

Chalmers and Semantics

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Abstract: David Chalmers' two-dimensionalism is an ambitious philosophical program that aims to ground or construct Fregean meanings and restore "the golden triangle" of apriority, necessity, and meaning that Kripke seemingly broke. This paper aims to examine critically what Chalmers' theory can in reality achieve. It is argued that the theory faces severe challenges. There are some gaps in the overall arguments, and the reasoning is in some places somewhat circular. Chalmers' theory is effectively founded on certain strong philosophical assumptions. It is concluded that it is unclear whether the theory can deliver all its promises.

Keywords: David Chalmers, semantics, two-dimensionalism, intensions, propositions

1. Introduction

IT IS COMMON TO DIVIDE theories of meanings and propositions roughly into two broad groups: on the one hand, the Fregean theories; and on the other hand, the Millian or the Russellian theories.¹ Logical positivists such as Carnap maintained that the totalities of necessary truths, a priori knowable truths, and analytic truths coincide. Both this latter view and the Fregean theories of meaning are now much less in vogue, especially as a consequence of the groundbreaking work of Kripke. David Chalmers is, however, swimming against this tide of opinion. In a series of writings, he has put forward his specific version of epistemic two-dimensional (2D) semantics (see Chalmers, 2002, 2004, 2006a, 2006b, 2011a, 2011b). Chalmers' broadly Fregean approach has received quite a lot of attention in the recent philosophy of language. This semantic theory also plays an essential role in Chalmers' famous argument against materialism (see esp. Chalmers, 2009), which makes it all the more important.

Chalmers' theory is a variation of the familiar possible worlds semantics. It utilizes the generic so-called 2D framework. Previous approaches within this general family have been presented by Kaplan (1977), Stalnaker (1978), Evans (1979), and Davies and Humberstone (1981). However, these have typically been local

¹ The direct reference theory of the meaning of names is regularly called "Millian." The related view of propositions, where the referent of a name itself is a part of the proposition, is commonly called "Russellian."

theories with rather limited scope and philosophical goals, dealing only with indexicals, descriptive names, and/or rigidified “actually”-involving expressions, for example. Chalmers’ framework, in contrast, aims to be an all-encompassing semantic theory that applies to expressions of all sorts and in which the semantic values at issue are deeply connected to apriority.² It involves an entire philosophically ambitious research program. In particular, Chalmers explicitly states that his purpose is not merely to put forward a tool for analysing independently grounded Fregean meanings because that would not help if someone is doubtful about Fregean meanings. Therefore, he cannot presuppose Fregean meanings. Chalmers says repeatedly that his goal is instead to “construct,” “erect,” or “ground” Fregean meanings — or at least a central aspect of meaning — in terms of modal notions, and apparently in this way convince even a sceptic of Fregean meanings (see Chalmers, 2006b, pp. 69–70).³ The ambition is ultimately to regain the glory of the traditional “golden triangle” of reason, meaning, and modality — or perhaps of apriority, analyticity, and necessity (see below) — which especially Kripke has brought into bad standing (see Chalmers, 2004, 2006b).

In this paper, I shall raise some critical questions on how well all the pieces really fit together and to what extent Chalmers’ 2D apparatus really can succeed in supporting the philosophical views it is supposed to reinforce. There is already quite a lot of critical discussion of both two-dimensionalism more generally and Chalmers’ approach in particular in the literature. However, a large share of it focuses on two-dimensionalism interpreted as a variant of the description theory of reference, or *descriptivism* for short. Chalmers, however, has repeatedly insisted that at least his own two-dimensionalist approach is *not* committed to descriptivism. Accordingly, in what follows, I aim to evaluate his account mostly independently of the question of descriptivism.

The paper is structured as follows. In section 2, the main features of Chalmers’ system are reviewed, whereas in section 3, certain concerns of a more technical nature are discussed. More general philosophical worries are presented in section 4, and in section 5 some conclusions are briefly summed up.

2 Chalmers sometimes calls such overarching approaches “two-dimensionalism” in order to distinguish them from the earlier, more local and modest applications of general 2D ideas. He mentions Lewis, Jackson, and Braddon-Mitchell as other advocates of two-dimensionalism.

3 Chalmers also writes elsewhere: “We could simply assume a Fregean view of propositions according to which these propositions [that Hesperus is not Phosphorus, and that Hesperus is not Hesperus] are distinct, but the viability of such a view is contested. Furthermore, one aim of the present treatment is to use epistemic space to help make sense of a Fregean conception of propositions. If so, one cannot simply presuppose such a conception.” (Chalmers, 2011a, p. 63).

2. A Closer Look at Chalmers' 2D Framework

2.1 Possible worlds in Chalmers' framework

What is common to different 2D theories is that expressions and sentences are evaluated in relation to two different classes of “possible worlds” (or at least in two different ways). The best-known example is probably Kaplan's analysis of demonstratives and indexicals: the semantic value of an utterance involving them depends on both the context in which the utterance is made (who utters it, where, and when) and how things are in the world; two distinct semantic values — the “character” and “content” — of the utterance are also distinguished (Kaplan, 1977). Chalmers calls such versions of the 2D approach, in which the contexts of utterance play a key role, *contextual*.

Chalmers' own interpretation of the 2D framework is, however, quite different, namely *epistemic*. In his approach, the relevant “possible worlds” of the first dimension, or *scenarios* (as he prefers to call them), are intended to be all “worlds” that are not ruled out a priori; they are worlds which are possible relative to truths that are (ideally) a priori knowable. For example, the sentence “Hesperus is not Phosphorus” is “epistemically possible” for Chalmers (although it is not metaphysically possible according to the standard Kripkean view): the sentence is certainly false, but we cannot know this purely a priori. Chalmers calls such a sentence, or the state of affairs it expresses, *conceivable*.

Chalmers' second dimension relates to the familiar metaphysically possible worlds (in the normal Kripkean sense). However, after putting forward this general 2D framework, Chalmers says fairly little about the second dimension. It is assumed to be well understood. His interest is almost exclusively in the intensions defined for the first dimension (see below). Accordingly, in what follows I shall myself focus primarily on the epistemic first dimension of the framework: worlds that are possible in relation to a priori knowledge.

Chalmers never explicitly notes this, but with regard to the first dimension his system is basically a variation of Hintikka's familiar “epistemic logic”— albeit focusing only on a priori knowability. A priori knowledge specifically was analysed with the tools of modal logic already by Anderson (1993). Perhaps even more accurately, Chalmers' treatment of conceivability comes very close to the Hintikka-style treatment of propositional attitudes with possible worlds semantics, especially the logic of imagination developed principally by Niiniluoto (1986). Thus, generally speaking there is nothing particularly peculiar in Chalmers' idea of analysing a priori knowability and conceivability in terms familiar from modal logic.

It is well known in the literature that there are a couple of quite different ways of understanding *possible worlds*. On the one hand, Hintikka and Kripke, for

example, reflect on *small worlds*; their “possible worlds” are often quite limited and local scenarios, for instance, about how a person could have chosen to proceed differently in a given situation. On the other hand, for Lewis, for example, possible worlds are *big worlds*, entire all-inclusive alternative universes. Chalmers’ general view of worlds is closer to Lewis here.

2.2 From senses to intensions

Fregean intuitions are attractive, but unfortunately Frege’s notion of *sense* (“Sinn”) was left quite unclear. Chalmers joins the tradition of Carnap (1947), Montague (1968, 1970), and Lewis (1970), in which the Fregean notions of sense and reference are explicated by *intensions* and *extensions* defined in the formal framework of possible worlds semantics. The extension of a singular term (e.g., proper name, definite description) is an individual entity; the extension of a predicate is a set of entities; and the extension of a sentence is a truth value (\top (true) or \perp (false)). Intension, in turn, is a function from possible worlds to extensions (entities, sets of entities, or truth values). For example, the intension associated with a given definite description tells us for each given world which entity the description refers to in that world. The intension of a sentence is a function from worlds to truth values: it tells, so to speak, in which worlds the sentence is true and in which it is false. Sentence intensions are often identified with *propositions*. The purpose of intensions is to reflect the aspects of meaning which go beyond extensional properties.

