# Semantic Abstractionism

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**Abstract**

Propositions may be defined by an abstraction principle, somewhat along the lines of similar accounts of abstract objects—most famously, the Neo-Fregean account of numbers. I present the basic outlines of such an account, discuss how it compares with existing theories of propositions, and sketch an initial defense from objections. The resulting theory is hyperintensional, improves on alternatives views on questions of granularity, and better fits with Linguistic methodology by codifying the practice of semanticists.

## 1  The Nature of Propositions

There's some agreement in Philosophy about the role propositions are supposed to play in theories of communication and cognition, but there are different views about what kind of objects play those roles. Typically, it's assumed that propositions are:

1. the semantic values of declarative sentences (relative to a context), and

2. the primary bearers of truth-values, and

3. the objects of propositional attitudes.

The competition is between two main families of accounts:[1] the Possible-World theory, and Structured Propositions theories (of which there are many). To a rough approximation, these contenders differ in giving privilege to job 1 over job 3 (the PW theory), or viceversa (SP theories): the metaphysics of each account is designed for the preferred job.

According to the PW theory ([21, 27]), propositions are sets of possible worlds. The PW theory has by far the best record of successful applications in Semantics, and thus there are good reasons to accept it. However, it has long been known to yield undesirable consequences, and pressure to revise or reject the PW theory is on the rise. Perhaps the most famous undesirable consequence is that, on the PW theory, all necessarily equivalent propositions are identical. I use angle brackets '⟨...⟩' as a term-forming operator for propositions. So '⟨*1021 is prime*⟩' is a term denoting the proposition that 1021 is prime. According to the PW theory, ⟨*1021 is prime*⟩ and ⟨*Triangles have 3 sides*⟩ are identical, because both are true in all possible worlds.

However, it appears that such identity conditions are too coarse grained, since it seems that a rational subject might believe that triangles have 3 sides and fail to believe that 1021 is prime, or viceversa. If so, then these should be distinct propositions. The Problem of Necessary Equivalents is a failure to distinguish distinct propositions with the same modal profile.[2]

Different strategies have been explored to account for this problem within the PW theory: one might tinker with the definition of a possible world, or try Stalnaker's two-dimensionalist

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[1]There are more options than the ones I list: some are discussed in e.g. [2, 15]. Some accounts reject the characterization I just gave: on "Radical Pragmatics" accounts, semantics disappears, as it were, squeezed between syntax and a very rich pragmatics. Things that play role 3 still exist, but nothing plays role 1.

[2]The criterion for which propositions should be distinct, if it is possible for a rational subject to believe one while failing to believe the other, seems intuitively plausible. Its long history goes back to Frege's Equipollence criterion for the identity of contents, in [8, p. 197]. For a recent discussion, see [28].

analysis ([27]), or rely on a theory of fragmented beliefs (e.g. [7]). On the other hand, the Problem of Necessary Equivalents seems to frustrate the attempt of the PW theory to yield an adequate account of the objects of attitudes, and so many regard it as the symptom of an underlying misconception. Accordingly, its lesson is taken to be that propositions ought to be individuated hyperintensionally.

SP theories are the most important alternative to date. What's common to these theories is the assumption that a proposition is a structured object whose parts correspond to the semantic values of the syntactic constituents of the sentence that expresses it. There are many different SP theories, e.g. Neo-Russellian accounts, and structured Fregean accounts that include 'modes-of-presentation'. On King's view ([17]), a proposition is composed of objects and properties, and a relation that "glues" them together. On Soames's view ([26]), a subject/predicate proposition is the cognitive act of predicating something of an object. On Hanks's view ([13]), a subject/predicate propositions is a cognitive act of predicating something of an object, together with a cognitive act of referring to it. Although different theories have different virtues and shortcomings,[3] and different accounts discriminate among propositions differently (depending on the treatment of singular terms), a common feature of SP theories is that the identity conditions of propositions depend on the identity of the predicates that contribute to expressing them. For example, consider the following pairs:

(1)    a. 3 is greater than 2.

        b. 2 is smaller than 3.

(2)    a. I met a farmer who was feeding a donkey.

        b. I met a farmer$_1$ and he$_1$ was feeding a donkey.

