

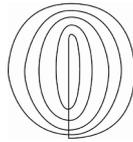
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POSSIBLE WORLDS

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Abstract

Possible worlds' semantics for modal logic has proven to be theoretically useful. But talk of possible worlds is puzzling. After all, what are possible worlds? This essay provides an overview of two of the main theories on the nature of possible worlds, namely, Lewis's Extreme Realism and Plantinga and Stalnaker's Moderate Realism. The essay also explores the merits and shortcomings of both theories.

Keywords

Possible worlds, Modality, Metaphysical Possibility, Kripke Semantics, Extreme and Moderate Realism

Possible Worlds

1 Introduction

Necessity, possibility and contingency are *modal* concepts, having to do with the *mode* of truth of propositions. There are thought to be different kinds of necessity, examples being *metaphysical* necessity (possibility and contingency), *physical* necessity and *moral* necessity. To give some examples, it is usually thought that the laws of physics are physically necessary. However, arguably, it is physically contingent that there is an element with atomic number 116, and physically possible for there to be an element with atomic number 200. Possible worlds talk has been taken to help understand talk of necessity and possibility. At the core of such elucidation lies the following principle:

P-W Link It is (X -)possible that φ if and only if there is a (X -)possible world w such that, at w , φ .¹

In general, the X -possible worlds are subsets of all the possible worlds. For instance, it is *physically* possible that φ if and only if there is a physically possible world w such that, at w , φ , and it is *morally* possible that φ if and only if there is a morally possible world w such that, at w , φ . Metaphysical possibility is understood as being the broadest kind of possibility, in the sense that a sentence is metaphysically possible just in case it is true at some possible world.² Usually, a world is taken to be *physically* possible if and only if it is a world where the

¹ The corresponding principles for *necessity* and *contingency* are:

N-W Link It is (X -)necessary that φ if and only if every X -possible world w is such that, at w , φ .

C-W Link It is (X -)contingent that φ if and only if, at $w_{@}$, φ , and it is not the case that every X -possible world w is such that, at w , φ (where $w_{@}$ denotes the actual world).

² More precisely, to use a distinction presented by Rayo (2013: section 2.2), metaphysical possibility is understood to be the broadest kind of possibility *de mundo*, i.e., possibility “sensitive to ways for the world to be” (Rayo 2013: 49), as opposed to possibility *de repraesentatione*, a kind of possibility sensitive to how ways for the world to be are themselves represented.

laws of physics obtain. Arguably, a world is *morally possible* if and only if it is one where all agents are ideally rational. As an example of an application of the P-W link, the principle yields the equivalence of the two following statements:

- (1) a. It is metaphysically possible that some chair is broken.
 b. There is a possible world w such that, at w , some chair is broken.

The P-W link helps elucidate talk of necessity and possibility in at least two ways. On the one hand, resorting to the P-W link makes it easier to capture relations between possibilities, thus providing the resources for understanding what is the logic of necessity and possibility. On the other hand, appealing to the P-W link is sometimes helpful in determining the plausibility of some possibility claims.³ Concerning the logic of necessity and possibility, the P-W link provides both i) the means to capture the interaction between different kinds of possibility, and ii) the means to account for the logic of these different kinds. For instance, in connection with the first point, we have that if something is physically or morally possible (and, in general, X -possible) then it is metaphysically possible, since to be a possible world is to be a metaphysically possible world. And in connection to with the second point, note that, in general, from there being a possible world w such that, at w , some chair is broken and every glass is empty, it follows that there are possible worlds w and w' such that, at w , some chair is broken, and, at w' , every glass is empty. In general, from there being a possible world w such that, at w , $\varphi \wedge \psi$ it follows that there are possible worlds w and w' such that, at w , φ , and, at w' , ψ . Given the P-W link, this means that $\Diamond(\varphi \wedge \psi) \vdash \Diamond\varphi \wedge \Diamond\psi$. In effect, the P-W link underlies the usual interpretation of the model-theory for modal logic provided in terms of Kripke frames, and thus plays a major role in our understanding of the logic of modality, allowing for the model-theory of modal logic to be provided in terms of the extensional language of set-theory.⁴

³ See Stalnaker (2011: section 2).

⁴ Kripke first provides what has come to be called the possible worlds semantics for modal logic in Kripke 1959, 1963.

Kripke frames have themselves been applied in fields such as semantics, pragmatics, and game theory, bringing with them talk of possible worlds. As to the second reason why the P-W link helps elucidate talk of necessity and possibility, by attempting to describe in more detail a possible world witnessing a possibility claim, one may find that the description turns out to be absurd, in which case the possibility claim is false, contrary to what might have been thought before trying to provide a description of the possible world witnessing the possibility claim.

But should one believe in the existence of possible worlds? And, if so, what kinds of things are they? In this article only the second question is dealt with. *Realism* about possible worlds will be presupposed, where this is the thesis that there are several possible worlds, among which is the actual world. As to the question what kinds of things are possible worlds, it will be assumed that any theory answering this question should have as a consequence that every instance of the P-W link is true. Thus, asking for what kinds of things are possible worlds may be seen as asking what kinds of things realise a certain theoretical role, partially determined by the P-W link.

Views on the nature of possible worlds can be distinguished according to whether they take possible worlds to be actual or nonactual (except for the actual world), and abstract or concrete.⁵ Two of the most popular views on possible worlds occupy two extremes. According to Extreme Realism possible worlds are concrete entities which, apart from the actual world, are nonactual, whereas Moderate Realism holds that possible worlds are abstract entities, all of which are actual. In this article the focus will be on Extreme Realism and Moderate Realism, more precisely on Lewis's version

⁵ Instead of 'concrete' and 'abstract', in the present context terms that would best capture the distinction being made would be 'individualism' (or 'first-orderism'), and 'higher-orderism', propositions, properties and relations all being examples of abstract entities, and things such as Cristiano Ronaldo, the number two and the set of all footballers all being examples of concrete entities. In particular, I do not have in mind any of the following distinctions: sets vs. nonsets, spatiotemporally located vs. not spatiotemporally located, well defined criteria of identity vs. not well defined criteria of identity.

of Extreme Realism, and Plantinga's and Stalnaker's versions of Moderate Realism.⁶

2 Lewis's Extreme Realism

According to Lewis's Extreme Realism ours is not the only universe. There are several others just as our own, having things as parts just as we are parts of this universe. Furthermore, Lewis holds that possible worlds are these total universes. That is, more precisely, Lewis holds the following thesis on the nature of possible worlds:

Concrete Worlds To be a possible world w just is to be a concrete⁷ individual w such that if any part y of w bears a spatiotemporal relation to some object x , then x is part of w , and every two parts of w are spatiotemporally related (see Lewis (1986: 70-72)).

A first consequence of Lewis's account of the nature of possible worlds is that possible worlds do not overlap, assuming that *being spatiotemporally related to* is an euclidean relation.⁸ To see this assume, for reductio, that there are two distinct but overlapping possible worlds

⁶ An important view on the nature of possible worlds that will be left out is *Combinatorialism*. The distinctive feature of the view is that to be a possible world just is to be sort of rearrangement or recombination. Apart from this claim, theorists differ on the nature of the recombinations, in particular on whether such recombinations are abstract or concrete. One of the most fully developed combinatorialist theories of modality is that of Armstrong 1986, 1989. Armstrong holds that facts are what there fundamentally is, and that individuals and relations are abstracted from these. These individuals and properties may be recombined in order to form "fact-like" entities which, contrary to facts, need not be true. According to Armstrong, states of affairs are these "fact-like" entities. Each possible world is taken to be a conjunction of states of affairs, and the actual world is the conjunction of all facts.

⁷ Even though Lewis is not totally clear on what is meant by saying that possible worlds are concrete or abstract. Still, Lewis's views on possible worlds entail that possible worlds are concrete on all of the ways in which he precisifies concreteness. See Lewis (1986: 81-82).

⁸ See Lewis (1986: 208-209), Menzel (2013: fn. 6). The notion of overlap being used in the text is of a mereological nature: two objects overlap if and only if they have a part in common. A relation is Euclidean if and only if, for every x, y and z , if x bears the relation to y and to z , then y bears the relation to z .

w_1 and w_2 . Since the worlds are distinct, there are parts x_1 of w_1 and x_2 of w_2 such that x_1 and x_2 are not spatiotemporally related. Let r be an overlapping part of w_1 and w_2 . Since w_1 and w_2 are Lewisian worlds, r is spatiotemporally related both to x_1 and x_2 . And since *being spatiotemporally related to* is assumed to be an euclidean relation, it follows that x_1 and x_2 are spatiotemporally related. Contradiction. Hence, it is not the case that there are two distinct but overlapping worlds, contrary to the assumption.

Among the theses contained in Lewis's Extreme Realism is a principle of recombination, meant to capture in a non-trivial way the claim that for every way a world could have been there is some world that is that way. The principle is as follows:

Principle of Recombination

1. For every set of objects there is a world that contains any number of duplicates of the objects in the set, in any spatiotemporal arrangement, size and shape permitting;
2. For every world w and set X of parts of w , there is a possible world w' such that w' is composed of duplicates of every element of X and for any x such that x is a part of w , if there is a duplicate of x that is a part of w' , then x is a part of some element of X .⁹

For an illustration of how the Principle of Recombination is supposed to work, consider the Eiffel Tower and some merely possible architectural landmark y . According to the first thesis of the principle of recombination, there is a possible world having duplicates of both the Eiffel Tower and y . According to the second thesis, there will be a possible world having the bottom half, but not the top half, of the Eiffel Tower, and there is a possible world having the top half, but not the bottom half, of the Eiffel Tower.¹⁰

A different component of Lewis's Extreme Realism concerns the

⁹ Lewis takes x and y to be duplicates if and only if every perfectly natural property had by x is also had by y , and vice-versa.

