

The present tense is not vacuous

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Abstract

This article presents a counter-argument to Sauerland's (2002) claim that the present tense is vacuous. Sauerland's conclusion is based on the premise that one cannot account for the felicity conditions of sentences like *Every Tuesday this month, I fast* if one assumes that the present tense denotes the time of utterance, or presupposes that its reference overlaps with the time of utterance. In a first step of the counter-argument, I show that Sauerland's anti-presuppositional analysis of the present tense makes incorrect predictions with simple present sentences in certain contexts of utterance. In a second step of the counter-argument, I show that this premise is false: a non-vacuous analysis of the present tense in Sauerland's examples is possible, once we acknowledge that they are interpreted either as futurates or as habituais. I conclude that the non-vacuous analysis of the present has the upper-hand. Incidentally, I propose a modal analysis of futurates that derives their temporal orientation from Condoravdi's (2002) Diversity Condition on metaphysical modality and that is argued to be superior to existing analyses of futurity.

1 INTRODUCTION

Sauerland (2002) argues that the present tense is vacuous, and derives its indexical meaning through a pragmatic competition with the past tense. His proposal is motivated by the analysis of the following sentences:

- (1) Every Tuesday this month, I fasted.
- (2) Every Tuesday this month, I fast.

Sauerland (2002) observes that while (1) can be felicitously uttered only after the last Tuesday of the month of utterance, (2) can be felicitously uttered on any day of the month that does not follow the last Tuesday. In other words, (1) and (2) are subject to the following felicity conditions:

- (3) Felicity conditions of (1) and (2):
 - a. (1) can be uttered felicitously in a context c only if every Tuesday in the month of utterance precedes the time of utterance (t_c).

- b. (2) can be uttered felicitously in a context c only if some Tuesday in the month of utterance does not precede t_c .

Note that these observations presuppose that the domain of quantification of *every* is not contextually restricted to a proper subset of the set of Tuesdays in the month of utterance. In particular, it is possible to utter (1) felicitously before the last Tuesday of the month, if we restrict the domain of quantification of *every* to Tuesdays that are not in the future of the time of utterance, which can be done overtly by using the adverbial *so far*, as in (4):

- (4) Every Tuesday this month so far, I fasted.

We can prevent contextual domain restriction of *every* by making its domain of quantification explicit, as in (5). In the rest of the article, I will use the more natural examples in (1) and (2), with the understanding that for the purpose of the present discussion, one should evaluate the sentences in contexts that do not impose a restriction on the domain of *every*.

- (5) On each of the four Tuesdays of this month, I fast.

Sauerland proposes that the felicity conditions of (1) are due to a presupposition introduced by the past tense:

- (6) Assertion of (1): For every time t that is a Tuesday and that is included in the month of utterance, the speaker fasts at t .
 Presupposition of (1): Every time t that is a Tuesday and that is included in the month of utterance precedes t_c .

On the other hand, he argues that the felicity conditions of (2) are due to an anti-presupposition that the past tense sentence is infelicitous:

- (7) Assertion of (2): For every time t that is a Tuesday and that is included in the month of utterance, the speaker fasts at t .
 Anti-presupposition of (2): (2) is felicitous in a context c only if (1) is not.

In order to derive these felicity conditions, Sauerland assumes that the present tense and the past tense are both interpreted as variables over time intervals but differ in their presuppositions: while the past tense triggers a presupposition of anteriority to t_c , the present tense triggers no presupposition at all. Furthermore, Sauerland assumes that the quantifier *every* in (1) binds the past tense, so that the presupposition triggered by the latter may project universally.

- (8) Denotation of the past and present tenses according to Sauerland:
- a. $\llbracket \text{PAST}_i \rrbracket^{c,w}$ is defined only if $g_c(i)$ precedes t_c . If defined, $\llbracket \text{PAST}_i \rrbracket^{c,w} = g_c(i)$.
 - b. $\llbracket \text{PRES}_i \rrbracket^{c,w} = g_c(i)$.