Since *x is greater than 2* and *x is smaller than 3* are distinct predicates expressing distinct properties, and acts of predicating them are distinct cognitive acts, SP theories have the consequence that the propositions expressed by (1a) and (1b) are distinct. Since the proposition expressed by (2b)—where the index '1' indicates the intended reading of the pronoun—contains a conjunction, or the act of conjoining, and the proposition expressed by (2a) doesn't, the propositions expressed by (2a) and (2b) are distinct, according to SP theories. More dramatically, for the same reason, $\langle A \rangle$ and $\langle A\ and\ A \rangle$ are regarded as distinct, whatever sentence $A$ is.

A popular complaint is that on SP theories propositions are individuated too finely. Sometimes this complaint is put in terms of a failure to reflect philosophers' intuitions about "saying the same thing": if this is the objection, I believe that King is quite correct in dismissing it ([18]). I also believe, however, that the more interesting objection is methodological: there is no use in semantics for a notion of proposition that distinguishes between pairs such as (1a) and (1b), and (2a) and (2b) respectively. The distinction in propositional content between $\langle A \rangle$ and $\langle A\ and\ A \rangle$ is one without a difference, for the behavior of competent speakers of English does not indicate that there's any semantic difference between (1a) and (1b), and (2a) and (2b) respectively, and so if one insists that these all express different propositions, important semantic generalizations are missed. Problems of Fineness of Grain are failures to identify the same proposition as being expressed by different sentences. According to some critics, this problem indicates that SP theories fail to characterize a notion of proposition that plays the role of contents of declarative sentences (role 1), as characterized by truth-conditional semantics.

I shall now outline a third option, and try to convince you that it's better than both the PW and SP theories. The view of propositions I develop here is designed to codify the methodology of empirical research in semantic theory.

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[3]A shortcoming specific to Soames's view is that there are no propositions, as he defines them, expressed by true negative existential sentences. See Soames's discussion in [26, p. 230].

## 2    Abstraction Principles

An abstraction principle is a statement of the form:

$$\forall \alpha, \beta(\$\alpha = \$\beta \equiv \alpha \sim \beta)$$

where '$\$$' is a term-forming operator (like '$\langle...\rangle$'), and '$\sim$' is an equivalence relation between objects in the domain of the quantifiers. The most famous abstractionist account is the Neo-Fregean account of numbers ([32, 12]). According to Neo-Fregeans, numbers are defined by Hume's Principle:

(HP)                     $\forall F, G(Nx : Fx = Nx : Gx \equiv \Theta(F, G))$

where '$F$' and '$G$' are variables ranging over concepts, '$Nx : \Phi x$' is the term-forming operator *The number of*, and '$\Theta$' abbreviates a second order statement of equinumerosity. So HP says, intuitively, that the number of the concept $F$ is identical to the number of the concept $G$ iff $F$ and $G$ are equinumerous. There are other abstraction principles, such as Frege's principle for directions (in *Grundlagen*, section 65). Thanks to the Neo-Fregean program, the logic and philosophy of abstraction principles have been extensively discussed in recent years, and are now fairly well understood.

Now consider the following inspiring passage from Frege's *Begriffschrift* (section 3):

> I remark that the contents of two judgments may differ in two ways: either the consequences derivable from the first, when it is combined with certain other judgments, always follow also from the second, when it is combined with these same judgments, [and conversely,] or this is not the case. ... I call that part of the content that is the *same* in both, the *conceptual content*.

Related passages may be found throughout Frege's work, but let's set aside questions of interpretation.[4] Perhaps an abstraction principle for propositions ('conceptual contents') can be extracted from this passage. Frege seems to suggest that given two 'judgments' $A$ and $B$, the proposition expressed by $A$ is identical to the proposition expressed by $B$ iff $A$ and $B$ have the same consequences given the same assumptions. So, an abstraction principle for propositions might be the following ('Semantic Abstraction'):

(SA)               $\forall A, B(\langle A \rangle = \langle B \rangle \equiv \forall \Gamma \forall C(\Gamma, A \text{ entail } C \equiv \Gamma, B \text{ entail } C))$

i.e. the proposition that $A$ is identical to the proposition that $B$ iff anything $C$ entailed by $A$ together with $\Gamma$ is entailed by $B$ together with $\Gamma$. I take $\Gamma$ to be a possibly empty set of things of the same type as things in the range of $A, B$, and $C$. SA identifies the proposition expressed by $A$ and $B$ just in case $A$ and $B$ are, as it were, "equientailing": they entail the same things under the same assumptions. Semantic Abstractionism is the view that propositions are the objects defined by SA.[5] I shall now discuss what the variables in SA range over, and discuss the notion of entailment. This will take up most of the paper. In the last section, I will briefly address some features of Semantic Abstractionism that in some way or other apply to all abstractionist projects, including a few remarks on the Caesar Problem.

