

# Necessitarian propositions

Jonathan Schaffer

Received: 24 February 2012 / Accepted: 24 February 2012  
© Springer Science+Business Media B.V. 2012

**Abstract** The *eternalist* holds that all propositions specify the needed time information, and so are eternally true if true at all. The *necessitarian* holds the parallel view for worlds: she holds that all propositions specify the needed world information, and so are necessarily true if true at all. I will argue that the considerations for both views run parallel: *the necessitarian can mimic the whole case for eternalism.*

**Keywords** Semantics · Propositions · Times · Worlds

What is the semantic role of *worlds*? To what extent should the semantics treat world and time information in parallel ways?

Kaplan invoked world and time neutral propositions, which bear truth values only relative to world and time parameters. This is a view on which world information is provided by index parameters, and on which world and time information are treated in parallel ways. There was then a debate over times. *Temporalists* sided with Kaplan in maintaining time neutral propositions with time relative truth values, while *eternalists* claimed that all propositions specify the needed time information and so are eternally true if true at all. But there was virtually no debate over worlds. Let *contingentism* be the view (parallel to temporalism) that sides with Kaplan in maintaining world neutral propositions with world relative truth values, and let *necessitarianism* be the view (parallel to eternalism) that propositions specify the needed world information and so

---

J. Schaffer (✉)  
Rutgers University, New Brunswick, NJ, USA  
e-mail: jonathan.schaffer@rutgers.edu

J. Schaffer  
Australian National University, Acton, ACT, Australia

J. Schaffer  
Arché, University of St Andrews, St Andrews, Scotland, UK

bear the same truth value at all worlds. Kaplan's contingentism still stands largely unquestioned. As a result many theorists (including Richard, Stalnaker, Salmon, Soames, King, Stanley, Glanzberg, and perhaps the majority of current theorists) favor the contingentist-eternalist package, with world neutral (but not time neutral) propositions, bearing truth values only relative to world (but not time) parameters. This is a view on which world and time information are treated in non-parallel ways.

I will argue that the considerations for eternalism and necessitarianism run parallel. Both views are supported by parallel arguments and liable to parallel objections (to which parallel replies are available). In short: *the necessitarian can mimic the whole case for eternalism*. I happen to consider the case for eternalism to be fairly compelling, and so would equate mimicking the case for eternalism with making the case for necessitarianism. But the temporalist is welcome to remain unmoved, or even to regard such mimicry as making a mockery of eternalism. The parallelism claim is neutral between Kaplan's contingentist-temporalist package and the necessitarian-eternalist package I favor. My main dispute is thus with the contingentist-eternalists for breaking the world-time parallel. I would have the same dispute with necessitarian-temporalists if there were any.

Given the deep parallels known to exist in our overall thought about modality and temporality, I think that the claim of semantic parallelism should be unsurprising. What should be surprising is that the existing contingentist-eternalist consensus would break this parallel with little argument. Perhaps this is only because necessitarianism has yet to come in for serious consideration. Perhaps some theorists have started from Kaplan's contingentist-temporalist framework and then been moved by arguments for eternalism, without yet considering whether analogous arguments might equally support necessitarianism. The contingentist-eternalist (and necessitarian-temporalist) should take this as an invitation to explain she would break the world-time parallel.

## 1 The parallelism thesis

The parallelism thesis says that the considerations for eternalism and necessitarianism are analogous. Both views are supported by parallel arguments and liable to parallel objections (to which parallel replies are available). I will now try to clarify what this thesis means. Basically, I take 'eternalism' to name the view that all propositions specify the needed time information, and 'necessitarianism' to name the counterpart doctrine that all propositions specify the needed world information. What is said to be parallel are the main considerations for and against propositions being fully time specific, and the main considerations for and against propositions being fully world specific.

### 1.1 Background semantic assumptions

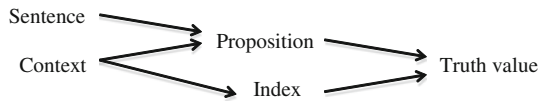
Some sentences concern contingent and transient matters, but do not explicitly specify either the world or time at issue, such as:

1. Obama is the president of the United States

Sentences of this sort are contextually variable in truth value. For instance, if Ann says 1 at actuality (@) in 2010 then she says something true. But if Ben says 1 at @

in 1990 then he says something false, and if Claire say 1s in 2010 at a world  $w$ - in which McCain defeated Obama then she says something false. Thus world and time information from the context must engage the machinery of truth evaluation.

What is controversial is *how* the world and time information needed for truth evaluation engages the semantic machinery. On the orthodox picture found in Kaplan (1989) (cf. Lewis 1980)—which I will work with in what follows—a sentence at a context expresses a *proposition* and a proposition relative to an *index* (a tuple of shiftable parameters, whose default settings come from context) determines a truth value:



I should emphasize that this Kaplanian picture is in no way sacrosanct. Indeed—for reasons that will emerge at the close (Sect. 5.2)—I myself would favor cutting the index out of the picture. The question of how things might look in other frameworks is a very interesting question, but not one I can address in the current discussion.

On the Kaplanian picture, there are *two paths* by which context can operate on truth evaluation. Context can operate *via the proposition path* by playing a role in determining which proposition a sentence expresses, or *via the index path* by providing the default settings of the index parameters.<sup>1</sup> So one can ask, with respect to the proposition expressed by a sentence (such as 1) at various contexts (such as Ann’s, Ben’s, and Claire’s):

- *Is the needed world information specified in the proposition?*
- *Is the needed time information specified in the proposition?*

Terminological matters already intrude: ‘proposition’ means different things to different theorists.<sup>2</sup> I am working with the notion of proposition embedded in the Kaplanian picture, which is that of the semantic value of a sentence at a context. I make no assumptions one way or another as to whether these are the same entities taken up in, say, the theory of communication (see Sect. 4.3 for further discussion). Though I warn against a potential terminological confusion: Lewis (1980) argues that different—albeit intimately related—entities are needed to play the roles of the semantic values of sentences in context, and the objects of assertion and belief. He calls the

<sup>1</sup> It is then a nice question whether exactly the same notion of context is operative in both cases, or whether the “Context” node really ought to be split into two different nodes. Indeed the notion of context operative along the proposition path seems like the notion of a *concrete speech situation*, while the notion of context operative along the index path seems like the distinct notion of an *abstract tuple of features* (though arguably the former might determine the latter). In any case, it may be worth keeping in mind Penco’s (1999, p. 270) warning: “Contexts are not things we find in Nature; there are ever so many different ways of using the term ‘context’... that it would be better to speak of a ‘family resemblance’ concept.”

<sup>2</sup> Propositions are said to be, not just the semantic values of sentences relative to contexts, but also the objects of the attitudes, the contents of the speech acts, and the nodes of inferences, inter alia (cf. Stalnaker 1970, p. 278; King 2007, pp. 1–2; and Cappelen and Hawthorne 2009, p. 1). Thus Stalnaker (1970, pp. 277–278) speaks of propositions as an “extra step on the road from sentences to truth values,” worth positing insofar as they “are of some independent interest,” which interest “comes from the fact that they are the objects of illocutionary acts and propositional attitudes. A proposition is supposed to be the common content of statements, judgments, promises, wishes and wants, questions and answers, things that are possible or probable.”

former “compositional semantic values” and reserves the term “propositions” for the latter only. My usage follows Kaplan: *what I call “propositions” are what Lewis calls “compositional semantic values of sentences.”*

Returning to Ann, Ben, and Claire’s propositions—understood as the semantic values of 1 at their respective contexts—it will help for illustrative purposes to make two further provisional assumptions. First, I will assume that propositions are Russellian structures.<sup>3</sup> Second, I will assume that truth evaluation requires reference to exactly one world point, one time point, and nothing more.<sup>4</sup> These assumptions are purely for illustrative purposes, and will be waived thereafter. (I will also ignore irrelevant details, such as the internal structure of ‘is the president of the United States.’)

So one might answer *yes* to both of the bulleted questions above, and think of *both* the needed world information and the needed time information for 1 as specified in the proposition. Given our provisional assumptions, this would be to think of Ann’s proposition as something like:

(1A<sup>ne</sup>) <Obama, being the president of the United States, @, 2010>

Likewise Ben’s and Claire’s propositions might be thought to look something like:

(1B<sup>ne</sup>) <Obama, being the president of the United States, @, 1990>

(1C<sup>ne</sup>) <Obama, being the president of the United States, *w*-, 2010>

Truth evaluation is then straightforward without consideration of any index parameters: Ann’s proposition is true since Obama is the president of the United States at @ in 2010, Ben’s proposition is false since Obama is not the president of the United States at @ in 1990, and Claire’s proposition is false since Obama is not the president of the United States at *w*- in 2010.

Illustrative propositions 1A<sup>ne</sup> – 1C<sup>ne</sup> have their truth values (n)ecessarily and (e)ternally (thus the superscripts). Since these propositions specify the world and time at issue, they will bear the same truth value relative to any world and time. Their truth value only relevantly depends on the specified world and time. For instance, the truth value of 1A<sup>ne</sup> only relevantly depends on how @ is in 2010. So one could in principle allow context to operate on the truth value of 1 *via both the proposition and index routes*, but there would seem little point. One could in principle evaluate 1A<sup>ne</sup> – 1C<sup>ne</sup> relative to any world or time parameters one likes. Only it would make no difference.<sup>5</sup>

But one might also answer *no* to both of the bulleted questions above, and think of *neither* the needed world information *nor* the needed time information for 1 as specified in the proposition. Such is the view one gets from Kaplan (1989) and Lewis (1980), as well as Ludlow (2001), Recanati (2004), MacFarlane (2009), and Brogaard

<sup>3</sup> This accords with Kaplan’s (1989, p. 494) own conception: “If I may wax metaphysical in order to fix an image, let us think of the vehicles of evaluation—the what-is-said in a given context—as propositions. Don’t think of propositions as sets of possible worlds, but rather as structured entities looking something like the sentences which express them.” See King (2007) for a detailed discussion and defense of such a view of propositions.

<sup>4</sup> The idea that exactly one world and one time is needed is implicit in Kaplan’s use of  $\langle w, t \rangle$  pairs as indices. Though Kaplan himself (1989, p. 504) was explicitly willing to add further coordinates to the index.

<sup>5</sup> As Kaplan (1989, p. 503) puts the point: “[I]f *what is said* is thought of as incorporating reference to a specific time, or state of the world, or whatever, it is otiose to ask whether what is said would have been true at another time, in another state of the world, or whatever.”

(2012), inter alia. Given our provisional assumptions, this would be to think of Ann, Ben, and Claire as each expressing the same world and time neutral proposition, which might be thought to look something like the following (relatively sparse) Russellian structure:

(1<sup>ct</sup>) <Obama, being the president of the United States>

Truth evaluation then requires consideration of index parameters  $\langle w, t \rangle$  to provide the needed world and time points. With the  $w$  and  $t$  parameters initialized from the context of utterance, truth evaluation runs as follows: Ann says something true since for her 1<sup>ct</sup> is evaluated relative to  $\langle @, 2010 \rangle$ , Ben says something false since for him 1<sup>ct</sup> is evaluated relative to  $\langle @, 1990 \rangle$ , and Claire says something false since for her 1<sup>ct</sup> is evaluated relative to  $\langle w-, 2010 \rangle$ .

The illustrative proposition 1<sup>ct</sup> has its truth value (c)ontingently and (t)ransiently. Since it is world and time neutral, and since it concerns a contingent and transient matter, it will not have a fixed once-and-for-all truth value like  $1A^{ne} - 1C^{ne}$ . Rather 1<sup>ct</sup> will bear different truth values relative to different worlds and times.

These first two options are options on which the bulleted questions above are answered in parallel ways: *yes* to both (as illustrated by  $1A^{ne} - 1C^{ne}$ ), or *no* to both (as illustrated by 1<sup>ct</sup>). But non-parallel options are possible too. Indeed probably the dominant view nowadays—and my main target—is the view that propositions are contingent but eternal, specifying the time but not the world at issue. This is the *no/yes* option. Such is the view one gets from Richard (1981), Stalnaker (1984), Salmon (2003), King (2003), Stanley (2005b), Glanzberg (2009), and Soames (2011), inter alia. On this view, Ann's and Claire's propositions might be thought to look something like:

(1AC<sup>ce</sup>) <Obama, being the president of the United States, 2010>

While Ben's proposition might be thought to look something like:

(1B<sup>ce</sup>) <Obama, being the president of the United States, 1990>

Truth evaluation then requires consideration of a single index parameter  $\langle w \rangle$  to provide the needed world point. With the  $w$  parameter initialized from the context of utterance, truth evaluation runs as follows: Ann has said something true since for her 1AC<sup>ce</sup> is evaluated relative to  $\langle @ \rangle$ , Ben has said something false since for him 1B<sup>ce</sup> is evaluated relative to  $\langle @ \rangle$ , and Claire has said something false since for her 1AC<sup>ce</sup> is evaluated relative to  $\langle w- \rangle$ . 1AC<sup>ce</sup> and 1B<sup>ce</sup> are illustrations of time specific but world neutral propositions, with (c)ontingent but (e)ternal truth values.

There is also the theoretical possibility of the other form of non-parallel treatment in which world information is specified in the proposition but time information is provided by the index. This is the *yes/no* option. Such a view has no advocates I know of, though by my lights it enjoys as much motivation as the dominant view. On this view, Ann's and Ben's propositions might be thought to look something like:

(1AB<sup>nt</sup>) <Obama, being the president of the United States, @>

While Claire's proposition might be thought to look something like:

(1C<sup>nt</sup>) <Obama, being the president of the United States,  $w-$ >

Truth evaluation then requires consideration of a single index parameter  $\langle t \rangle$  to provide the needed time point. With the  $t$  parameter initialized from the context of utterance, truth evaluation runs as follows: Ann has said something true since for her  $1AB^{nt}$  is evaluated relative to  $\langle 2010 \rangle$ , Ben has said something false since for him  $1AB^{nt}$  is evaluated relative to  $\langle 1990 \rangle$ , and Claire has said something false since for her  $1C^{nt}$  is evaluated relative to  $\langle 2010 \rangle$ .  $1AB^{nt}$  and  $1C^{nt}$  are illustrations of world specific but time neutral propositions, with (n)ecessary but (t)ransient truth values.

There are thus four main options—all of which can capture the intuitively correct truth values—as to whether world and/or time information is specified in the proposition<sup>6</sup>:

	<i>Eternalism</i>	<i>Temporalism</i>
<i>Necessitarianism</i>	World and time information are both specified in the proposition, as in $1A^{ne} - 1C^{ne}$	World but not time information is specified in the proposition, as in $1AB^{nt}$ and $1C^{nt}$
<i>Contingentism</i>	Time but not world information is specified in the proposition, as in $1AC^{ce}$ and $1B^{ce}$	Neither world nor time information is specified in the proposition, as in $1^{ct}$

I would just reiterate that this is merely an illustrative menu of options, relative to a particular sentence under some provisional assumptions.

## 1.2 Four doctrines: eternalism and temporalism, necessitarianism and contingentism

To reach a proper characterization of the doctrines at issue, one must abstract away from the provisional assumptions of Russellian structures and of exactly one bit of world information and one bit of time information being needed, and one must abstract away from the treatment of any one particular sentence. Starting with the assumption of Russellian structures, one can work with any notion of proposition. One only needs to be able to make sense of the intuitive notion of *the information specified in the proposition*.

