Use, Compositionality and Prior's Puzzle*

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Abstract: There is an often-assumed competition between mainstream truth-conditional semantics and more philosophically-oriented use theories of meaning. In this vein, this paper pursues three interrelated goals. First, it argues that use-theoretic approaches do not fall prey to a common objection, namely that they cannot account for the compositionality of meaning. Second, this argument will be based on a specific understanding of the practice of formal semantics. Under this picture, formal semanticists provide mathematical models for the compositionally derived semantic structures found in natural language. It is argued that this is within the limits of what can be reasonably expected from the practice. Third, the resulting picture allows us to comprehensively and conclusively solve Prior's puzzle. In conclusion, given a proper understanding of the practice of formal semantics, neither its use-theoretic competitors nor the issue of Prior's puzzle are a threat to it.

1. Use Theories and Compositionality Use theories of meaning try to elucidate the meaning of linguistic expressions by drawing on some salient notion of 'use'. Originally conceived by [19] and his contemporaries, it has been further developed systematically by authors such as [10] and [15]. Under this approach, meaning itself is often *identified* with some salient sense of use, usually either rules that govern the correct use of expressions [e.g. 8], or patterns in the behaviour of speakers [e.g. 10].

As an example, consider the following rule for the use of the expression snoring:

$$\frac{x \text{ is snoring}}{x \text{ is asleep}} *$$

with the presupposition * that x refers. It can be understood as stating a necessary criterion for the *truth* of a statement of the *form* x is snoring.[1] However, especially in the inferentialist tradition, this rule-based approach considers *sentences* with their conventional meaning their semantic unit [cf. 11]. After all, rules *of inference* operate on sentences, not subsentential expressions. This stance has lead to an objection related to the issue of accounting for the compositionality of meaning. To wit: the meaning of a whole – such as a sentence – depends on the meaning of its parts – subsentential expressions – and their syntactic mode of combination [14]. Fodor and Lepore ([4], [5]) have argued against inferentialism on the basis that it cannot account for the compositionality of meaning. In a nutshell, their charge is that since meaning is constituted by rules, yet rules

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[1] As argued for in my [17].

cannot be composed in the way that the principle requires, inferentialism – or any use theory operating under a ‘sentence-first’ principle – cannot account for such compositionality.

This argument can be defused by recognising the inherent *schematic nature* of rules, which already feature the different syntactic modes of combination, as suggested in [9], [15], and [8]. The use-theoretic approach to specifying the meaning of expressions thus would not only incorporate compositionality in the very way in which the salient rules are stated, but also state genuinely informative truth-conditions beyond disquotational ones [15]. Thus, consider the following ‘rule-network’ for sentences of the form x is snoring:

$$\frac{\dfrac{\cdots}{x \text{ is asleep}} \qquad \dfrac{\cdots}{x \text{ is making certain sounds}}}{x \text{ is snoring}}\ *$$

$$\frac{x \text{ is snoring}}{\dfrac{x \text{ is not dead}}{\cdots} \qquad \dfrac{x \text{ is asleep}}{\cdots} \qquad \dfrac{x \text{ is making certain sounds}}{\cdots}}\ *$$

with the usual presupposition $*$ that x refers. These rules are both compositional in virtue of being schematic for different expressions occupying the position of x, and give genuinely informative explanations of the meaning of snoring.

However, the use theorists that suggested this line of response so far ([15], [8]) also err in some respects. First, Peregrin believes that his *decompositional* route to compositionality is indeterminate – there are many equally valid ways of carving up the contribution of subsentential expressions [15]. This is obviously false with respect to simple sentences such as Peter is snoring, where the semantically thin copula allows only for one way of understanding the composition of meaning. Furthermore, we would not say that the meaning of, say, Peter changes if placed in different syntactic configurations. Thus, if it makes a clear semantic contribution in simple sentences, so too in other cases. Generalising this to other expressions arguably refutes Peregrin’s claim. Moreover, his approach is inconsistent with our practice of explaining the meaning of subsentential expressions first and foremost, not sentences [7].