Different theories of anti-presuppositions may be used to analyze the competition between the vacuous present in (8-b) and the past tense in (8-a). Here, I will rely on Percus's (2006) theory:

- (9) Anti-presuppositions (Percus 2006):
- a. Alternatives are only defined for lexical items. For any lexical item, the alternatives consist of all 'presuppositionally stronger' items of the same syntactic category.
 - b. Let the Alternative-Family of a sentence ϕ be the set of sentences that you get by replacing at least one alternative-associated expression in ϕ with an alternative.
 - c. Do not use ϕ if a member of its Alternative-Family ψ is felicitous and contextually equivalent to ϕ .

It follows from (9-a) that PAST_i is an alternative to PRES_i . Although Percus (2006) provides a definition of an expression X being presuppositionally stronger than an expression Y, we need not discuss it here. Let us be content with the fact that, if the present triggers no presupposition at all but the past presupposes that its denotation precedes t_c , the presupposition of the past is trivially stronger than that of the present.

Given these assumptions, (1) and (2) are interpreted as follows:

- (10) $\llbracket (1) \rrbracket^{c,w}$ is defined only if every Tuesday in the month of utterance precedes t_c .
If defined, $\llbracket (1) \rrbracket^{c,w}$ is true iff every t that is a Tuesday in the month of utterance is such that the speaker fasts on t .
- (11) $\llbracket (2) \rrbracket^{c,w}$ is true iff every t that is a Tuesday in the month of utterance is such that the speaker fasts on t .

The truth-conditions of the two sentences are identical. Therefore, in a context where the presuppositions of the past tense sentence (1) are satisfied, the two sentences are contextually equivalent. As a consequence, (9-c) prohibits the use of the present tense sentence (2) in such a context. This explains the conditions of use of the sentence, described in (12):

- (12) $\llbracket (2) \rrbracket^{c,w}$ is felicitous only if some Tuesday in the month of utterance does not precede t_c .

Sauerland's anti-presuppositional analysis of (2) is only one part of his argument that the present tense is vacuous. The other one is an argument that one cannot derive the felicity conditions of (2) if one does not assume that the present tense is vacuous. In making this argument, Sauerland seems to take for granted that the only reasonable alternative to his anti-presuppositional analysis is to try to derive the felicity conditions of (2) as the projection of a presupposition triggered by the present tense. To show that this is not possible, Sauerland asks his reader to consider the definition of the present tense in (13):

- (13) $\llbracket \text{PRES}_i \rrbracket^{c,w}$ is defined only if $g_c(i)$ overlaps t_c . If defined, $\llbracket \text{PRES}_i \rrbracket^{c,w} = g_c(i)$.

Sauerland assumes that PRES_i may be bound either by the whole adverbial quantifier *every Tuesday this month* or just by the adverbial *this month*. In the first case, the presupposition of the present projects universally, and the sentence is interpreted as in (14). This presupposition is absurd, since it entails that all the Tuesdays in the month of utterance have a temporal part in common. In the second case, the sentence is interpreted as in (15), with a trivial presupposition that is satisfied in any context of utterance.

- (14) Assertion: for every Tuesday t in the month of utterance, the speaker fasts during t .
 Presupposition: every Tuesday t in the month of utterance overlaps with the time of utterance.
- (15) Assertion: for every Tuesday t in the month of utterance, the speaker fasts during t .
 Presupposition: the month of utterance overlaps with the time of utterance.

Sauerland concludes that one cannot derive the felicity conditions of (2) if one does not assume that the present tense is vacuous.

Although Sauerland's anti-presuppositional analysis of the present tense is appealing, his objections to non-vacuous analyses of the present in (2) overlook the fact that (2) is interpreted either as a futurate or as a habitual sentence. As a consequence, he fails to eliminate the possibility that the felicity conditions of (2) are the result of an interaction between the meaning of the present tense and the properties of futurate and habitual aspect/modality.

In this article, I challenge the claim that the present tense is vacuous. First, I argue that the anti-presuppositional analysis of the present tense makes incorrect predictions, from which a non-vacuous analysis is free. Secondly, I argue that once one acknowledges the futurate and habitual

interpretations of (2), one does not need to reject non-vacuous analyses of the present. As a part of this second argument, I also develop an analysis of futurates that derives their temporal orientation from their modal properties.