Virtually all leading views of propositions permit one to make sense of this intuitive notion. The Russellian can make sense of this notion quite easily, in terms of the elements of her tuples (which is why the Russellian view was illustratively useful.) The Fregean can equally make sense of this notion—she'll just add that at least some of the information specified in the proposition is specified under a mode of presentation.<sup>7</sup> And even the unstructured sets-of-worlds theorist can and should make sense of this

<sup>6</sup> The careful reader might note an immediate spill-over dispute concerning *samesaying*. All of these main options disagree over who has said the same thing as whom: the necessitarian-eternalist thinks that Ann, Ben, and Claire have all said different things, the contingentist-temporalist thinks that they have all said the same thing, the contingentist-eternalist singles out Ben as having said something different, and the necessitarian-temporalist singles out Claire. Thus a developed theory of *samesaying* might usefully be brought to bear, but unfortunately I have none to offer.

<sup>7</sup> The Fregean might also explore the idea that information specified in the proposition comes under a mode of presentation, while information provided by the index does not. That might give her a further means to address questions about how a given bit of information enters into the machinery of truth evaluation, by considering whether that bit of information comes under a mode of presentation or not.

notion. Of course she cannot make sense of this notion in terms of structural components, but she can avail herself of other notions such as the account of *subject matters* via partitions over worlds detailed in Lewis (1988).<sup>8</sup> Of course the assumption that one can make sense of the intuitive notion of the information specified in the proposition (and thereby distinguish specifying from neutral propositions) is not sacrosanct. One might defend a radical view that rejects this assumption. Such a view would dissolve all the debates at issue, in a parallel way.

Turning to the assumption that truth evaluation requires reference to exactly one world point, one time point, and nothing more, of course one need not hold this assumption to be concerned with the question of whether all the needed world and time information is specified in the proposition. One only needs to make sense of the more general notions of *the world information needed for truth evaluation*, and of *the time information needed for truth evaluation*. There are many viable conceptions of what information is needed. Perhaps one needs to specify multiple worlds or times for truth evaluation. For instance, one might want three time points in play to implement Reichenbach's (1947) view that the tense system involves not one but rather three times: the speech time, the reference time, and the event time. One might also want to replace time points with *intervals*, or replace world points with certain collections of worlds. Or one might even get by with specifying a single world-and-time-bound situation (Kratzer 1989), and thereby specify both a world and a time indirectly and in one fell swoop—see Sect. 5.1 for further discussion.<sup>9</sup>

There are in addition many viable conceptions as to how needed information may be specified, including referential and quantificational treatments. For instance, perhaps a given bit of time information is specified through a referring free time variable, or perhaps through a contextually restricted existential quantifier ranging over times.<sup>10</sup>

It remains to abstract away from the treatment of any particular sentence such as 1. After all, there is no guarantee that 1 expresses the same sort of proposition across contexts. Perhaps Ann has managed to express the world and time specific proposition  $1A^{ne}$ , but Ben has only mastered the world and time neutral proposition  $1^{ct}$ . And even

<sup>8</sup> The notion of information specified corresponds to the intuitive idea that Salmon (2003, p. 108) expresses in the course of an argument for structured propositions: “[I]t is evident that propositions are not ontologically simple but complex. The proposition that Frege is ingenious and the proposition that Frege is ingenious are both, in the same way, propositions directly about Frege; hence, they must have some component in common. Likewise the proposition that Frege is ingenious has some component in common with the proposition that Russell is ingenious, and that component is different from what it has in common with the proposition that Frege is ingenious.” It seems to me however that a fan of unstructured views may still claim to respect Salmon's natural intuitions about propositions specifying information (the individual at issue, the property at issue, etc.), without thinking about this information in terms of structural components. Thus I think that the notion of the information specified is a neutral notion which different theorists might try to capture in different ways.

<sup>9</sup> Point of clarification: the fan of situation semantics may recognize world and time variables in addition to her situation variables, and may think of world and time information as providing optional adjunctive modification of her one mandatory situation argument. When I speak of “the needed world and time information” such a theorist should understand me to be speaking of her one mandatory situation argument, and not her optional world and time adjuncts. See Sect. 5.1 for some further discussion.

<sup>10</sup> See Enç (1986) for a referential treatment of time specification, and see Toshiyuki (1995) for arguments for preferring a quantificational treatment, under which time variables are obligatorily existentially closed under a contextually restricted existential quantifier.



if 1 does express the same sort of proposition across contexts, there is no guarantee this uniform pattern generalizes any further. Perhaps Ann, Ben, and Claire have all expressed the world and time neutral  $1^{ct}$ , but that they would all have expressed something world and time specific with a different sentence such as:

2. Gillard is the prime minister of Australia

Or perhaps only Claire might manage to express something world and time specific with 2. *The real issue is not the proper treatment of any one sentence, but rather whether there are any world or time neutral propositions at all.*

Putting all this together, by *eternalism* I mean the semantic view that all propositions are fully time specific:

(*Eternalism*) For every proposition  $p$ , and every bit of time information  $i_t$  needed for truth evaluation,  $i_t$  is specified in  $p$

*Temporalism* is then the negation of *Eternalism*, which is to say that at least some propositions are at least partially time neutral:

(*Temporalism*) For some proposition  $p$ , and some bit of time information  $i_t$  needed for truth evaluation,  $i_t$  is unspecified in  $p$  (equivalently:  $p$  is neutral with respect to  $i_t$ )

These two definitions are intended to be fairly faithful to the spirit of the literature, but may involve some element of stipulation. There is of course a large literature on the eternalist-temporalist debate, and it is doubtful that every author understands the doctrines in exactly the same way, or operates with exactly the same notion of propositions, or the same background assumptions about the semantic machinery.<sup>11,12</sup>

Note the quantifiers in *Eternalism* and *Temporalism*. *Eternalism* as characterized is a very strong doctrine, falsified if there is even a single proposition which is neutral with respect to even a single bit of needed time information. This is as it should be. If there is a single proposition neutral with respect to a single bit of needed time

<sup>11</sup> Richard (1981, p. 1; cf. Aronszajn 1996, p. 71) defines “eternalism” as the view that: “[A]ll sentences of English are such that, if they express a proposition relative to a time  $t$ , then they express (relative to  $t$ ) a proposition which cannot change truth value over time.” While Salmon (2003, p. 112) says: “Not just some; all propositions are eternal. The eternalness of a proposition is central and fundamental to the very idea of a proposition....” Salmon goes on to cite the Fregean conception of content, on which: “Only a sentence with the time-specification filled out, a sentence complete in every respect, expresses a thought.” My conception of eternalism is closer to Salmon’s conception of “being filled out” than Richard’s notion of “being unchangeable.” This comes out in propositions about non-transient matters of fact such as that two plus two is four. On the “being unchangeable” conception this can be time-neutral, since there will be no change over time with respect to its truth. But on the “being filled out” conception even this proposition needs time-specification.

<sup>12</sup> *Eternalism* and *Temporalism* must be distinguished from the *metaphysical* doctrines that sometimes bear the same name. The metaphysical doctrine that sometimes goes by the name “eternalism” is (roughly) the doctrine that all times past, present, and future are equally real; while the metaphysical doctrine that sometimes goes by the name “temporalism” (though it more often gets called “presentism”) is then the doctrine that only the present is real. What relations obtain between the semantical and metaphysical doctrines turns on deeper methodological questions about the relations between semantics and metaphysics. For the record I view these matters as utterly independent: semantics encodes a sort of “folk metaphysics;” or at least the metaphysical assumptions embedded in the workings of a particular cognitive module. The metaphysical assumptions embedded in the module may be false. But that has no effect on how the module computes.



information, then some index parameters will be needed to supply this information,<sup>13</sup> and—assuming a treatment of truth evaluation that is uniform for all propositions—this will mean that all propositions will bear truth values only relative to this bit of time information. Whereas if all propositions are fully time specific, then no index parameters will be needed to supply any time information. Indeed any time information provided by the index will be otiose, since all propositions will bear a constant truth value at every time.

Thus the temporalist need not reject the existence of *some* time specific propositions. Nor should she. Thus suppose again that only a single bit of time information is needed, and contrast the simple sentence 1 above with the following more explicit counterpart:

3. Obama is the current president of the United States

Sentence 3 looks to explicitly fix the time at issue (via the indexical ‘current’), and so relative to any context 3 should presumably express a proposition that specifies the time of speech as the time at issue. The temporalist need not deny such a truism. She need only maintain that there are *some* propositions that are *at least partially* time neutral.

This of course means that the temporalist bears no specific commitments for 1. It is perhaps most thematic for the temporalist to treat 1 as expressing a fully time neutral proposition in every context, especially since it might seem that sentences like 1 express time neutral propositions if any sentences do. But this is not required. The temporalist may allow that in some contexts 1 expresses a partially or even fully time specific proposition. She may even hold that in all contexts 1 expresses a fully time specific proposition, and simply put forward some other sentence (e.g. 2) as expressing an at least partially time neutral proposition in at least some context. There is also the prospect of a temporalist thinking that a plurality of propositions can be expressed (or perhaps merely implicated), and thus thinking that a time-specific proposition is *always* expressed, but that time neutral proposition is at least sometimes expressed (or merely implicated) as well.<sup>14</sup>

<sup>13</sup> I am assuming that a truth value is always determined. Strictly speaking one could allow a neutral proposition to be evaluated without any index parameters supplying the needed information, with the result that the semantics assigns no truth value (perhaps a truth value—or some analogous sort of correctness value—is still determined post-semantically). I take it as built into the background Kaplanian picture that this does not happen. But it should be acknowledged that there is room for rejecting the inference from having propositions that are neutral with respect to needed information, to having the index provide that information.

<sup>14</sup> Indeed strictly speaking the temporalist might even deny that natural language can provide any sentence that ever expresses a partially neutral proposition, but merely maintain that these partially neutral propositions *exist* whether or not natural language can express them. For the record, I find this last view highly implausible, but I do not build this judgment into the characterization of *Temporalism* itself. That said in the main text I will only consider propositions expressible in natural language. The philosopher who thinks this makes a difference might also consider versions of *Eternalism* restricted to propositions expressible in natural language. (A similarly “restricted” version of *Necessitarianism* might also be considered. I myself would be content to defend the restricted necessitarian-eternalist package.)

With *Eternalism* and *Temporalism* clarified, *Necessitarianism* and *Contingentism* can now be characterized as counterpart semantic doctrines with respect to world information:

(*Necessitarianism*) For every proposition  $p$ , and every bit of world information  $i_w$  needed for truth evaluation,  $i_w$  is specified in  $p$

*Contingentism* is then the negation of *Necessitarianism*, which is to say:

(*Contingentism*) For some proposition  $p$ , and some bit of world information  $i_w$  needed for truth evaluation,  $i_w$  is unspecified in  $p$  (equivalently:  $p$  is neutral with respect to  $i_w$ )

Note again the initial quantifiers. *Necessitarianism* as characterized is a very strong doctrine, falsified if there is even a single proposition which is neutral with respect to even a single bit of needed world information. This is again as it should be. If there is a single proposition neutral with respect to a single bit of needed world information, then some index parameters will be needed to supply this information, and—assuming a treatment of truth evaluation that is uniform for all propositions—this will mean that all propositions will bear truth values only relative to this bit of world information. Whereas if all propositions are fully world specific, then no index parameters will be needed to supply any world information. Indeed any world information provided by the index will be otiose, since all propositions will bear a constant truth value at every world.

Thus the contingentist need not reject the existence of *some* world specific propositions. Nor should she. Thus suppose again that only a single bit of world information is needed, and contrast the simple sentence 1 above with the following more explicit counterpart:

4. Obama is the actual president of the United States

Sentence 4 looks to explicitly fix the world at issue (via the indexical ‘actual’), and so relative to any context 4 should presumably express a proposition that specifies the world of speech as the world at issue. The contingentist need not deny such a truism. She need only maintain that there are *some* propositions that are *at least partially* world neutral. This of course means—for reasons parallel to those just discussed for the temporalist—that the contingentist bears no specific commitments for 1, or any particular natural language sentence whatsoever.

The underlying dispute is about *which propositions exist*. Everyone agrees that world and time specific propositions exist (as expressed by 4 and 3 respectively). But the contingentist and the temporalist both claim that these are not propositions enough for semantics. The temporalist thinks that one also needs time neutral propositions, while the contingentist thinks that one needs world neutral propositions in addition.

### 1.3 Concomitant differences: denotations and operations

Whether a bit of needed information comes via the proposition route or via the index route has implications for the form of semantic denotations, and also the proper semantic treatment of operations on this information (for instance, modal and temporal

operators). It will prove useful to clarify these implications, to reach a fuller understanding of the doctrines at issue.

Starting with the form of semantic denotations, what is at issue is whether world or time information feature in the superscripts relative to which denotations are taken. The necessitarian-eternalist will (assuming no further index parameters) render denotations in the fairly simple format:

$$[[\alpha]]^{c,g} \text{ (where “}c\text{” is the context and “}g\text{” is the assignment function)}$$

But the contingentist will need to add world superscripts (one for each needed bit of world information), and the temporalist will need to add time superscripts (one for each needed bit of time information). So—re-invoking the simplifying assumption that exactly one bit of world information and exactly one bit of time information is needed for illustrative purposes—the contingentist-temporalist will render denotations in the more complex format:

$$[[\alpha]]^{c,g,w,t}$$

And of course the contingentist-eternalist and the temporalist-necessitarian will render denotations in the following respective formats:

$$[[\alpha]]^{c,g,w}$$

$$[[\alpha]]^{c,g,t}$$

But the necessitarian-eternalist should not be credited with any overall simplification of denotations, for any needed world or time information removed from the format of the denotation must resurface in the content. Thus the contingentist-temporalist might think of a predicate like ‘is the president of the United States’ as denoting a fairly simple function from an entity to a proposition:

$$\lambda x.x \text{ is the president of the United States}$$

But the necessitarian will need to add world arguments (one for each needed bit of world information), and the eternalist will need to add time arguments (one for each needed bit of time information). So—again assuming that exactly one bit of world information and exactly one bit of time information is needed, but also assuming that the arguments are applied in a particular order (world last and time second-to-last), the necessitarian-eternalist might think of ‘is the president of the United States’ as denoting a more complex function from an entity to a function from a time to a function from a world to a proposition:

$$\lambda w.\lambda t.\lambda x.x \text{ is the president of the United States at } w \text{ in } t$$

And of course the contingentist-eternalist and the temporalist-necessitarian might then posit the following respective denotations for ‘is the president of the United States’:

$$\lambda t.\lambda x.x \text{ is the president of the United States in } t$$

$$\lambda w.x.x \text{ is the president of the United States at } w$$

Going back to the sorts of propositions exhibited in Sect. 1.1, the necessitarian-eternalist who works with Russellian structures with one world argument and one time argument will claim something like the following structure for 1 (again ignoring irrelevant internal structure)<sup>15</sup>:

$$\langle \langle [[Obama]]^{c,g}, [[is\ the\ president\ of\ the\ United\ States]]^{c,g}, [[w]]^{c,g}, [[t]]^{c,g} \rangle \rangle$$

Taking  $[[Obama]]^{c,g}$  to be Obama himself, and  $[[is\ the\ president\ of\ the\ United\ States]]^{c,g}$  to be the property of being the president of the United States:

$$\langle \langle Obama, \text{being the president of the United States}, [[w]]^{c,g}, [[t]]^{c,g} \rangle \rangle$$

Taking  $[[w]]^{c,g} = g(w)$  and  $[[t]]^{c,g} = g(t)$ , and building into the assignment function that  $g(w)$  is the speech world and  $g(t)$  is the speech time, then the propositions suggested for Ann, Ben, and Claire in Sect. 1.1 are now recovered:

$$(1A^{nc}) \quad \langle Obama, \text{being the president of the United States}, @, 2010 \rangle$$

$$(1B^{nc}) \quad \langle Obama, \text{being the president of the United States}, @, 1990 \rangle$$

$$(1C^{nc}) \quad \langle Obama, \text{being the president of the United States}, w-, 2010 \rangle$$

The reader should be able to see how the other views can now recover the propositions suggested on their behalf in Sect. 1.1.<sup>16</sup>

It should be emphasized that this is not the only option for the necessitarian or the eternalist. One option worth mentioning (though it won't play much of a role in what follows) is having the world and or time variable receiving default existential closure when left free.<sup>17</sup> The default existential quantification could still be highly contextually restricted. (What is crucial to the treatment of operations below is that the world or time variable only be existentially quantified at the very end if still left free—the variables need to be open to binding by quantifiers.)