In 2D frameworks like that of Chalmers, there are two classes of intensions corresponding to two distinct classes of worlds (or, at least, two different ways of viewing worlds). Chalmers calls the intensions of the first dimension *primary intensions* (or *1-intensions* for short), and the intensions of the second dimension *secondary intensions* (or *2-intensions*). Further, their compound and “diagonal” intensions can be defined. However, Chalmers’ main focus is on primary intensions.

In Chalmers’ system, it is primary intensions in particular that are intended to be deeply connected to apriority, to play (roughly) the role of the Fregean senses (Sinn), and to provide an account of the cognitive significance of, for example, identity statements involving co-extensional but non-synonymous expressions such as “Hesperus is Phosphorus.” “Hesperus” and “Phosphorus” can evidently refer to different entities in some (a priori) epistemically possible worlds, so they also have different primary intensions. Accordingly, the sentence “Hesperus is Phosphorus” can be — unlike the sentence “Hesperus is Hesperus” — cognitively significant; that is, it can add to what is already known.

2.3 Chalmers' 1-worlds: Scenarios

As to the first dimension, Chalmers suggests that there is an overarching space of scenarios. Every scenario in that space should correspond to a maximally specific and all-encompassing hypothesis about the way the world might turn out to be, for all we know a priori. Every declarative sentence which is not refutable a priori should be true in some such scenario. I shall call this general picture Chalmers' *basic intuitive understanding* of scenarios.

Chalmers also considers two more specific possible ways of constructing or explicating these scenarios and their space: First, especially in his earlier works, Chalmers often begins with the standard metaphysically possible worlds, even though he adds that we should distinguish worlds with different "centers": an ordered pair of an individual and a time (which may vary for otherwise one and the same world). Such "centered worlds"⁴ are intended to reflect the nature of a world from the perspective of a particular language user with an expression within a world. Chalmers has contended that the totality of such worlds would be sufficient to serve as the epistemic space of scenarios. This is not obvious because there are *prima facie* many statements which are not ruled out a priori but are metaphysically impossible.⁵ Chalmers has nevertheless suggested that there is always a metaphysically possible world which, when viewed differently, can make such an impossible statement true.⁶ That is, Chalmers has proposed, roughly, the following thesis:

Metaphysical Plenitude: For all S , if S is not ruled out a priori, there is a centered metaphysically possible world which makes S true.

It is important to recognize that if scenarios are understood metaphysically in terms of centered worlds, Chalmers' whole 2D system can only work if Metaphysical Plenitude can be established. Otherwise, it is doomed to break down.

In a later paper, Chalmers grants that the match between centered metaphysical worlds and scenarios (in the intended basic intuitive sense) may not be perfect, and that because this approach "makes a substantive claim about the relationship between [metaphysically] possible worlds and epistemic possibility," this "analysis goes beyond a surface analysis of epistemic possibility itself" (Chalmers, 2011a,

4 The general idea of centered worlds goes back to Quine (1969). Chalmers' specific understanding of them is, however, roughly that of Lewis (1979).

5 The opposites of Kripkean a posteriori necessities, for example (if one admits their existence).

6 More exactly, Chalmers makes a distinction between a world's *verifying* a sentence and *satisfying* a sentence. There may exist, according to his view, a world which verifies such a statement, even if the claim is not satisfied by any world. Actually, I believe that this distinction is, at the general level, much less clear than is often assumed. However, I must leave the more thorough discussion of this issue for another occasion.

p. 74). Indeed, the metaphysical construction of scenarios requires taking already at the beginning a particular stance on certain difficult and controversial metaphysical questions, for example, whether there are necessarily existing beings or not.

Second, Chalmers considers, as an alternative, understanding scenarios in purely epistemic terms from the start. More specifically, he seems to increasingly prefer to construct his 1-worlds, that is, scenarios, out of linguistic materials, namely sentences.⁷ The role of “worlds” is then played by maximal, “epistemically complete” linguistic hypotheses on how the world is. These are obviously extremely comprehensive and in fact infinite sentences. More exactly, a scenario, in this approach by Chalmers, is an equivalence class (modulo a priori entailment) of such maximal sentences (see Chalmers, 2006b, 2011a).

Chalmers says that because the epistemic construction of scenarios is grounded more purely in the epistemic realm, and its central theses require fewer commitments than the metaphysical approach, one can argue that this approach to scenarios is “more basic” (Chalmers, 2006b, p. 85). He also grants that in the metaphysical construction, the characterization of canonical descriptions of scenarios is significantly more complicated, and this “may be another point in favour of the purely epistemic understanding of scenarios” (Chalmers, 2006b, p. 89).

Indeed, the metaphysical approach brings with it several highly complex metaphysical questions peculiar to it, which are beyond the scope of this paper. In its case, things get quite convoluted. It is not essential for the general epistemic 2D framework as such, and Chalmers himself now seems often to prefer the more thoroughly epistemic approach and the linguistic construction. Therefore, I shall set the metaphysical construction largely aside and focus mainly on the basic intuitive understanding of scenarios (and to some extent, to the linguistic construction of scenarios). Any more specific construction can serve the purposes of Chalmers’ epistemic two-dimensionalism only inasmuch as it conforms to the basic intuitive understanding of the space of scenarios.

2.4 Philosophical theses

Chalmers contends that his epistemic 2D framework can be used to defend certain substantive philosophical theses. Chalmers motivates his theory with a reference to what he calls “the golden triangle” of connections between meaning, reason, and modality, or perhaps simply (see below) of analyticity, apriority, and necessity. Kripke seemingly broke this golden triangle. Chalmers also mentions

⁷ Under the more general label of “epistemic approach” to scenarios, Chalmers also mentions in passing the possibility of taking the notion of scenario as a *primitive*. However, he does not elaborate that alternative but quickly moves on to discuss the linguistic construction of scenarios (see Chalmers, 2006b, p. 83).

various more specific philosophical theses, “the Kantian Thesis,” “the Fregean Thesis,” “the Carnapian Thesis,” and “the Neo-Fregean Thesis,” which according to him together constitute and support the golden triangle. Chalmers declares that the epistemic 2D theory promises to “fully restore” the golden triangle (see Chalmers, 2004, 2006b).

For the general statement of those theses, Chalmers introduces the following schematic notation: “ $A \equiv B$ ” expresses the claim that “ A ” and “ B ” have the same extension. Thus, where “ A ” and “ B ” are singular terms, it amounts to the identity “ $A = B$ ”; where “ A ” and “ B ” are sentences, it will correspond to the material equivalence “ $A \leftrightarrow B$ ”; and where “ A ” and “ B ” are general terms, it means “For all x , $A(x) \leftrightarrow B(x)$.” The relevant theses now are the following⁸:

Kantian Thesis: A sentence S is necessary iff S is a priori.

Carnapian Thesis: “ A ” and “ B ” have the same intension iff “ $A \equiv B$ ” is necessary.

These two entail:

Neo-Fregean Thesis: “ A ” and “ B ” have the same intension iff “ $A \equiv B$ ” is a priori.

Now one common definition of a sentence’s being *analytically true* reads: “can be converted to logical truth by substituting synonyms for synonyms.” Synonymity is sameness of meaning, and intension is an explication of meaning. Consequently, “can be converted to logical truth by substituting an expression with the same intension to another” would presumably be a plausible explication of analyticity. Therefore, it seems that Chalmers could just as well have summarized the golden triangle simply by saying that (at least for all sentences of the form “ $A \equiv B$ ”):

(GT*) Necessity, apriority, and analyticity coincide,

which was the neo-classical view of Carnap and other logical positivists anyway.⁹

8 “The Fregean Thesis” that “two expressions ‘ A ’ and ‘ B ’ have the same sense iff ‘ $A \equiv B$ ’ is cognitively insignificant” plays no further role in Chalmers’ system but is explicated with the Neo-Fregean Thesis.