¹⁰ For more on the principle of recombination, see Lewis (1986: 87-90), as well as Efrid and Stoneham 2008 and Nolan 1996.

notion of actuality. According to Lewis, there are possible worlds and parts of these that do not actually exist. In effect, Lewis holds an indexical theory of actuality. On his view ‘actual’ behaves semantically as expressions such as ‘here’ and ‘now’. These are indexical expressions whose extension is determined by the context of utterance. Lewis takes the extension of ‘actual’ to be, relative to a context of utterance, the same as the extension of ‘this-worldly’, namely, a property that holds of an object x just in case x is a part of the world in which the utterance of ‘actual’ takes place.¹¹ Hence, the actual world is the maximal sum of spatiotemporally related objects of which I am a part. Still, inhabitants of other worlds would be as right in calling their worlds ‘actual’ as I am in calling my world ‘actual’, even though I would not be right in calling their worlds ‘actual’, and they would not be right in calling my world ‘actual’ (just as John and Mary are both right in saying ‘I am here now’, even though John would not be right in saying that he was in the place where Mary was at the time at which she uttered ‘I am here now’, and Mary would not be right in saying that she was in the place where John was at the time at which she uttered ‘I am here now’).

2.1 *A metaphysician’s paradise: two arguments for Extreme Realism*

Two main arguments by Lewis for Extreme Realism may be distinguished, the argument from familiarity and the argument from theoretical utility. The argument from familiarity is as follows:

I believe, and so do you, that things could have been different in countless ways. (...) Ordinary language permits the paraphrase: there are many ways things could have been besides the way they actually are. On the face of it, this sentence is an existential quantification. It says that there exist many entities of a certain description, to wit “ways things could have been”. I believe that things could have been different in countless ways; I believe permissible paraphrases of what I believe; taking the paraphrase at face value, I therefore believe in the existence of entities that might be called “ways things could have been”. I prefer

¹¹ See Lewis 1970, (1986: 92-96). Note that Lewis allows for ‘actual’ to be used more broadly in some contexts, applying also to things that are not part of the world where the utterance of ‘actual’ takes place. For instance, in a broader sense of ‘actual’ he allows for the actuality of sets whose members are parts of the world where the utterance of ‘actual’ took place.

to call them ‘possible worlds’ (Lewis 1973: 84).

As Stalnaker mentions when discussing Lewis’s argument, the argument’s rhetorical force lies in making plausible the view that “what appears to be a weighty metaphysical theory is really just some ordinary belief by another name” (1976: 66). Lewis does acknowledge that we sometimes justifiably refrain from taking ordinary language sentences at face value. Still, he endorses the view that there is a presumption in favour of taking them at face value. We may justifiably refrain from doing so when this leads to trouble and the trouble could be avoided by taking them in some different way. In such case, the presumption is defeated. But since, according to him, no argument has successfully shown that Extreme Realism leads to trouble (and furthermore he takes every other alternative to lead into trouble), the upshot is that we should not be suspicious of our “ordinary belief” in the existence of concrete possible worlds.

The argument from theoretical utility starts with an analogy with the case of set theory. Talk of sets provides the means to reduce all mathematical vocabulary to just the language of first-order logic with identity and membership as its only extra primitives. Likewise, Lewis shows how modal talk, talk of mental content, of semantic values and of properties and relations may all be substituted by talk of concrete possible worlds (in conjunction with talk of concrete merely possible individuals, and talk of sets). Furthermore, the axioms of set theory have as consequences all the theorems of mathematics. Likewise, he argues that his Extreme Realism has as consequences several of the truths involving talk of mental content, properties, semantic values, etc. The hypothesis that there is a hierarchy of sets is thus theoretically useful, so much so that mathematicians have been led to accept the hypothesis that there are “rather a lot of entities unknown to *Homo javanensis*” (Lewis 1986: 4). Likewise, Lewis holds that the hypothesis that there is a plurality of concrete worlds should be accepted on the basis of its theoretical utility.

2.2 *The reduction of modal discourse*

As mentioned, Lewis shows how Extreme Realism offers the resources for reducing modal talk, property talk, etc. to possible

worlds talk. Here I will briefly focus on Lewis's proposed reduction of modal talk, more precisely on the reduction of talk of necessity and possibility. Lewis takes the P-W link to provide an analysis of possibility.¹² According to him, the expression 'at w ', in 'at w , φ ', works as a restricting modifier, restricting the scope of the quantifiers present in φ to things that are parts of w . Thus, 'at w ' works in a way similar to 'in Australia' when it occurs in sentences such as 'in Australia, every philosopher is a metaphysician'. An interesting question concerns what happens when there are no quantifiers in φ . That is, how is *de re* modality analysed, where a *de re* modal claim consists, roughly, in the attribution of a modal property to an individual? Consider the following statement:

- (2) It is possible that Ryan Giggs wins the Ballon D'Or.

Statement (2) is analysed as

- (3) There is a possible world w such that, at w , Ryan Giggs wins the Ballon D'Or.

Let us assume that it is not the case that Ryan Giggs wins the Ballon D'Or in the actual world. Still, (2) seems to be a true possibility statement. Thus, there must be some possible world w different from the actual world such that, at w , Ryan Giggs wins the Ballon D'Or, or else (3) does not consist in an analysis of (2). Ryan Giggs does not exist at w , since, as previously mentioned, Lewis holds that possible worlds do not overlap, and Ryan Giggs is an inhabitant of the actual world.¹³ The question is thus how can it be true, at w , that Ryan Giggs wins the Ballon D'Or, since Ryan Giggs does not exist at w . As Lewis puts it, Giggs must satisfy 'wins the Ballon D'Or in 2013' at world w *in absentia*.

Lewis takes satisfaction *in absentia* to be *vicarious* satisfaction, holding the view that just as "other worlds are alternative possibilities for an entire world, so the parts of other worlds are alternative possibilities for lesser individuals" (Lewis 1986: 8). The idea is that some

¹² Similarly, the N-W link and the C-W link provide analyses of, respectively, necessity and contingency (see footnote 1).

¹³ A different reason why Lewis holds the view that possible worlds do not overlap concerns the problem of accidental intrinsics. See Lewis (1986: 199-202).

individuals in other worlds serve as alternative possibilities for each of us. Other worlds “represent”, as Lewis would say, alternatives for the actual world, and denizens of other worlds represent alternatives for the denizens of the actual world. An alternative possibility for an individual x is a *counterpart* of x . An individual y is a counterpart of an individual x just in case y resembles x in a sufficient degree in relevant respects, and there is no other individual that is part of the possible world of which y is a part that resembles x more than y . What degree counts as sufficient and what respects are relevant is taken to be a relative and indeterminate matter, subject to contextual variation. Now it can be said what it takes for Ryan Giggs to satisfy vicariously ‘wins the Ballon D’Or’ at a world w . This is the case if and only if there is a *counterpart* of Ryan Giggs that is a part of w and wins the Ballon D’Or.¹⁴ In general, an atomic formula in the language of first-order modal logic of the form $P\alpha$, where α is an individual constant and P is a unary predicate in the language, is satisfied at a possible world w if and only if there is a counterpart of α at w that has property P at w .¹⁵ Since nothing in the actual world is as similar to Ryan Giggs as Ryan Giggs himself, what it takes for Ryan Giggs to satisfy ‘wins the Ballon D’Or’ at the actual world is simply for Ryan Giggs to win the Ballon D’Or.

2.3 *Is it really a paradise? The argument from familiarity*

Stalnaker 1976 and van Inwagen 1986 object to the argument from familiarity by noting that from the innocent equation of possible worlds with ways things could have been it does not follow that possible worlds are mereological sums of spatio-temporally related objects. To assume so is to confuse between objects and the ways these objects are. To be a way an object is is to be a property or a state of the object, not the object itself. That is, from the equation of pos-

¹⁴ Lewis 1968 provides a different account of how modal operators work. Lewis notes that the two accounts yield the same results in Lewis (1986: 10).

¹⁵ More generally, an atomic formula of the form $R\vec{\alpha}$ where $\vec{\alpha}$ is a sequence of individual constants $\alpha_1, \dots, \alpha_n$ and R is an n -ary relation, is satisfied at a possible world w if and only if there is a counterpart n -ary sequence of $\vec{\alpha}$ such that the elements in the sequence stand in the relation R . See Lewis (1983: 44).

sible worlds with ways things could have been it follows that possible worlds are properties or states of things, not that possible worlds are things themselves. Thus, Lewis's argument from familiarity does not succeed in showing that possible worlds are maximal sums of spatio-temporally interrelated objects.

Lewis briefly addresses this objection in Lewis (1986: 87, fn. 57). He argues that Stalnaker and van Inwagen's argument establishes that possible worlds should be equated with unit sets of maximal sums of spatio-temporally interrelated objects, instead of being equated with the maximal sums themselves, given his nominalistic account of properties as sets of (actual as well as merely possible) individuals. But he sees this as a point "of the utmost unimportance, on a par with the arbitrary choice between speaking of a set or its characteristic function."