With the adjustments to the form of denotations come concomitant adjustments to the form of operations on the information involved. Essentially, systems which treat a given bit of information as provided via the index will treat operations on this information via intensional operators, while systems which treat a given bit of information as provided via the proposition will treat operations on this information via object-level quantification. In this vein consider:

5. Necessarily, Obama is the president of the United States

6. Eternally, Obama is the president of the United States

For the necessitarian, 5 is best treated as involving a universal quantifier over worlds (what 'necessarily' contributes), prefixed to a structure with a free world variable which it binds:

$$(5^n)(\forall w) \text{ Obama is the president of the United States at } w$$

<sup>15</sup> Thanks to Roger Schwarzschild for discussion.

<sup>16</sup> This treatment involves viewing 1 as having free world and time variables evaluated via the assignment function. If things with free variables are not to count as proper sentences, then this treatment denies that 1 is a proper sentence. It will instead be what Lewis called a "schmentence": "Schmentences would be akin to the open formulas that figure in the standard treatment of quantification" (Lewis 1980, p. 34).

<sup>17</sup> See Toshiyuki (1995) for an eternalist treatment in which tense provides existentially closed time variables.

So 5 winds up making the false claim that every world  $w$  is such that Obama is president at  $w$ .<sup>18</sup> While for the contingentist, 5 is treated as involving an intensional modal operator (“[w]”) which takes in a world-neutral proposition and checks whether its content holds at all worlds:

(5<sup>c</sup>) [w] Obama is the president of the United States

In this way 5 winds up with the unmet requirement that every world  $w$  be such that Obama is president at  $w$ . The requirements given in 5<sup>n</sup> and 5<sup>c</sup> are equivalent, which should be unsurprising given that intensional modal operators are standardly given a semantics which essentially replicates the effect of object-language quantification without explicit variables.

Likewise the eternalist will treat 6 as involving a universal quantifier over times, prefixed to a structure with a free time variable which it binds:

(6<sup>e</sup>) (∀ $t$ ) Obama is the president of the United States at  $t$

So 6 winds up making the false claim that every time  $t$  is such that Obama is president at  $t$ . While for the temporalist, 6 is treated as involving an intensional temporal operator (“[t]”) which takes in a time-neutral proposition and checks whether its content holds at all times:

(6<sup>t</sup>) [t] Obama is the president of the United States

In this way 6 winds up with the unmet requirement that every time  $t$  be such that Obama is president at  $t$ . Again the requirements given in 6<sup>e</sup> and 6<sup>t</sup> are equivalent: the intensional temporal operator in 6<sup>e</sup> is “faking” the effect of universal quantification over times without explicit time variables.

Necessitarians and contingentists can thus recover equivalent truth-conditions for 5, in a way that looks to generalize to all modal operations. Likewise eternalists and temporalists can recover equivalent truth-conditions for 6, in a way that looks to generalize to all temporal operations.<sup>19</sup> The contingentist-temporalist treatment of such operations is drawn from the image of intensional logic, but it is of course an empirical question whether natural language has the structure of intensional logic, or rather has the structure of a fully extensional system with explicit world and time variables.

<sup>18</sup> In the main text I am ignoring the prospect of contextual restriction on the quantifiers (which takes up “accessibility relations” over worlds in a necessitarian system). In a suitable context 5 can actually count as true. For instance, if 5 is tokened in a context  $c$  at which all actual matters of fact are held fixed save the outcome of the presidential vote in Rhode Island, 5 should be true at  $c$ .

<sup>19</sup> Quantificational treatments are the most natural option for the necessitarian or eternalist, but there are alternatives. One alternative is to retain intensional operator treatments, but have the operators operate on semantic values other than that of a full proposition. In different ways, both [Richard \(1981\)](#) and [Salmon \(2003\)](#) opt for such a treatment in the temporal case, and as far as I can determine their treatments could equally be extended to the modal case if wanted. The core idea is to say that I at a given context has multiple semantic values: perhaps a necessitarian and eternal value (the proposition), and a contingent and temporal value (the neutered remainder), with modal and temporal operators semantically built to operate only on the latter. (See Sect. 3.3 for some reason to think that all these semantic values should be recognized, as all potential anchors for phrases like ‘what is said.’)

## 1.4 Clarifying the parallelism thesis

So far I have defined *Eternalism* and *Temporalism* as contrary views concerning the role of time information in truth evaluation, defined *Necessitarianism* and *Contingentism* as analogue contraries concerning the role of world information in truth evaluation, and clarified some of the concomitant semantic differences. That said, I will not primarily be concerned with defending any one of these doctrines, but only with defending the preferability of the two parallel packages (the contingentist-temporalist and necessitarian-eternalist packages) over the two non-parallel packages (the contingentist-eternalist and necessitarian-temporalist packages). What I will defend is:

(*Parallelism*) The main arguments for *Eternalism* have parallels which provide equally good arguments for *Necessitarianism*, and the main arguments for *Contingentism* have parallels which provide equally good arguments for *Temporalism*

*Parallelism* grounds an objection to the contingentist-eternalist and necessitarian-temporalist packages, for providing skewed (non-parallel) treatments of the roles of world and time in semantics. The objection is not that such packages are incoherent, but only that they cannot be coherently motivated. (To put the matter dialectically: if you are an eternalist, say why. I will then try to show you why you should for parallel reasons be a necessitarian. If you are a contingentist, say why. I will then try to show you why you should for parallel reasons be a temporalist.)

The upshot of *Parallelism* is thus to reduce the theoretical options. Replicating the table from above but populating the boxes with some of the leading advocates of the view in question (subject to the caveat that some theorists might not be using the term ‘proposition’ as I am), the upshot of *Parallelism* would be to eliminate the lower-left and upper-right boxes as not coherently motivated:

	<i>Eternalism</i>	<i>Temporalism</i>
<i>Necessitarianism</i>	Schaffer	[No one]
<i>Contingentism</i>	Stalnaker, Richard, Salmon, Soames, King, Stanley, Glanzberg	Kaplan, Lewis, Ludlow, Recanati, MacFarlane, Brogaard

This table is not intended to be complete. For instance, if one has a different picture of the underlying semantic machinery, one can then hold further views.<sup>20</sup>

Four final points of clarification may be useful before moving on to the arguments. First, *Parallelism* does *not* claim that every single aspect by which the semantics treats time information is reflected in an aspect by which the semantics treats world

<sup>20</sup> For instance, Cappelen and Hawthorne (2009) hold a view on which world information is neither specified in the proposition (2009, p. 95) nor borne by the index (2009, p. 1). Instead they (2009, p. 78) claim that no world information is needed at all, on grounds that there is only one world that could be at issue: all propositions are to be held up to the actual world as “*the only reality there is*.” As to time information, they (2009, p. 4) initially sketch a parallel treatment (all propositions are to be held up to the present time, as the only time there is), but they (2009, p. 97) ultimately adopt an eternalist treatment involving time-specific propositions. This leaves them handling world and time information in non-parallel ways. That said, their ultimate purpose is to argue against propositional truth being relative to world or time information, and in that respect they and I are allies (Sect. 5.2).

information.<sup>21</sup> *Parallelism* only concerns the considerations relevant to arguing for *Eternalism* or for *Contingentism*.

Secondly, *Parallelism* merely makes a claim of *relative equality* of strength between considerations. It makes no claims as to the *absolute strength* of any considerations. So it is consistent, for instance, with the view that the arguments for *Eternalism* and *Necessitarianism* are equally of negligible strength, while the arguments for *Temporalism* and *Contingentism* are equally utterly compelling. As mentioned above, I happen to consider the case for *Eternalism* to be fairly compelling, and so equate mimicking the case for *Eternalism* with making the case for *Necessitarianism*. But this matter is strictly beyond the scope of the current discussion.

Thirdly, my *Parallelism*-fueled objection to skewed treatments of world and time information does not require the full strength of *Parallelism*. It would be sufficient, for instance, if there were a single fully compelling argument for *Eternalism* which had a parallel which provided a single equally fully compelling argument for *Necessitarianism*. (By my lights the argument from expressive power discussed in Sect. 2.2 is quite close to serving as such an argument.) But since there seems to be little agreement in the literature as to which arguments are to any degree compelling, I work with the full strength *Parallelism* thesis for dialectical purposes.

Fourth and finally, the quantification in *Parallelism* is restricted to “the main arguments,” since obviously I cannot pretend to consider every conceivable argument. I will rely on the literature to provide the main arguments for *Eternalism*, but must rely on my imagination and the kindness of interlocutors to provide the main arguments for *Contingentism*. I cannot exclude the prospect that I have missed some important considerations without a relevant parallel. The fan of skewed treatments of world and time should take what follows as an invitation to explain what I have missed.

## 2 The case for eternalism mimicked

I will now review three main arguments for *Eternalism* drawn from the literature. Every one of these can be mimicked as an argument for *Necessitarianism*. These three mimickries constitute the first part of the case for *Parallelism*: the main arguments for *Eternalism* have parallels which provide equally good arguments for *Necessitarianism*.

### 2.1 The argument from analogies with pronouns

The first main argument for *Eternalism*—which traces back to Partee (1973)—involves a range of analogies between pronouns and tense. Since pronouns are paradigmatically referential, the analogies suggest that tense is analogously referential, specifying the time at issue. I will review these analogies, and then—drawing on Stone (1997)—show how the range of analogies between tense and pronouns extends smoothly to mood on every point, thus suggesting to an equal degree that mood is referential, specifying the world at issue (as per *Necessitarianism*). In other words: if you are an eternalist

<sup>21</sup> Indeed there look to be interesting disanalogies. For instance, the semantics looks to treat time information in ways that presuppose a total ordering over time points but not over world points.



because you are impressed with the analogies between pronouns and tense, then you should be equally impressed with the extension of the analogies to mood, and equally be a necessitarian.

Start with pronouns. One finds the following seven characteristic features of pronominal reference. First, pronouns can exhibit *deictic reference*. Thus imagine that Ben, weeping over a photograph of his beloved Ann, laments:

7. She left me

The referent of ‘she’ in 7 is naturally read as Ann, in a way that is determined by the extra-linguistic surround.<sup>22</sup> Second, pronouns can exhibit *anaphoric reference to a definite individual*. Thus imagine that Ben’s lament takes the form:

8. Ann loved me, but she left me

The referent of ‘she’ in 8 is again naturally read as Ann, but this time in a way that is anchored to the preceding linguistic reference to Ann. Third, pronouns can exhibit *anaphoric reference to an indefinite individual*, as seen in:

9. I had a wife, but she left me

In 9 the referent of ‘she’ is naturally read as anchored to the indefinite description ‘a wife.’

Sentences 7–9 exhibit perhaps the simplest possibilities for pronominal reference, but these are hardly the only possibilities. Fourth, pronouns can also participate in *bound reference*, as in:

10. Every man believes that he is special

10 has a natural reading on which the referent of ‘he’ is bound by the higher quantifier, producing something equivalent to: *man1* believes that *man1* is special, *man2* believes that *man2* is special, ... (and so on for all the men in the domain of discourse).<sup>23</sup> Fifth, pronouns can feature in *E-type reference* where they appear co-indexed to material syntactically too low for c-command:

11. Every man who has a wife loves her

In 11 the referent of ‘her’ is naturally read as tied to the referent of ‘a wife,’ yet syntactically speaking ‘a wife’ is buried inside a free relative and thus sits too low to c-command ‘her.’

Two final characteristic features of pronominal reference are worth noting. Sixth, pronouns in certain sorts of elliptical constructions generate characteristic *strict/sloppy ambiguities*, as seen in:

<sup>22</sup> I leave open how exactly the extra-linguistic surround links ‘she’ to Ann. This might for instance work via the fact that the photograph is a photograph of Ann, or purely through the speaker’s (Ben’s) intentions, with the photograph merely providing a way he can make his intentions manifest (cf. Bach 2001; Montminy 2010).

<sup>23</sup> Sentence 8 has other natural readings including a deictic reading (imagining pointing to Obama while uttering ‘he’). What is relevant is just that there is a possible bound reading.

## 12. I love my wife, and you do too

12 has one natural reading (*the strict reading*) on which the second conjunct says that you love *my* wife, and another natural reading (*the sloppy reading*) on which the second conjunct says that you love *your* wife. Seventh and finally, pronouns involve *potentially uninterpreted features*, as per:

## 13. Only I love my wife

13 has a natural reading on which it says that I love my wife, and no one else loves *their* wife. One way to think about this reading is in terms of ‘I’ and ‘my’ serving as bound variables (“fake indexicals”) whose first-personal features go uninterpreted under agreement.<sup>24</sup>

Tense suggestively displays every single one of these seven characteristic features of pronominal reference (cf. Partee 1973). I will take these in order. To illustrate deictic tense comparable to 7, imagine someone looking at photos from Ann’s party last Friday and commenting:

## 14. Ben got drunk

In such a situation, 14 is most naturally read as saying something much stronger than merely that there was some time in the past when Ben was drunk. The extralinguistic surround seems to determine specific temporal reference to last Friday. To illustrate anaphoric tense with a definite anchor comparable to 8, consider:

## 15. Ann had a party last Friday and Ben got drunk

In 15, the time at which Ben got drunk is naturally read as being last Friday, in a way that is anchored to the previous linguistic reference to last Friday. Here is an example of anaphoric tense with an indefinite anchor comparable to 9:

## 16. Ann left sometime during her party, and went to buy beer

The time at which Ann went to buy beer in the second conjunct of 16 is naturally read as anchored to the previous indefinite reference ‘sometime during her party’.