9 There is virtually no mention of the notion of *analyticity* in Chalmers’ key papers on 2D semantics. He nevertheless discusses it briefly near the end of Chalmers (2012). He even says, “I am not committed to analytic truths” (Chalmers, 2012, p. 194). Chalmers seemingly never considers the sort of explication of analyticity in terms of the intensions that I have sketched here, although it appears very natural in this context. He rather characterizes analytic truths quite roughly as “truth that subjects have a conceptual warrant to believe” (Chalmers, 2012, p. 386). Chalmers at least leaves the door open for synthetic a priori truths (Chalmers, 2012; he mentions some sporadic mathematical, moral, and metaphysical truths as possible cases). However, Chalmers’ golden triangle and his Carnapian and Neo-Fregean theses arguably entail (GT*) (at least for all sentences of the form “ $A \equiv B$ ”) when analyticity is explicated in terms of intensions in the way I have suggested. If there are, as a matter of fact, synthetic a priori truths in *this* sense, so much the worse for those philosophical theses of Chalmers.

In any case, Chalmers gives an important place for the following thesis¹⁰:

Core Thesis: For any sentence S , S is a priori iff S has a necessary 1-intension.¹¹

It is, according to Chalmers, “the distinctive claim of two-dimensionalism” and “the crucial requirement.” He says that it “asserts a very strong and general connection between primary intensions and apriority” (Chalmers, 2006a, p. 587; 2010, p. 548). Chalmers states that “the key question” is this: is it possible to define intensions and associate sentences with intension so that the Core Thesis is true? If so, Chalmers continues, the 2D framework “promises an account of a broadly Fregean aspect of meaning”; the Core Thesis does “the crucial work”; and “If the Core Thesis is true, it *restores a golden triangle* of connections between meaning, reason, and possibility. It also immediately entails a version of the Neo-Fregean Thesis.” (Chalmers, 2006b, p. 64; my emphasis) By “a version,” Chalmers means the following:

Neo-Fregean Thesis (2D Version): Two expressions “ A ” and “ B ” have the same 1-intension iff “ $A \equiv B$ ” is a priori.

Note also the close connection between the Core Thesis and the Kantian Thesis: the former is basically simply a more specific 2D version of the latter.

In sum, Chalmers clearly thinks that the Core Thesis is a substantive and robust thesis, and that establishing it would be an important philosophical achievement. In particular, he maintains, it would restore the golden triangle.

I shall now move on to discuss several worries I have with Chalmers’ 2D theory. I will begin with a few concerns of a somewhat more technical sort, and after them, discuss certain more general philosophical qualms.

3. Technical Concerns

3.1 From simple intensions to structured intensions?

A large portion of Chalmers’ discussion focuses on whole sentences and their meanings: sentence intensions or propositions. Those are, in the standard possible world accounts, functions from possible worlds to truth values. For many

10 In Chalmers (2002), it is called simply “(2*),” and in Chalmers (2006a, 2010 (Appendix), 2011b), “(T5).” The label “the Core Thesis” is used in Chalmers (2004, 2006b). The formulations also vary a bit: the latter talk about a sentence having “a necessary 1-intension”; the former say that a sentence’s “intension is true at all scenarios”; cf. footnote 11.

11 This is a bit of an odd way of expressing things. The standard metaphysical notion of *necessity* belongs essentially to the 2nd dimension, not to the 1st dimension. However, it is clear from other passages that “has a necessary 1-intension” here means that the 1-intension returns the truth-value \top (true) for every world (scenario) of the 1st dimension; that is, that S is true in every scenario; cf. footnote 10.

purposes, one can just as well take the proposition expressed to be more simply the set of all worlds in which the sentence is true. Either way, there is a well-known problem¹²: all necessarily true sentences have the *same* intension, namely, the constant function which returns the truth-value \top (true) for every possible world (or, if we consider propositions as sets of worlds: the set of all worlds). Similarly, in Chalmers' first dimension, there is only one proposition (or one sentence intension) which corresponds to every a priori knowable truth: the constant function that attaches the value \top (true) to all scenarios, or alternatively, the set of all scenarios. All true sentences which are (allegedly) a priori knowable, from “ $5 + 7 = 12$ ” and “ $\sqrt{2}$ is irrational” to “no vixen is male” and “all bachelors are unmarried,” would consequently have the *same* “meaning.” But certainly, that is utterly implausible.¹³

Chalmers is perfectly aware of this difficulty. As a remedy, he suggests repeatedly that we should invoke, instead, more fine-grained *structured* intensions or *structured* propositions.¹⁴ He explains that a structured 1-intension of a sentence is a structured entity involving the 1-intensions of the constituent simple expressions, structured according to the sentence's logical form. But beyond that, Chalmers says very little about how more exactly this is meant to be realized. Nevertheless, they are presumably ordered n -tuples of word intensions, or finite mathematical trees (corresponding to the syntactic tree of the sentence) with word intensions as their nodes, along the lines that Lewis (1970) and Cresswell (1985) have already earlier proposed.¹⁵ Although Chalmers often pleads for a pluralism about meanings, he even says that “[m]y own view is that if one were forced to identify *propositions* with one sort of entity that can be modelled in the framework, there would be a good case for choosing *structured* two-dimensional entities of some sort” (Chalmers, 2006a, p. 595; my emphasis).¹⁶

However, it has not been sufficiently recognized that such an approach in fact raises a problem: Although one can undoubtedly construct such set-theoretic structures that consist of word intensions and mirror the syntactic structures of sentences, they just are *not* sentence intensions, which are functions from possible worlds to truth-values. They are merely complexes of word intensions, which in turn have individuals and sets of individuals in their range; truth values, essential for sentence intensions, are simply absent. Nevertheless, Chalmers also talks about

12 Already Carnap seems to have been aware of this problem. Lewis (1970) and Cresswell (1985) can be viewed as attempts to circumvent this problem.

13 More generally, whenever two sentences happen to be true in exactly the same worlds, they have the same intension, even if their meanings have intuitively very little in common.

14 See, e.g., Chalmers (2002, p. 179, 2006a, pp. 595–596, 2010, p. 372, 2011b, p. 600, 2012, p. 42).

15 Chalmers, though, refers to neither of them nor to anyone else here. See also King (2019).

16 Cf. Chalmers (2010, pp. 558–559).

such structured intensions as being true or false in a world (see, e.g., Chalmers, 2010, p. 372). It is most unclear how all that is really supposed to work.

It is obviously possible to define the intension of a sentence, given the intensions of the constituting words, in terms of the latter — when one knows what one is looking for. But it is the definition, some kind of linguistic description of the function that has some structure, not the function defined — which is (according to the standard modern understanding of functions) simply a class of ordered pairs of worlds and truth values and has no finer structure. A function can often be defined in a number of different ways, in terms of definitions with different structures. It would be a sort of category mistake to ascribe the structure of any particular definition to the abstract function itself. In sum, it is very difficult to see any possible way to have a sentence intension which is both structured in the desired way and would still also be a sentence intension.

Cresswell's theorem. The above worries are reinforced by a certain rigorous result due to Cresswell (2002). Namely, Cresswell demonstrates that if a language only conforms to four reasonable conditions, the propositions expressed by sentences of that language which are true in exactly the same worlds are identical. It follows that if a language satisfies those conditions, propositions cannot really have any structure.¹⁷ The conditions of Cresswell's result express credible general connections between sentences and the propositions they express, their truth conditions, the functional compositionality of meaning, and negation. Chalmers seems to be committed to the first three conditions, or it is at least quite natural to interpret him being so, and he does not seem to have any principled reason to deny the fourth condition on negation. Also for this reason, it is not clear that he can simultaneously appeal to structured propositions or structured intensions. Cresswell's theorem should at least give Chalmers pause.

The Russell–Myhill paradox. Then there is a paradox related to propositions, which goes back to Russell (1903) and Myhill (1958), the so-called Russell–Myhill Paradox. It has been neglected for a long time, but it has recently gained new interest.¹⁸ It can be viewed as a paradox specifically related to *structured* propositions. Unlike the better-known Kaplan's paradox (which Chalmers (2011a) considers), this paradox does not require the assumption that the totality of propositions is a set; it may well be a proper class. However, generalizations concerning propositions are expressed repeatedly; consequently, it must be at least possible to quantify over propositions. Some relatively simple sentences attribute properties to entities.

