thus assignment shifters are a close, though perhaps more innocent, cousin to meaning-shifting devices.²⁹ Given that these proposals only work for singular terms, a natural generalisation would be to have epistemic contexts shift the interpretation of general terms such as 'eye doctor' and 'optometrist' as well. Here there is likely to be an interesting convergence of the resulting picture and certain aspects of two-dimensional semantics (cf. Stalnaker 1978, Chalmers 2004).

Or consider cases of meaning negotiation.³⁰ In a dispute about what should be in the extension of 'athlete' someone who is arguing that it only applies to humans might utter the following conditional (see Ludlow 2008).

(18) If Secretariat is an athlete, then the greatest athlete of all time was a horse.

The semantics of this conditional most naturally involves evaluation of the consequent relative to a shifted (or more discerning) interpretation.

There are also cases that concern a more explicit form of meaning shift. These involve constructions of semantic stipulation, where one coins new terms or stipulates new meanings for old terms.

(19) Let's call horse appendages *legs*. Then, how many legs does a horse have?³¹

²⁸Note that the literature on the 'logicality of language' or 'natural logic' often makes use of interpretation-shifting devices in the logical form. These are sometimes called "modulation" functions. See, e.g., Del Pinal (2017) and Chierchia (manuscript)

²⁹The operators of early modal logic in the style of Carnap were like this. Even the semantics for quantification is sometimes given in terms shifting the interpretation (see Bostock 1997). In this connection see Wehmeier (2018) and Pickel and Rabern (manuscript).

³⁰See the literature on metalinguistic negotiation, e.g. Plunkett and Sundell (forthcoming).

³¹See Stalnaker (1978: 317) who says, "If you call a horse's tail a leg how many legs does a horse have? The

It might seem reasonable to answer ‘five’ (the lower limbs plus the appendage of ligaments and long hairs beginning at the coccygeal vertebrae) but if the meaning of ‘leg’ is stable, then the answer should be ‘four’. These type of stipulations are common in both everyday conversations and in theoretical writing, e.g. when we introduce names for objects or concepts.

(20) Let us use ‘Julius’ to refer to whoever invented the zipper.

(21) The function f has two roots—call them ‘ r_1 ’ and ‘ r_2 ’. (Dever 1998: §2.3.2.4.1.1)

These constructions of semantic stipulation result in a rearrangement of the relations between words and meanings in the language system, or at least alter the “linguistic scoreboard”. Shifts of this kind are highly reminiscent of certain commands in imperative programming languages, where one might have a command like this: Let ‘a’ = 5. The result would be that the string ‘a’ gets assigned to the value 5. But such an assignment isn’t permanent, since later within the same program there might be the command: Let ‘a’ = 7. A semantic framework built around the semantics of interpretation-shifting imperatives (and “mutable variables”) might provide a systemic account of natural language constructions of semantic stipulation (and meaning negotiation).³²

6 Where monsters dwell

The topic of monsters has reared its head in a wide variety of philosophical and linguistic debates. In an important sense the issue concerning monsters is at at the very foundations of semantic theory and has been implicit in many early discussions of semantic metatheory.

In the early tense logical work on the interactions of temporal operators and indexicals stemming from the work of A.N. Prior, which led to the development of multiply-indexed semantics, the issue of monsters is just below the surface (see Prior 1968, Kamp 1971, and

answer, of course is four, since calling a tail a leg doesn’t make it one. But one can see a different way to take the question.”

³²All forms of semantic stipulation, however, are not this explicit. There are many forms of implicit semantic shifts. For example, if some conversational participants don’t remember the name of a certain bike part, they might spontaneously begin referring to it as the “whatchamacallit”. Here there would be no explicit stipulation but it is clear that “whatchamacallit” would come to have a meaning in this conversation via the cooperation of the interlocutors. This points to a dynamic conversational phenomenon of shifts in the lexicon throughout a discourse, which calls for a logical framework that can model the processes of “on the fly” meaning shift. For discussion of the *dynamic lexicon* along these lines see Ludlow (2014).

Vlach 1973).³³ Likewise, when Evans (1985) asks whether tense logic rests on a mistake, the final theory he considers, T_3 , is arguably a monstrous semantic theory, and he notices that it employs what he calls “a hitherto unknown form of embedding”.³⁴

And, of course, Kaplan’s monster prohibition was in part a reaction to the early formulations of semantic theory, and what Kaplan viewed as a misguided attempt to “assimilate the role of *context* to that of *circumstance*” (Kaplan 1989a, p. 509). That is, in so far as a point of reference was to do the work of a context of utterance it is arguable that the frameworks developed in Montague (1968), Scott (1970) and Lewis (1970b) were monstrous.