Bound tense and E-type tense are also exhibited. For a bound reading of tense comparable to 10, consider:

## 17. Whenever Ann looked, Ben was dancing

17 has a natural reading in which Ben’s dancings are naturally read as occurring through the times of Ann’s lookings, producing something equivalent to: Ann looked at  $t_4$  and Ben was dancing at  $t_4$ ; Ann looked at  $t_9$  and Ben was dancing at  $t_9$ , ... (and so on for all the times in the domain of discourse at which Ann was looking). For an E-type reading comparable to 11, consider:

<sup>24</sup> Sentences such as 13 were offered by Heim as counterexamples to Kaplan’s influential treatment of terms like ‘I’ and ‘my,’ on which these should keep a constant speaker-involving character. See Roeper (2006) for further discussion.

18. Whenever Ann had a party on a Friday, Ben danced

With 18, Ben's dancings are naturally read as occurring on the Fridays when Ann had a party, despite a syntax that does not allow 'on a Friday' to *c*-command any material in 'Ben danced.'

For the final two points of analogy, concerning the strict/sloppy ambiguities in 12 and uninterpreted features in 13, consider first:

19. Ann thought Ben was drunk, and she still does

As with 12, the elided second conjunct of 19 has a strict reading on which Ann continues to think that Ben was drunk at the past time at issue in the first conjunct, and a sloppy reading on which Ann also thinks that Ben is still drunk at present. Also consider:

20. Ann thought Ben was drunk

As with 13, 20 has a reading—the *simultaneous de nunc* reading—on which the embedded past tense on 'was' goes uninterpreted (Kratzer 1998). This is the reading on which Ann would, at the time of her thinking, have expressed her thought with the present tense 'Ben is drunk'.<sup>25,26</sup>

So much for the suggestive parallels between pronominal reference and tense. With mimicry in mind, I will now show—drawing primarily from Stone (1997)—that the analogies extend smoothly to mood on every point. To illustrate deictic mood comparable to 7 and 14, imagine that we are walking past the florist, where a beautiful bouquet of roses has drawn our attention:

21. You would make me feel loved

21 has a natural reading in which it concerns what would eventuate in the extralinguistically salient scenario in which you buy me those roses. For anaphoric mood with a definite anchor comparable to 8 and 15, consider:

22. If you were to buy me those flowers, you would make me feel loved

The 'would' in the "consequent" of 22 has a natural reading as concerning the antecedently mentioned scenario in which you buy me those flowers. For anaphoric mood with an indefinite anchor comparable to 9 and 16, consider:

23. If a woman were to buy a man flowers, she would make him feel loved

The 'would' in the "consequent" of 23 has a natural reading as concerning any of the many scenarios in which a woman buys a man flowers.

Here is an example of bound mood comparable to 10 and 17:

<sup>25</sup> It may be illuminating to consider the alternative sentence 'Ann knew that Ben is drunk'. This alternative is of questionable grammaticality (one should be careful not to repair it by reading the complement clause with quotational intonation). If it has an interpretation, it does not have the *simultaneous de nunc* interpretation, but the so-called *double access* interpretation, which requires Ann to have known of Ben's past drunkenness and to still know at present of his ongoing present drunkenness (cf. von Stechow 2004).

<sup>26</sup> One leading strategy for explaining sequence of tense phenomena is developed by von Stechow (2004), who essentially posits time variables alongside a general pattern of feature deletion under agreement for bound variables. From this plus specific posits of binding properties for English, German, and Russian, von Stechow is able to explain an impressive variety of sequence of tense phenomena across these languages.

24. If any man were to be given flowers, he would be happy

24 has a natural reading on which it says that, in *scenario1* in which man1 is given flowers, man1 is happy in *scenario1*; in *scenario2* in which man2 is given flowers, man2 is happy in *scenario2*; etc. To capture the bound reading, the scenarios in play in the consequent must be correlated with the gifting scenarios in the antecedent. And here is an example of E-type mood comparable to 11 and 18:

25. If a woman were to buy a man flowers when they are on a date, she would get a kiss

The scenarios on which 25 says the woman would get a kiss are those in which she buys a man flowers when they are on a date. Perhaps if a woman were to buy a man flowers in other circumstances she would get a very different reaction. But crucially ‘when they are on a date’ seems to be sitting too low in the structure to c-command material in ‘she would get a kiss.’

For the analogy with strict/sloppy ambiguities seen in 12 and 19, imagine that Ann is pondering whether to buy Sam flowers, and consider:

26. Sam would panic, and Tom as well

The elided second conjunct of 26 has a strict reading on which it says that Tom would panic in the scenario in which Ann bought Sam flowers, and a sloppy reading on which it says that Tom would panic in the scenario in which Ann bought Tom flowers. And finally, for a case where mood features go uninterpreted comparable to 13 and 20, imagine that I am dreaming of a hypothetical scenario in which we are walking past the florist, and say:

27. I would hope you would buy me flowers

27 is naturally read as one in which the embedded ‘would’ goes uninterpreted. This is the reading on which I would, in the world I am hoping for, express my hopes with the indicative mood: ‘I hope you buy me flowers.’<sup>27</sup>

I take no stand on what these analogies show about the semantic role of time or world information, other than to say that they ought to be regarded as having the same force in either case.<sup>28</sup> As Stone (1997, p. 7) puts the matter:

[T]he interpretation of modals offers the same range of effects that characterize the interpretation of pronouns and tense. The only difference is the type of object

<sup>27</sup> Likewise, just as there are *double access* readings with tense requiring the content of the attitude to be held at both the past and present times, so there seem to be analogous double access readings with mood (Schlenker 2004c, p. 557). Thus consider: ‘If Ann knew that Ben is drunk, then she would be mad’. This has a reading which requires Ben to be drunk both at the actual world and at the world in which Ann knows of Ben’s drunkenness.

<sup>28</sup> It is perhaps most natural to take these parallels to favor referential treatments of both tense and mood, where a single time point and a single world point is referentially specified. Thus Partee (1973, p. 601) speaks of “representing the tenses in terms of variables and not exclusively as sentence operators.” Though she does say (1973, pp. 602–603), of her deictic reference example: “The sentence clearly refers to a particular time—not a particular instant, most likely, but a definite interval.” And, as Toshiyuki (1995) notes, Partee’s data can also be taken to support quantificational treatments of tense given sufficient contextual restrictions. Similar comments of course apply on the mood side of the ledger.

involved. Where pronouns refer to individuals, tenses refer to times/events, and modals refer to hypothetical scenarios.

Likewise [Speas \(2004, p. 266\)](#) maintains: “The evidence for a world argument comes from the fact that the world within which a sentence is to be interpreted shows the same locality conditions and restrictions on interpretation that pronouns and tense do.” And [Schlenker \(2006, p. 504\)](#), bringing these considerations together, speaks of “a *pervasive symmetry* between the linguistic means with which we refer to [individuals, times, and possible worlds].”

A natural syntactic picture emerges on which the verb, in addition to projecting the usual arguments for individuals, also obligatorily projects functional heads for tense, aspect, and mood. There is an inner verb phrase argument providing a “small clause,” which must combine with inflectional elements including both tense and mood to produce something that can serve as a stand-alone sentence.<sup>29</sup> Semantically, the tense projection would then be taken to specify time information, and the mood projection to specify world information. For the necessitarian-eternalist the obligatory tense and mood projections are no accidents, as they respectively provide the needed time and world information. That said, an interesting if minor asymmetry between individual, world, and time reference remains on this picture, which is that different verbs may demand different numbers of individual arguments (in a lexically variable way), but must demand the same fixed number of time and world arguments (in a functionally fixed way). I leave open whether this minor syntactic asymmetry has any deeper semantic significance.

[Enç \(1986\)](#) suggests that, since the time information is specified in the proposition, one should “abandon the notion that intensions are functions from times and worlds, and maintain perhaps that they are only functions from possible worlds” (1986, p. 421; cf. [King 2003](#)). For better or worse, a perfectly parallel argument is available for abandoning worlds.

As further confirmation of *Parallelism*, note also that at least three parallel rejoinders are available to both the temporalist and the contingentist. One rejoinder open to both is to stand the analogies on their head and call for a non-referential treatment of pronouns, maintaining individual neutral propositions which take truth values relative to individuals (cf. [Prior 1968](#); [Cresswell 1990](#)). A second rejoinder open to both is to grant there are time/world variables in logical form but deny that these specify times/worlds, perhaps by positing obligatory world and time lambda binders taking scope over everything else and binding any hitherto free world or time variables (cf. [Ninan forthcoming: Sect. 2](#)). A third rejoinder open to both is to grant that some time/world information is specified in the proposition but claim that truth evaluation requires further needed time/world information, so that the specification is at most partial. I cannot discuss the plausibility of these and other possible rejoinders further,

<sup>29</sup> See [Glanzberg \(2011\)](#) for a useful overview of the philosophically relevant issues. [Glanzberg \(2011, p. 117\)](#) defends time-specificity by invoking the syntactic picture in which a time-neutral small clause (VP) must interact with tense (TP) to deliver a full matrix clause. Of course exactly the same can be said about mood. Indeed, as [Glanzberg \(2011, p. 118\)](#) immediately notes: “Modal auxiliaries, verbal mood, etc. all live outside of VP, and appear to occupy heads around the T level. Like tense, they do not function syntactically as sentential operators.”

though it should be emphasized that we are looking at empirical, abductive arguments whose conclusion is never that *Eternalism (Necessitarianism)* is logically mandatory, but always that *Eternalism (Necessitarianism)* provides what King (2003, p. 221) aptly calls “a simpler, more elegant, less ad hoc treatment”.

2.2 The argument from expressive power

The second main argument for *Eternalism*—which has roots in Kamp (1971) arguments for double time-indexing, and sees important developments in the work of Vlach (1973), van Benthem (1977), and Cresswell (1990)—is based on the fact that natural language has the expressive power of a system with explicit time variables. Treating natural language as actually having explicit time variables is then said to be the best explanation for it having exactly such expressive power.

The issue of expressive power is best introduced with respect to Prior’s (1957) tense logical picture—inherited by Kaplan—of time neutral propositions evaluated relative to a single time point. Kamp (1971) proved that Prior’s system was inadequate for natural language semantics, on the basis of sentences with embedded tense such as the following (Kamp 1971, p. 231):

28. A child was born who will become ruler of the world

As Kamp points out, no single point of time is adequate for assessing sentences like 28. Rather the semantics needs to “store” a reference time when going back to the past time when the child was born, in order to properly interpret the future tense ‘will’ on the embedded free relative. For 28 can only be read as saying that the child becomes ruler of the world at a time later than *the speech time*:



Crucially, 28 *cannot* be read as saying that the child will become ruler of the world at a time later than the birth time but before the speech time:



To express this latter sort of temporal relationship one needs a ‘would’ instead of a ‘will’. In order for the semantics to rule this latter picture incompatible with 28, the semantics must be able to access the present speech time even underneath Priorean sentential tense operators.<sup>30</sup>

<sup>30</sup> The problem essentially is that in Prior’s system we will “lose track” of the speech time as soon as we reach an operator that shifts us to another point of time. So when we come to interpret the ‘will’ embedded under the past tense ‘was’ we only have the past time point to work with, and have no way to “look back” and recover the present speech time. So Kamp essentially posits a second time parameter  $t_2$  to serve as a storage point, together with a ‘now’ operator that re-sets the evaluation time  $t_1$  back to the stored reference time  $t_2$ . Vlach (1973, p. 2) then shows, via sentences such as “Jones was once going to cite everyone then driving too fast”, that a ‘then’ operator is also needed which replaces the stored reference time  $t_2$  with the evaluation time  $t_1$ . Indeed Vlach (appendix) already sees the need for an infinite sequence of coordinates.

But it was readily seen that the problem generalized indefinitely, since in principle any number of introduced times must be tracked for later cross-reference. Thus consider the following sentence (adapted from Vlach) which requires tracking three times:

29. When the war began, every soldier alive then would soon be dead.

As [Saarinen \(1978, p. 215\)](#) concluded on the basis of related considerations: “For all natural numbers  $n$ , the semantics should have a capacity to keep track of  $n$  points introduced earlier in an evaluation.”

It of course remains open to work with a world coordinate and an infinite sequence of time coordinates  $\langle w, t1, t2, t3, \dots \rangle$ , plus a rich enough system of tense operators. Indeed it is provable that a system with explicit variables is equivalent to a system with an infinite sequence of coordinates and a rich enough system of operators.<sup>31</sup> But the resulting system seems ad hoc and inelegant. In this vein [van Bentham \(1977, p. 426\)](#), contrasting the tense logic tradition with “the use of predicate-logical formulas containing moment variables,” notes:

[I]f one is willing to increase the complexity of the index to any extent (while adding enough operators to take profit of it), there is no need ever to resort to predicate logic *technically*, but in our opinion it is a Pyrrhic victory.

So again we reach the conclusion that *Eternalism*—while not logically mandatory—is still simpler, more elegant, and less ad hoc. (By my lights the argument from expressive power is the most compelling of the arguments for *Eternalism*.)

By way of mimicry, I follow [Cresswell 1990](#) in claiming that this full expressive power is equally found for worlds. Indeed this can be established in one fell swoop, since the example of 29 is readily adaptable:

30. If peace had prevailed, every soldier who would then still be alive still might have died.

And so, to the extent that natural language can be said to have the expressive power of a system with explicit time variables in a way that best fits *Eternalism*, natural language can equally be said to have the expressive power of a system with explicit world variables in a way that best fits *Necessitarianism*. For better or worse, the arguments are parallel. On this point I follow [Kratzer \(2009, Sect. 5\)](#), who explains:

[Cresswell 1990](#) presented parallel arguments for modal anaphora, and showed more generally that natural languages have the full expressive power of object language quantification over worlds and times. Quantification over worlds or times is thus no different from quantification over individuals, and should be accounted for in the same way.

As [Schlenker \(2006, p. 510\)](#) details, concerning the traditional extensional treatments of individual reference but intensional treatments of world and time: “the overwhelm-

<sup>31</sup> [Kuhn \(1980, p. 148; cf. Cresswell 1990\)](#) shows that one can get by with just four one-place operators (his generalization, “rotation”, switch, and identification operators). Effectively, rotation and switch allow one to move information around among the sequence of coordinates, generalization does the work of universal quantification over the coordinates, and identification does the work of identity between coordinates. Infinite coordinate sequences plus these four operators can do exactly what explicit variable schemes do.



ing evidence is that *the semantic differences that were traditionally posited between the three ontological domains are largely imaginary.*”

As further confirmation of *Parallelism*, note also that at least four perfectly parallel rejoinders are available to both the temporalist and the contingentist. One rejoinder open to both is simply to accept the need for infinite sequences of world and time parameters (cf. [Cresswell 1990](#)). The second and third rejoinders (akin to those found to the argument from the analogies with pronouns: Sect. 2.1) would be to permit world/time variables in logical form but hold them to be obligatorily lambda bound, or merely partially specifying all the needed time/world information. A fourth rejoinder would be to accept that 29 and 30 express time and world specific propositions but just maintain that not all propositions are like this (recall from Sect. 1.2 that the contingentist/temporalist need only hold that *some* propositions are world/time neutral). Though presumably this requires the contingentist/temporalist to make the inelegant post of two distinct formal systems (one explicit, one implicit) for world/time information, each having exactly the same expressive power.

