CONTEXTUALITY AS SUPERVENIENCE

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Wilfrid Hodges proposes an explication of the context principle. I show that the explication is, in a certain respect, too weak and propose to replace it by the principle that meaning supervenes on contribution, which however, entails Hodges' principle.

1. Equivalent languages

If the interpretation of every *sentence* of a language is fixed, there might still be different options how to interpret *subsentential* expressions. I call two languages *equivalent* iff they share the same set of expressions and the same grammar and also the same interpretation of sentences. (An interpretation is a function that assigns every expression in the language its meaning.) Equivalent languages differ at most wrt. to the interpretation of some non-sentences. The question is: are there different equivalent possible natural languages?

The answer is yes, if interpretations of natural languages are like interpretations in model-theoretic semantics.

1.1. Example 1: extensional interpretations

Let $M = (D, V)$ be a model of first-order logic and π a permutation of the domain D. $\pi M := (D, \pi V)$, where πV is defined in a way such that:

1. If a is a name, then $\pi V(a) = \pi(V(a))$;

2. if P is an n-place predicate,
   then $(\pi a1, \ldots, \pi an) \in \pi V(P) \Leftrightarrow (a1, \ldots, an) \in V(P)$.

M and πM are *elementary equivalent*,[1] i.e. sentences have precisely the same interpretation (here, truth-value) in each model of a permutation-related pair, e.g. $\pi M \models Pa \Leftrightarrow \pi V(a) \in \pi V(P) \Leftrightarrow V(a) \in V(P) \Leftrightarrow M \models Pa$. Usually there

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[1] Permutations are not the only possible source of elementary equivalence, witness the Löwenheim-Skolem theorem that is used by Putnam in Putnam 1981 for his model-theoretic argument against metaphysical realism.

is more than one object in D, hence there are non-trivial permutations, and hence different equivalent languages of first-order logic.[2]

1.2. Example 2: intensional interpretations

If $M = (W, R, (Dw)_{w \in W}, V)$ is a model of first-order modal logic and
π a permutation of $D := \bigcup(Dw)_{w \in W}$, then $\pi M := (W, R, (\pi Dw)_{w \in W}, \pi V)$,
where for any $w \in W$, πDw is the image of Dw under π and
πV is defined in a way such that

1. If a is a name, then $\pi V(a) = \pi(V(a))$;

2. if P is an n-place predicate, then for any $w \in W$,
   $(\pi a1, \ldots, \pi an) \in \pi V(P)(w) \Leftrightarrow (a1, \ldots, an) \in V(P)(w)$

Again, sentences receive precisely the same interpretations (here, propositions, understood as sets of possible worlds) in each model of a permutation-related pair. And again, since D need not be a singleton, there are non-trivial permutations, and hence different equivalent languages of first-order modal logic.

1.3. Putnam's scenario

Imagine that men and women talk two different languages that are syntactically identical varieties of English. The two languages interpret sentences in precisely the same way; yet there are still semantic differences. For instance the word "dog" means in the language of women what the word "cat" means in the language of men; the reason this difference has no implications at the level of sentence meanings is that compensatory reinterpretations are made in the rest of the language, with the effect that, e.g. "There is a cat on the mat", "Look, there is a cat", and even the one-word exclamative "Cat!" all mean the same in both languages, although the *word* "cat" means different things.

The scenario is a variant of one that is used by Hilary Putnam in Putnam 1981, pp 33–35, and Putnam 1983, pp IX–X. Putnam uses his scenario for another purpose, namely to illustrate under-determination of *reference* (on a certain conception, by the truthvalues of sentences), whereas I want to illustrate the under-determination of *meaning* (on a certain conception, by the meanings of sentences). But the model-theoretic facts that may be used to argue for under-determination are the same in both cases, e.g. the existence of certain permutations, see examples 1 and 2 above. Possibly you find the scenario, strange. The sentences of men and women mean precisely the same; *how could their words mean different things*, then?

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[2]Cf. Quine 1968. Quine calls permutations of this kind *proxy-functions*.