17 In this and the next subsection (on Cresswell's theorem and the Russell–Myhill paradox), I shall use the *proposition* talk uniformly with the relevant literature; however, these are clearly just as much challenges for the idea of structured *intensions*.

18 See, e.g., Uzquiano (2015), Dorr (2016), Fritz (2017), and Goodman (2017). I have also benefited from various unpublished notes on the paradox by Andrew Bacon, Sten Lindström, and Juhani Yli-Vakkuri.

Propositions too have different properties. Some sentences attribute properties to propositions, and such a sentence presumably also expresses a proposition. Consequently, some propositions attribute a property to a proposition. But one can ask, in the case of any such proposition, whether it attributes the property to itself or not. The existence of the paradoxical property R then follows by comprehension. The assumption that propositions are structured directly entails that two propositions p_1 and p_2 of sentences attributing properties P and Q , respectively, to a proposition p_3 (the propositions expressed by $P(p_3)$ and $Q(p_3)$) or to all propositions (the propositions expressed by $(\forall p)P(p)$ and $(\forall p)Q(p)$) can be identical only if P and Q are identical. With the above general assumptions and the assumption that propositions are structured, one ends up with a contradiction.

Opinions seem to vary on just how unescapable and fatal the paradox is for structured propositions. There are known ways out of the paradox, such as Russell's ramification of types, albeit at least that response is widely taken to be cumbersome and unattractive (Chalmers (2011a) himself expresses concerns about the ramification when he discusses Kaplan's paradox). It is not clear whether any of these is both consistent with everything else that Chalmers assumes, well-motivated and not ad hoc from that perspective, and genuinely available to him. Again, the burden is on Chalmers to present a convincing account of how exactly his semantic theory could avoid the contradiction. It is far from clear that Chalmers is entitled to give up any of the assumptions of the paradox if he wants to remain faithful to the Fregean tradition.

Interim conclusion. The idea of structured propositions or structured intensions faces both serious technical troubles and more general philosophical challenges.

3.2 *The linguistic construction of scenarios*

As we have noted, Chalmers now often seems to prefer to construct the space of 1-worlds (scenarios) in a metaphysically neutral way from linguistic building blocks, that is, sentences. The intensions of singular terms are standardly functions from worlds to the referents of these expressions (in each world), that is, to certain individual entities (and the intensions of general terms are functions to sets of such entities). But if worlds are replaced by their linguistic descriptions, where does one get the values of these intensions: individual entities (and sets of them)? Chalmers' solution is that individual entities are also constructed linguistically as equivalence classes of singular terms (equivalence modulo a priori entailment).

This is an ingenious move, but it raises new critical questions when scrutinized more closely. To begin with, in what sense is this *semantics* anymore? A name is associated with a function from linguistic descriptions to linguistic expressions

(or equivalence classes of such). The theory is thus confined to intra-linguistic relations and attaches only linguistic expressions to linguistic expressions (and classes of such); it provides no connection between the language and the extra-linguistic reality. From a philosophical point of view, such “semantics” is somewhat vacuous. When Chalmers considers the straightforward and naive view that Fregean senses are simply descriptions, he notes critically that “senses of this sort can never break out of the linguistic domain” — and this is clearly a fault in his view (Chalmers, 2002, p. 147). However, exactly the same is the case with his own 2D semantics with linguistically constructed scenarios.¹⁹

Furthermore, the following question arises: Sentences and expressions of what kind of language are these building blocks of “worlds” intended to be? Clearly, it cannot be an uninterpreted formal language, but it must be an already interpreted and meaningful (idealized) language, for example, idealized English.²⁰ Then again, it is one fundamental baseline of philosophical theorizing about meaning that two different expressions, including expressions from different languages, should be able to be synonymous — in other words, to share the same meaning or sense.²¹ For instance, according to the Fregean view, not only the expressions “the morning star” and “the evening star” have distinct meanings or senses, even though they actually refer to the same entity (the planet Venus). In addition, “the morning star,” “der Morgenstern” (German), and “aamutähti” (Finnish) all have the same sense or meaning. Understandably, Chalmers’ own discussion focuses on English. Accordingly, the intension of “the morning star,” in Chalmers’ view, is a function; more precisely, it is a set of ordered pairs in which the first entry is a scenario, that is (under the linguistic construction of scenarios), an equivalence class of maximal English sentences (complete descriptions of a possible world), and the second entry is a set of English expressions (an equivalence class of singular terms). However, let us then look instead, say, at Finnish. Obviously, its expressions must also have meanings or Fregean senses. But what are they? For example, what is the sense or the intension of the Finnish expression “aamutähti”? In all reason, it must be the same as the sense or the intension of the corresponding English expression “the morning star” because they intuitively mean

19 Chalmers discussed this issue very briefly in Chalmers (2012, pp. 249–250). It is debatable whether those short remarks are sufficient to remove such worries.

20 For example, when Chalmers discusses identifying expressions merely on the basis of their orthographic type (when they are made up of the same letters or sounds, regardless of their meaning), he notes that even “bachelors are unmarried” would then be false in some worlds, for instance, in worlds in which the string “bachelors are unmarried” means that horses are cows. And that would not obviously do for Chalmers. Consequently, the language must be already interpreted (Chalmers, 2006b, p. 67).

21 Frege himself explicitly held this view: “The same sense has different expressions in different languages” (Frege, 1892a, p. 159).

the same. However, it would be quite odd if the meaning of a particular Finnish expression contained as its constituents expressions of English.

Chalmers states: “A Fregean ‘thought’ [a sense of a sentence] is not a mental entity. It is more like what many philosophers call a proposition, capturing the content that a sentence expresses, when stripped of the accidental clothing of a particular language” (Chalmers, 2002, p. 141). The linguistic construction of scenarios is, however, in apparent conflict with this. By the way, although Chalmers avoids committing himself without reservations to descriptivism, he sometimes proposes that the senses, or the intensions, can at least be approximated by so-called causal or metalinguistic descriptions (see, e.g., Chalmers, 2002, p. 170). But this again violates the above point and ties a sense to a particular language.²²

3.3 *Infinitary languages and their limits*

In all cases, complete canonical descriptions of scenarios play a central role in Chalmers’ approach. Chalmers notes repeatedly that his framework requires an idealized language which, among other things, allows *infinite* and even uncountable conjunctions (and perhaps disjunctions). He writes:

There are reasons to believe that one should allow scenarios corresponding to arbitrarily large conjunctions. ... So our ideal language should allow infinitary conjunctions with size corresponding to arbitrary cardinals, and some scenarios will require arbitrarily large conjunctions for their specification. (Chalmers, 2011a, p. 90)

Chalmers seems to assume that a sufficiently powerful infinitary language can always uniquely characterize at least the structure of any possible world — in technical terms, that a model can be characterized *up to isomorphism*. In reality, this is just not possible: although infinitary languages are very powerful indeed, and any countable structure can be fully described by a countable sentence, there are relatively simple models with the power \aleph_1 which cannot be described (up to isomorphism) even in the highly infinitary language \mathcal{L}_{\aleph_1} (see Nadel and Stavi, 1978). This means that there are possible worlds which differ in their structure but are nevertheless inseparable in terms of even such an extremely strong infinitary language. It is not therefore clear that allowing infinite conjunctions in the language can deliver everything that Chalmers needs.

22 These descriptions, such as “The person called ‘Peter’ by those from whom I acquired the name,” explicitly involve expressions, such as “Peter,” of a particular language. (If we are talking about Saint Peter, he was called “Kepha” in Aramaic and “Petros” in Greek (both meaning “rock”); all these names presumably have the same sense in contrast to his original name “Simon,” with a distinct sense.) For more about the problems of such views, see Raatikainen (2020a).