The article is structured as follows. In the next section, I build an argument against the anti-presuppositional analysis of the present tense. Sections 3–7 develop a non-vacuous analysis of the present tense which accounts for the felicity conditions of Sauerland's examples. In section 3, I argue that Sauerland's examples can be interpreted as futurates or as habitual sentences, and I give an outline of my analysis. In section 4, I present my assumptions about the interpretation of tense, aspect and modality, and I propose an analysis of quantifiers in temporal prepositional phrases building on the analysis of quantifiers of Schein (1993), Kratzer (2004) and Ferreira (2005), which is crucial for the analysis of Sauerland's examples. In section 5, I discuss the semantics of futurates. I adopt a modal analysis of futurates, following Copley (2002, 2008, 2009). In section 6, I argue that the temporal orientation of futurates is not built in the denotation of the futurate modal, but that it is an effect of the application of Condoravdi's (2002) diversity condition to this modal (see also Werner 2003). I show how this modification of Copley's analysis allows us to account for the felicity conditions of Sauerland's examples under their futurate interpretation. In section 7, I apply the diversity condition to the analysis of habitual sentences, from which I derive the felicity conditions of Sauerland's examples in their habitual readings. Section 8 concludes.

Let me close this section on a terminological note. I will call sentences like (2) 'Sauerland's examples'. These are sentences that are obtained by modifying a simple present tense sentence with a universal quantifier over times, whose domain of quantification is explicitly restricted to a finite interval that includes the time of utterance, such as the interval denoted by the indexical *this month*. Two additional examples are given in (16) and (17):

(16) (On) every week-end this year, Jena works for a charity.

(17) (During) every holiday this semester, Mark takes care of the dog.

2 AGAINST AN ANTI-PRESUPPOSITIONAL ANALYSIS OF THE PRESENT TENSE

If Sauerland's analysis of the present tense is correct, the use of the present tense in a sentence should not be blocked by anti-presupposition

in contexts where the presupposition of the past tense alternative of the sentence is not satisfied, or more generally in contexts where the present tense sentence is not contextually equivalent to its past tense alternative. In this section, I show that this prediction is not borne out, which argues against the anti-presuppositional analysis of the present tense.

My strategy will be to compare the interpretation of the present tense with that of the plural, which Sauerland (2003) and Sauerland *et al.* (2005) argued is interpreted by anti-presupposition. I show that while the anti-presupposition of the plural can be suspended in contexts where the interlocutors are ignorant about certain facts, the putative anti-presupposition of the present tense is maintained in similar contexts.

In the first subsection, I discuss the use of the plural in contexts where the interlocutors ignore whether a noun phrase refers to a singularity or to a plurality. I show that the use of plural morphology is felicitous in such contexts, in keeping with Sauerland's anti-presuppositional analysis of the plural.

In the second subsection, I construct parallel examples with the present tense, by considering contexts in which the speaker does not know whether the reference time of her utterance is in the past, in the present or in the future. I show that the predictions of the anti-presuppositional analysis are not borne out in these contexts.

2.1 *Anti-presuppositions, ignorance and plural morphology*

Sauerland (2003) and Sauerland *et al.* (2005) argue that plural morphology on English NPs is uninterpreted, while singular morphology (which may surface as an absence of number marking) presupposes that an NP denotes atoms:¹

(18) $\llbracket \text{SG} \rrbracket^{c,w}(x)$ is defined only if x is a singularity. If defined,
 $\llbracket \text{SG} \rrbracket^{c,w}(x) = x$

(19) $\llbracket \text{PL} \rrbracket^{c,w}(x) = x$

According to this analysis, the singular DP *Marta's child* triggers a presupposition that Marta has a single child, while the plural DP *Marta's children* only triggers a presupposition that the addressee has at least one child. However, the use of the plural DP *Marta's children* should trigger an anti-presupposition that Marta has more than one child. That is in every context where it is common ground that the addressee has one child, the use of the DP *your children* to refer to that child should be

¹ More precisely, the singular feature presupposes that its argument is an atom or a mass. For the sake of conciseness, I will ignore mass interpretations of the singular.