In the intervening literature the issue has come up most explicitly with respect to the semantics of discourse about thought and speech, especially with respect to reports of indexical attitudes (e.g. Israel and Perry 1996 and Schlenker 2003), including reports involving *de se* attitudes, self-locating belief, or logophoricity (e.g. Castañeda 1966, Chierchia 1989).³⁵ As mentioned above there has been much discussion in empirical linguistics of indexicals that can shift when embedded in attitude reports, e.g. some much discussed examples include Amharic (Schlenker 2003), Zazaki (Anand and Nevins 2004), and Nez Perce (Deal 2014). For a comprehensive overview see Deal (2020).

In theorizing about mental and epistemic discourse monsters have been employed in treatments of various puzzles of substitution in opaque contexts (e.g. Recanati 2000 and Cumming 2008). For similar reasons, linguistic devices that make implicit reference to attitudes, the common ground or information states, e.g. the semantics of knowledge claims, epistemic modals and indicative conditionals, have been given a monstrous semantics (e.g. Israel and Perry 1996, Weatherson 2001, and Santorio 2010).³⁶ For example, consider an epistemic use of “I might not be here now”. And the threat of monsters has

³³In fact, Vlach (1973) introduced the “index operator” K , whose function is to fix the context to which the “then-operator” refers—and this is technically a monstrous operator as it shifts the temporal parameter that represents the time of utterance. The issue even comes up in connection to disambiguations of Anslem’s ontological argument (see Lewis 1970a: 185-186)

³⁴Evans compares the situation to the following: “Suppose that there is a language exactly like English, save that it possesses two additional operators, ‘To the right’, and ‘To the left’, which can be prefixed to sentences in the first person. A sentence like ‘To the left (I am hot)’ as uttered by a speaker x at t is true iff there is at t on x ’s left someone moderately near who is hot” (Evans 1985 pp. 357-358). The discussion in Evans appears to be independent of Kaplan’s work but the unknown form of embedding Evans is considering is clearly monstrous embedding. See also Evans (2004), which is a letter dated 14 July, 1979, written to Martin Davies in response to a draft of “Two notions of necessity”.

³⁵It is also arguable that the issue is just below the surface in discussions of indexical belief revision and the semantics of credential attributions in relation to Bayesian probability theory see e.g. Elga (2000) and Chalmers (2011).

³⁶See also Chalmers (1998) and Nolan (2003).

also been noted with respect to the semantics of embedded knowledge claims and embedded epistemic modals in the literature on relativistic semantics (e.g. Egan et al. 2005 and Ninan 2010). Monsters are also featured in the semantics of metalinguistic discourse, including the semantics of quotation, speech reports, talk about fiction, and ascriptions of indexical validity.³⁷

A key area of the philosophical literature where the topic of monsters (or quasi-monstrous operators) arose was in theorizing about attributions of apriority with respect to analyses of the Kripkean contingent apriori and necessary aposteriori (see Stalnaker 1978, Evans 1979, and Davies and Humberstone 1980).³⁸ These two-dimensional analyses often employ monstrous or quasi-monstrous two-dimensional modal operators. For example, Davies and Humberstone’s fixedly operator \mathcal{F} and Stalnaker’s “copy up” operator \dagger (Davies and Humberstone 1980; Stalnaker 1978).

In this connection various puzzles arise when epistemic and non-epistemic modalities are combined with indexicals. One such puzzle is Fritz’s nesting puzzle for temporal-epistemic logics (Fritz 2013: 1768). Assume a multi-modal propositional language with both temporal and epistemic operators. So the language has standard temporal operators such as P (“It has at some time been the case that. . .”), F (“It will at some time be the case that. . .”), H (“It has always been the case that. . .”), and G (“It will always be the case that. . .”). But also assume it has N, the indexical “now” operator (Kamp 1971). The language also has an epistemic operator, K, for “the agent knows that. . .”. We assume perfectly rational agents, so that the agent always knows every validity. Or one might insist that we are concerned with the *implicit* knowledge of a rational agent—what is compatible with the information available to the agent. In any case, we assume the following logical omniscience principle:

ETERNAL LOGICAL OMNISCIENCE: If $\vDash \phi$, then $\vDash \text{GK}\phi$

³⁷For monsters in the semantics of quotation see e.g. Maier (2007), Maier (2016), Cappelen and Lepore (2003), Geurts and Maier (2005) and Cappelen and Lepore (2007), in speech reports see e.g. Schlenker (2003) and Anand and Nevins (2004), in talk about fiction see Predelli (2008), and on indexical validity see Deutsch (1989). A further fundamental topic where monsters arise is with various phenomena whereby the context of interpretation is dissociated from the context of utterance: the historical present, answering machine cases, talk about fiction, shotgun assertions, free indirect discourse, imaginary contexts, and pretense. See e.g. Predelli (1996), Predelli (1998) and Egan (2009) for discussion of the nature of context, shotgun assertions and delayed assertions. See Predelli (2008) for a monstrous treatment of discourse about fiction and pretense.