4. Philosophical Worries

4.1 *The status of various theses and the golden triangle*

After these technical critical questions, let us turn to more general philosophical issues. We observed above that Chalmers visibly takes the Core Thesis to be a substantive philosophical thesis and its establishment to be an important achievement. In particular, it would, according to him, restore “the golden triangle.” Chalmers also discussed various other philosophical theses, such as “the Carnapian Thesis,” and “the Neo-Fregean Thesis,” which according to him together constitute and support the golden triangle.

For a start, let us simply assume that an exhaustive epistemic space of scenarios just has been somehow successfully delimited, in accordance with the basic intuitive understanding of a scenario as a maximally specific way the world might be, for all one can know *a priori*.²³ Let us then note that, no matter how exactly “possible” and “necessary” are interpreted, the following two simple equivalences involving them hold more or less trivially:

A is possible iff A is true in some possible world
 A is possible iff not- A is not necessary

Let us call them *modal platitudes*. They have as immediate corollaries:

A is necessary iff not- A is not possible
 A is necessary iff A is true in every possible world

As is familiar, various modal logics are grounded on such platitudes.

In Chalmers’ basic intuitive understanding of scenarios and their space, “possible” worlds of the 1st dimension (that is, scenarios) are taken to be all such worlds which are not ruled out *a priori*. In other words, it is simply stipulated that “possible” is here understood to mean being consistent with what is *a priori* knowable, that is, being not *a priori* refutable. However, in the light of “the modal platitudes,” that amounts to stipulating that “necessary” will henceforth be used, in the 1st dimension, to mean *a priori* knowable.²⁴

Recall then the Core Thesis: “ S is *a priori* iff S has a necessary 1-intension.” As was noted above, the right-hand side is a bit of an opaque way of expressing

²³ “Successfully” here is intended to mean in particular that the epistemic space is inclusive enough: if a sentence S is not *a priori* refutable, then there exists a scenario which makes S true.

²⁴ Echoing Evans, Chalmers himself on a few occasions calls this “deep epistemic necessity,” which should reveal that we are not talking about necessity in its standard metaphysical sense anymore. At least in one place, Chalmers even explicitly states: “We can say that s is deeply epistemically necessary when s is *a priori*” (Chalmers, 2011a, p. 65). In some other contexts, Chalmers nevertheless seems to talk as if we were still dealing with necessity in its standard metaphysical sense.

things, but it evidently means that S is true in every scenario. We can now conclude that, if the epistemic 2D framework functions at all as it is intended to, in accordance with the basic intuitive understanding of the space of scenarios, the Core Thesis is, on closer scrutiny, more or less trivially true. Namely, if it is stipulated that “necessary” is from now on used (in this context) to mean a priori knowable, and this is what in effect happens in Chalmers’ 1st dimension, unsurprisingly there is a close connection between apriority and “necessity.” The Core Thesis is then virtually only a roundabout way of saying that what is a priori knowable is a priori knowable.²⁵ And that is hardly a remarkable philosophical conclusion, and establishing it is hardly a significant philosophical achievement.

Something very similar happens with the various other theses and the golden triangle. For simplicity, let us focus on sentences; “ $A \equiv B$ ” thus means that “ A ” and “ B ” have the same truth-value. The Carnapian Thesis then says that “ A ” and “ B ” have the same intension iff “ A ” and “ B ” have the same truth value at every scenario. However, that holds trivially.²⁶ The Neo-Fregean Thesis (2D version) becomes likewise, in a parallel way, nearly trivially true. Note, however, that “necessary” in the Carnapian Thesis, just like in the Core Thesis, is not any more the regular notion of necessity but an epistemological surrogate. Consequently, Chalmers’ 2D framework does not as a matter of fact “restore the golden triangle,” that is, the (alleged) connections between necessity, apriority, and meaning, as was promised. Rather, it stipulatively redefines “necessary” to mean a priori knowable.

It is important to see the wood for the trees here: if the golden triangle and the various related theses had really been *fully restored*, it would have been demonstrated that the Kripkean alleged a posteriori necessities are all in reality either contingent or a priori. However, nothing of the sort has been established. Elsewhere, Chalmers does not claim so much but writes instead: “two-dimensionalism proposes a unified analysis of the necessary a posteriori: all such sentences have a necessary secondary intension but a contingent primary intension” (Chalmers, 2006a, p. 588; 2010, p. 548). However, that amounts really to merely saying that necessary a posteriori truths are not a priori (this is what having a “contingent” 1-intension means in practice), which is trivial given the

25 In one passage, Chalmers comes close to granting this: “On this [epistemic] construction, thesis (T5) [the Core Thesis] is all but guaranteed to be true” (Chalmers, 2010, p. 552). On another occasion, he writes that under the *metaphysical* construction of scenarios specifically, the Core Thesis “is not entirely trivial” (Chalmers, 2002, p. 152) and implicitly almost concedes that outside this specific construction, it is trivial.

26 I am assuming here that only simple, standard sentence intensions are at issue. I shall discuss structured intensions after a while.

definitional relation between a priori and a posteriori as opposites.²⁷ And obviously, this does nothing to restore the golden triangle involving necessity proper.

Chalmers does briefly address the question of triviality in a few places (Chalmers, 2002, pp. 151–152; 2006b, p. 105; 2010, p. 552). However, he focuses primarily on the connection between meaning (intension) and a priori. Chalmers grants that the strong connection between them is built into the framework to a large extent by definition. My main complaint of triviality, in contrast, concerns the stipulative redefinition of “necessary” to mean a priori knowability, which does nearly all the philosophical work here. It creates an illusion that a substantive connection with necessity (in its regular sense) has been established. In fact, the latter is simply set aside.

The above-noted triviality of the various theses obviously disappears if the special *metaphysical construction* of scenarios as centered metaphysically possible worlds and the related thesis of metaphysical plenitude are additionally presupposed. Indeed, those theses then become quite controversial. But all the substantive content that results is due to metaphysical plenitude. Everything then turns to the question of whether the metaphysical construction can really succeed and satisfy the requirements of the epistemic 2D theory and the basic intuitive understanding of the space of scenarios — that is, whether it is inclusive enough. The 2D framework itself does otherwise no philosophical work here.

A particular more specific attempt to construct the epistemic space of scenarios may of course be controversial, given the overall aims, and it may be non-trivial whether it can succeed. Some attempts may well fail. But either such a construction succeeds and fulfils the requirements of the basic intuitive understanding of the space of scenarios or it does not. If it does, the various philosophical theses of Chalmers become more or less trivial. If it does not, the whole 2D framework grounded upon it fails. Practically all the nontriviality there may be relates to the question of whether the particular construction can ever work in the intended way.

If the golden triangle is ever to be fully restored, it will only be via the metaphysical construction and metaphysical plenitude. The more thoroughly epistemological construction of scenarios, which Chalmers now often seems to favour, simply cannot do so — it can only establish the rather trivial connection between a priori and “deep epistemic necessity” (which virtually just is a priori).

Finally, even if Chalmers managed to firmly justify metaphysical plenitude, a Kripkean a posteriori necessary statement would still be necessary and a posteriori. Even if there existed a metaphysically possible world which would,

27 For a primary intension to be “contingent” in the 1st dimension does not really mean that anything is contingent in the regular metaphysical sense but only that its negation is made true by some scenarios, which means merely that it is not a priori.

when viewed differently,²⁸ make true, for example, “Hesperus is not Phosphorus,” its opposite “Hesperus is Phosphorus” is no less necessary (in the customary sense of “necessary”) and no less a posteriori; necessity and apriority still diverge, and the golden triangle remains broken. As I said, it is important to see the wood for the trees here.