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[4]See [10, p. 188], [9, p. 70], and the Equipollence criterion referred to in fn. 2.

[5]The idea of defining propositions by abstraction is not entirely new, and not just because it may have been suggested by Frege. An attempt at such a definition is made by Hale in [12, p. 91–116], though the background and goals of Hale's discussion are completely different from mine. Another account is discussed and negatively assessed by Wrigley in [33]. In part, Wrigley worries about what types of objects the variables $A$ and $B$ range over. I shall address this point below. Remaining worries raised by Wrigley are dealt with in [30].

# 3   Natural Language Syntax

I shall assume, as in informal explanation of the concept of proposition underlying SA, that propositions are things expressed by sentences. In my opinion, SA is best understood as abstracting from (something like) natural language sentences—whether we may define propositions abstracting from sentences of some formal language is not a simple question, and I set it aside.

We should be clear on the notion of sentence that is relevant here. Since it's implausible to take propositions to be defined by sentences regardless of context (for some sentences express different propositions in different contexts), the variables in SA should range over utterances, i.e. pairs of a sentence and a context.[6] However, utterances are sometimes understood as concrete physical objects: actually occurring sequences of sounds. But it's implausible to assume that all propositions are expressed by actually occurring sequences of sounds (there aren't enough of them). So I shall take the variables in SA to range over *utterance-types*, i.e. pairs of a sentence-type and a context. Generalizing beyond the concrete physical objects that provide evidence for a theory is a straightforward generalization made for scientific purposes. Perhaps not unproblematic, but very common.

The variables in SA range over utterance-types of declarative sentences of a natural language. Two related questions may arise. Which language are we talking about? And also: How are sentence-types identified? I will address the first question at the end of this section. In the answer to the second question, it is crucial that we distinguish different sentences without relying on the assumption that they express different propositions: that would be circular. Abstraction principles, like SA, succeed in establishing the identity conditions of the objects denoted by singular terms on the left-hand side, only if the conceptual resources employed on the right-hand side do not already presuppose what the principle itself should establish. If there is no explanatory priority of the right-hand side on the left-hand side of the main biconditional in SA, the attempted definition by abstraction fails.

To avoid this potential problem, I shall identify sentence-types syntactically. There is a tendency in Philosophy to think of sentences as phonologically individuated objects, but, in my opinion, this may be no more than an old empiricist prejudice. Better to abstract away from the phonological description (Phonological Form) of sentences, and identify them by their syntactic description. You can think of syntactically individuated sentence-types, in the tradition of Chomsky, as those objects recursively generated by the grammar that get "sent off" to the 'conceptual-intentional interface' for semantic interpretation—sometimes these are called 'Logical Forms', or 'Sentences in the Language of Thought'. For present purposes, it is unnecessary to think of sentence-types as mental objects, though we might. But for all I say here, they might be mathematical objects of some kind (see fn. 7).

Semantic Abstractionism is plausible only if the background syntactic theory distinguishes between sentence-types that, relative to the same context, express different propositions. Thus to some degree, the truth of SA depends on details of syntactic theory, but that seems fair. Indeed, the truth of SA depends on the assumption, which is commonly made by different theories of grammar, that semantic composition and syntactic dependence work in parallel.[7] Semantic

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[6]By a context I shall take, for simplicity, a Lewisian centered world ([20]): it seems reasonable to think, at least to a first approximation, that all the information required for the resolution of context-sensitivity, broadly understood, is packed into a centered world. A more sophisticated option, perhaps, is to take a context to be a particular set of centered worlds. The choice bears on accounts of context-sensitivity, and deserves more discussion than a footnote, but these and possibly other options are compatible with the present account.