Lewis's dismissal of Stalnaker and van Inwagen's objection is, arguably, too quick. The argument from familiarity does a formidable job as a defence of realism about possible worlds. But what is at stake is whether the argument does a good job as a defence of Extreme Realism, a theory that is committed not only to the existence of possible worlds, but also to the claim that these are maximal sums of spatio-temporally related individuals. One of the main reasons why Extreme Realism is found to be suspect concerns the fact that the thesis that there is a plurality of maximal sums of spatio-temporally interrelated objects – with, for instance, the consequence that there are things such as talking donkeys –, is found by many philosophers to be simply implausible. If the argument from familiarity were successful, then Lewis would have a good case for the thesis that the belief that there is a plurality of maximal sums of spatio-temporally interrelated objects is, despite appearances, an ordinary belief, shared by philosophers and non-philosophers alike. That is, Lewis would have shown that there is no good reason for meeting Extreme Realism with an incredulous stare. What Stalnaker and van Inwagen's reply shows is that, by itself, the argument from familiarity does not establish that possible worlds are mereological sums of spatio-temporally related objects, nor that they are unit sets of mereological sums of spatio-temporally related objects, since such conclusion relies on an independent argument for the thesis that ways things could have been are to be identified with unit sets of maximal sums of spatio-

temporally related objects. Hence, the argument from familiarity does not establish the truth of Extreme Realism. Lewis still needs to take seriously the incredulous stare.

This being said, Lewis believes he has an independent argument for the equation of ways things could have been with sets of maximal sums of spatiotemporally related objects, namely, the argument from theoretical utility. If the argument is successful, then properties and states are nothing but certain set-theoretic constructions from individuals. In particular, ways things could have been are nothing but singleton sets of maximal sums of spatio-temporally related objects. In general, properties and states turn out to be primitives not required by our total theory. Hence, the question is whether Lewis's argument from theoretical utility is successful.

2.4 *Is it really a paradise? The argument from theoretical utility*

As previously discussed, the argument from theoretical utility purports to show that Lewis's Extreme Realism is a theory with an enormous explanatory power, so much so that the price of having a profligate ontology is one worth paying. Objections to the argument from theoretical utility come in three kinds. They either intend to show that a) Lewis's Extreme Realism is incoherent, and thus cannot serve as the basis of a reduction of some notions to others, or that, even though the theory is coherent, b) it does not provide an appropriate reduction of at least some of the notions in question, or that even though Extreme Realism is a coherent theory, and the reductions do seem to work, c) this does not suffice to show that the price of endorsing a plurality of concrete worlds is worth paying. Here I will focus solely on the objections having to do with the charge that Extreme Realism does not afford a proper reduction of the relevant notions, in particular of modal talk.¹⁶

¹⁶ Lewis discusses two objections to the effect that Extreme Realism is incoherent in Lewis (1986: sections 2.2 and 2.3), providing what seem to be satisfactory replies to both of them. One objection to the effect that the price is not worth paying is what Lewis has dubbed "the incredulous stare". See Lewis (1986: section 2.8).

2.4.1 *The possibility of island universes, and of nothing*

One reason for endorsing the view that Extreme Realism does not provide an appropriate reduction of modality has to do with the possibility of “island universes”. That is, it seems that there could have been disconnected spacetimes. However, if this is so, Lewis’s reductive account of modality is wrong, for it is not the case that there is a possible world – i.e., a maximal sum of spatiotemporally related objects – that has disconnected spacetimes. Similarly, it seems plausible to assume that there could have been nothing. Again, Lewis’s Extreme Realism rules out this possibility, since possible worlds are mereological sums, and thus are composed of at least one object.

Lewis acknowledges that the hypotheses that there could have been nothing and that there could have been disconnected spacetimes are incompatible with his Extreme Realism. However, he does not think that these hypotheses constitute a “central part of our modal thinking” (Lewis 1986: 71-72). Thus, he rejects the truth of the hypotheses in favour of his theory of possible worlds. Furthermore, he shows that statements akin to these hypotheses are compatible with Extreme Realism. For instance, even though the possibility of nothing is excluded, the hypothesis that there could have been empty spacetime is compatible with Extreme Realism. Similarly, the hypothesis that there could have been universes with little or no causation between them is compatible with Extreme Realism. Thus, Lewis concludes, even though the hypotheses that there could have been nothing and that there could have been disconnected spacetimes are incompatible with his Extreme Realism, statements quite close to them are compatible with the theory.

2.4.2 *Charge of circularity*

Shalkowski 1994 argues that Lewis’s theory does not provide an appropriate reduction of modality, the reason being that Lewis’s principle of recombination is too weak to guarantee that the following claim holds (as acknowledged by Lewis himself (see Lewis 1986: 92)):

Plenitude For every way things could have been there is a maximal sum of spatio-temporally related objects, and vice-versa.

Hence, Shalkowski's argument goes, the only way to enforce the truth of Plenitude is by adding it by hand to Lewis's Extreme Realism. But this makes Lewis's theory circular – or, perhaps better stated, non-reductive – since Lewis would have to appeal to modal notions in order to provide an account of the space of possibilities.

Sider 2003 gives the following reply to Shalkowski's argument. He asks us to assume that it is indeed the case that for every way things could have been there is a maximal sum of spatio-temporally related objects, and vice-versa. In such case, modal statements are indeed true if and only if the corresponding statements about possible worlds are. Furthermore, the analysis contains no modal expressions. Hence, Lewis's analysis of modality is not circular, pace Shalkowski, provided that it is indeed the case that for every way things could have been there is a maximal sum of spatio-temporally related objects, and vice versa. As it stands, Sider's reply seems appropriate. However, in section four I will put forward an objection to Extreme Realism that is quite connected to Shalkowski's and which, I believe, stands.

2.4.3 *The Humphrey objection*

Kripke argues that Lewis's analysis of *de re* modality is wrong. He asks us to consider the state of Humphrey, a candidate to the presidency of the United States who lost the election to Richard Nixon in 1972, stating that:

Thus if we say 'Humphrey might have won the election (if only he had done such-and-such), we are not talking about something that might have happened to Humphrey but to someone else, a "counterpart".' Probably, however, Humphrey could not care less whether someone else, no matter how much resembling him, would have been victorious in another possible world. Thus, Lewis's view seems to me even more bizarre than the usual notions of transworld identification that it replaces (Kripke 1980: 45, footnote 13).

Following Sider 2006, one way of understanding Kripke's objection is as follows: since Humphrey has different attitudes towards the proposition that Humphrey could have won the election and the proposition that there is a counterpart of Humphrey that wins the election in some other concrete possible world, it is not the case that these are one and the same proposition. Hence, Lewis's analysis of

modality does not work.

Sider replies on behalf of Lewis that it does not follow that the propositions are different, since different propositional attitudes may be taken towards one and the same proposition under different descriptions of the proposition (Sider 2006). To take an example of Kripke's, Pierre may both believe and disbelieve that London is pretty under the descriptions, respectively 'Londres est jolie' and 'London is pretty' (Kripke 1979). But this need not mean that Pierre believes one proposition and disbelieves a different one.

Sider's reply seems to be on the right track, even though one should proceed more cautiously. Cases such as that of Pierre's are quite tricky. Perhaps they show that Pierre has different beliefs towards the same proposition under different descriptions of the proposition. Perhaps they show instead that belief reports fail to track the beliefs themselves, and it is indeed the case that Pierre believes one proposition and disbelieves another one, even though both 'Londres est Jolie' and 'London is pretty' have as semantic values the same proposition (in which case Pierre may even fail both to believe the proposition that London is pretty and to disbelieve the proposition that London is pretty). Perhaps what is believed are not propositions but instead entities like Fregean senses, in which case it is plausible to assume that Pierre believes different Fregean senses that determine the same proposition. In any case, what I take to be the main point in Sider's reply is the observation that analyses often generate Frege puzzles. Hence, the fact that Kripke has found a Frege puzzle concerning Lewis's analysis of *de re* modality is not surprising. Nonetheless, this does not give us more reason to reject Lewis's analysis of *de re* modality than any other proposed analysis. Thus, the Humphrey objection is not successful. This point seems right.

2.4.4 *The necessity of existence*

Consider the statement

- (4) Everything necessarily exists.

Lewis's analysis of *de re* modality has the effect that (4) is equivalent to

- (5) For every object x in the actual world, for every possible world w , every counterpart y of x in w is in w .

Since (5) is trivially true, the proposed analysis of *de re* modality leads to the result that (4) is also true. But (4) is widely regarded as false. Hence, Lewis's account of *de re* modality is flawed.

Lewis identifies several possible diagnoses. On the one hand, perhaps satisfaction *in absentia* at worlds requires different things to be the case depending on the formulae in question. That is, perhaps in order for an object to satisfy 'x is something' at a world it is required that there be a counterpart of the object in the world, while satisfying 'x is a man' at a world requires that every counterpart of the object in that world be a man. On the other hand, perhaps the modal language just is ambiguous, (4) being ambiguous between (5) and

- (6) For every object x in the actual world, for every possible world w there is a counterpart y of x in w .

These diagnoses lead Lewis to downplay the objection:

What is the correct counterpart-theoretic interpretation of the modal formulas of the standard language of quantified modal logic? – Who cares? We can make them mean whatever we like. We are their master. We needn't be faithful to the meanings we learned at mother's knee – because we didn't. If this language of boxes and diamonds proves to be a clumsy instrument for talking about matters of essence and potentiality, let it go hang (Lewis 1986: 12).