Then again, assume that, following Chalmers’ reflected view, structured intensions are rather to be used (suppose they could somehow be made to work). Chalmers’ Carnapian and Neo-Fregean theses then seemingly fail: even if “*A*” and “*B*” are a priori equivalent but only have different syntactic structures, they will *not* have the same intension: Consider, for example, “Betty is a vixen” and “Betty is a fox and Betty is female.” Although allegedly equivalent a priori (at least by Chalmers’ own standards; see below), their structured intensions (whatever more exactly they are supposed to be) are by all reason different. Apparently, this also means that the restoration of the golden triangle fails.²⁹

4.2 Apriority, analyticity, synonymy, and meanings

Intensions are functions, and as such they presuppose a domain. Therefore, before we can construct intensions, we must first specify their domain. It is a class of the relevant possible worlds. The possible worlds of the first dimension, scenarios, for Chalmers, are all worlds which are possible relative to the truths that are a priori knowable. But what, more exactly, is a priori knowable? This is in fact quite controversial in philosophy. Some noted philosophers such as Kitcher (1980, 2000) and Devitt (1998, 2005, 2010) contend that nothing is (and I am not entirely unsympathetic toward their critical arguments). Others may concede that logic and mathematics are, in some sense, a priori knowable, but nothing else is. Clearly Chalmers wants more, and for his 2D semantics to have any real interest, there has to be more.³⁰ But what, and where does it come from? Chalmers’ few examples of a priori knowledge are somewhat disappointing. They are often only cases like:

All bachelors are unmarried males
Lawyers are attorneys

28 For example, if the actual world was such that “Hesperus” denoted in fact a satellite and not Venus (cf. Chalmers, 2006b, p. 60). That would not change the widely accepted Kripkean conclusion, apparently granted also by Chalmers, that “Hesperus is Phosphorus” (with the meanings and references these names in reality have being fixed) is necessary (in the standard metaphysical sense).

29 Recall that according to Chalmers, those philosophical theses together constitute and support the golden triangle.

30 As will become more evident below, Chalmers’ 2D framework in fact requires abundant (non-logical) a priori connections between expressions.

Chalmers also writes that “‘Vixens are rare’ and ‘Female foxes are rare’ are trivially equivalent” because they are “intuitively synonymous,” and consequently have the same Fregean sense. Chalmers contends that when two expressions are intuitively synonymous, an identity between them is trivial and knowable a priori (Chalmers, 2002, p. 139).³¹

Of course, the above are garden-variety examples of *analytic truths*, that is, of sentences which are true solely in virtue of the *meanings* of their words. Chalmers himself is talking about “intuitive synonymy” here. But where do these *meanings* and *synonymities* come from? We are only at the beginning of the undertaking of constructing intensions. As functions, intensions presuppose as their domain a class of worlds whose scope we have only begun to determine. Meaning facts and intuitive synonymities delimit it. Therefore, those meanings cannot be intensions, and the relevant synonymities cannot be based on intensions. These *fundamental meanings* must already be out there and presupposed. But this seems to contradict Chalmers’ explicitly stated precondition that we are not to presuppose any independently grounded Fregean meanings.

There is a slogan in computer programming: “garbage in, garbage out.” Its idea is that there is only so much that a computer can do if the programming is bad or the inputted data is distorted or even blatantly false. Somewhat similarly, in the epistemic 2D framework, we only get out analytic truths we put in when we decide which worlds (scenarios) are “possible” (that is, are not refutable a priori). If we assume very little (or no) a priori knowledge of analytic truths, we get very little out. For example, one may want to rule out worlds in which bachelors are married because that is (allegedly) false a priori in virtue of the meanings of “bachelor” and “married.” It should not then be big news that the 1-intension of “No bachelor is married” is (epistemically) “necessary,” that is, true in all “possible” worlds, because one just ruled out worlds in which it would not be true as (epistemically) “impossible.” The intensions of “bachelor” and sentences containing it then simply reflect that choice. If it is, more controversially, assumed that “Hesperus” is analytically tied to, say, “the brightest object in the evening sky” and worlds which would contradict this are ruled out, one gets out intensions that mirror this choice. But if this assumption is not made, the resulting intensions in no way reflect the erased assumption.

The fundamental meaning facts are therefore primary and given; the whole technical apparatus of scenarios and intensions merely mirrors them (probably less than perfectly) and cannot in any way constitute them or explain them. The

31 This could be challenged: one might well have in one’s vocabulary, for example, both “groundhog” and “woodchuck” and use them fluently in conversation without recognizing that they actually apply to the same creature and are presumably intuitively synonymous.

semi-formal 2D framework does virtually no real philosophical work here. We primarily get out only what we have put in.

4.3 *A priori entailment and scrutability*

So far, I have simply presupposed that sentences somehow intuitively have a truth value in a world, and expressions have or are associated with intensions, without asking in virtue of what does a sentence have the truth value and an expression have the intension it has? In common modal logics, the language is purely formal; there are numerous possible formal interpretation functions, or valuations, and it is simply assumed that one is chosen and fixed. However, in Chalmers' 2D framework, the setting is quite different. Let us now take a closer look at this.

Even if worlds (scenarios) were not constructed as linguistic from the beginning instead of considering worlds in themselves, Chalmers quickly moves on to reflect "canonical" linguistic *descriptions* of worlds or scenarios (more of those descriptions below).³² Let D be such a canonical description of a world W . For a sentence S to be true in a world W then means, for Chalmers, that there is an a priori entailment from D to S ; that is, that the conditional " $D \rightarrow S$ " is knowable a priori. This also induces the intension of the sentence S : such a priori entailments determine in which worlds S is true and in which it is false.³³ The general intuitive idea is the following: "Once we know enough about the state of the world, we are in a position to know the truth-values of our sentences" (Chalmers, 2006b, p. 90). The extensions and intensions of sub-sentential expressions are (allegedly) achieved similarly: "Once we know how the world has turned out, once we know which epistemic possibility is actual, we are in a position to determine the extensions of our expressions" (Chalmers, 2006b, p. 75).

In order to avoid evident triviality, Chalmers requires that canonical descriptions of scenarios are given in a limited vocabulary, which does not include proper names and natural kind terms, for example:

One needs to make the case that epistemically complete descriptions do not need to specify the truth or falsity of most statements explicitly, so that epistemic evaluation does not have a trivial structure. (Chalmers, 2006b, p. 89)

Accordingly, Chalmers and Jackson (2001) have defended the following a priori entailment thesis:

³² And if we follow the linguistic construction of worlds (scenarios), we are there already.

³³ This is the setting for the 1st dimension and 1-intensions. Chalmers does not say much about the 2nd dimension and how exactly sentences get their semantic values there, except that worlds are "considered as counterfactual." (This is related to Chalmers' distinction between world's *verifying* a sentence and *satisfying* a sentence: cf. footnote 6.)

(AET) There is an a priori entailment from, roughly, physical and phenomenal truths to all other truths.

More exactly, the limited base is restricted to (i) physical truths (P), that is, all truths of the languages of fundamental and classical physics; (ii) phenomenal truths (Q), which are truths about *what it is like* to be a given entity; (iii) (at least two) indexical truths (I) (e.g., “I am such-and-such,” “Now is such-and-such”); and (iv) a totality or “that’s-all” truth (T) (which entails various negative truths, such as “there are no ghosts”). Chalmers abbreviates this base as PQTI (physical, qualia, that’s-all, indexical). Chalmers thus argues that all other truths, for example, truths of the special sciences, possibly containing proper names and natural kind terms (not in the base language of PQTI) are a priori entailed by this very restricted base. Later, Chalmers (2004, 2006b, 2012) has expressed this conviction by saying that all truths are *scrutable* from the PQTI base. According to Chalmers, the scrutability framework aims to provide a *foundation* for his 2D semantics (Chalmers, 2012, p. xxii). The PQTI base also assumedly determines a priori the extension of every expression (including those not in the language of PQTI) (see esp. Chalmers, 2012). And generalizing this, Chalmers contends that the canonical description D of an arbitrary world W in the restricted base language of PQTI entails a priori all sentences true in W . Chalmers comments on this as follows:

A Priori Scrutability bears on this debate [Fregean vs Russellian accounts of meaning] in part by making the case that most expressions in natural language, ... *have substantive and nontrivial a priori connections to other expressions*. In particular, they have substantive *a priori* connections to expressions in a compact base language (the language of PQTI, say). Substantive connections of this sort strongly suggest that there is a *Fregean aspect of content* that is reflected in these connections. (Chalmers, 2012, p. 245; my emphasis)

This is not the place to dwell on this overarching epistemological thesis. Suffice it to say here that it is a very strong and quite controversial thesis and has been critically discussed considerably in the literature.³⁴ But inasmuch as such comprehensive a priori entailments are dubious, primary intensions themselves threaten to become voluminously indeterminate. We may also note in passing that the various philosophical theses of Chalmers essentially depend on the sufficient determinacy of intensions and become likewise contested in Chalmers’ specific a priori entailment approach to 1-intensions.