[7]There are many theories of grammar, but my claim holds of at least Generative Grammar (e.g. [3]) and Head-driven Phrase Structure Grammar ([23]). These differ in many details, one of which is the metaphysical status of the objects they study (which I hinted at in the previous paragraph). A major difference between GG and HPSG is the analysis of syntactic dependence (movement vs. structural identity). There are several other

Abstractionism can thus afford to be largely neutral on the choice of background grammar, since it is uncontroversial that the syntax has the resources to make some indispensable distinctions, such as the ones below. Consider (the source of examples (3) and (5) is [1]):

(3)   Teacher strikes idle kids.

This sentence is structurally ambiguous: (3) could mean that kids have become idle as a consequence of teacher strikes, or that a teacher hit some lazy kids. In order to account for structural ambiguity, the most indispensable item in the grammar is some notion of phrase structure, which is part of an account of syntactic dependence. Phrase structure analysis is quite fundamental to syntactic theory—but somewhat trivial for the syntax of artificial languages because of the small set of syntactic categories.[8] On a rough approximation, there are two phrase structure analyses of (3):

(4)   a.  [$_S$ [$_{NP}$ Teacher strikes ] [$_{VP}$ idle kids ] ]
      b.  [$_S$ [$_{NP}$ Teacher ] [$_{VP}$ strikes idle kids ] ]

In the former, *Teacher strikes* is the NP to the left of the verb, with the head noun *strikes*, and *idle kids* is the VP; in the latter, *Teacher* is the left NP, and *strikes idle kids* is the VP. So there are (at least) two sentence-types corresponding to (3). Lexical ambiguity works otherwise:[9]

(5)   Doctor testifies in horse suit.

(5) could mean that a doctor testified in a legal case involving a horse, or that a doctor testified dressed like a horse. As customary, lexical ambiguity is eliminated by distinguishing between expressions. There's two words *suit* in English, i.e. distinct lexical entries with the same phonological description. That these are distinct words can be established independently of any semantic knowledge of the kind that might threaten the claim of explanatory asymmetry regarding the two sides of SA. The key notion in this case is cross-linguistic comparability. Since the two words *suit*, for example, are systematically distinguished even in languages closely related to English, these are different words, with a different history.[10] The standard assumption in Linguistics is that the lexicon is the source of arbitrariness in language: if there was a grammatical explanation for why English apparently correlates tuxedos and court trials, the correlation should be found across languages.[11]

World knowledge may be indispensable for speakers to arrive at the preferred interpretation in some cases, but that doesn't matter. What's crucial for an account of propositions by abstraction is that utterance-types expressing different propositions in the same context can be systematically distinguished without relying on the identity of the propositions they express. This is indeed the case.

At the beginning of this section, I raised another question: to which language do these sentence-types belong? Which language-specific grammar is the one whose sentences we abstract propositions from? The answer is: it doesn't matter too much. The extent to which

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differences, both conceptual and empirical: see the Introduction to [23].

[8]According to [4, p. 86], the notion of phrase structure goes back to Arnauld and Lancelot's *Port Royal Grammar* (1662).

[9]There are other kinds of ambiguity. Contextual ambiguity (e.g. about the antecedent of unbound anaphors) is taken care of by building contexts into the notion of an utterance-type, and phonological ambiguity (e.g. *right* vs. *rite*) is irrelevant here. Scope ambiguity is another, rather different, case of structural ambiguity, but it's handled similarly. Finally, type-shifting principles may introduce some kind of "ambiguity", but insofar as they apply to resolve syntax-semantics mismatches, they should pose no more problem than structural ambiguities.

[10]It helps to think of the metaphysics of words in the way [16] recommends we do.

[11]For example, Kratzer relies on this standard assumption in her argument that modal verbs are not ambiguous, in "What 'Must' and 'Can' Must and Can Mean", now chapter 1 of [19].

it matters is that, to avoid needless complication, sentence-types should belong to a single grammar. The question of which grammar is then answered by the following assumption:

> *Effability*
> Every proposition (if it can actually be expressed at all) can be expressed in every natural language.