What seems to matter is that, whatever is the context in question, one can always find an appropriate translation of modal talk into possible worlds talk. Thus, according to Lewis what is defective is the modal language itself, not talk of concrete possible worlds. When there is the risk of the modal talk being, for instance, ambiguous, what one should do is use possible worlds talk directly, without talk of "boxes and diamonds" as a middle man.

3 Moderate Realism

A different view on the nature of possible worlds is provided by Moderate Realism. Moderate realists hold the view that possible worlds are abstract entities, things like properties, propositions or states of affairs, for which there is a distinction between existence and being realised/being true/obtaining. In what follows the focus will be on Plantinga's 1974, 1976 and Stalnaker's 1976, 2012 theo-

ries of possible worlds. The two theories are quite close, even though they also differ in important respects, as shall be seen.

Plantinga holds that possible worlds are states of affairs, whereas Stalnaker holds that possible worlds are propositions. Plantinga (1976: 145) also remarks that one may wonder whether states of affairs just are propositions, and thinks that what he says in his theory will hold even if this equation holds. Hence, in what follows I will talk just in terms of propositions. Say that a proposition P *includes* a proposition P' if and only if necessarily, if P is true then P' is true, and that a proposition *precludes* a proposition P' if and only if necessarily it is not the case that if P is true then P' is true. For instance, the proposition that Cristiano Ronaldo is the best footballer in the world and plays in Real Madrid includes the proposition that Cristiano Ronaldo is the best footballer in the world, and each of these propositions preclude the proposition that Cristiano Ronaldo is not the best footballer in the world. Finally, say that a proposition P is maximal if and only if, for every proposition P' , P either includes or precludes P' . Plantinga holds the following view on the nature of possible worlds:

Plantinga's Worlds To be a possible world just is to be a maximal and possibly true proposition.

Stalnaker's account of possible worlds is quite similar. Say that a proposition P is maximal* if and only if, for every proposition P' , either P entails P' or P entails the contradictory of P' . He endorses the following view on possible worlds:

Stalnaker's Worlds To be a possible world just is to be a maximal* consistent proposition.

This may lead to the thought that the accounts really are the same, since it is often assumed that a proposition A entails a proposition B if and only if necessarily B is true if A is true. However, this is not the case, due to the fact that Plantinga's and Stalnaker's underlying theories of propositions differ. The difference between the theories and the reason why the account of entailment in terms of necessary truth-preservation is rejected by Stalnaker is given in section 3.4, page 26. For now the focus is on the commonalities between Plantinga's and Stalnaker's theories of possible worlds.

As previously seen, Lewis is committed to the idea that there are possible worlds that do not actually exist and, more generally, to there being mere *possibilia* (i.e., objects which do not actually exist, which for him are parts of nonactual worlds). On the other hand, both Plantinga and Stalnaker endorse the view that everything actually exists. Given their commitment to the existence of many possible worlds, Plantinga and Stalnaker hold that all of them actually exists. But this does not mean that all possible worlds are on a par. There is one possible world that is special, in that it is the true maximal proposition. Sometimes this world is also dubbed *the actual world*. What is important to note is that to say that this proposition is the actual world is not say that this proposition is the only possible world that actually exists. Moderate realists use ‘actual’ in two different senses.

Moderate realists, like Extreme Realists, endorse the P-W link. Unsurprisingly, they provide a different interpretation of the ‘at w ’ phrase occurring in the principle. In the context of the P-W link, ‘at w , φ ’ means that necessarily, if w is true then it is true that φ .¹⁷ For instance, (1-a) is equivalent to the statement that there is a possible world w such that necessarily if w is true then the proposition that there is a broken chair is true.

3.1 *The familiarity argument, and no reduction*

Interestingly, proponents of Moderate Realism appeal to Lewis’s argument from familiarity as a defence of their own view. “Ways things could have been” are plausibly equated with higher-order entities, such as propositions (other candidates being properties and states of affairs). For instance, the proposition that Cristiano Ronaldo is not a footballer seems to be a candidate for a way things could have been. Since possible worlds are “ways things could have been”, it follows that the equation of possible worlds with propositions is quite plausible. Hence, Moderate Realism reflects the common sense view on the nature of possible worlds.

¹⁷ Or, on Stalnaker’s theory, that w entails that φ . In what follows I will be speaking in terms of necessary truth-preservation, except when discussing aspects specific to Stalnaker’s theory of propositions and possible worlds.

Even though the argument from familiarity gains cogency when used as a defence of Moderate Realism (a cogency it did not enjoy as a defence of Extreme Realism) the argument from theoretical utility is not so readily available to moderate realists. Sure, the hypothesis that possible worlds are propositions may, in the context of a theory of propositions, lead to useful theorising. But one of the great theoretical advantages of Extreme Realism was that it promised to provide a reduction of many primitives. Moderate Realism does not offer such reductive power. Clearly, Moderate Realism does not provide a reduction of talk of propositions. Furthermore, it also does not provide the resources to reduce modal talk. Since Plantinga explains the notions of inclusion and exclusion in terms of the notion of necessity, he explicitly appeals to modal talk in his analysis of possible worlds, and thus cannot appeal to possible worlds talk as a way to reduce modal talk. And even though Stalnaker's account of possible worlds *prima facie* does not appeal to modal talk, his theory of propositions does (see Stalnaker (2012: 27-30)). Hence, Stalnaker's overall theory cannot be taken as providing a reduction of modal talk to non-modal talk. Hence, the theoretical virtue of reduction (of modal talk and talk of propositions) is one that is not available to moderate realists.

3.2 *Objection: Moderate Realism is no theory*

Lewis's first objection to Moderate Realism hinges precisely on the fact that the theory does not provide a reductive analysis of modal talk and talk of propositions. Insofar as his Extreme Realism accomplishes just that, it fares better than Moderate Realism in this respect. Lewis acknowledges that this need not be seen as tipping the balance in favour of Moderate Realism, given the extreme realist commitment to queer entities such as flying pigs. But he argues that it does indeed tip the balance in favour of his theory once it is appreciated that the moderate realist cannot grasp some of the notions in terms of which he formulates his theory.

Lewis's argument for the latter claim focuses on the "makes-true" relation that holds between the universe and a proposition when the world makes the proposition true.¹⁸ He challenges the moderate re-

¹⁸ The use of 'makes-true' to designate the relation Lewis is alluding to is

alist to at least tell him whether the relation is an internal or an external relation, that is, whether the makes-true relation is “determined by the two intrinsic natures of its two *relata* (...) Or (...) only by the intrinsic nature of the composite of both of them: [proposition] plus concrete world” (Lewis 1986: 176). As Lewis points out, this is not a request for an analysis of the makes-true relation, a request that the moderate realists would resist to fulfil given their view that talk of propositions is not reducible. Instead, it is only a request for some characterisation of it. Lewis argues that the relation cannot be external. For assume it is external. In such case whether the universe bears the makes-true relation to a proposition is a matter independent of the nature of the proposition, and thus it could have been the case that the universe did bear the makes-true relation to the proposition, as well as it could have been the case that the universe did not bear the makes-true relation to the proposition. But this is absurd. Hence, the makes-true relation must be internal. And here comes the real problem for the moderate realist. Since the relation is an internal one, in order to grasp that the relation holds between a proposition and the world one has to grasp the nature of the proposition. But this is beyond one’s range of abilities, it seems. The reason is that propositions are nonspatiotemporal things, and thus things with which there is no causal acquaintance. But how can the nature of something be grasped without there being some sort of causal acquaintance with it? It seems it cannot. Since the nature of propositions cannot be grasped, propositions cannot be distinguished from one another. But then there is no saying when the makes-true relation holds between the world and a particular proposition instead of any other. And since this is so, the relation itself cannot be grasped.

Suppose the moderate realist replies that he can indeed individuate propositions in such a way that he can then tell when the makes-true relation holds between the world and a proposition instead of some other, doing so via descriptions such as the description ‘the proposition that Cristiano Ronaldo is the best footballer in the world’. Lewis argues that this does not work. The reason is that this way of individuating propositions implicitly appeals to the makes-true relation, since the proposition is being specified as the proposi-

taken from van Inwagen 1986.

tion that is made-true by Cristiano Ronaldo being the best footballer in the world. But the fact that one needs to appeal to the makes-true relation in order to provide such description makes the description unilluminating, since what was being doubted was whether the moderate realist had a grasp of the makes-true relation to begin with.¹⁹ If one could distinguish between the different propositions in terms of their intrinsic properties, then it would not be implausible to claim an ability to distinguish between cases where the makes-true relation holds between the world and a proposition and cases where it does not. But the moderate realist seems unable to do so. Hence, he does not grasp the makes-true relation, and thus his theory is cashed out in terms that he does not understand. Hence, Lewis concludes, moderate realists do not understand ‘makes-true’. But then, Moderate Realism is no theory. Note that, *prima facie*, Lewis does not have any similar problem. Since he provides a reductive account of propositions, he can distinguish them by talking about the maximal sums of spatiotemporally related objects that belong to them and those that do not. And he can say when the (actual) world makes true a proposition. This is the case when the actual world belongs to the

¹⁹ van Inwagen provides the following example illustrating how this reply by the moderate realist would not work:

There are exactly ten cherubim. There is a certain internal relation I call ‘typosynthesis’. I cannot define the word ‘typosynthesis’; it is one of my primitives. I know that each human being bears typosynthesis to some but not all cherubim, that only human beings bear typosynthesis to anything, and that typosynthesis is borne by things only to cherubim. I am absolutely unable to make distinctions among cherubim – except by using the term ‘typosynthesis’. I can sometimes refer to individual cherubim or to non-empty proper subsets of the set of all cherubim by calling them things like ‘the one cherub that all Greeks and all Tasmanians bear typosynthesis to’ or ‘the set of all cherubim that any Cartesian dualist bears typosynthesis to’; but unless I use the term ‘typosynthesis’, I can single out neither any one of the ten cherubim nor any one of the 1022 one-to-nine-membered sets of cherubim (van Inwagen 1986: 206).