Let us instead consider for a moment the alleged a priori entailment as such. Namely, we can ask on what is this a priori knowledge of the conditional “ $D \rightarrow S$ ” between a canonical description D of a world (scenario) and a sentence

34 See, e.g., Block and Stalnaker (1999), Byrne (1999), Díaz-León (2011), and Elpidorou (2014). (I discuss certain aspects of the thesis in some detail in Raatikainen, 2020b; see also Raatikainen, 2014).

S itself grounded? Let us focus on the interesting case where *S* is neither a priori knowable in itself nor in the neutral base language of canonical descriptions *D* of worlds; *S* may thus contain, for example, proper names or natural kind terms. When the languages of *D* and *S* are distinct, the a priori entailment cannot in most cases be purely logical and formal. Therefore, even if we set aside (reasonable) doubts concerning such a priori entailments, it is clear that *S* must here first be equipped with a *meaning*, and only after that it is possible to evaluate whether a canonical description *D* in the base language a priori entails it or not. It is simply not possible to first decide such questions of (non-logical) a priori entailments and only afterwards construct the meaning for *S* on the ground of such a priori entailments. That would get things the wrong way round. The intension of *S* thus presupposes, in Chalmers' setting, the meaning of *S* and depends essentially on it. The resulting intension can at best reflect this *meaning*, to some degree, but it cannot replace the real thing and do its job. But recall again that we were not, according to Chalmers, to presuppose any independent Fregean meanings. It now seems that Chalmers' 2D approach cannot even get off the ground without violating this desideratum repeatedly.

It is not always clear what rests on what in Chalmers' writings. Namely, in *Constructing the World* (Chalmers, 2012) and elsewhere, Chalmers grants that there are in general *no definitions* of the other expressions (e.g., proper names and natural kind terms) in terms of the base language of PQTI. However, he contends that the *intensions* of his 2D framework, which do not require explicit definitions, can take care of the job and support the a priori entailment (scrutability) thesis (see Chalmers, 2012, pp. 16–19). But once again, it should be noted that we are only at the beginning of the undertaking of constructing a foundation for the 2D framework and 1-intensions in particular. Chalmers' 1-intensions are not even well defined without the pervasive a priori entailments being already on hand. As we have seen, Chalmers' 2D semantics and its intensions presuppose the a priori entailment (scrutability) thesis and extensive a priori entailments. But now the plausibility of the a priori entailment (scrutability) thesis is made to depend on the availability of intensions. Sometimes it appears as if the justifications are moving in circles here.

The philosophical thesis that linguistic expressions do have abundant and substantive a priori connections to other expressions, and to the restricted base language of PQTI in particular, is a very strong assumption, *prima facie* quite controversial, and acutely in need of philosophical support. Building a complex semi-formal system over this strong thesis, which takes the thesis for granted and merely mirrors its presuppositions, does not make the thesis itself more plausible.

4.4 *Semantic pluralism as a rescue?*

Expecting objections, Chalmers often retreats, as a preventive move, to a kind of semantic pluralism. He writes:

Expressions can be associated with semantic values in many different ways.... there is no claim that any given semantic value exhausts the meaning of an expression ... this approach gives little weight to disputes over whether a given (purported) semantic value is “the” meaning of an expression ... Such disputes will be largely terminological, depending on the criteria one takes to be crucial in one’s prior notion of “meaning” or “semantics.” (Chalmers, 2006b, p. 65)

Instead, Chalmers frames as his key question the following: Is it possible to define intensions and associate sentences with intension so that the Core Thesis is true? However, we have seen above that it is very difficult to execute this in a way that is neither trivial nor infeasible.

Be that as it may, I would argue that the philosophically interesting question is whether the entities we thus have at hand — Chalmers’ primary intensions, that is — have something to do with meanings as they have been commonly understood in contemporary philosophy. After all, his expressed pluralism notwithstanding, Chalmers also repeatedly ties his theory and its intensions closely to the common notions of meaning and synonymy, and the mainstream philosophical debates about them. For example, he often puts his 2D semantics forward as a contribution to the debate between the Fregean and the Millian (or Russellian) theories of *meaning*. Chalmers says, for instance: “I have argued that a broadly Fregean account of meaning is tenable” (Chalmers, 2002, p. 178). To be sure, Chalmers never goes so far as to claim that his primary intension of an expression is “The Meaning.” Rather, he is content with saying that it is an *aspect* of meaning (albeit an important aspect).

However, it is also a fact — and Chalmers on a few occasions explicitly grants it is — that Chalmers’ primary intensions just cannot be public meanings: he admits that his primary intensions “do not play the ‘public meaning’ role” (Chalmers, 2012, p. 249).³⁵ They are, on the contrary, fairly subjective and vary quite wildly even within one linguistic community. Chalmers contends that the issue is “largely terminological.” He adds:

We could distinguish “type meanings” and “token meanings”, and allow that primary intensions are not (in the general case) type meanings, but they are token meanings. Or we can use a different term, such as ‘content’, for the sort of meanings that can vary between tokens of an expression type. (Chalmers, 2002, pp. 174–175)

³⁵ See also Chalmers (2002, pp. 173–178). Chalmers comments: “On the account I have given, it is clear that the epistemic intension of a name can vary between speakers” (Chalmers, 2002, p. 173).

Perhaps that is what we should indeed do. The idea that meanings are intersubjectively shareable and public has been most predominant in the contemporary philosophy of language. No matter what was the real view of the historical Frege,³⁶ if the aim is to participate in the later philosophical debates about meaning, from Carnap and Quine to Searle, Dummett, Putnam, and beyond, even the “Fregean” theories of meaning are primarily theories of *meaning* — where meaning is quite unanimously understood as something public, stable, and socially shared. If this widely held interpretation is given up, it is unclear whether one is participating in the same discussion anymore.³⁷ So maybe it would indeed be clearer to reserve the term “meaning” for that notion, and use some other term for Chalmers’ notion, as he himself deliberates.

Once we do that, however, it becomes visible that the issue is *not* purely terminological: Although there were several interesting aspects of meaning, it is not unreasonable to expect that even an *aspect* of meaning should still be an aspect of *meaning* — and not of something quite different. Furthermore, if the aim is to solve “Frege’s puzzles” *about meaning*, it does not help to offer a theory which is not even about meaning. For the theory may then be perfectly compatible with the Millian view about *meaning*. How could such an account ever convince a sceptic about Fregean *meanings*? Finally, how could epistemic two-dimensionalism ever hope to restore the golden triangle between reason, modality, and *meaning* if it does not even concern *meaning*?

There is of course nothing wrong as such in an attempt to develop an account of some more subjective kind of content. But it should then be clear that such a theory has quite little relevance for the mainstream debates concerning meaning, where meaning — whatever else it is supposed to be, and views vary — is standardly understood as something public and shared. It just seems as if Chalmers is trying to have his cake and eat it too here. Consequently, his view is quite unstable.

36 In his defence, Chalmers refers here to Frege, and reminds that Frege allowed that two language-users may attach different senses to a name (Chalmers, 2002, p. 175; 2012, p. 251). However, for Frege, such a difference of senses amounted to speaking really different languages. This aspect of Frege’s views on sense should not be one-sidedly exaggerated at the expense of just how central the objectivity and the shareability of meaning was for him (see, e.g., May, 2006; Kremer, 2010). Mankind has, according to Frege, “a common store” of meanings (“thoughts,” as he called the senses of sentences). Such a meaning can be expressed in different languages and is objective. The meaning (sense) of an expression or a sentence is what one grasps in understanding it: it is grasped by everyone sufficiently familiar with the language in which it belongs. Successful communication is grounded, for Frege, on shared meanings (Frege, 1892a, 1892b). In sum, arguably even Frege’s senses are much closer to public, shared, and stable linguistic (type) meanings than to Chalmers’ comparably subjective and varying 1-intensions.