Let's set aside the question whether there are actually inexpressible propositions. Any proposition that *can* actually be expressed, can be expressed in every natural language. Of course, languages are going to do it in different ways, depending on what's in their lexicon, on what has to be conventionally conveyed, on what can be backgrounded (e.g. by presupposing), and on what's socially acceptable for a speaker to say. Effability is a strong empirical hypothesis, and an idealization about the availability of lexical resources, but it's a widespread working assumption in empirical semantic research, and I shall not challenge it.[12]

## 4   Natural Language Entailments

I shall now discuss the notion of entailment in SA. It is crucial to distinguish between *natural language entailment* and *formal entailment*. The relevant notion for SA is the former. Formal entailment, i.e. necessary truth preservation, is well-understood. Clearly though, if the relevant notion for SA was formal entailment, then SA wouldn't distinguish among necessarily equivalent sentences, and no progress would be made on the Problem of Necessary Equivalents. For brevity, I shall use 'entailment' for the natural language notion from here on.

Entailment is a relation between a set of utterance-types and an utterance-type. It's therefore context-sensitive, and moreover it should relate utterance-types of different contexts, otherwise we couldn't identify propositions expressed in different contexts—see [24] for a discussion of a formal definition of cross-contextual validity. Furthermore, it seems reasonable to assume that necessary truth preservation is a necessary condition on entailment, so that whenever $A$ entails $B$, it follows that, necessarily, $A$ is true only if $B$ is true. But it is not a sufficient condition. So necessary truth preservation can be a heuristic guide to entailment, and indeed of crucial importance, because we have sophisticated mathematical techniques to study necessary truth preservation. Entailment is, more generally, a grammatical relation, that can be studied by generalizing probabilistically over competent speakers' patterns of judgment in an experimental setting. Its theory is partly a matter to be settled empirically, and partly by global theoretical considerations.

Semantic Abstractionism is a view of the nature of propositions designed for the methodology of Linguistics. Typically, the study of the content of linguistic expressions is carried out by means of judgment elicitation tasks, during which a speaker may be tested as to whether she takes a given sentence to be entailed in context. What this methodology seems to indicate is that information about contents is provided primarily by the investigation of what entailments obtain in a context. An abstractionist metaphysics of propositions reflects the epistemological underpinnings of linguistic methodology. The resulting view is conservative also in the sense that, once propositions are defined, intensions are still available, and each proposition can be assigned a function from worlds to truth-values (worlds may already be needed, as contexts: see fn. 6).

It seems to me that the existence of patterns of entailment is something of a pre-condition on the plausibility of semantics as an empirical discipline, and there is no reason to be skeptical

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[12]See the favorable discussion in [31]. I also rely on their assessment of the persistent myth that native speakers of different languages *must have* different cognitive abilities, like grasping different propositions.

about it. No one doubts that data from speakers acceptance and rejection responses fall into general patterns, unless one is skeptical about semantics itself.[13] Notice that SA does not require that the notion of entailment be an equivalence relation (I do assume, below, that entailment is reflexive; but this doesn't seem particularly problematic). Abstraction does require the definition of an equivalence relation between utterance-types, but such relation is: *the set of things entailed by x and* $\Gamma$ *has the same members as the sets of things entailed y and* $\Gamma$. Assuming entailments data are robust enough for the development of semantics, I think it's plausible to say that such relation is well-defined, and then it is certainly an equivalence relation.[14]

It is important to emphasize that generalizations about entailments are probabilistic, as we are trying to characterize a relation that depends on the grammar: regularities of speakers' linguistic competence, generalizing away from performance limitations. A first consequence of this point is that, should a competent speaker accept one of a pair of utterance-types that express the same proposition (according to the population which she belongs to), and fail to accept the other, that would indicate a performance error (of which there are various kinds). A second consequence is that no claim of analiticity should be attached to SA—unlike (perhaps) HP, the epistemology of SA is that of an empirical generalization.[15]

Not everything is an entailment: for instance, Gricean conversational implicatures are not entailments. There are standard tests to determine what speakers take to be entailed, and what they derive instead from world knowledge and expectations about other people's behavior. Indeed, implicatures are not considered part of the semantic content of a sentence. Therefore, part of the question what counts as an entailment bears on theoretical choices about what counts as semantics. None of this warrants skepticism about the notion of entailment.