As van Inwagen concludes, we seem to be unable to distinguish cherubim from another in a way that enables us to apply ‘cherubim’ correctly. And so we have no handle on when the relation of typosynthesis holds, in which case we do not really understand what is said by using the expression ‘typosynthesis’. Similarly, Lewis argues, for propositions and the makes-true relation.

set that is identical to the proposition in question.

van Inwagen 1986 replies to Lewis on behalf of Moderate Realism not by directly showing a flaw on Lewis's reasoning, but instead by arguing that if Lewis's argumentative strategy was good, it could be turned against Extreme Realism. The argument is thus a *tu quoque* argument. What van Inwagen's argument purports to show is that if the argumentative strategy used by Lewis is good, then it can be used to show that we have no grasp of the membership relation. But Lewis's Extreme Realism has membership as one of its primitives. Hence, if the argumentative strategy is a good one, then Lewis's Extreme Realism is no theory at all (also, set-theory is not a theory at all, which seems to be absurd, in which case it is better to take Lewis's argument as not being cogent, failing to show that the moderate realist does not grasp the makes-true relation). Say that a relation is range-internal if and only if necessarily, whatever bears it to x bears it also to anything having the same intrinsic properties as x . van Inwagen shows that if membership is not range-internal, then it must be (purely) external, and uses this fact to argue that membership is range-internal, since it is not external. For assume for reductio that it is purely external. In such case one should conclude that there is no necessary connection between a set and its elements since, as van Inwagen puts it, "it seems to be one fact that Tom exists and another that he enters into a certain external relation with this set and not with that. What stops it from going the other way?" (van Inwagen 1986: 210). Thus, it would not be a necessary fact that a set has the elements it has, which is absurd. Hence, membership is a range-internal relation. But in such case, by reasoning similar to Lewis's, it is plausible to conclude that one cannot understand 'is a member of'. The reason is that in order to be able to tell, for instance, whether any x is a member of a set X instead of a set Y one must be able to distinguish between the sets with respect to their intrinsic natures. But the only way that we seem to be able to do so is by appealing to the membership relation, which is exactly the relation whose grasp was being called into question. Hence, van Inwagen concludes, either something is wrong with Lewis's argument or set talk should be abandoned. Either way, Lewis's objection does not make Extreme Realism more advantageous when compared to Moderate Realism.

3.3 Objection: iterated modalities and the P-W link

McMichael 1983 provides a powerful objection to Moderate Realism, arguing that the position is in conflict with the P-W link, and thus that it does not constitute an appropriate theory of possible worlds. The conflict can be appreciated by considering some *prima facie* true claims involving iterated modalities, such as

- (7) Cristiano Ronaldo and Mariza could have had an 11th son that was a footballer and could have been an hockey player instead.

By the P-W link, we have that (7) holds if and only if

- (8) There is a possible world w such that necessarily, if w is true then it is true that there is an x such that x is Cristiano Ronaldo and Mariza's 11th son and x is a footballer, and there is a possible world w' such that necessarily, if w' is true then it is true that x exists and x is an hockey player.

Besides assuming the truth of Moderate Realism, two other assumptions of the argument are the truth of both (7) and of (every instance of) the P-W link. A fourth assumption (a quite plausible one) is that no actual individual could have been Cristiano Ronaldo and Mariza's 11th son. The argument also relies on the notion of a *constituent* of a proposition. The thought is that some but not all propositions have constituents. For instance, the proposition that Cristiano Ronaldo is the best footballer in the world has Cristiano Ronaldo as a constituent, and the proposition that Cristiano Ronaldo and Mariza have an 11th son has both Cristiano Ronaldo and Mariza as constituents, whereas the proposition that there are some men has no constituents. Two other assumptions of the iterated modalities argument, assumptions that appeal to the notion of constituency, are that a) necessarily, for every proposition p and individual x , if it is possible that p is true and necessarily, if p is true then x exists, then x is a constituent of the proposition that p – that is, it is assumed that necessarily any proposition that strictly implies²⁰ the existence of some x is taken to have x as a constituent –, and b) that, for every proposition p , necessarily, for

²⁰ Where a proposition p strictly implies a proposition q if and only if necessarily, if it is true that p , then it is true that q .

every x , if x is a constituent of p , then x actually exists. Assumption b) can be seen as itself deriving its justification from a more general assumption, namely, that propositions ontologically depend on their constituents. That is, that necessarily, for every p , necessarily, for every x necessarily, if x is a constituent of p then it is not possible for p to exist and x fail to exist. The idea is that the constituents of propositions function in a manner analogous to the members of sets. Just as part of what it is to be a set is to have certain elements, and thus sets ontologically depend on their elements, for some propositions part of what it is to be them is to have certain constituents, and thus these propositions ontologically depend on their constituents. A final assumption of the argument is that propositions are necessary existents, or more precisely, that necessarily every proposition necessarily exists.

Roughly, McMichael's argument is the following: consider (8). Given the assumption that no (actual) thing could have been Cristiano Ronaldo and Mariza's 11th son, from (8) it follows that

- (9) There is a possible world w such that necessarily, if w is true then it is true that there is an x such that x does not actually exist, and there is a possible world w' such that necessarily, if w' is true then it is true that x exists.

Furthermore, since w is a possible world, it is possible that w is true, and thus

- (10) It is possible that there is an x such that x does not actually exist, and there is a possible world w' such that necessarily, if w' is true then it is true that x exists.

Given the assumption that necessarily every proposition necessarily exists, from (10) we get that

- (11) There is a possible world w' such that it is possible that there is an x such x does not actually exist, and necessarily, if w' is true then it is true that x exists.

From (11) and the assumption that if a proposition strictly implies that an object exists, the object is a constituent of the proposition it follows that

- (12) There is a possible world w' such that it is possible that there

is an x such x does not actually exist, and x is a constituent of w' .

Finally, from (12) and the assumption that for every proposition p , necessarily, for every x , if x is a constituent of p , then x actually exists we get that

- (13) There is a possible world w' such that it is possible that there is an x such x does not actually exist, and x actually exists.

But (13) is absurd. Thus, Moderate Realism is not compatible with the truth of every instance of the P-W link, and must therefore be rejected.²¹

3.4 *McMichael's objection and the differences between Plantinga's and Stalnaker's theories*

McMichael's objection to Moderate Realism provides a natural place to introduce an important difference between Plantinga's and Stalnaker's theories of propositions. Plantinga holds the following thesis about propositions:

Higher-Order Necessitism Necessarily, every proposition, property, and n -ary relation necessarily exists.

In particular, Plantinga holds that necessarily, for every object x every proposition that may be said to be about x (such as the proposition that x exists) necessarily exists and that necessarily every haecceity necessarily exists, where an haecceity is a property such that it is possible that some x instantiates it, and necessarily, if anything instantiates it, that thing is identical to x . An example of an haecceity is the property of being identical to Cristiano Ronaldo.

Stalnaker, on the other hand, holds that some propositions, properties and n -ary relations possibly do not exist, and also that there could have been some propositions, properties and n -ary relations that actually do not exist. One of the reasons why Stalnaker endorses this view has to do with the fact that he endorses the claim that some propositions properties and n -ary relations ontologically depend on

²¹ For the interested reader, the appendix of McMichael 1983 provides a formalisation of the iterated modalities objection.

contingently existing individuals.²² In particular, Stalnaker would reject the necessary existence of several haecceities, one natural candidate for being a contingently existing haecceity being the property of being identical to Cristiano Ronaldo, for the reason that he endorses the view that those haecceities depend on the individuals that they may be said to be haecceities of.

These two views on the modal status of propositions are connected to two different lines of reply to McMichael's objection.²³ Plantinga's theory would force him to reject at least one of the following two assumptions,

- (14) a. necessarily, for every proposition p and individual x , if it is possible that p is true and necessarily, if p is true then x exists, then x is a constituent of the proposition that p (that is, it is assumed that necessarily any proposition that strictly implies the existence of some x is taken to have x as a constituent);
- b. for every proposition p , necessarily, for every x , if x is a constituent of p , then x actually exists.

The reason is that (14-a) and (14-b) lead to an inconsistency in con-

²² Even though this is not the only reason why Stalnaker endorses such view. See Stalnaker (2012: 53).

²³ There is yet another reply to McMichael's objection that has gained some popularity in recent times, which consists in holding that there (actually) is an x such that x could have been the 11th son of Cristiano Ronaldo, contrary to McMichael's assumption. This reply is put forward by Linsky and Zalta 1996 and Williamson 2013. These philosophers are proponents of Necessitism, the thesis that necessarily every object necessarily is something. Necessitism entails that every claim of the form $\Diamond\exists x\phi$ is equivalent to a claim of the form $\exists x\Diamond\phi$ (that is, necessitists are committed to the truth of every instance of both the Barcan Formula and the Converse Barcan Formula). The thought that some individuals exist contingently is accommodated by distinguishing between being concrete or abstract and being neither. For instance, when it is held that Cristiano Ronaldo could have been nothing, necessitists argue that what is the case is that Cristiano Ronaldo could have been nonconcrete (and nonabstract), while still being something. One of the main reasons why these philosophers advocate Necessitism has to do with the fact that the position is compatible with the Simplest Quantified Modal Logic. Whether this is enough to vindicate Necessitism is a topic outside of the scope of this paper.

junction with the plausible claim that there could have been an individual x and proposition p such that x does not actually exist and p is the proposition that x exists. As for Stalnaker, as previously discussed he would reject assumption (15)

(15) Necessarily, every proposition necessarily exists.