37 This issue is discussed a little more extensively in Raatikainen (2020a).

4.5 Jubien's dilemma and other troubles

Some of our philosophical concerns above may be related to the following: Chalmers' 2D theory seems to be susceptible to what I like to call *Jubien's dilemma* (for certain kinds of theories of propositions; see Jubien, 2001; cf. King, 2007). To begin with, among different types of theories of propositions, there are what Jubien calls *mathematical theories*. These are theories in which set-theoretical or other mathematical entities play the role of propositions. Jubien mentions explicitly theories in which propositions are functions from possible worlds to truth-values as a paradigm of such theories. Chalmers' 2D theory thus clearly belongs to this category. Jubien next notes that the advocates of mathematical theories can take two rather different attitudes toward their theories: either such a theory is not even intended to be a theory of what propositions *really* are but only to provide a model of propositions, in which mathematical constructions are only "proposition surrogates," or it is contended that the relevant mathematical constructions *literally are* propositions.

The dilemma now is the following: in the former case, it is legitimate to press the fundamental question of what propositions themselves really are then. In the second case, in which the claim is that certain mathematical constructions (particular functions, or sets, for example) *really are* propositions — and it often seems as if this is the option toward which Chalmers is inclined — Jubien points out that such theories face a Benacerraf-type problem (more familiar from the philosophy of mathematics; see Benacerraf, 1973).³⁸ Namely, if it is possible to use certain kinds of set-theoretical constructions to play a role or represent a structure of theoretical interest, given the infinite richness and flexibility of the set-theoretical universe, it is typically possible to find indefinitely many other kinds of set-theoretical constructions which can do the same job just as well.

Consider, for example, the suggestion that propositions are functions from possible worlds to truth values. However, one could have also chosen to take propositions to be sets of possible worlds. And with a little ingenuity, one could no doubt provide any number of further (possibly more complex) set-theoretical candidates. But a plain set of possible worlds simply is not a function from possible worlds to truth values — and similarly for other possible alternatives. There does not appear to exist any principled reason to consider any one particular candidate correct and all the others wrong. Therefore, it is reasonable to conclude that in reality a proposition is not any of the alternative kinds of set theoretical constructions that can act as its surrogate. In sum, either a mathematical theory does not even begin to answer the question of what propositions truly are, and is as such

³⁸ In fact, such a Benacerraf-type objection to mathematical theories of propositions was put forward already earlier by Crane (1992).

seriously defective, or it does but is seriously undermined by a Benacerraf-type problem.

King (2007, pp. 7–8) extends the Benacerraf-like objection to mathematical theories of structured propositions. His own focus is, however, on Russellian structured propositions. But the critical argument clearly applies, *mutatis mutandis*, to Fregean structured propositions as well. Consider thus, for example, the (alleged) structured Fregean proposition expressed by the sentence “Steve admires Ruth.” If f_1 is the intension of “admiring,” f_2 the intension of “Steve,” and f_3 that of “Ruth,” the alleged structured intension of the whole sentence might perhaps be the ordered triple: $\langle f_1, f_2, f_3 \rangle$. The enthusiasts of structured propositions may quickly identify the proposition expressed by the sentence with this particular triple (or with something analogous). But is this really plausible? In reality, one could find several different structured entities, none of which seems less or more justifiable than others to be the proposition expressed by “Steve admires Ruth”:

$$\langle f_2, f_1, f_3 \rangle, \quad \langle f_2, f_3, f_1 \rangle, \quad \langle f_1, \langle f_2, f_3 \rangle \rangle, \dots$$

There is also another fundamental problem for mathematical theories of propositions; it seems to be in the air already in Jubien (2001), but it is more explicitly (although still briefly) noted by King (2007). Namely, many things, such as sentences or statements and beliefs, can or at least appear to be able to represent the world, and therefore be true or false, have truth conditions, and so on. However, those who believe in propositions typically think that the former do so only derivatively, and that it is propositions which really and primarily have this property; that propositions represent the world and have truth conditions essentially and non-derivatively. Quite independently of the details, propositions of mathematical theories are in any case simply some kinds of sets. However, sets do not normally essentially represent the external material world, that is, are not true or false and do not have truth conditions: think of the set of integers or the set of decreasing functions. So why would very few of them be an exception and have essentially truth conditions, and if so, which ones and exactly in virtue of what (cf. King, 2007, p. 8)? These are pressing philosophical questions for all mathematical theories of propositions.

5. Conclusions

We have taken note of various problematic aspects of Chalmers’ ambitious two-dimensionalist program. On the one hand, standard sentence intensions are far too coarse-grained to serve plausibly as anything like meanings. On the other hand, it turns out to be exceedingly unclear how more exactly one could really have coherently more fine-grained, structured intensions. The latter also face

grave technical challenges. Constructing scenarios from linguistic constituents has certain philosophically odd consequences. Furthermore, it is not clear whether even allowing infinitary conjunctions is sufficient for all the purposes of Chalmers' two-dimensionalism.

As to my more general critical philosophical considerations, it is perhaps worth underlining that I have *not* argued here that there are no a priori knowable truths or no analytic truths. Moreover, I have *not* defended the direct reference theory (or Millianism) or the Russellian view of propositions. Furthermore, I am emphatically *not* suggesting that the framework of possible worlds would be completely futile as a tool for analysing semantic, epistemological, and metaphysical issues. My key question has rather been the following: Has Chalmers really succeeded, with the help of his epistemic 2D apparatus, to construct or ground Fregean meanings (at least a central aspect of such); to demonstrate that most expressions have wide and substantive a priori connections to other expressions; to convince even a sceptic about Fregean meanings that there are such things; and to restore the golden triangle of meaning, reason, and modality — as Chalmers explicitly stated as his aims? I have argued that all this remains doubtful; that on closer scrutiny, there are some serious gaps in the overall arguments, and the reasoning appears in some places somewhat circular. Chalmers barely provides the tools for breaking out of those circles. We have also identified several apparent stumbling blocks for Chalmers' specific theory. It seems that in the attempt to restore the golden triangle of meaning, necessity, and apriority, both necessity and meaning are surreptitiously replaced with something else.

Of course, no reasonable philosopher should deny that inasmuch as a word or a concept is analytically tied to some other expressions or concepts, such as, perhaps, "bachelor" to "unmarried," and those connections are knowable a priori; there is an aspect of its meaning that is "constitutively tied to the expression's role in reason and cognition." Such alleged connections, if they exist, are likely non-extensional and can undoubtedly be analysed, to some extent, with the help of the framework of possible worlds. The argument is rather about the magnitude that there really are such a priori connections, and whether they are abundant enough to determine in general an expression's extension and intension. Formal tools such as the 2D framework cannot even begin to answer the fundamental philosophical questions concerning the nature of meaning and the existence and scope of a priori knowledge and analytic a priori connections between expressions. They merely mirror — less than completely, as the case may be — what is already out there, if indeed it even is out there. Chalmers apparently gives much too much philosophical work for his semi-formal 2D apparatus to do.

Acknowledgements

I owe a special debt to Juhani Yli-Vakkuri here. It was he who first incited me to delve into this topic, and he has also been an important interlocutor with me over time on these themes. Some critical considerations in this paper were inspired and set in motion by certain brief remarks by Jason Stanley in his 2014 critical notice. I hereby express my debt to him. I also want to thank Jeff King for the inspiration and comments on structured propositions. I am indebted to Jouko Väänänen for his help with infinitary logics. I am also very grateful to David Chalmers, who has always kindly replied to my queries and clarified his views for me. Of course, I am solely responsible for the remaining misunderstandings. Different portions of this paper have been presented at the Logos Seminar, Barcelona; at the Logic, Epistemology and Metaphysics Forum, The Institute of Philosophy, London; at The Central European University, Budapest; and at various workshops in Tampere. I would like to thank the audiences on all those occasions for their comments.

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