We don't know much about the global shape of a theory of natural language entailment (yet). It's not going to look like any of the formal systems logicians have studied, although, locally (i.e. relative to some parameter), it might. Entailments are sensitive to various features of communication, well beyond the usual parameters of context-sensitivity. It's possible, but consistent with SA, that a theory of entailment will not be axiomatizable, but that of course doesn't mean that there are no generalizations to be made. Perhaps the best approach should be some kind of pluralism about entailment. This is not necessarily a problem.

A different worry is that the notion of linguistic competence, that I rely upon in an explanation of what counts as an entailment, might be where semantic notions are illegitimately sneaking in. Of course, if judgments about entailments are not constrained by competence, all bets are off. But competence is sometimes understood as involving some kind of privileged epistemic status on part of speakers, perhaps some kind of a priori knowledge about the language. Maybe linguistic competence consists in part in the ability to recognize how many propositions are expressed by two utterance-types. If that's the case, the required explanatory asymmetry between the two sides of SA is flouted.

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[13]In which case there would be little need for a *semantic* notion of content—see fn. 1. Anyway, such skepticism is not to be confused with, for instance, Glanzberg's skepticism (in [11]) that anything like *Tarski's notion of logical consequence* can be reconstructed from natural language. Glanzberg agrees, of course, that there are semantic regularities in natural language.

[14]So, SA does not require that to establish how many propositions are expressed by two utterance-types, one should merely check for mutual entailments. The semantics is, of course, still compositional, and generalizations about contents are the result of testing speakers on a variety of related tasks—consistently with the methodology that justifies SA. Semantic Abstractionism, therefore, does not come with an account of Frege's Puzzle, but it was never meant to.

[15]One issue is that a grasp of the left-hand side of SA by a speaker does not provide a priori justification for reference to propositions: whether SA holds is an a posteriori matter. There is also a deeper and related issue. In my discussion, I do rely on a (partial) explanation of the concept of a proposition that doesn't follow from SA: namely, that propositions are things expressed by sentences. So I don't claim that grasp of SA alone *suffices* for reference. This is a radical departure from the Neo-Fregean conception of abstraction.

To defuse the circularity worry, I shall sketch a probabilistic account of competence:

> *Competence*
> Competence is better than Random.

The key insight behind this slogan[16] is to treat competence as the probability to give the right response, and to stipulate that competent speakers are those who perform better than a random function (by a statistically significant measure) at least in tasks of production and recognition. Consider a subject S and a fair coin. To establish whether S is competent in L, we assign production and recognition tasks. For instance, in a recognition task, S is shown sequences of lexical items of L and is asked for each sequence whether it is a sentence of L. In another room, a fair coin is flipped for each sequence shown to S, and the coin "says" that a sequence is a sentence of L just in case it lands Heads. So the coin's "responses" to the task are random. S is competent only if she scores significantly better than the coin in the long run. Production tasks are designed in a similar fashion. The result is a somewhat minimal condition on competence, a condition of adequacy that is perhaps necessary but insufficient—and so, the probabilistic account I sketched is not a conceptual analysis. Much more could be said, but unlike epistemological accounts of competence, the probabilistic account seems to promise a strategy to defuse circularity worries about SA.

## 5   Ontology and Troubles

Many questions about the ontology of abstraction principles have been already addressed by existing literature. Semantic Abstractionism is compatible with different ways of understanding the ontology and metaontology of abstraction.[17] Following [22], abstractionist projects can be understood as implementing a form of *metaontological minimalism*, since objects defined by abstraction are ontologically "thin": very little is required on the world for their existence. On the other hand, precisely because the demands on reality are little, abstractionist views tend to support forms of *ontological maximalism* ([6]): there's a lot of objects of the kind so defined. Further questions can be addressed within the basic framework for the metaphysics of abstraction developed by existing literature.

Semantic Abstractionism inherits some potential problems of any abstractionist accounts. The interesting question for present purposes is whether the present perspective adds anything illuminating to the debates about these well-investigated difficulties, and there might be something to be said about the Caesar Problem.[18] What the Caesar Objection is has been clarified in recent years, and for my brief remarks here I rely mostly upon [14]. The difficulty for Frege's

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[16]This is inspired by the account of competence in decision-making of Condorcet's *Essai* on voting systems (1785).