### 2.3 The argument from invalid sequences

The third main argument for eternalism—and the final one I will consider—uses devices of seeming propositional anaphora to maintain that, if there were time neutral propositions, then intuitively invalid argument sequences would get validated ([Richard 1981](#); cf. [Fitch \(1998\)](#), [Salmon \(2003\)](#), pp. 115–116). Time specificity is thus upheld to explain the felt invalidity.

Thus consider the following clearly invalid inference ([Richard 1981](#), p. 4).

31. Ann believed that Nixon was president<sup>32</sup>
32. Ann still believes that
33. So Ann believes that Nixon is president

As Richard points out, if the ‘that’ in 32—which looks like a device of propositional anaphora—picks up on a time neutral temporalist proposition embedded under the attitude verb in 31, then the inference to 33 incorrectly gets validated. Likewise consider:

34. Ann believed that Nixon was president, and she still believes that

On the reading of 34 that is not an insult to Ann, she is not being said to think that Nixon has remained in office and is now still president, but merely being said to have retained the belief that Nixon was president *at the relevant time* (e.g. 1970). The availability of the non-insulting reading shows that the concluding occurrence of ‘that’ can be anaphoric to a time specific belief content in the first conjunct.

<sup>32</sup> The embedded tense “was” must be read as semantically uninterpreted, a morphological reflex triggered by agreement with the tense on the higher verb (the *simultaneous de nunc* reading). What Ann believed at the time in question is what she would have then expressed as “Nixon is president.” If the embedded past tense were semantically interpreted (the *anterior de nunc* reading), then the belief that Ann maintains in the conclusion should preserve the embedded tense: “So Ann believes that Nixon was president.” That inference is valid.

By way of mimickry, I will now show that parallel invalid inference patterns with seeming propositional reference constructions can be found with worlds, and thereby draw the parallel conclusion that propositions involve specification of the world at issue.

Thus imagine that Ann was a fervent Gore supporter in the 2000 US elections, and consider the following clearly invalid inference:

35. If Gore had won the 2000 election, he would have said that America chose wisely in 2000
36. Ann agrees with that
37. So Ann agrees that America chose wisely in 2000

If the ‘that’ in 36—which looks as much like a device of propositional anaphora as the ‘that’ in 32—picks up on a world neutral contingentist proposition embedded under ‘said’ in 35, then the inference to 37 incorrectly gets validated. (To confirm that Ann’s agreement is targeting the content embedded under ‘said’ in 35, and not the whole counterfactual, one might also try ‘Ann agrees with what Gore would have said’). Likewise consider:

38. If Gore had won the 2000 election, he would have said that America chose wisely in 2000, and Ann agrees with that

On the reading of 38 that is not an insult to Ann, she is not being said to think that America actually chose wisely in choosing Bush over Gore in 2000, but merely being said to think that America chose wisely *in the world(s) where Gore won the election*. The availability of the non-insulting reading shows that the concluding occurrence of “that” can be anaphoric on a world specific belief content in the first conjunct.

Yet again I take no stand on what these arguments ultimately show about the semantic role of time or world information, other than to say that they ought to be regarded as having the same force in either case.

As further confirmation of *Parallelism*, perhaps the main temporalist rejoinder is that there are also intuitively *valid* sequences that require time neutral propositions (cf. Aronszajn 1996; Fitch 1998). For instance, if it were common ground that Ann is a conspiracy theorist who thinks that some ancient Republican is still clinging to power (and spreading false rumors about his own death, and the coming to power of other “presidents”), one could use 34, as well as the inference from 31 to 33, to convey this idea. The reading of 34 that is an insult to Ann is also available, and can even be preferred in some contexts.<sup>33</sup> The contingentist can issue a parallel rejoinder. For instance, if Claire at *w*- believes that Obama is a Muslim, and Dave back at @ believes that too, then it does sound as if Dave must be thinking that Obama is a Muslim, with respect to @. Thus:

<sup>33</sup> Aronszajn’s (1996, p. 87) example of an intuitively valid inference runs from (a) at one point in time, most Americans believed that Elvis was alive, but today few Americans believe that; to (b) few Americans believe that Elvis is alive. What is nice about Aronszajn’s example is that the validating reading of the final conjunct of (a) (“but few Americans believe that”) is the non-insulting reading, while the invalidating reading of the final conjunct of (a) is one in which requires the insulting reading. The invalidating reading of the final conjunct of (a) says that few Americans now hold the belief that Elvis was alive at the relevant time in the past, perhaps because Elvis has now been forgotten entirely, or perhaps because he is now widely believed to have lived in the seventeenth century or some other era.

39. If Obama were a Muslim, then Claire would believe that Obama was a Muslim, but Dave actually believes that

The natural reading of 39 is the reading that is an insult to Dave, on which he is being said to think that Obama is a Muslim.<sup>34</sup> What is interesting about these cases is that it seems that all sides should admit the prospect of ‘that’s which pick up on time/world-specific information, and ‘that’s which pick up on time/world-neutral information. I will return to this in Sect. 3.3.

Bringing this section together, I conclude that, at least for all three main reasons to be an eternalist just reviewed, there is equal reason to be a necessitarian. There are of course further arguments in the literature to consider, but none I know of that break the parallel.<sup>35</sup>

### 3 The case for contingentism mimicked

I have just defended the first half of *Parallelism*, according to which the main arguments for *Eternalism* have parallels which provide equally good arguments for *Necessitarianism* (Sect. 2). I will now defend the second half of *Parallelism*, according to which the main arguments for *Contingentism* have parallels which provide equally good arguments against *Eternalism*.

#### 3.1 The feeling of contingency

Perhaps the most straightforward argument for *Contingentism*—and certainly the first I usually encounter in conversation—is that certain claims are just evidently contingent. For instance—the objector might say—isn’t it just *obviously contingent* that Obama is president, as per 1? If Ann’s utterance of 1 expresses a truth, doesn’t it just as obviously express a contingent truth? So doesn’t *Necessitarianism* simply get the modality wrong from the start?<sup>36</sup>

But of course a perfectly parallel objection could be offered against *Eternalism*. Isn’t it just as obviously a transient matter as it is a contingent matter, that Obama is

<sup>34</sup> To put this into Aronszajn’s format, for the purposes of further mimicry: (a) if Elvis were still alive, most Americans would believe that Elvis was alive, but actually few Americans believe that; (b) few Americans believe that Elvis is alive.

<sup>35</sup> One other argument worth mentioning—which motivates the even stronger view that each noun phrase is associated with its own proprietary world and time arguments—is the capacity for *dislocated interpretations*. In this vein Enç (1986) gives examples like “Every fugitive has now been captured” in which the interpretation of “Every fugitive” seems to require a distinct earlier time when these people were fugitives, since once captured they are presumably no longer fugitives. One finds similar prospects for dislocated information with respect to world information. Thus consider: “If the gates had been locked, the fugitives would never have escaped.” The phrase “the fugitives” must be interpreted, not relative to the scenario under consideration at which the gates were locked (since in that scenario that are no fugitives), but instead relative to the actual scenario. Indeed Percus (2000) argues that the de re/de dicto distinction is best understood not as a scope distinction but rather in terms of dislocated world interpretations.

<sup>36</sup> In this vein MacFarlane considers the prospect of “bringing the world of the context of use into the content of Sam’s thought,” but objects that “bringing the world of the context into the content of Sam’s thought would make this content a necessary truth about this possible world, rather than a contingent truth about the weather in Paris” (2009, p. 243).

president? If Ann's utterance of 1 expresses a truth, doesn't it just as clearly express a transient truth? So doesn't *Eternalism* simply get the temporality wrong from the start?

For the purposes of defending *Parallelism* such mimicry is already sufficient, but—lest one think that any serious objection is in the offing against either *Eternalism* or *Necessitarianism*—it may be worth explaining how the eternalist vindicates intuitions of transience in her theory, so it can then be seen how the necessitarian can maneuver in parallel to vindicate intuitions of contingency.

To begin with, the feeling of contingency and transience may be countered by *the feeling of aboutness*. As King (2003, p. 196) notes, concerning time and location information: “It seems clear that when I believe that the sun is shining, I believe something about a particular time and location, so that what I believe does not vary in truth values over times and locations.” But likewise when I believe that the sun is shining I believe something about a particular world (my own). Just like I am not concerned with the weather at the Big Bang, or inside a black hole, so I am not concerned with the weather in a black hole world. (Of course I might in some cases lack the means to conceive of the world, place, or time at issue except in indexical terms such as ‘actually,’ ‘here,’ and ‘now.’ But such indexical conceptions are available to any competent conceiver.)

At any rate, the feeling of transience ought to furnish no objection to *Eternalism*, since *Eternalism* in fact can vindicate the very claims of contingency that express the feeling. The eternalist just needs to recall her claim that temporal operators are object-level quantifiers rather than intensional operators (Sect. 1.3). She can just let her full theory go to work on claims such as:

6. Eternally, Obama is the president of the United States

Her theory will render 6 as a universally quantified claim, true iff at every time  $t$  Obama is the president of the United States at  $t$ . So—taking proper account of the eternalist's full theory—6 comes out false. Likewise the theory delivers all the correct judgments about what is transiently the case, and what is the case relative to any other temporal term. And that is getting all the truth-values right, with respect to claims about what is eternally the case and what is transient.

Once one sees how the eternalist's theory vindicates intuitions about what is transient, one can likewise see how the necessitarian's theory vindicates intuitions about what is contingent. She just need to let her full theory go to work on claims such as:

5. Necessarily, Obama is the president of the United States

Her theory will render 5 as a universally quantified claim, true iff at every world  $w$  Obama is the president of the United States at  $w$ . So—taking proper account of the necessitarian's full theory—5 comes out false. Likewise the theory delivers all the correct judgments about what is contingently the case, and what is the case relative to any other modal term. And that is getting all the truth-values right, with respect to claims about what is necessarily the case and what is contingent.

The objector can continue by trying to directly invoke propositions via devices of propositional anaphora, and claiming that they are contingent. So if Ann utters 1 at @ in 2010, the objector might try:

#### 40. What Ann said is contingent

The claim will be that 40 should be true, but would be false on the necessitarian conception. But all that awaits is further confirmation of *Parallelism*. The objector could equally have tried:

#### 41. What Ann said is transient

The claim will be that 41 should be true, but would be false on the eternalist conception. What one should ultimately think of these parallel objections will depend in part on what one ultimately thinks of phrases like “what Ann said,” which I will return to in Sect. 3.3.<sup>37</sup>

### 3.2 The operator argument

Perhaps the most sophisticated argument for *Contingentism*—in fact the main argument offered by Kaplan and Lewis—is that *Contingentism* is needed to fit an intensional semantics for modal operators. *Necessitarianism* does not provide the right semantic values to interact properly with intensional modal operators.

The operator argument begins from a key assumption, which is that modal terms like ‘necessarily’ function as intensional operators that shift the world parameter in the index (Sect. 1.3).

Thus consider Ann at @ in 2010, and contrast 1 with a modalized counterpart such as 5:

1. Obama is the president of the United States
5. Necessarily, Obama is the president of the United States

What happens with 5, according to the intensional operator view, is that we compute a semantic value for the embedded 1, and then ‘necessarily’ (functioning *as if* it were a universal quantifier over worlds, restricted by accessibility relations) checks whether the semantic value for 1 holds for all (accessible) values of the world parameter.

*Necessitarianism* is indeed incompatible with the orthodox conception of modal terms as intensional operators, in two respects. First, the orthodox conception requires a world parameter to shift in the index. If there are no world parameters, there is no possibility of intensional operators that shift such parameters. Second, the orthodox conception requires world neutral propositions to be evaluated at different index points. This is indeed the main argument that Kaplan (1989, pp. 502–503; cf. Cappelen and Hawthorne 2009, pp. 70–73) offers for world neutral propositions. A world specific proposition would have the same truth value from the perspective of every world, so even if there were a world parameter to shift, shifting it would do nothing. All modal terms would at most be semantically vacuous. So it would seem that 1 and 5 must wind up with the same truth value, which is evidently the wrong result.

<sup>37</sup> Returning to the feeling of aboutness, note that what Ann said may equally well be described as being about a particular world and time (@, 2010). Of course what happens at a particular world and time is a necessary and eternal matter.

By way of mimicry, it should be obvious that exactly the same objection could be offered against *Eternalism*.<sup>38</sup> If temporal terms like ‘eternally’ are intensional operators that shift the time parameter in the index, exactly the analogous problems will arise for exactly analogous reasons. The eternalist will posit no time parameters for an intensional operator to shift, and her time specific propositions would seem to render all temporal terms semantically vacuous (if well-defined at all). Thus contrast 1 with a temporalized counterpart such as:

6. Eternally, Obama is the president of the United States

What Ann would have expressed with 6 would have been just as false as what she would have expressed with 5. Yet if temporal terms are at most semantically vacuous then 6 will come out true, which is evidently the wrong result.

For the purposes of defending *Parallelism* such mimicry is already sufficient. But I would just add that one should keep in mind what [Schlenker \(2006, p. 504\)](#) calls the “pervasive symmetry” between the system of reference to individuals, worlds, and times, as seen in types of reference (Sect. 2.1) and expressive power (Sect. 2.2). Given such a pervasive symmetry I think it is perverse to have an extensional treatment of individual reference but insist on an entirely different kind of formal apparatus for worlds or times. Surely a symmetric formalism ought to be at least the default view.<sup>39</sup>

### 3.3 Propositional reference

One further argument for *Contingentism* that I will consider uses devices of seeming propositional reference to argue that contents are world neutral. This argument might precede in at least three slightly different ways. First, the argument might use seeming propositional reference to impute modal features to propositions. This style of argument arose at the close of Sect. 3.1, with:

40. What Ann said is contingent

Second, the argument might use seeming propositional reference together with same-saying (or in this case same-believing) claims:

42. If a fly were to have landed on Ben’s nose a moment ago, Ann would still have believed just what she actually believes<sup>40</sup>

<sup>38</sup> Indeed this objection to *Eternalism* comes directly from [Kaplan \(1989, p. 503\)](#), since he uses the operator argument in a parallel way, to defend both world and time neutral propositions: “Temporal operators applied to eternal sentences (those whose contents incorporate a specific time of evaluation) are redundant. Any intensional operators applied to *perfect* sentences (those whose contents incorporate specific values for all features of circumstances) are redundant.”

<sup>39</sup> Likewise [Kratzer \(2009, Sect. 5\)](#), after showing that natural language has the full expressive power of variables for situations, concludes: “Quantification over situations is no different from quantification over individuals, then, as far as expressive power is concerned. Since natural languages have syntactically represented individual variables and it would be surprising if they used two different equally powerful quantification mechanisms, it seems to be at least a good bet that there are syntactically represented situation variables in natural languages.”

<sup>40</sup> [Soames \(1998, p. 15\)](#), critiquing the view that names are rigidified descriptions of the form ‘the actual F’, points out that people in other worlds can have beliefs involving a given name without having any beliefs

Or third, the argument might use seeming propositional reference to draw valid inferences. This was mentioned in passing at the close of Sect. 2.3, via the natural inference to the “insulting” reading in:

39. If Obama were a Muslim, then Claire would believe that Obama was a Muslim, but Dave actually believes that

Given that locutions such as “what is said”, “what is believed”, and “that” (in appropriate contexts) are serving as devices of propositional reference, all three styles of argument then converge on the claim that propositions are world-neutral. Taking the contents of these locutions of seeming propositional reference to be world-specific would generate the wrong truth values.