2. The Context principle

2.1. Frege's Principle

To say the latter is to appeal to the context principle, the principle that "the meaning of an expression is the contribution that it makes to the meanings of sentences containing it."Hodges 1998, p.20.

The context principle is usually traced to Frege, who wrote that "[o]ne must ask for the meaning of words in the context of a sentence, not in isolation". (Frege 1968, p.X). But not all commentators agree that Frege held the above context principle even at the time when he wrote these words, see Pelletier 2001.

The principle might either be taken to express a *strict identity* of entities called meanings with entities called contributions, or that the meaning of an expression *is constituted* by its contribution,[3] or that expressions have their meanings *in virtue* of their contributions, or at least that meanings are *determined* by their contributions.[4]

Cautiously, I will choose the last reading. Understood either way, the principle excludes the scenario. "cat" means different things in our two languages although the two terms contribute in precisely the same way to the same sentence meanings in their respective languages, hence, what "cat" means is not determined by the contribution of "cat" to the sentences it occurs in; but then, "cat" does not have its meaning in virtue of its contribution, neither could what "cat" means be constituted by nor be identical to the contribution of "cat" to those sentences.

Now let us try to make the principle precise in a way such that it *stays* inconsistent with the scenario.

In the following I will use some abbreviations. Variables e, e', and L, L' range over arbitrary possible expressions, and languages, resp.

$eL \equiv e'L'$: expression e in L is *synonymous* to expression e' in L'

$eL \simeq e'L'$: the semantical *contribution* of e to L equals the semantical contribution of e' to L'

$L[e|e']$: e and e' are *intersubstitutable salva interpretatione*,
   i.e. for any sentence s of L, exchanging e for e' or *vice versa* results in a sentence s' of L, such that s and s' are synonymous in L.

2.2. Hodges' Principle

Hodges proposes the folllowing explication of the context principle.[5]

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[3]"[T]he sense of any expression less than a complete sentence must consist only in the contribution it makes to determining the content of a sentence in which it may occur" Dummett 1981, p.495

[4]"[T]hat in the order of explanation the sense of a sentence is primary" Dummett 1981, p.4

[5]To be precise, Hodges offers a more general explanans in order to make a more general explanandum (his principle "F") precise, see Hodges 2001, p.16; but the context principle is an instance of F, and the principle below, together with the reverse conditional, is the corresponding instance of his explication of F. That explication is put in terms of meaning functions instead of in terms of synonymy, but these are two equivalent formulations. Cf also the principle of *full abstraction* on p.19f. of Hodges 1998.

Hodges' Principle if $L[e|e']$, then $eL \equiv e'L$.

(Assume this holds for all natural languages L and expressions e, e' of L.)

While Hodges' Principle is plausible in itself, it is unable in principle to rule out the above scenario. It deals solely with intra-linguistic synonymy and thus stays silent about the question whether there are different equivalent languages. We can only apply Hodges' Principle to compare meanings in equivalent languages if the languages are presumed to be identical. But that they are is something we want to establish, not something we should presuppose.

Therefore, we need to improve on Hodges' attempt. The outcome should at least rule out the above scenario; but it should possess a level of precision that allows to compare it with Hodges' Principle.

A complete analysis of the context principle should be able to answer the following questions. *What does it mean that contributions determine meanings? And what are contributions?* In the following I will answer the first question, and give a tentative answer to the second one.

3. What does it mean that contributions determine meanings?

First, there is a standard way to make determination precise, *viz.* in terms of supervenience. Applied to the case at hand, we get

Meaning Supervenes on Contribution If $eL \simeq e'L'$, then $eL \equiv e'L'$.
(Same contribution, same meaning).

This principle is a conditional, whereas Hodges principle was of biconditional form. So, one could also consider to add the other direction.