However, Glock also errs in that he takes semantic rules to be stating meaning-contributions of subsentential expressions only, without there being (additional) rules for whole sentences [8]. Consider his example of drake [8, 208]:

(SP_D) $\forall x$(it is correct to apply drake to $x \leftrightarrow x$ is a male duck)

This formulation leaves a gap between the correctness of applying drakes to entities and using drake in order to make true claims. This point is relevant, because for Glock specifically, correct, in this instance, is not synonymous with true. Furthermore, this rule clearly does not tell us anything about how drake is to be combined with other expressions to form meaningful sentences. Thus, it seems he would agree with me that rules have a dual role: they specify the meaning of a subsentential expression, yet thereby also “[...] specify how the [expression] can be used within sentences and what contribution it makes to the latter’s [meaning]” [8, 201]. That said, formulations such as (SP_D) do not seem to live up to this promise.

However, under the present approach, rules *do* have such a dual role in most cases. For the rules state under which conditions the semantic correctness for the speech act in question is achieved, and speech acts are performed with sentences, in most cases. Thus, rules can only ever state the contribution of a given expression to the unit of communication – the sentence. Therefore, with the potential exception of vocabulary such as referring expressions, greetings, and exclamations, rules are ostensibly tied to specific expressions, but elucidate their meaning in a compositional way vis-à-vis schematic *sentences*, thereby also specifying the meaning of the latter. Thus, drake can be given analogous rules as in (SP_D), but by making clear there position in a sentence:

$$\dfrac{\dfrac{\dots}{x \text{ is male}} \qquad \dfrac{\dots}{x \text{ is a duck}}}{x \text{ is a drake}}\,*$$

$$\dfrac{x \text{ is a drake}}{\underset{\dots}{\underline{x \text{ is male}}} \qquad \underset{\dots}{\underline{x \text{ is a duck}}}}\,*$$

while once again presupposing x to refer to something. Here, the rules detail both the role in a sentence, as well as the contribution of drake. Last, but not least, the normativity of meaning can be preserved, along the lines suggested by Glock himself [8] and others (e.g. [15], [9]).

2. Formal Semantics as Strictly Compositional Semantics Given the often assumed competition between truth-conditional semantics and use-theoretic approaches, there might still be the impression that these two approaches are necessarily at odds. After all, the ultimate analyses more often than not differ in content. However, there is a reasonable understanding of formal truth-conditional semantics where these two approaches do not stand in competition. The guiding idea is this:

> Formal semantics seeks to explain how the semantic structure of composite expressions is composed out of its parts, by means of mathematical models,[2] whereas use-theoretic approaches try to elucidate the *conceptual content* of expressions.[3]

Understood in this way, there is no competition between these approaches, given their differing explanatory ambitions.

Thus, if we use the above 'network' for x is snoring to elucidate the meaning of Peter is snoring, we get a *rule* of the following form:

(1) Peter is snoring is used to say something true just in case Peter refers to something that can be snoring (presupposition), that something is asleep and it is making certain sounds [those characteristic of snoring] (cf. my [17]).[4]

Contrasting this with a compositional analysis from intensional semantics:

(2) $\big(\lambda x_e.\lambda w_s.snore_{<e,<s,t>>}(x)(w)\big)(peter)$.[5]

[2] By model, I do not necessarily mean the Tarksian models of model theory, but in the sense of 'scientific models' (cf. [20]).

[3] This is similar in spirit to what [6] suggests, *pace* the role for use theories.

[4] Assuming truth-conditions to be stated using bi-conditionals, hence ignoring 'one-sided' entailments to propositions such as that x is not dead, etc.

[5] This is a clear simplification, given the intended reading of Peter is snoring as an event concurrent with the utterance. However, none of my points hinge on this, and the example serves its purpose at least as well, if not better, given its simplified nature.

Two observations are important. First, nothing prevents us from reading (2) as a statement of a rule: given an index of evaluation (w), the sentence is true just in case Peter is snoring in w. Second, this analysis (2) is wholly uninformative: clearly, the meaning of snoring is not adequately captured in this formulation, but rather tacitly 'subsumed' under *snore*. Thus, I suggest we can accept (2) as an elucidation of how Peter and is snoring *compose* to generate a proposition with truth-conditional content, but also accept (1) on the grounds that it tells us more about the content of snoring.