By way of mimickry, exactly the same objection can be offered against *Eternalism*. Indeed—as has already emerged in Sect. 2.3—exactly the same objection has been offered against *Eternalism*, via contexts in which the insulting reading is most natural for:

34. Ann believed that Nixon was president, and she still believes that

And likewise one can parallel 40, 42, and 39 on the time side. Here is a parallel to 42:

43. If a fly were to have landed on Ann’s nose causing her to speak a second later, Ann would still have said just what she actually said

If talk about of “what Ann said” must pick up on a proposition, then the eternalist is in trouble.<sup>41</sup>

Such mimickry is already sufficient for *Parallelism*. But still I think it is worthwhile to seek a deeper understanding of these cases. In Sect. 2.3 I concluded that all sides should admit the prospect of using seeming propositional reference to pick up on either time-specific or time-neutral semantic values, and to pick up on either world-specific or world-neutral semantic values. The main problem with all of these arguments (whether given in favor of *Eternalism* and *Necessitarianism*, as in Sect. 2.3, or in favor of *Temporalism* and *Contingentism* as above) is with the undefended assumption that locutions such as ‘what is said,’ ‘what is believed,’ and ‘that’ (as a device of semantic anaphora) can only serve as devices of propositional reference.

---

Footnote 40 continued

about actuality. Likewise—the form of the objection in the main text maintains—people in other worlds (such as those in the counterfactual world in which a fly lands on Ben’s nose) can have beliefs of the same content without having any beliefs about actuality. In both cases the conclusion drawn is that the relevant world is not part of the semantic content.

<sup>41</sup> Brian Rabern (p.c.) has called my attention to commonplace utterances of ‘I just said that,’ as in:

Ann: Obama is the president of the United States

Ben: Obama is the president of the United States

Ann: I just said that

Ann’s final claim would be false if ‘that’ picked up a time-specific (or at least a moment-specific) proposition. The same phenomena arise in the modal realm. Indeed one can imagine Ben continuing the dialogue with:

Ben: I would have said that first if you hadn’t cut me off

Ben’s added claim would be false if ‘that’ picked up a world-specific (or at least a single-world-specific) proposition, since what he would have said had Ann not “cut him off” would have specified a different world.



The conclusion that all sides should admit the prospect of using seeming propositional reference to pick up on either specific or neutral values can be buttressed in two further ways. First, the cases that seemed to require neutral values can be replicated *even when the world or time in question is explicitly invoked*. Thus imagine that it is common ground that Ann believes in a conspiracy on which some ancient Republican has long been clinging to power, and consider:

44. Ann believed that Nixon was president in 1970
32. Ann still believes that
33. So Ann believes that Nixon is president

Everyone in the debate should agree that the embedded content in 44 ('Nixon was president in 1970') expresses an eternal proposition which specifies the time at issue. But one can still use this sequence to generate the insulting reading of 33 on which Ann is being said to believe that Nixon remains in the White House. For a modal example, consider:

45. Dave believes that Obama is actually a Muslim; and Dave would still believe that even if the entire Republican establishment were to issue a joint proclamation otherwise

The embedded content in the first conjunct of 45 ('Obama is actually a Muslim') expresses a necessary proposition which specifies the world at issue, but the 'that' in 'Dave would still believe that' can still pick up on a world neutral semantic value. So everyone should agree that seeming devices of propositional reference can pick up on a time (/world) neutral semantic value *even in the presence of an eternal (/necessary) proposition*.

As a second way of buttressing the conclusion that all sides should admit the prospect of using seeming propositional reference to pick up on either specific or neutral values, consider how things work in cases of reference to individuals.<sup>42</sup> Thus consider:

46. I'm surprised that Ed said that he beat his dog; only a fool would say *that*

In 46 the final 'that' is not naturally read as picking up on the individual specific content that Ed beats his dog. For anyone (fool or not) who has little concern for Ed might say that Ed beats his dog. If Fred has little concern for Ed (or wishes to damage Ed's reputation), Fred might well say that Ed beats his dog, without Fred thereby being a fool.<sup>43</sup>

The example of 46 points the way forward, since I think it is evident what the final 'that' in 46 picks up on, namely the individual-neutral property of being a beater of one's own dog:

$\lambda x.x$  beats  $x$ 's dog

For the content that only a fool would admit to is having the property of beating one's own dog. What 46 exhibits is just the familiar strict/sloppy ambiguity mentioned in Sect. 2.1 with respect to:

<sup>42</sup> I owe this point to Mark Richard (p.c.).

<sup>43</sup> Though of course there are contexts in which 46 can naturally be read as picking up on the individual specific content that Ed beats his dog. Imagine that Ed has seized power and established severe sedition laws, imposing especially terrible punishments on anyone who says that Ed beats his dog.

## 12. I love my wife, and you do too

The ambiguity in 12 is standardly explained in terms of their being two possible contents from the ellipsis site that might be elliptically reconstructed: the “strict” content of loving the speaker’s wife, or the “sloppy” content of being a lover of one’s own wife:

$\lambda x.x$  loves  $x$ ’s wife

With this in mind consider:

47. Ed said that he loves his wife; and Fred also said that

In 47 it should be clear that the final ‘that’ has both a strict and sloppy reading.

Now applied to the time and world cases, all the necessitarian eternalist needs are sloppy semantic values which abstract out the world and/or time of the proposition, and which are eligible referents for phrases like ‘what is said’.<sup>44</sup> She might think that her world and time specific propositions are compositionally constructed from world-and-time neutral small clause semantic values which obligatorily take tense phrases and mood phrases. The neutral semantic values might have a form such as (using 1):

$\lambda w.\lambda t$ . Obama is president at  $w$  in  $t$

A tense phrase would then specify a time value, delivering for instance:

$\lambda w$ . Obama is president at  $w$  in 2010

A mood phrase would then specify a world value, delivering for instance:

Obama is president at @ in 2010

On this picture the necessitarian eternalist actually has all the needed semantic values within her semantic derivation. Alternatively the necessitarian eternalist might simply posit a lambda abstraction operation that can take world and time specific semantic values and abstract out world and/or time neutral information. Either way the necessitarian eternalist will recognize all the semantic values needed for all the examples.

Indeed from the necessitarian-eternalist view plus the seemingly incontrovertible point that devices of seeming propositional reference can work in “sloppy” ways, one can predict the full range of data. There will be devices of seeming propositional reference that pick up on world-specific and on time-specific information (strict reference) and that pick up on world-neutral or time-neutral information (sloppy reference). This predicts the prospects for both the insulting and the non-insulting readings of 34 and 38, and predicts the prospects for picking up on neutral information even in the presence of explicitly necessary/eternal propositions as seen with 44 and in 45, and uses no technology not already needed in the case of information about individuals as seen in 12 and 47. What emerges from the full range of data is just further confirmation, not just of *Parallelism*, but also of the necessitarian-eternalist package.<sup>45</sup>

<sup>44</sup> Such a claim is already defended by Stanley (1997) and Cappelen and Hawthorne (2009, p. 95). Thus Stanley (1997, §VII) argues that “some such occurrences of the word ‘that’ denote the ingredient senses, rather than the assertoric contents, of the preceding sentences.”

<sup>45</sup> That said I would acknowledge one nagging aspect of imperfect parallelism, which is that the readings that are strict with respect to world information seem (to my ears at least) harder to hear than the readings

Bringing this section together, I conclude that, at least for all three main reasons to be a contingentist just reviewed, there is equal reason to be a temporalist. No doubt there are further arguments for contingentism to consider, but I know of none that break the parallel.<sup>46</sup>

## 4 Objections to parallelism considered

I have made my case for *Parallelism*, according to which the main arguments for *Eternalism* have parallels which provide equally good arguments for *Necessitarianism* (Sect. 2), and the main arguments for *Contingentism* have parallels which provide equally good arguments against *Eternalism* (Sect. 3). This should be unsurprising given the deep parallels known to exist in our overall thought about modality and temporality. *So why haven't eternalists gone necessitarian?* To my knowledge three contingentist-eternalists have discussed this question in print: King (2003, pp. 228–229; cf. Stanley 2005b), Soames (2011, p. 177), and Glanzberg (2009, p. 300). I will now engage with their discussions. Though I should note that each author devotes but a single paragraph to the matter, presumably because they did not consider *Necessitarianism* to be a live option. So if nothing else I hope to prod contingentist-eternalists to consider the question more seriously.

### 4.1 King's three arguments against parallelism

King (2003), after having mounted a defense of *Eternalism* based on the idea that tense referentially specifies the time at issue, concludes (2003, p. 228) by asking: “What if a similar argument could be mounted for modal expressions? This would mean that worlds would not be needed as coordinates of indices,…” The arguments of Sect. 2 were intended to show that the answer to King's question is *yes*: a similar argument can indeed be mounted for modal expressions. (King's question in fact provided a main point of departure for my own thinking on this topic.)

But King, while clarifying (2003, pp. 228–229) that he “won't try here to produce a definitive response,” and that “this question deserves further thought”, offers three reasons to think that the answer to his question is *no*. King (p.c.) in fact no longer endorses

---

Footnote 45 continued

which are strict with respect to temporal information. This near-parallelism is hard to predict on any view. But perhaps, if the necessitarian eternalist thinks of the neutral semantic values as arising within the course of her semantic derivations via a neutral basis to which a time and then a world argument gets applied, she can make something of the fact that she has only one time-neutral value (the base value) but two world-neutral values (the base value and the value when the time argument is applied). So she might conceivably predict a greater opportunity for us to pick up on time-neutral information than world-neutral information.

<sup>46</sup> There is of course the metaphysically asymmetric perspective of the philosopher who believes that all times past, present, and future are equally real, but denies that there are any worlds other than the actual world. I think there might actually be good empirical reasons to sustain this asymmetric perspective: it is difficult to reconcile special relativity with other views of time, but there seems no comparable empirical pressure on the world side of the ledger. But I consider such metaphysical asymmetries irrelevant to the semantics (Sect. 1.1).

these arguments.<sup>47</sup> But still the arguments are interesting and have been influential.<sup>48</sup> And since they are among the only explicit arguments to have been mounted against *Parallelism*, they remain worthy of further discussion.

King's first objection runs as follows: "[M]odal 'operators' ('It is necessary that' etc.) do seem to iterate, as operators are supposed to (unlike tenses and 'somewhere')" (2003, p. 228). Presumably King has in mind that quantifiers ought not iterate in a substantive way, since once the inner quantifier attaches there are no free variables remaining, so any outer quantifier(s) go vacuous. So substantive iterability is taken to be the sign of an intentional operator rather than a quantifier.

As a first reply, I am not sure that the iteration profiles of modal and temporal expressions are as sharply disanalogous as King suggests. King says that tense operators do not iterate, and he is certainly right that the following is awful:

48. ? Yesterday yesterday Obama is the president of the United States

That said there is no disanalogy with modal operators here, since the following is equally awful:

49. ? Necessarily necessarily Obama is the president of the United States

Indeed, a google search on 'necessarily necessarily' only returns examples with internal punctuation, typos, and modal logic texts.<sup>49</sup>

That said, there are constructions with multiple substantive modal elements. Thus imagine the tourist stumbling over the corpse in the alleyway, and remarking:

50. It might be necessary to call the police

The natural reading of 50 involves a deontic inner modal and an epistemic outer modal. Essentially what 50 says is that there is an accessible possibility compatible with what is known from which every accessible ideal world is one in which one calls the police. But there are also constructions with multiple substantive temporal elements, as in *anterior de nunc* readings of sentences such as:

20. Ann thought Ben was drunk

On the *anterior de nunc* reading of 20, the time of Ben's being drunk must precede the time of Ann's thinking, which must in turn precede the speech time: there is a double pastness in play.

<sup>47</sup> The attentive King scholar might note that King 2003 is reproduced nearly verbatim as chap. 6 of King 2007, but the paragraph on *Parallelism* disappears.

<sup>48</sup> King's three arguments are for instance endorsed by Stanley (2005b). In critiquing the temporalist orientation of Recanati 2004, Stanley invokes "the trend in linguistic theory (starting with Partee (1973)) away from operator approaches of tense, and relativity of content generally, and towards explicit syntactic representation of elements that were once thought of as features of circumstances of evaluation." This sounds like a trend that ought to culminate in necessitarian eternalism. But Stanley explicitly cites King's arguments as providing the rationale for stopping short of world-specification: "Indeed, as King (2003) argues, the direction of research suggests that the only features of circumstances of evaluation are possible worlds."

<sup>49</sup> As Stone notes: "*Possibly* occurs 59 times in the Brown corpus. Never does it co-occur with another modal adverbial" (1997, p. 11). Stone provides the sentence type *i* 'necessarily, John will possibly come' as an example of what is *not* attested in natural language. Note that there are cases in which "possibly" harmonizes with a modal auxiliary like "may," as in "I may possibly be in trouble." But these are merely cases of *modal concord*, which do not involve a semantic interpretation of double modality.

As a second reply to King's first objection, I am not sure that substantive iterability would tell against a quantification treatment. I take King to be assuming that quantifiers can only iterate in a vacuous way. But if the inner quantifier introduces a restrictor argument with a new free variable, then an outer quantifier has something to bind. Indeed I think this may be exactly what is happening in 50. What is essential to understanding 50 is that the deontic necessity of calling the police must be a necessity *from the vantage point of one of the epistemic possibilities*, as comes out in:

[ $\exists w_1$ :  $w_1$  is compatible with what is known] [ $\forall w_2$ :  $w_2$  is accessible from  $w_1$  &  $w_2$  is morally ideal] PRO to call the police in  $w_2$

So understood, the outer modal quantifier in 50 is non-vacuous as it is binding material in the restrictor of the inner quantifier, in ways that generate the right meaning. Overall, whatever the iteration profiles of modal and temporal expressions might be, the cases where modals do iterate do not seem to provide any evidence against the kind of quantificational treatment of modal terms which the necessitarian goes in for. No relevant evidence against *Parallelism* has yet emerged.

King's second objection is that modal 'operators' "do not appear to exhibit quantifier like behavior," as they "do not occupy argument positions in sentences" and "do not allow the addition of restrictive material" (2003, pp. 228–229). As to occupying argument positions, King (2003, p. 224) contrasts:

51. Somewhere is beautiful

with:

52. ? Necessarily is beautiful

53. ? Chris completed necessarily

Of course there is a sharp contrast between 51 and 52–53. But the contrast is merely that the latter case involves a modal *adverb* slotted into a frame where adverbs of any sort cannot fit. Temporal adverbs fare no better:

54. ? Eternally is beautiful

55. ? Chris completed eternally

Indeed temporal expressions do not occupy argument positions either (Higginbotham 2002, p. 209):

56. ? Sometime is beautiful

57. ? Chris completed sometime

What I think King's point about occupying argument positions might reveal is an interesting disanalogy between location information on the one hand, and world and time information on the other hand. Given that arguments positions are associated with material in the small clause, which material must combine with inflectional material like tense and mood to produce a viable stand-alone sentence (Sect. 1.1), one potential moral is that location information appears in the small clause as an argument lexically projected by certain verbs like 'rain,' while tense and mood information comes outside the small clause. In any case, however exactly one should think about locational information, no disanalogy between world and time information has emerged.