Recall the remark that Stalnaker cannot equate the relation of entailment obtaining between propositions with that of necessary truth-preservation, the upshot being that Plantinga's and Stalnaker's account of the nature of possible worlds are in fact different. The reason why entailment cannot be equated with necessary truth-preservation is connected to Stalnaker's rejection of (15). Here are two counterexamples to the equation, in both directions. Assume, as Stalnaker does, that the proposition that Cristiano Ronaldo does not exist ontologically depends on the existence of Cristiano Ronaldo. That is, assume that it is not possible for the proposition that Cristiano Ronaldo does not exist to exist and for Cristiano Ronaldo not to exist. On the one hand, it is plausible to assume that it is not the case that the proposition that Cristiano Ronaldo does not exist entails every proposition. For instance, it does not entail the proposition that Messi is a footballer. On the other hand, it is impossible for the proposition that Cristiano Ronaldo does not exist to be true. The reason is that the proposition must exist in order to have the property of truth, in which case Cristiano Ronaldo must also exist. Thus, necessarily, if the proposition that Cristiano Ronaldo does not exist is true, then the proposition that Messi is a footballer is true. Still, as assumed, the proposition that Cristiano Ronaldo does not exist does not entail that Messi is a footballer. For the other direction, the counterexample is Stalnaker's:

The proposition that no one is immortal entails the proposition that it is not the case that Barack Obama is immortal. But if Obama had not existed, the proposition that he was (or that he was not) immortal would not exist, and so the proposition that it is not the case that he is immortal would not be true. But it might still be true, in such a counterfactual situation, that no one was immortal (Stalnaker 2012: 48).

3.4.1 *Plantinga's theory and possible worlds semantics*

An important feature of Plantinga's theory is that the hypothesis

that necessarily every proposition, property and n -ary relation necessarily exists (and thus also actually exists), provides the tools for a straightforward realist interpretation of the Kripke semantics for first-order modal logic, one accommodating the existence of an intended model.

Briefly, Kripke models are quadruples $M = \langle W_M, w_M, D_M, I_M \rangle$, where W_M is a non-empty set (usually seen as standing for the set of all possible worlds), $w_M \in W_M$ (usually regarded as standing for the actual world), D_M is a function mapping each $w \in W_M$ to a (possibly empty) set $D_M(w)$ (seen as standing for the set of individuals that exist at world w), with the proviso that $\bigcup_{w \in W_M} D_M(w)$ is nonempty, and I_M is an interpretation function mapping each world w and n -ary predicate letter in the language to a set of n -tuples in $(D_M(w))^n$ and mapping each individual constant to an element in $\bigcup_{w \in W_M} D_M(w)$.

The most straightforward interpretation of Kripke semantics (the one provided by the parenthesis in the previous paragraph) is *possibilist* (that is, it is committed to there being objects that do not actually exist), provided that the following holds:

- (16) a. There could have been something that does not actually exist.
 b. $\diamond \exists x \neg (@ \exists y (x = y))$.

To see this, note that formula (16-b) is true at a model M if and only if there is a $w \in W_M$ and $d \in D_M(w)$ such that $d \notin D_M(w_M)$. But according to the straightforward interpretation of the semantics the set $D_M(w_M)$ stands for the set of actual things. That is, according to the straightforward interpretation of the semantics the model depicts reality as being such that there is an object that is not an actual object. If it is assumed that there is such a thing as an intended model M^* , and that if M^* is the intended model then, for instance, $D_{M^*}(w_{M^*})$ really is the set of actually existing things, it then becomes even clearer that the most straightforward interpretation of Kripke semantics is possibilist.²⁴ The reason is that formula (16-b) can only

²⁴ The assumption that there is an intended model causes other sorts of problems, most notably it *prima facie* entails that there is a set containing everything that actually exists, and thus containing every set, which there is not. However, note that this problem is different from the one being alluded to in the text. Even

be true according to the intended model if there is some $w \in W_{M^*}$ and $d \in D_{M^*}(w_{M^*})$, which would be taken as implying that there is something that does not actually exist. But this is contrary to Actualism, the thesis that everything actually exists. However, Plantinga and Stalnaker are actualists. They both accept the truth of (16-b). Thus the most straightforward interpretation of Kripke semantics is available neither to Plantinga nor to Stalnaker.

Plantinga's theory (and in particular his commitment to the thesis that necessarily every haecceity necessarily exists) provides the resources for an actualist interpretation of Kripke semantics. Plantinga takes the intended model to be a model M^* where W_{M^*} is the set of all maximal and possibly true propositions (i.e., of possible worlds), w_{M^*} is the true possible world, D_{M^*} is a function mapping each world w to the set of all haecceities X such that it is not possible for w to be true and X not to be exemplified, and I_{M^*} is such that, for every n -ary predicate P^n and world $w \in W_{M^*}$, $I_{M^*}(P^n, w)$ is the set of all n -tuples of haecceities that are coexemplified with P^n at w (i.e., the set of all n -tuples of haecceities such that necessarily, if w is true then they are coexemplified with P^n), and for every individual constant c , $I_{M^*}(c)$ is the haecceity of c . A formula such as

$$(17) \ \Diamond Bg$$

where B may be read as the predicate 'wins the Ballon D'Or' and g the name 'Ryan Giggs', is satisfied by the intended model M^* if and only if there is a possible world $w \in W_{M^*}$ and haecceity d such that $d \in I_{M^*}(B, w)$, i.e., if there is an haecceity d and possible world w such that necessarily, if w is true then B and d are coexemplified.²⁵

Despite the elegance of Plantinga's theory, McMichael argues that it is ultimately flawed, since it relies on the controversial claim that things such as haecceities and *de re* propositions necessarily exist. A first reason presented by McMichael in defence of the claim that Plantinga's theory is flawed concerns the intuition that properties such as the property of being identical with Cristiano Ronaldo de-

if there was such a set, the most straightforward interpretation of the semantics would still be possibilist.

²⁵ For more details on how the actualistic interpretation of Kripke semantics provided by Plantinga works, see Jager 1982.

pend for their existence on the existence of Cristiano Ronaldo (who, it is being assumed, exists contingently). A different reason concerns the observation that Plantinga's semantics is isomorphic to Kripke's. Since, "on the face of it", Kripke semantics is possibilist, this is a sign that Plantinga's semantics is possibilist as well. A variation on the same theme is McMichael's remark that "To introduce primitive properties each of which is specific to some nonactual object seems tantamount to acceptance of possibilism" (McMichael 1983: 61). And lastly, McMichael complains that Plantinga cannot provide a single example of an unexemplified essence, nor of any proposition that could have been a proposition about an actual nonexistent. Thus, McMichael holds that Plantinga's theory of possible worlds and its realist account of the semantics of first-order modal logic should be rejected. In section 5.1 McMichael's objections to Plantinga's theory will be assessed.

3.4.2 *Stalnaker's theory and possible worlds semantics*

McMichael's objections to the necessary existence of *de re* propositions and haecceities presuppose that he himself rejects (15). But he also argues that the moderate realist is in no position to reject (15). The reason, as he puts it, is that rejecting (15) leads to giving up on the extensionality afforded by talk of possible worlds,

since it is being claimed that the possible worlds quantifier within the context 'there is a possible world W such that W includes _____' does not have a range identical to that of the quantifier on the outside. That is, they don't both range over some universal set of possible worlds (McMichael 1983: 55).

But then, rejecting (15) would lead to the loss of one of the main virtues of appealing to possible worlds in theorising. In particular, the moderate realist would be forced to adopt a nonrealistic semantics. But this is something which McMichael takes to be unsatisfactory since, on the one hand, "the number of non actual possibles and their relationships must be determined" (McMichael 1983: 62), and McMichael is not clear how this can be achieved, and on the other hand "We will want a method for 'factoring' out the artificial aspects" of the semantics (McMichael 1983: 63).

Stalnaker argues that moderate realists are not forced to provide

a nonrealistic semantics, since they can in fact provide “a method for ‘factoring’ out the artificial aspects.” According to him this is done by enriching Kripke models with the means for distinguishing the elements that are representationally significant from those that are merely instrumental. In order to do so it is crucial to be clear on what Kripke models are intended to be models of. According to Stalnaker,

The whole Kripke model represents not just these properties [the possible states of the world] but also a structure of relations between these properties (the possible states of the world) and between them and other things. The points [in a Kripke model, i.e., the elements in W_M] themselves are not properties – they are points in an abstract space that are being used to represent possible states of the world (Stalnaker 2012: 38).

Besides propositions, Stalnaker takes Kripke models to represent properties, relations, and the relations obtaining between propositions, properties, relations, propositions and properties, propositions and relations, etc. It is important to note that the notion of proposition in which Stalnaker is interested is one according to which mutually entailing propositions are identical. This, Stalnaker takes it, is a conception of proposition that “all theorists of propositions can agree about, even if they want to allow, in various different ways, for more fine-grained objects that determine propositions in this coarse-grained sense” (Stalnaker 2012: 26). Focusing on the representation of propositions, Stalnaker takes them (and thus, possible worlds) to be represented by sets of elements in W_M . Recall that Lewis also held that possible worlds could be seen as sets of maximal sums of spatiotemporally related objects. An interesting feature of Stalnaker’s way of representing propositions (falling out of his commitment to the possibility of there being propositions that do not actually exist, and there being contingently existing propositions) is that whereas for Lewis possible worlds could be seen as singleton sets of maximal sums of spatiotemporally related objects, Stalnaker allows for sets representing possible worlds to contain more than one element in W_M .