³⁸For a survey of various two-dimensional approaches to the Kripkean contingent apriori and necessary aposteriori see Chalmers (2006).

Knowledge is factive, so that if ϕ is known then ϕ , but moreover it seems that factivity holds at all times. That is, it is always the case that if ϕ is known, then ϕ . Call this eternal factivity:

ETERNAL FACTIVITY: $\models \mathbf{G}(\mathbf{K}\phi \rightarrow \phi)$

While both principles seem plausible, along with common assumptions they entail the absurd principle that if ϕ , then it will always be the case that ϕ . That is, $\phi \rightarrow \mathbf{G}\phi$ comes out as valid. A quick derivation is as follows:

1. $\mathbf{N}p \rightarrow p$ [theorem]
2. $\mathbf{G}\mathbf{K}(\mathbf{N}p \rightarrow p)$ [1, LOGICAL OMNISCIENCE]
3. $\mathbf{G}(\mathbf{K}(\mathbf{N}p \rightarrow p) \rightarrow (\mathbf{N}p \rightarrow p))$ [ETERNAL FACTIVITY]
4. $\mathbf{G}(\mathbf{N}p \rightarrow p)$ [2, 3, dist, mp]
5. $p \rightarrow \mathbf{G}\mathbf{N}p$ [theorem]
6. $p \rightarrow \mathbf{G}p$ [4, 5, dist, chain]

But of course we don't want that result. The fact that it is raining certainly doesn't entail that it is always going to rain.

One way out of the puzzle is to reject eternal factivity. For indexical languages the validities are the sentences that are *true in every context*. To say that the agent knows all the validities, then is to say that if ϕ is true in every context then, the agent knows ϕ . This motivates the idea that \mathbf{K} should be interpreted as a quantifier over all the *contexts* compatible with the information available to the agent.³⁹ On this interpretation \mathbf{K} is monstrous.

Another way out of the puzzle is to deny the logical omniscience principle. Given that $\mathbf{N}p \rightarrow p$ is valid, a perfectly rational agent should know it, thus $\mathbf{K}(\mathbf{N}p \rightarrow p)$ ought to hold as

³⁹That is, one could give \mathbf{K} this sort of interpretation: $\llbracket \mathbf{K}\phi \rrbracket^{w,t,t'} = 1$ iff for all contexts c compatible with the information available to the agent (in w relative to $\langle t, t' \rangle$), $\llbracket \phi \rrbracket^{w_c, t_c, t_c} = 1$. This is to give up eternal factivity. Assume it's raining today (t_c) but not at some other time t , then $\mathbf{G}(\mathbf{N}r \rightarrow r)$ is false – $\mathbf{N}r$ is true at t (relative to t_c) but r is false at t (relative to t_c). Yet, even at t , $\mathbf{K}(\mathbf{N}r \rightarrow r)$ is true since it's the diagonalised proposition that is relevant to the \mathbf{K} operator.

well. But since $G(Np \rightarrow p)$ is false (let's assume) we should expect $GK(Np \rightarrow p)$ to be false as well. For example, assume it's raining today but not tomorrow, then although "if its raining now, it is raining" is valid (and known), it won't be true tomorrow – so then why think it will be known tomorrow?

The puzzle here is an instance of a more general puzzle. The *nesting problem* arises in a multi-modal logic with operators for metaphysical necessity, \Box , and epistemic necessity (*apriority*), \blacksquare . Assuming \Box distributes, the following are inconsistent

$$(1) \blacksquare\phi \wedge \neg\Box\phi$$

$$(2) \blacksquare\phi \rightarrow \Box\blacksquare\phi$$

$$(3) \Box(\blacksquare\phi \rightarrow \phi)$$

Thus, in light of the contingent priori we face a dilemma: Either (i) what is a priori is a contingent matter or (ii) it is possible that something is a priori but false. Neither options looks especially appealing.⁴⁰

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⁴⁰See Dever (2007), Chalmers and Rabern (2014), and Fritz (2013).

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