Contribution Supervenes on Meaning If $eL \equiv e'L'$, then $eL \simeq e'L'$.
(Same meaning, same contribution).[6]

Indeed, the pronouncement that meaning *is* contribution invites a biconditional form, simply because identity is symmetric. But, above we have seen that not all formulations of the principle are as strong as this. Indeed, Contribution Supervenes on Meaning may appear to be somewhat problematic. It is equivalent to saying that, if e in L and e' in L' *differ* in contribution, then they differ in meaning. This may be problematic. Depending on how you make "contribution" precise, the addition of new expressive capabilities to a language tends to change the contributions of the old terms, because they now also appear in new linguistic contexts. But does this automatically also change the *meanings* of the old terms?—It is for this reason that I do not adopt Contribution Supervenes on Meaning, here.

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[6] In Hodges 1998, Hodges terms a similar principle restricted to *intra-linguistic* synonymy "strong compositionality"; in Szabo 2000, Szabó argues that principles about intra-linguistic synonymy are not enough: compositionality is a supervenience principle.

4. What are contributions?

When do e in L and e' in L' make the same contribution to the sentences they appear in? Surely, if both appear in precisely the same linguistic contexts and their appearance makes the resulting sentences mean the same. Our first definition simply declares this criterion to be sufficient *and* necessary.

Let $\mathcal{S}_L, e$ be the set of sentences of L which e appears. For any member $S(e) \in \mathcal{S}_{L,e}$, $S(x)$ is the result of replacing every occurrence of e with the variable x (that is neither in L nor in L'). The set of these, $\mathcal{S}(x)_{L,e}$, is the set of contexts in L in which e appears. Let μ be the function that assigns the meanings to the sentences of L and μ' be the function that assigns meanings to the sentences of L'.

1st try $eL \simeq e'L'$ iff $\mathcal{S}(x)_{L,e} = \mathcal{S}(x)_{L',e'}$ and
for every $S(x) \in \mathcal{S}(x)_{L,e}$, $\mu(S(e)) = \mu'(S(e'))$

1st try, together with Meaning Supervenes on Contribution implies Hodges' Principle. It also suffices to exclude equivalent languages, e.g. "cat" appears in the same contexts in the languages of men and women, and when it does so it makes the resulting sentences mean the same. Hence, **1st try** predicts that both versions of "cat" contribute in the same way to the sentences they appear in; it follows from Meaning Supervenes on Contribution that they mean the same.

On the other hand, according to our definition, e in L and e' in L' already differ in contribution when there is a single context in L that differs in some of its expressions from the corresponding context in L'. Imagine e.g. that L and L' only differ in that L' has "tac" where L has "cat", but that every sentence in which "tac" is used[7] has the same meaning as the corresponding sentence of L; and that the two languages are semantically indistinguishable for every other sentence. The example illustrates first, that our definition of contribution is not very natural. Wouldn't it be more appropriate to say that the semantic contribution of "dog" to L' equals the semantic contribution of "dog" in L? It illustrates, second, that, as a result, so far Meaning Supervenes on Contribution is still a very weak principle: it fails to imply that "dog" in L' and "dog" in L mean the same.

Hence, a second try. The main idea is to individuate contexts more coarsely, namely along semantic lines rather than in terms of their expressions. In the remainder of the talk I will speculate how this could be done.

But if two expressions provide the same contribution according to our **1st try**, they would also do so according to such a 2nd try; therefore the latter, together with Meaning Supervenes on Contribution would still entail Hodges' principle and exclude different equivalent languages.

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[7] To keep things simple, let's assume that words are only used and never mentioned in these languages.

5. Conclusion

Hodges' principle may be generalised in a way that it excludes the possibility of different equivalent languages.

If you are a contextualist, what should you do? First option: drop standard model-theoretic semantics. Second option: continue to do model-theoretic semantics but drop a realist interpretation of model-theoretic semantics. An instrumentalist might regard two permutation-related interpretations to represent the same meaning functions.[8] Either way, for a contextualist, the interpretation of a language could not be something like an interpretation in a model.

Acknowledgements

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[8] Here I am indebted to Ede Zimmermann, *p.c.*