To see this assume, in Stalnakerian fashion, that necessarily, for every individual x that is Cristiano Ronaldo and Mariza’s 11th son, actually there is no proposition that is the proposition that x is Cristiano

Ronaldo and Mariza's 11th son, even though there could have been such a proposition. Let w be a possible world (i.e., a maximally* consistent proposition) that, among others, entails the proposition that there is some x such that x is Cristiano Ronaldo and Mariza's 11th son. According to Stalnaker, w is a contingently maximal proposition. There could have been a proposition w' such that w would not entail w' , and this proposition w' would entail, for some merely possible x , the proposition that x is Cristiano Ronaldo and Mariza's 11th son. In the model, the proposition w is represented by a set S with more than one element in W_M , while w' , we may assume for the present purposes, is represented by a unit set of one of the elements of S . As Stalnaker puts it, "Intuitively, one may think of the points as representations of possibilities, one of which would be maximal if the [maximal* consistent proposition represented by the set of which they are members] had been realised" (Stalnaker 2012: 31).

In order to distinguish the elements in a Kripke model that are representationally significant from those that are merely instrumental Stalnaker adds to Kripke models a family of equivalence relations, with one equivalence relation for each element in W_M . As he puts it,

each point within an equivalence class has exactly the same representational significance (in the actual world) as every other point within its equivalence class. But we need more than one such point in order to represent the different possibilities that would exist if that possibility were realized (Stalnaker 2012: 32).

Applying Stalnaker's remarks to the example just discussed, each point in the set S has exactly the same representational significance as any other point in S , and thus they will all belong to the same equivalence class of points determined by the equivalence relation annexed to the actual world. But we need the different points to represent the fact that, if the possible world represented by w were realised, then there would have been different possibilities corresponding to the different individuals that would have been Cristiano Ronaldo and Mariza's 11th son.

Stalnaker therefore holds that Moderate Realism has the resources to provide a realist interpretation of possible worlds semantics. The trick is to be explicit about what the semantics is trying to represent, and to provide a method for "factoring out" the elements in the semantics that are not representationally significant. His meth-

od is to supplement each Kripke model with a class of equivalence relations, every point within an equivalence class generated by an equivalence relation being seen as having the same representational significance (in the world to which the equivalence class is annexed) as any other point in the same equivalence class. As to McMichael's reservations concerning the feasibility of a semantics capturing "the number of non actual possibles and their relationships", Stalnaker is somewhat concessive, holding that he only wants the semantics to provide as many non-actual possibles as required by the aims leading to the construction of the model (see Stalnaker (2012: 42)).

4 Extreme Realism reconsidered

Philosophers are generally suspicious of the hypothesis that there are a plurality of concrete universes. Still, showing exactly why one should not endorse the truth of the hypothesis is not an easy task. In this section I will argue that, pace Lewis, the hypothesis is not theoretically useful. I begin by presenting some considerations by Rayo (2013: section 5.2.2) to the effect that Lewis's theory falls short of providing a reductive account of modal talk. Later on I will argue that the hypothesis that there is a plurality of concrete universes is self-defeating, if taken seriously, since doing so requires appealing to modal talk and property talk. The upshot is that the hypothesis should be abandoned, since the only reason on the table for its adoption was its theoretical utility.

4.1 *Lewis's substantial assumption*

As previously mentioned, for Lewis a *de re* modal claim such as

- (3) There is a possible world w such that, at w , Ryan Giggs wins the Ballon D'Or

is true just in case Giggs satisfies vicariously, at w , 'x wins the Ballon D'Or' (since it is not the case that Giggs actually wins the Ballon D'Or), which is the case if and only if there is a counterpart of Giggs that is a part of w and wins the Ballon D'Or. Rayo points out that, according to Lewis, this is the case if and only if there is some condition Ψ that is analysable as a spatio-temporal distribution of per-

factly natural properties such that w represents ‘Ryan Giggs wins the Ballon D’Or’ only if x satisfies Ψ in w . In general, a sentence of the form

$$(18) \ \diamond\Phi\alpha$$

is true, according to Lewis, if and only if there is a possible world w , counterpart x of α and condition Φ^* such that x is a part of w and satisfies Φ^* , where Φ^* is analysable as a spatio-temporal distribution of perfectly natural properties. But, as Rayo notes, it is highly doubtful whether there is any theory capable of presenting, for every true statement of the form $\diamond\Phi\alpha$, a condition Φ^* analysable as a spatio-temporal distribution of perfectly natural properties such that the fact that there is a counterpart of α in some world w which, in w , satisfies Φ^* represents that, in w , $\Phi\alpha$ is true. For instance, Φ^* cannot be a predicate standing for a dispositional property, since a dispositional property is one whose exemplification by an individual depends on the behaviour of its counterparts. But even the primitive vocabulary of physics contains, arguably, expressions that stand for dispositional properties. As an example, Rayo mentions the property of having mass, since it is plausible to hold that “part of what it is to have mass is to be *disposed* to resist acceleration” (Rayo 2013: 137).

Rayo anticipates a Lewisian objection to the effect that this is at most a problem of language, of our current expressive resources, not a problem of there being the required perfectly natural properties to do the job. He replies to the objection by noting that the claim that there are such perfectly natural properties to do the job is a substantial assumption, one requiring justification. I believe that Rayo’s reply is essentially right, and that it puts more pressure on the hypothesis that there is a Lewisian pluriverse than it may at first appear. To see this, remember that Lewis’s best argument for the existence of such a pluriverse is the argument from theoretical utility, an argument crucially relying on the claim that the hypothesis of a Lewisian pluriverse allows the reduction of modal talk and property talk. What Rayo shows is that, in general, Lewis has not given us such reduction, and that he does not even have available, at least not presently, the resources to perform such reduction (since the reduction would be carried out, plausibly, in a language containing the language of physics which, Rayo suggests, is itself couched in modal

terms). Hence, Lewis has not succeeded in showing that the hypothesis of a Lewisian pluriverse has the theoretical utility he claims it has. But then, there seems to be insufficient justification to believe in the hypothesis.

4.2 *The hypothesis is self-defeating*

Recall Shalkowski's objection to Lewis to the effect that his theory is circular. I will suggest that the considerations adduced by Shalkowski can be used to frame a different objection. The structure of the objection is as follows: if the hypothesis that there are several maximal sums of spatiotemporally related objects is taken seriously, then Lewis's is not the best theory available. A theory faring better than Lewis's with respect to theoretical utility, providing more truths about the Lewisian pluriverse, is obtained by accepting modal talk and property talk as primitive. But the only reason for taking seriously the hypothesis of a Lewisian pluriverse was the promise of reduction. Hence, one does better to dismiss the hypothesis altogether.

As Sider notes, Shalkowski's charge of circularity is misguided. But Shalkowski is right in pointing out that Lewis's principle of recombination is too weak to guarantee the intuitive content of Plenitude,

Plenitude For every way things could have been there is a maximal sum of spatio-temporally related objects, and vice-versa.

This observation invites a different sort of objection to Lewis's Extreme Realism. The idea is that a theory that would have all the desirable consequences of Lewis's theory and would also be able to characterise the Lewisian pluriverse would be preferable to Lewisian Realism. At first glance, such a theory is immediately available by the addition of Plenitude to Lewis's theory, in which case both modal talk and property talk will have to be taken as being primitive. But not so. The problem is that Lewis's reductive analyses enable him to get from truths in the language of concrete possible worlds to truths stated in a modal language and in a language of properties. But this problem is not insurmountable. The trick is to add to this novel theory bridge principles connecting statements about the Lewisian

pluriverse to statements about modality and properties. One such bridge principle will be the P-W link itself, but others will be required. To give just one example, in order to connect the Lewisian pluriverse to the domain of properties, one of the principles that would be required would be: $\forall X^n$, if X^n is a set of n -ary sequences of parts of maximal sums of spatiotemporally related individuals, then there is a property X' such that $\forall x_1 \dots \forall x_n ((x_1, \dots, x_n) \in X^n)$ iff (the haecceities of x_1, \dots, x_n are coexemplified with X'). I will not here provide such a theory, but I hope my remarks have sufficed to give an idea of how the theory would look like.

Let me dub this new theory ‘Overkill Realism’. There will be truths of Lewis’s Extreme Realism that Overkill Realism will not be able to yield. Notable examples will be that to be a property just is to be a set of parts of Lewisian universes, and that to be a proposition just is to be a set of Lewisian universes. But this cost does not seem to be high, since the theory yields whatever undisputable truths involving modal talk and property talk that were yielded by Lewis’s Extreme Realism. On the other hand, Plenitude provides the means for characterising the Lewisian pluriverse in a way that is not available to Lewis, since it is part of his theory that modal talk and property talk is not primitive. Furthermore the bridge principles can be used to get to truths about properties, propositions, modality, etc. via truths about the pluriverse, and vice-versa. Thus, Overkill Realism is a theory preferable to Lewis’s Extreme Realism. Even though it has higher costs when compared to Extreme Realism with respect to ideology, the price seems right given the advantage of being able to characterise the Lewisian pluriverse. The rationale behind a defence of Overkill Realism as being preferable to Extreme Realism is thus a sort of “anti-Razor”: appeal to as many primitives as required in order to derive the statements that should count as true statements of the theory.