[17]According to e.g. [25], abstraction principles yield a *platonistic* account of abstract objects, at least in the sense that objects defined by abstraction exist necessarily. However, there's reason to doubt that all propositions exist necessarily, the reason being a common view of singular propositions. There are ways to account for contingently existing propositions that are compatible with SA. A strategy might be to consider whether sentence-types exist necessarily. Perhaps they don't, since their identity conditions depend on the linguistic resources available in actual human languages, especially their lexicon, and it seems that there might be merely possible languages just like ours but whose speakers lack the resources to refer to actual individuals with whom they don't have any cognitive contact. In these non-actual languages, there will be no propositions about actual individuals. So, whether contingently existing propositions defined by SA might be accommodated with some approaches to the metaphysics of abstraction deserves careful consideration.

[18]The *other* major difficulty facing any abstractionist account is the Bad Company Objection. This is a challenge to explain the difference between acceptable abstraction principles and unacceptable ones. I don't think that the present project has much new to contribute to this. For a recent discussion and overview, see [5].

project can be described as follows. The job of HP is to establish the identity conditions of numbers. This is done by establishing the truth-conditions of formulas in which the identity sign is flanked by singular terms of a certain form that denote numbers. However, in order to evaluate the truth of e.g. '$\exists x(x = Ny : Fy)$', i.e. something is the number of $F$, we should be able to evaluate '$x = Ny : Fy$' for every value of '$x$' in the domain of the quantifier. Given Frege's universalist conception of logic, *every* object falls in the domain of quantifiers that range over numbers, including Julius Caesar. Indeed, it is crucial for Frege's conception of numbers as objects that numbers be of the same logical type as any other object. But while HP establishes the truth-conditions of identity statements about numbers where both singular terms are of the form '$Nx : \Phi x$', HP is no help on the question whether Caesar is the number of $F$. Of course he is not, but that's not thanks to HP—just like Frege said.

Perhaps we can go again through the steps above, replacing 'propositions' for 'numbers' everywhere. Thus SA establishes the truth-conditions of identity statements in which the identity sign is flanked by singular terms of a certain form that denote propositions, and an objectual understanding of quantification over propositions requires the evaluation of formulas '$x = \langle A \rangle$' for every object in the domain. As I pointed out, the Caesar Problem hits Frege with particular force given his universalist conception of logic. But there may be reasons to think that quantifiers over intensional entities, such as propositions, may be subject to special restrictions that don't apply everywhere. Such reasons may come from an analysis of the intensional paradoxes (which I shall not discuss here, see [29]), and may be further justified by the homely thought that the laws of semantics are the laws of a special science. This thought is available also to a Fregean universalist. So we may suppose that the domain of the quantifiers in SA only include intensional objects of the right type. This restriction helps us dodge the most serious consequences of the Caesar Problem. Further questions, no doubt, still remain.

# 6   Conclusions

I have discussed and clarified various aspects of SA, an abstraction principle for propositions. The rough sketch given here suffices, I hope, to show some of the virtues of Semantic Abstractionism. Presumably, competent speakers of English won't regard *1021 is prime* and *Triangles have 3 sides* as entailing one another to begin with, though each entails itself. So ⟨*1021 is prime*⟩ and ⟨*Triangles have 3 sides*⟩ are not identical, and it's consistent to accept one and fail to accept the other. Moreover, it seems plausible to say that there's no context in which I met a farmer who was feeding a donkey such that a competent speaker would not accept *I met a farmer$_1$ and he$_1$ was feeding a donkey* as entailed, and viceversa. This kind of considerations indicates that ⟨*I met a farmer who was feeding a donkey*⟩ and ⟨*I met a farmer$_1$ and he$_1$ was feeding a donkey*⟩ are identical. So, it seems, an account of propositions based on SA scores higher than the PW theory on the Problem of Necessary Equivalents, and higher than SP theories on Fineness of Grain. The identity conditions of propositions fixed by SA are determined neither by the identity conditions of sets of possible worlds, as for the PW theory, nor by the identity of predicates or acts of predication, as for SP theories. Rather, propositions are identified in part syntactically, by the identity of sentence-types that express them relative to a context, and in part cognitively, by what speakers take to be entailed by an utterance in a context.

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