As to allowing for the insertion of restrictive material, I follow [Kratzer \(1977, 1991\)](#) in thinking of modality via the tripartite structure: [*quantifier:restrictor*] *proposition*. Modals come with semantically—and perhaps syntactically—realized restrictors, which can be rendered overtly (cf. [Schaffer 2011](#)). Thus consider 1 alongside:

58. For all I know Obama is president  
 59. For all I know and care Obama is president

Assuming that the ‘for’-clauses in 58 and 59 serve to restrict the modality, this sequence displays the progressive insertion of restrictive material.<sup>50</sup> Overall, leaving aside the question of whether or not it would be relevant to *Parallelism*, no salient disanalogy in distribution has emerged.

King’s third and final argument invokes deference to linguistic research: “[I]ntensive investigation of modal phenomena in natural languages has not driven virtually all researchers away from the view that modal expressions are index shifting operators, whereas this has happened with tense” (2003, p. 229; cf. [Stanley 2005b](#)). While I agree with King’s deferential attitude, I just think that his timing proved unfortunate. For at the time King was writing, a referential approach to modal semantics was just beginning to emerge, rooted in [Stone’s \(1997\)](#) extension of Partee’s pronoun-tense parallels to modals, [Cresswell’s \(1990\)](#) points about expressive power, and [Kratzer’s \(1989\)](#) version of situation semantics, as well as [Groenendijk and Stokhof’s \(1984\)](#) semantics for questions. This approach then began to blossom in [Percus’s \(2000\)](#) use of explicit situation arguments to understand *de re/de dicto* readings, [Schlenker’s \(2004a\)](#) treatment of “if-” clauses as denoting worlds (cf. [Bhatt and Pancheva 2006](#)), his (2004b) analysis of the subjunctive, and his general (2006) case for symmetry in the treatment of individual, world, and time information, [Speas’s \(2004\)](#) treatment of evidential morphemes via agreement with the modal base, and [von Stechow’s \(2004\)](#) treatment of attitude verbs as quantifiers that bind person, world, and time variables, *inter alia*.

As some evidence that this approach has already become the new orthodoxy—and that deference now calls for the opposite attitude—[Heim and von Fintel](#), p. 98, in their lecture notes on *Intensional Semantics*, have a section heading “The Standard Solution: Explicit World Variables.” (The problem being that of explaining various *de re/de dicto* readings, and the solution they label standard is essentially that offered in [Percus 2000](#).)<sup>51</sup> Likewise [Szabolcsi \(2011\)](#) speaks of “a growing body of literature” proposing “a uniform treatment” of worlds, times, and individuals, furthering this idea via considerations of scope with intensional raising verbs.

<sup>50</sup> Indeed some languages—such as Salish—apparently do not lexicalize the modal quantifier, but only lexicalize the stereotypical restrictor. The restrictive material is all that is explicit. (The default covert modal quantifier is the universal quantifier, but the existential quantifier can be contextually cued.) See [Matthewson et al. \(2005\)](#) for a detailed description of modality in Salish.

<sup>51</sup> [Heim and von Fintel](#), p. 100 then distinguish between the option of assigning a free world variable to the speech world via the assignment function (which would yield a referentialist treatment), and the option of positing an obligatory wide-scope lambda binder for worlds (which retains a world-neutral content). They opt for the latter, albeit without discussion. Of course time variables permit parallel options (cf. [Ninan](#), forthcoming: Sect. 2), as do individual variables.

## 4.2 Soames's belief contrast

Soames (2011, p. 128), who labels the contingent-eternalist view “traditionalist,” sketches the following rationale for the non-parallel aspect of the traditionalist treatment:

On behalf of traditionalists, we observe that if asked, ‘Is this true—or do you believe this—that a Democrat occupies the White House?’, we have no trouble answering, even though the proposition queried is world-state neutral. But when asked, ‘Is this true—or do you believe this—a Democrat to occupy the White House?’, we are perplexed. Whereas world-state neutral contents can be evaluated for truth, and are objects of belief and other attitudes, time neutral contents seem to resist this.

Soames is certainly right that there is a contrast here. But I think he has mischaracterized the contrast.

The contrast at work in Soames's example is between small clause semantic values as in:

60. ? A Democrat to occupy the White House

And the semantic values of small clauses combined with inflectional elements including tense, aspect, and mood features incorporated on the verb, as in:

61. A Democrat occupies the White House

His contrast shows that the former are not proper objects of belief or truth-evaluation, while the latter are. Indeed I agree with Soames that his contrast shows that propositions are not world-and-time-neutral: the inflectional elements are needed to build a proposition (cf. Glanzberg 2011).

Now the contingentist-temporalist can reply that small clause constructions can occupy the complement positions of certain attitude verbs like ‘consider,’ as in:

62. I consider Obama a good president

Overall one can treat 62 as revealing the prospect of world-and-time-neutral objects of attitudes (‘Obama a good president’), or one could treat the phrase ‘Obama a good president’ as *inheriting* the tense, aspect, and mood on the embedding attitude verb ‘consider.’ I think that there are at least two *prima facie* reasons to prefer the latter inheritance model. First, such a treatment explains why ‘Obama a good president’ cannot stand alone as a viable sentence: it needs to receive tense, aspect, and mood from somewhere. Whereas if ‘Obama a good president’ could be a world-and-time-neutral object of ‘consider,’ its inability to stand alone would seem to have to be regarded as a brute syntactic fact. Second, such inheritance seems clearly exhibited at least with respect to aspect (Parsons 1990; Szabó 2004, pp. 51–52). Thus compare:

63. John saw Mary cross the street

64. John was watching Mary cross the street

As Szabó notes, if Mary in fact collapsed and died halfway across the street, 63 would be false but 64 could still be true, thus suggesting that the embedded small clause in 63



inherits the perfective aspect from the embedding ‘saw,’ while the very same embedded small clause in 63 inherits the progressive aspect from the embedding ‘watching.’

In any case, Soames begs the question against the necessitarian in asserting without argument that the full sentence (‘a Democrat occupies the White House’) remains world-neutral. Keep in mind that the inflected phrase not only features present tense, but equally features indicative mood (compare: ‘a Democrat would have occupied the White House if Clinton had been the nominee’). Presumably Soames thinks that the time information in the full sentence is specified via tense. If so then he owes a rationale for his assumed non-parallel treatment of tense and mood, in the face of the similarities between tense and mood mooted in Sect. 2.1. The underlying contrast between small clause semantic values and inflected semantic values looks like a contrast between a world-and-time neutral core, and a world-and-time specific expansion. Such a contrast provides no support for any non-parallel treatment of world and time information.

#### 4.3 Stalnaker’s model of communication

A second line of argument against *Parallelism* might be extracted from [Stalnaker \(1978, 1984\)](#) model of communication.<sup>52</sup> Indeed [Glanzberg \(2009, p. 300\)](#), after arguing against the view that the relativity of truth to a world “plays any empirically significant role in semantics,” goes on to credit Stalnaker for having provided reasons for still maintaining a conception of content as world-neutral, based on the idea ([2009, p. 304](#)) that worlds are what “is divided up to capture content.”

On Stalnaker’s model, assertions are made against the backdrop of a *context set*, which [Stalnaker \(1978, p. 151\)](#) describes as “the set of possible worlds recognized by the speaker to be the ‘live options’ relevant to the conversation.” [Stalnaker \(1978, p. 153\)](#) then characterizes the communicative effect of assertion as follows:

To make an assertion is to reduce the context set in a particular way... The particular way in which the context set is reduced is that all of the possible situations incompatible with what is said are eliminated... [T]he essential effect of an assertion is to change the presuppositions of the participants in the conversation by adding the content of what is asserted to what is presupposed.

There is no denying the elegance and insightfulness of this model. By embedding contingent but eternal contents, Stalnaker’s model supports the non-parallel contingentist-eternalist conception of the proposition.

I should note that one can work with a slight variant of Stalnaker’s model which uses world-and-time neutral propositions. On this variant, context sets would be sets of world-time pairs, and assertions would have sets of world-time pairs as their contents. The essential effect of assertion would then be to divide the world-time pairs. As such there is no real conflict Stalnaker’s model and the contingentist-temporalist implementation of a parallel treatment of world and time information.

<sup>52</sup> I am indebted to Andy Egan for discussion on these issues.

But it might still be thought that Stalnaker's model cannot so easily take in world-and-time specific propositions. After all, world-and-time specific propositions, being either necessarily true or necessarily false, are either incompatible with no situations or with all situations. Either way they will not divide possibilities. They will either not reduce the context set at all, or "break" the context by reducing the context set down to the empty set. Hence they cannot serve communication on Stalnaker's model. So there seems to be a real conflict between Stalnaker's model and my preferred necessitarian-eternalist way of implementing a parallel treatment of world and time information.

By way of reply, I think the conflict between Stalnaker's model and world-and-time-specific propositions merely reflects a known shortcoming of Stalnaker's model. The known shortcoming (which traces back to Stalnaker's use of possible worlds contents) is that the model cannot straightforwardly handle assertions of necessary truths or falsehoods. It should be evident regardless of where one stands on *Parallelism* that necessary claims can be used to communicate. This is not just true of mathematical claims, but it is also true of sentences that everyone should think express world-and-time-specific propositions, such as the clearly informative:

65. Obama is the actual current president of the United States

Obviously a model of communication that cannot handle claims like 65 will not fit necessitarian-eternalist contents, but the problem is the model of communication and not the view of content. The communicative value of necessitarian-eternalist contents can only be assessed relative to a model of communication apt for necessary claims.<sup>53</sup>

It would be utterly backwards to argue that, since 65 can be used to communicate, it must express a contingency; or to argue that since mathematical claims can be used to communicate, all mathematical claims must be contingent. It would be equally backwards to argue that, since sentences like 1 can be used to communicate, they must express contingencies. Rather I want to say: since necessary claims can evidently be used to communicate, necessitarian-eternalist contents can be used to communicate. There is an open theoretical question as to how to model such communication. But we should agree in advance that such communication exists.

I consider this first reply sufficient but also reserve a backup reply, should it emerge that necessitarian-eternalist contents remain problematic for communication even by the lights of an improved model apt for necessary claims. Recall (Sect. 3.3) that all sides should recognize various neutral and specific semantic values as the potential referents of phrases such as 'what is said. As such the necessitarian-eternalist recognizes semantic values such as the world-and-time neutral:

$\lambda w.\lambda t.$  Obama is president at  $w$  in  $t$

And also eternal but world-neutral values such as:

$\lambda w.$  Obama is president at  $w$  in 2010

<sup>53</sup> Stalnaker allows that what is communicated can be *the diagonal proposition*. Given that "actual" and "current" are the only two indexical elements of 61, the diagonal will be something like:  $\lambda w.\lambda t.$  Obama is president at  $w$  in  $t$ . I am about to suggest that the necessitarian-eternalist can work directly with such semantic values in her theory of communication.

Thus the necessitarian-eternalist can (if she likes) make full use of the Stalnakerian model as is, simply by holding that *what plays the main role in communication are not propositions but world-abstractions*. That is, she need only identify context sets with sets of worlds satisfying a salient world-abstraction, identify assertive values with sets of worlds satisfying a world-abstraction of the proposition expressed, and then she can understand the essential effect of assertion via intersection just at Stalnaker recommends.

On this backup reply, the fully saturated semantic values of sentences at contexts turn out to be a different sort of entity from what is communicated. Though of course these entities are related by lambda abstraction. Both sorts of entities would then have some claim to the title of “proposition,” but such a result seems otherwise unproblematic.<sup>54</sup>

In a sense, this backup reply would invert the picture of Lewis (1980). Where Lewis goes in for world-and-time neutral propositions (for him, world-and-time neutral “compositional semantic values”), this reply posits world-and-time specific propositions. Where Lewis generates world-neutral but time-specific objects of assertion by applying the speech time, this reply generates world-neutral but time-specific objects of assertion by abstracting out the speech world. The top route represents Lewis’s route, proceeding by application of the time of the context; the bottom route represents the route of the reply being considered, by abstraction on the world in the content:



Both routes provide the same world-neutral objects of assertion, if such be wanted. So if Lewis’s picture can support communication, and if his division of roles between the proposition (“compositional semantic value”) and objects of assertion (“proposition”) is tolerable, it is hard to see how the necessitarian-eternalist can be doing worse.

Bringing this section together, I conclude that none of the extant rationales for non-parallel treatments of world and time information in semantics survive scrutiny. Together with the arguments for parallel treatments in Sects. 2-3, this concludes my case for *Parallelism*.

### 5 Beyond parallelism

By way of conclusion, I will now offer two distinct lines of speculation that go beyond the thesis of *Parallelism*. One line of speculation concerns a possible explanation for

<sup>54</sup> Though this result might re-instate the complaint of Lewis 1980 that the “proposition” node in the Kaplanian diagram (Sect. 1.1) is unneeded, since one can go directly from a sentence at a <context, index> pair to a truth-value. The justification for such “middle-men” as propositions was that they were of independent interest, playing other useful roles (Stalnaker 1970). But the backup reply under consideration in the main text might be thought to undermine such justification, and so renew the call to cut out the middle-men. Much would depend on what other roles propositions still play, and also on how exactly the fully saturated proposition and its world-abstraction are related: the proposition might still be needed to define the world-abstraction.

*Parallelism* in terms of Kratzer's (1989, 2009) situation semantics, on which needed world and time are specified in an inseparable way via the situation at issue. A second and distinct line of speculation concerns further advantages the necessitarian-eternalist package might claim over the contingentist-temporalist package, including the opportunity to reclaim the classical Fregean conception of the proposition as an informationally complete entity that bears a truth value absolutely.

### 5.1 From worlds and times to situations

Kratzer (1989, 2009) provides an elegant and detailed semantic framework—used in some of the leading treatments of adverbial quantifiers (von Stechow 2004; cf. Schaffer and Szabó forthcoming)—based on situations. On Kratzer's situation semantics, world and time information are indirectly co-encoded via world- and time-bound situations. The needed world and time information all comes from a single source: *the situation at issue*. The needed world information and the needed time information are then not merely parallel but *inseparable*. Such a framework might thereby provide a deeper explanation for *Parallelism*.<sup>55</sup>

There are three aspects of Kratzer's situation semantics that are directly relevant. The first aspect is metaphysical: for Kratzer (1989, pp. 612–615) situations are non-repeatable individuals, which are world and time bound. If Ann kisses Ben, then we have a situation occurring at a particular world and time. A situation occurring at a distinct world or time may *resemble* this first situation in various respects, but cannot *be* this situation. This means that, to the extent that a given situation is directly specified, the world and time of the situation are thereby indirectly specified.

The second relevant aspect of Kratzer's situation semantics is that situations enter the semantic machinery via syntactically represented situation variables (Kratzer 2009, Sect. 5). Kratzer's argument for this is an extension of the expressive power argument discussed in Sect. 2.2, via the following example (which calls for the semantics to keep track of three situations):

66. Whenever it snowed, some local person dreamed that it snowed more than it actually did, and that the local weather channel erroneously reported that it had snowed less, but still more than it snowed in reality

The third relevant aspect of Kratzer's situation semantics is that an obligatory wide-scope lambda binder is posited for situations. This means that for Kratzer, I will express something like:

$\lambda s$ . Obama is president in  $s$

This is a situation-neutral content, which requires a situation parameter in the index to determine a truth-value.<sup>56</sup> The result is a contingent and transient content. But I

<sup>55</sup> I thank Zoltán Gendler Szabó for discussion of these matters.