This is a natural place to stop and reconsider Lewis’s original argument for Extreme Realism. The argument relied on the fact that the hypothesis of a Lewisian pluriverse is theoretically useful, since it plays an ineliminable role in a theory having fewer primitives than the alternatives, and which fares at least as well as other theories on offer with respect to their consequences concerning statements about mental content, properties, semantic values, etc. whose truth is not

in dispute. But since this is so, let us take the hypothesis of a Lewisian pluriverse seriously, trying to get to as many truths about it as possible. Doing so leads to privileging Overkill Realism over Extreme Realism, since Overkill Realism comes with a substantive principle characterising the structure of the plurality of concrete worlds. What is important to note at this point is that Overkill Realism requires modal talk and property talk as not being analysable, or in any case as not being analysable solely in terms of what is going on at Lewisian worlds. This means that if one takes the hypothesis of a Lewisian pluriverse seriously, then the conclusion is reached that the Lewisian pluriverse does not deliver the means for the promised reduction, since characterising the pluriverse would require appealing to modal talk and property talk anyway. But this shows that the only reason for endorsing Extreme Realism is absent once one takes the hypothesis of a Lewisian pluriverse seriously. Thus, the theoretical advantage of Extreme Realism is illusory, disappearing once one tries to characterise the Lewisian pluriverse itself. Hence, one does better in discarding Extreme Realism altogether. The hypothesis of a Lewisian pluriverse will not deliver the goods that were promised to us, namely, reduction of modal and property talk. Furthermore, it comes with high costs, for instance, the cost of accepting the existence of talking donkeys.

5 The iterated modalities objection reconsidered

Arguably, the iterated modalities objection is nowadays the most pressing challenge to Moderate Realism. In this section I will take yet another look at McMichael's arguments against Plantinga's strand of Moderate Realism, as well as to Stalnaker's reply to McMichael's objection to his theory. On behalf of Plantinga I will argue that McMichael's arguments do not provide good reasons to believe that haecceities exist contingently. As to Stalnaker's reply to McMichael, I will note what I think is a minor difficulty to the Stalnakerian strategy for providing a realist interpretation of Kripke semantics, and say why I believe that the difficulty does not undermine Stalnaker's reply to McMichael. The upshot is that McMichael's objection fails to establish the untenability of Moderate Realism.

5.1 *Do propositions and properties exist necessarily?*

McMichael's objections to Plantinga seem less than persuasive. Let me start with the claim that Plantinga's semantics should be taken to be possibilist since it is isomorphic to Kripke semantics, a semantics which is as McMichael puts it, "on the face of it, a possibilist semantics" (McMichael 1983: 61). A reply to this objection consists in noting that an appeal to the fact that Plantinga's semantics and Kripke semantics are isomorphic does not establish much, since it can be used in arguments going in opposite directions. In particular, the following reply is available to a proponent of Plantinga's Moderate Realism: since the two semantics are isomorphic, the conclusion to take is that, despite appearances, Kripke semantics is in fact actualist, since Plantinga's semantics is an actualist semantics.

As to the complaint that Plantinga is not able to provide a single example of an unexemplified essence, here is an example of an unexemplified essence that will work if the thesis of the necessity of origins is true: the property of being the human being originating from the union of egg y and sperm z , assuming that egg y and sperm z haven't actually united. Concerning McMichael's remarks that "To introduce primitive properties each of which is specific to some nonactual object seems tantamount to acceptance of possibilism" (McMichael 1983: 61) the only thing to say is that the remark by itself does nothing by way of showing that there actually are no such properties, and that it is false that to accept their existence is tantamount to accepting possibilism: according to Plantinga every property necessarily exists, and thus these primitive properties actually exist. Hence, there is no commitment to there being things which do not actually exist. Finally, it seems to me that there is no such thing as a robust intuition concerning the necessary or contingent existence of haecceities. The upshot is that the jury is still out on the question whether necessarily every property and proposition necessarily exists.

5.2 *Stalnaker's realist interpretation of Kripke semantics*

Recall Stalnaker's comment on what gives his version of Kripke semantics its realist bite: "each point within an equivalence class has

exactly the same representational significance (in the actual world) as every other point within its equivalence class” (Stalnaker 2012: 32). Usually, the way equivalence relations are thought to “factor out” what is representationally significant from what is not is that what is representationally significant is what is invariant across the different elements in each of the equivalence classes generated by the equivalence relation. However, I believe that this story is incomplete, at least with respect to finding out which elements of a Kripke model are representationally significant.

Suppose that there is one equivalence class generated by the equivalence relation attached to w_M such that every point in that class is a set. Is this fact of any representational significance? Should, for instance, the possible world represented by that equivalence class be taken to be a set? Arguably not. For a second, perhaps more pressing case, suppose that it is not only possible that there is some human being x that results from the union of egg y and sperm z that actually have not united, but also that necessarily, x results from the union of egg y and sperm z . In such case the subset S of elements of W_M modelling a possible world entailing the proposition that there is a human being that results from the union of y and z will be such that there is an element $x \in \bigcup_{w \in W_M} D_M(w)$ such that $x \notin D_M(w_M)$ and $x \in \bigcap_{w \in S} D_M(w)$. The presence of this particular element x would be invariant across the domains of every world in S . Thus, does S represent a proposition that entails that this particular x exists? Arguably not. But then, Stalnaker’s account of what is representationally significant in a Kripke model must be complemented. The equivalence relations proposed are not enough.

One plausible strategy would be to assume that facts about propositions, properties, relations, relations between these, etc. are represented not by one model, but by a set of them (call it the *intended set*). Again, what would be representationally significant would be what was invariant across the intended set. This would, arguably, account for the two cases discussed. Only some models M in the intended set would have an equivalence class generated by the equivalence relation annexed to w_M such that every element in that class was a set. And the models M in the intended set would also differ with respect to which element would represent the merely possible x that would result from the union of egg y and sperm z . But, this strategy

would perhaps not be enough. For instance, it is plausible to assume that every model M in the intended set had some $w \in W_M$ such that $D_M(w_M) \subset D_M(w)$. The elements in $D_M(w) - D_M(w_M)$ would still actually exist according to the moderate realist, since the moderate realist holds that everything actually exists. Hence, one invariant feature across the models in the intended set would be that some actual things are not in $D_M(w_M)$, the domain of the actual world. But this cannot be taken as representing that everything that possibly exists is such that it actually exists. Thus, equivalence relations cannot be assumed to do all the job required. What is representationally significant in a model cannot be just what is invariant across the different elements of an equivalence class, at least if the equivalence classes in question are those that have been considered so far.

Even though equivalence relations may not be enough to show what is representationally significant in a Kripke model, I believe Stalnaker's overall point, namely, that a realist interpretation of Kripke semantics compatible with his moderate realism can be given, still stands. The main point to take from Stalnaker's appeal to equivalence relations should be that in order for a Kripke model to have a realist interpretation, i.e., for it to be a model of modal phenomena, it need not be the case that every element in it is representationally significant, that it represents *every* feature of modal reality, or even that the model represents, for instance, that something is a particular way by really having something that is that way. Furthermore, it does seem that Kripke models afford the means to represent propositions, properties, relations, relations between these, etc. However, the challenge of distinguishing all the representationally significant features of a Kripke model from the features that are not representationally significant still stands. My guess is that this is not only a problem for Stalnakerian moderate realists using Kripke models, but also for most theorists appealing to modelling techniques in their investigations. Arguably, that should not prevent either from using modelling techniques in their investigations.

6 Conclusion

Possible worlds talk is nowadays common in philosophy as well as in several other areas of inquiry. In this paper I have set myself to

present two of the most influential views on the nature of possible worlds, as well as the main arguments for and against them.

Firstly, an explanation of why talk of possible worlds is taken to be theoretically useful was provided. It was pointed out that, on the one hand, such talk illuminates the logic of modality and, on the other hand, it provides a way to test the tenability of claims about what is possible. Afterwards, Lewis's extremely influential view on the nature of possible worlds was presented, as well as the main arguments for and against it. The same was done for Moderate Realism, with two strands of the view being distinguished, namely, Plantinga's Moderate Realism and Stalnaker's Moderate Realism. As shown, one of the main differences between these two theories has to do with their underlying theory of propositions and other higher-order entities. While Plantinga holds that necessarily every higher-order entity necessarily exists, and in particular that necessarily every haecceity necessarily exists, Stalnaker rejects both claims.

Subsequently, critical evaluations of both Extreme and Moderate Realism were presented. Concerning Extreme Realism, it was shown why there are reasons for scepticism concerning the Extreme Realist's promise of a reduction of modal and property talk, and it was argued that taking seriously Lewis's hypothesis of a multitude of concrete universes is, in a sense, self-defeating. As to Moderate Realism, it was argued that McMichael's iterated modalities objection to the view does not really rule out Plantinga's Moderate Realism, nor Stalnaker's. Nevertheless, the objection does seem to show that there is a lot of work still to be done by Moderate Realists. On the one hand, good arguments in support of the hypotheses that necessarily every higher-order entity necessarily is something, and in particular that necessarily every haecceity necessarily exists, are lacking (as are good arguments in support of the negation of these hypotheses). On the other hand, Stalnaker has only given a sketch of what could be a solution to the problem of providing a realist interpretation of Kripke semantics that is compatible with his strand of Moderate Realism.

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