Not only is the view of formal semantics coherent with the actual research results of formal semanticists, but is within limits of what can be reasonably expected from the practice. First, the many conceptual observations about the pre-theoretical concept of meaning – and hence about the subject matter of semantics – yield that the actual meaning of an expression can be explained to and learned by other speakers. However, the results of formal semantics arguably do not allow this, hence it might be thought that their results are not about meaning [e.g. 9]. While that might be true, formal semantics can still provide accurate mathematical models of *compositionality*. For $\lambda x_e.\lambda w_s.snore_{<e,<s,t>>}(x)(w)$ might not tell you anything about snoring, but does say how the meaning of the word can interact with the meaning of other expressions. Second, the many equivalence results concerning different type-systems can now be explained [e.g. 22]. For if formal semantics is ultimately occupied with giving a mathematical model of the semantic structure of composite expressions, then the same structure can obviously be accounted for using different underlying type-systems – structures are unique up to isomorphism, after all.

One might object to my characterisation of formal semantics on the grounds that some semantic theories are focussed on explaining entailment relations, not compositionality. For example, in modern developments ([12], [13]) of Davidsonian event semantics [3], the focus lies on explaining 'diamond entailments' such as from John buttered a toast at midnight in the bathroom to John buttered a toast at midnight. Against this, three points can be brought forth. First, on a pre-theoretical level, modifier-dropping is a *structural* entailment: it merely removes a part of a proposition. This phenomenon is clearly compositional, albeit on a *sentential* level. Second, modern versions of event semantics *are* also compositional on a *subsentential* level [e.g. 1], hence there is no incompatibility between these approaches. On the contrary, the endeavours to combine event semantics with compositional semantics showcases the importance of the latter as a central research paradigm. Lastly, even if formal semanticists draw upon lexical semantics, they do not *practice* it, and use theorists would readily agree that, as a matter of conceptual truth, events and actions have a location in space and time, and can be described with modifiers in myriad ways. Thus, even in the rare instance when these two enterprises share an explanatory goal, incompatibility need not arise.

3. Prior's Puzzle Most crucially, it allows us to conclusively solve Prior's puzzle [16].[6] Under the picture sketched above, the failure of substituting in proposition within propositional attitude reports is no longer a surprise. Proposition, as used by semanticists, refers to the semantic value assigned to the that-clause in, for example, Sara knows that 2 + 2 = 4. This value is not the meaning of the expression, but at best a formal representation of it. Thus, to say that knowledge is a relation to a proposition is not to be taken literally – unlike [18] – but as an account of how the meaning of such sentences depends on the content of the that-clause. On the other hand, in natural language, proposition means as much as offer, recommendation, or plan of action. Thus, Sara knows that 2 + 2 = 4 and Sara knows the proposition that 2 + 2 = 4 could not mean the same thing

[6] Along similar lines as in [21]. However, I approach the solution from a distinct angle and hence obtain a different formulation, albeit of the same basic thought: the problem does not require a substantial, technical solution.

in natural language.[7] However, this is precisely where the substitution test is carried out, and it constitutes yet another piece of evidence that formal semantics does not provide an analysis of meaning, viz. an elucidation of what expressions mean, but formally accounts for compositionally derived semantic structures.

Lastly, just as Prior's puzzle generalises [2], so does this solution. The technical terms used by formal semanticists to refer to the semantic values assigned to expressions will rarely, if ever, correspond to that same expression's meaning in natural language. For example, we should not be surprised to find that Sally seeks a unicorn does not mean the same thing as Sally seeks the generalized quantifier denoted by "a unicorn" – not that it ever could. Generalized quantifier is a *technical* term hailing from the *mathematical machinery* used to explain the semantic structure of a sentence, not what a unicorn means. In other words, it is to be expected that the salient substitutions will (almost) always fail. This, again, is no issue if the practice of formal semantics is understood properly. If the ambition is to provide mathematical models for the semantic structures of sentences, the failure of such substitutions is of no concern, and henceforth requires no technical solution. We should not confuse the mathematical models and tools with the actual meanings of terms, which are more aptly captured by use-theoretic analyses. Nevertheless, we ultimately ignore each approach only at our own peril – given their complementary explanatory ambitions.

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[7] Also, sentences of the form x knows o usually express acquaintance with the object o, not propositional knowledge [9]. Hence, it is no surprise that in German, I know the city of Berlin is not translated with the German word for knowing (wissen), but with kennen – 'being acquainted with sth.'.

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