<sup>56</sup> Though strictly speaking it does not require that the situation parameter be *shiftable*. Quantificational adverbs can be treated as quantifiers over situations (e.g. 'always' will denote a universal quantifier over situations, subject to various restrictions), and modal and temporal operators can be treated in a similar quantificational way. The obligatory outer lambda-binder will then be semantically vacuous.

know of no empirical reason to posit this obligatory wide-scope lambda binder beyond any felt need for contingency and transience. There is also the option of allowing the situation variable to be left free. This simplifies the semantics: one just drops the “obligatory” outer lambda binder. If Ann utters 1 in a particular situation  $s^*$  at @ in 2010, then—building into the assignment function that  $g(s)$  is the speech situation  $s^*$ —this this will yield a content like:

Obama is president in  $s^*$

This is a situation-specific content, which is necessarily and eternally true if true at all, and which does not need to be evaluated relative to any situation parameter in the index. But either way—with the obligatory wide-scope lambda binders or without—*Parallelism* is ensured.

Thus Kratzer’s situation semantics guarantees *Parallelism*. Of course one could reject this framework. Or one could try to fiddle with the details in ways that allow the world-time parallel to be broken. For instance one could alter the metaphysical assumption so that situations were treated as time-bound but not as world-bound. Then situation-specific content (without any obligatory wide-scope lambda binder for situations) will be eternal but still contingent. But such fiddling seems both complicating and empirically unmotivated.

As such *Parallelism* may not merely be a plausible semantic application of the deep parallels known to exist in our overall thought about modality and temporality, and not merely a plausible upshot of the empirical evidence considered above. *Parallelism* may turn out to be a mandatory consequence of an underlying semantics of situations.

## 5.2 From parallelism to necessitarian eternalism

In arguing for *Parallelism* I have been officially neutral between Kaplan’s contingentist-temporalist package and the necessitarian-eternalist package I favor. I will part with a brief glimpse beyond the present discussion, sketching three reasons why one might in the end prefer the necessitarian-eternalist package.

The first and most obvious reason would be if one happened to prefer eternalism to temporalism. This will be a matter of how one assesses the relative strength of the arguments (such as those mentioned in Sect. 2). Though given that eternalism is the majority view—indeed Brogaard (2012) speaks of eternalism as “orthodoxy”—I would think that the majority should prefer the necessitarian-eternalist package.

The second reason to prefer the necessitarian-eternalist package is that it seems to preserve a deeper parallel encompassing not just worlds and times, but individuals as well. Recall (Sect. 2.1) Schlenker’s claim of “a *pervasive symmetry* between the linguistic means with which we refer to [individuals, times, and possible worlds].” Overall it seems to me that the contingentist-temporalist must go all the way to Cresswell’s (1990) radical view of individual-neutral propositions if they would sustain the deeper parallel, or else posit an empirically unmotivated distinction between individual reference and the machinery for world and time information, involving two entirely separate but expressively equivalent sorts of formal machinery.

The third reason to prefer the necessitarian-eternalist package is that it seems to permit a radical simplification of the semantic machinery together with an elegant

conception of propositions (Schaffer manuscript). If propositional truth is not relativized to either worlds or times, then propositional truth seems to become an absolute matter (though there is still the role of the assignment function to consider, and any other candidate index parameters such as location). If absolutism can be maintained, then the way would be open to radically simplify the semantic machinery by cutting out the index entirely. The way would also be open to revive the elegant Fregean conception of the proposition as an informationally complete entity that bears a truth value absolutely, and thereby sustain the first platitude of Cappelen and Hawthorne's (2009, p. 1) *Simplicity* view, namely: "There are propositions and they instantiate the fundamental monadic properties of truth *simpliciter* and falsity *simpliciter*."

Stanley (2005a, p. 133) traces the following historical arc since Kaplan: "Much work in the years following the distribution of Kaplan (1989) was devoted to replacing Kaplan's non-eternal propositions with more eternal entities that embody our intuitions that what is said and what is believed are true *simpliciter*, rather than relative to times or places." Necessitarian propositions would represent the culmination of this historical arc, finally embodying the full intuition that what is said and what is believed are true or false *simpliciter*, without any lingering relativization to worlds.

**Acknowledgments** For helpful comments and discussion I thank Kent Bach, David Braun, Rachael Briggs, Berit Brogaard, Herman Cappelen, Andy Egan, Delia Fara, Kit Fine, Justin Khoo, Jeff King, Dilip Ninan, Jim Pryor, Brian Rabern, Mark Richard, Susanna Schellenberg, Wolfgang Schwarz, Roger Schwarzschild, Jason Stanley, Zoltán Gendler Szabó, Clas Weber, and audiences at New York University, the Rutgers Semantics Workshop, the ANU Formal Semantics Reading Group, the Arché Contextualism & Relativism seminar, *Propositions and Same-saying I* at Macquarie University, and *On the Plurality of Worlds @25* at UMass-Amherst.

## References

- Aronszajn, M. (1996). A defense of temporalism. *Philosophical Studies*, 81, 71–95.
- Bach, K. (2001). You don't say?. *Synthese*, 128, 15–44.
- Bhatt, R., & Pancheva, R. (2006). Conditionals. In M. Everaert, H. Van Riemsdijk, R. Goedmans, & B. Holbrandse (Eds.), *The Blackwell companion to syntax* (Vol. 1, pp. 638–687). Oxford: Basil Blackwell.
- Brogaard, B. (2012). *Transient truths: an essay in the metaphysics of propositions*. Oxford: Oxford University Press.
- Cappelen, H., & Hawthorne, J. (2009). *Relativism and monadic truth*. Oxford: Oxford University Press.
- Cresswell, M. (1990). *Entities and indices*. Dordrecht: Kluwer.
- Enç, M. (1986). Toward a referential analysis of temporal expressions. *Linguistics and Philosophy*, 9, 405–426.
- Fitch, G. W. (1998). Tense and contents. *Philosophical Studies*, 94, 151–158.
- Glanzberg, M. (2009). Semantics and truth relative to a world. *Synthese*, 166, 281–307.
- Glanzberg, M. (2011). More on operators and tense. *Analysis*, 71, 112–123.
- Groenendijk, J., & Stokhof, M. (1984). *Studies on the semantics of questions and the pragmatics of answers*. Ph.D. dissertation, University of Amsterdam.
- Heim, I., & von Stechow, K. (2010). *Intensional semantics*. (Spring ed.). MIT. Accessed January 17, 2011, from [mit.edu/fintel/IntensionalSemantics.pdf](http://mit.edu/fintel/IntensionalSemantics.pdf).
- Higginbotham, J. (2002). Why is sequence of tense obligatory?. In G. Preyer & G. Peter (Eds.), *Logical form and language* (pp. 207–227). Oxford: Oxford University Press.
- Kamp, H. (1971). Formal properties of 'now'. *Theoria*, 37, 227–274.
- Kaplan, D. (1989). Demonstratives: An essay on the semantics, logic, metaphysics, and epistemology of demonstratives and other indexicals. In J. Almog, J. Perry, & H. Wettstein (Eds.), *Themes from Kaplan* (pp. 481–563). Oxford: Oxford University Press.

- King, J. (2003). Tense, modality, and semantic values. *Philosophical Perspectives: Language and Philosophical Linguistics*, 17, 195–245.
- King, J. (2007). *The nature and structure of content*. New York: Oxford University Press.
- Kratzer, A. (1977). What ‘must’ and ‘can’ must and can mean. *Linguistics and Philosophy*, 1, 337–355.
- Kratzer, A. (1989). An investigation of the lumps of thought. *Linguistics and Philosophy*, 12, 607–653.
- Kratzer, A. (1991). Modality. In A. von Stechow & D. Wunderlich (Eds.), *Semantics: An international handbook of contemporary research* (pp. 639–650). Berlin: Walter de Gruyter.
- Kratzer, A. (1998). More structural analogies between pronouns and tenses. In *Proceedings of Salt VIII* (pp. 92–109). Ithaca, NY: Cornell University Press.
- Kratzer, A. (2009). Situations in natural language semantics. *Stanford Encyclopedia of Philosophy*. Accessed 8 August, 2010, from <http://plato.stanford.edu/entries/situations-semantics/>.
- Kuhn, S. T. (1980). Quantifiers as modal operators. *Studia Logica*, 39, 145–158.
- Lewis, D. (1980). Index, context, and content. In S. Kanger & S. Öhman (Eds.), *Philosophy and grammar* (pp. 79–100). Dordrecht: Reidel.
- Lewis, D. (1988). Relevant implication. *Theoria*, 64, 161–174.
- Ludlow, P. (2001). Metaphysical austerity and the problems of modal and temporal anaphora. *Philosophical Perspectives*, 15, 211–227.
- MacFarlane, J. (2009). Nonindexical contextualism. *Synthese*, 166, 231–250.
- Matthewson, L., Rullman, L., & Davis, H. (2005). Modality in St’át’imcets. In J. C. Brown, M. Kiyota, & T. Peterson (Eds.), *Papers for the 40th international conference on salish and neighboring languages* (pp. 166–183). Vancouver: University of British Columbia.
- Montminy, M. (2010). Context and communication: A defense of intentionalism. *Journal of Pragmatics*, 42, 2910–2918.
- Ninan, D. (forthcoming). Propositions, semantic values, and rigidity. *Philosophical Studies*.
- Ogihara, T. (1995). The semantics of tense in embedded clauses. *Linguistic Inquiry*, 26, 663–679.
- Parsons, T. (1990). *Events in the semantics of English: A study in subatomic semantics*. Cambridge, MA: MIT.
- Partee, B. (1973). Some structural analogies between tenses and pronouns in English. *The Journal of Philosophy*, 70, 601–610.
- Penco, C. (1999). Objective and cognitive context. In P. Bouquet, P. Brézillon, L. Serafini, & F. Castellani (Eds.), *Modeling and using context, 2nd international and interdisciplinary conference, CONTEXT 99* (pp. 270–283). London: Springer.
- Percus, O. (2000). Constraints on some other variables in syntax. *Natural Language Semantics*, 8, 173–229.
- Prior, A. (1957). *Time and modality*. Oxford: Clarendon Press.
- Prior, A. (1968). Egocentric logic. *Noûs*, 2, 191–207.
- Recanati, F. (2004). *Literal Meaning*. Cambridge: Cambridge University Press.
- Reichenbach, H. (1947). *Elements of symbolic logic*. New York: Macmillan.
- Richard, M. (1981). Temporalism and eternalism. *Philosophical Studies*, 39, 1–13.
- Richard, M. (2003). Introduction to Part I. In A. Jokic & Q. Smith (Eds.), *Time, tense, and reference* (pp. 25–45). Cambridge, MA: MIT.
- Roeper, T. (2006). Not only I: Notes on the syntax of focus binding. In P. Brandt & E. Fuss (Eds.), *Studia Grammatica 63: Form, structure, and grammar: A Festschrift presented to Günther Grewendorf on occasion of his 60th birthday* (pp. 353–366). Berlin: Akademie Verlag.
- Saarienen, E. (1978). Backwards-looking operators in tense logic and in natural language. In E. Saarienen (Ed.), *Game-theoretical semantics* (pp. 215–244). Dordrecht: Reidel.
- Salmon, N. (2003). Tense and intension. In Q. Smith & A. Jokic (Eds.), *Time, tense, and reference* (pp. 107–154). Cambridge, MA: MIT.
- Schaffer, J. (manuscript). Confessions of a Schmentencite: Towards an index-free semantics.
- Schaffer, J. (2011). Perspective in taste claims and epistemic modals. In A. Egan & B. Weatherston (Eds.), *Epistemic modality* (pp. 179–226). Oxford: Oxford University Press.
- Schaffer, J., & Szabó, Z. G. (forthcoming). Epistemic comparativism: A Contextualist semantics for knowledge ascriptions. *Philosophical Studies*.
- Schlenker, P. (2004a). Conditionals as definite descriptions (a referential analysis). *Research on Language and Computation*, 2, 417–462.
- Schlenker, P. (2004b). The Lazy Frenchman’s approach to the subjunctive: Speculations on reference to worlds and semantic defaults in the analysis of mood. In T. Geerts, I. van Ginneken, &



- H. Jacobs (Eds.), *Romance languages and linguistic theory 2003* (pp. 269–309). Amsterdam: John Benjamins.
- Schlenker, P. (2004c). Sequence phenomena and double access readings generalized: Two remarks on tense, person, and mood. In J. Guéron & J. Lecarme (Eds.), *The syntax of time* (pp. 555–596). Cambridge, MA: MIT.
- Schlenker, P. (2006). Ontological symmetry in language: A brief manifesto. *Mind and Language*, 21, 504–539.
- Soames, S. (1998). The modal argument: Wide scope and rigidified descriptions. *Noûs*, 32, 1–22.
- Soames, S. (2011). True at. *Analysis*, 71, 124–133.
- Speas, M. (2004). Evidential paradigms, world variables and person agreement features. *Italian Journal of Linguistics*, 16, 253–280.
- Stalnaker, R. (1970). Pragmatics. *Synthese*, 22, 272–289.
- Stalnaker, R. (1978). Assertion. In P. Cole (Ed.), *Syntax and semantics: Pragmatics* (Vol. 9, pp. 315–332). New York: Academic Press.
- Stalnaker, R. (1984). *Inquiry*. Cambridge: Cambridge University Press.
- Stanley, J. (1997). Names and rigid designation. In B. Hale & C. Wright (Eds.), *A companion to the philosophy of language* (pp. 555–585). Oxford: Basil Blackwell.
- Stanley, J. (2005a). *Knowledge and practical interests*. Oxford: Oxford University Press.
- Stanley, J. (2005b). Review of François Recanati’s “literal meaning”. *Notre Dame Philosophical Reviews*. <http://ndpr.nd.edu/news/24857/?id=3841>.
- Stone, M. (1997). *The anaphoric parallel between modality and tense*. Philadelphia: Department of Computer & Information Science Technical Reports, University of Pennsylvania.
- Szabó, Z. G. (2004). On the progressive and the perfective. *Nous*, 38, 29–59.
- Szabolcsi, A. (2011). Certain verbs are syntactically explicit quantifiers. *The Baltic international yearbook of cognition, logic and communication*, Vol. 6 (pp. 1–26).
- van Bentham, J. (1977). Tense logic and standard logic. *Logique Et Analyse*, 80, 395–437.
- Vlach, F. (1973). ‘Now’ and ‘then’: A formal study in the logic of tense anaphora. Ph.D. Dissertation, University of California Los Angeles.
- von Stechow, K. (2004). A minimal theory of adverbial quantification. In H. Kemp & B. Partee (Eds.), *Context-dependence in the analysis of linguistic meaning* (pp. 137–175). Boston: Elsevier.
- von Stechow, A. (2004). Binding by verbs: Tense, person, and mood under attitudes. In H. Lohnstein & S. Trissler (Eds.), *The syntax and semantics of the left periphery* (pp. 431–488). Berlin: Mouton de Gruyter.