infelicitous. Indeed, this is confirmed by the contrast between the following dialogues:

- (20) Marta only has one son and she has no daughter. Her child goes to a public school.
- (21) Marta only has one son and she has no daughter. #Her children go to a public school.²

On the other hand, it is predicted that the plural DP *Marta's children* can be used felicitously to refer to Marta's progeny in contexts where the interlocutors believe that Marta has at least one child but ignore whether she has more than one. This prediction is also correctly borne out, as illustrated by the contrast between (22) and (23) on the one hand, and (23) and (24) on the other hand:

- (22) Berta: How many children does Marta have?
 Johann: I don't know that, but I know that she has at least one daughter.
 Berta: Okay, she is welcome to bring her children to the party.
- (23) Berta: How many children does Marta have?
 Johann: She has only one: her daughter Lisa.
 Berta: #Okay, she is welcome to bring her children to the party.
- (24) Berta: How many children does Marta have?
 Johann: She has only one: her daughter Lisa.
 Berta: Okay, she is welcome to bring her child to the party.

More generally, let ε be a lexical item and ε' a presuppositionally stronger alternative to ε . Let S be a sentence in which ε occurs, and let S' be the alternative to S obtained by substituting ε by ε' . In contexts where all the presuppositions of S are satisfied but some presupposition of S' is not satisfied, the process of anti-presupposition should not make the use of S infelicitous. We have just seen that this prediction borne out when ε is the plural feature on DPs. In contrast, I show in the next section that the present tense does not conform to this prediction.

2.2 Back to the present

I will consider two arguments against the anti-presuppositional analysis of the present.³ Before I spell them out, it will be useful to ask how

² In this article, * means that a sentence is unacceptable in any context, and # means that a sentence is unacceptable in the context provided in the example.

³ Inspiration for this section came from discussions with Benjamin Spector and Yasutada Sudo.

anti-presuppositions of the present tense are calculated in simple sentences like (25), whose past tense alternative is in (26):

(25) John is_i in Paris today.

(26) John was_i in Paris today.

There are several ways to analyze the semantic contribution of the adverb *today* in these sentences. We may assume that it binds tense, following Heim (1994). In this case, we may also assume that the quantification over times is restricted to a contextually relevant domain, so that the truth-conditions of (25), anti-presupposition aside, are as follows:

(27) $\llbracket(25)\rrbracket^{c,w}$ is true iff there is a contextually relevant time t in the day of utterance, such that John is in Paris at t .

Before we can compute the anti-presupposition of (25), we need to identify the presupposition of (26). Unfortunately, if *today* binds the past tense, it is not obvious how the presupposition of the past tense should project. If it projects universally, as in (28), the presupposition of (26) is appropriate, but the anti-presupposition of the present tense in (29) is too weak, since (25) ends up felicitous and true in a context where John was in Paris at some relevant past time but is not in Paris at the time of utterance, provided there is a relevant non-past time in the day of utterance:

(28) $\llbracket(26)\rrbracket^{c,w}$ presupposes that every contextually relevant time in the day of utterance is in the past.

(29) $\llbracket(25)\rrbracket^{c,w}$ is felicitous only if some contextually relevant time in the day of utterance is not in the past.

If on the other hand the presupposition of the past tense in (26) projects existentially, as in (30), it is the past tense sentence that is too weak, since it ends up felicitous and true in a context where John is in Paris on the day of utterance but he was not in Paris before the time of utterance, provided there is some relevant time in the past that is included in the day of utterance:

(30) $\llbracket(26)\rrbracket^{c,w}$ presupposes that some contextually relevant time in the day of utterance is in the past.

This shows that there is a general issue with existentially quantified tense in the anti-presuppositional analysis of the present. This problem is related to the difficult question how to analyze the projection of

existentially quantified presuppositions (see Karttunen & Peters 1979, Heim 1983, Beaver 2001, Kadmon 2001, George 2008, Sudo 2012, among others). Because of this, it seems reasonable to assume that the temporal frame adverb in sentences like (25) and (26) does not bind tense. Tense is interpreted as a free pronoun, and the adverb is interpreted as a property of times that is intersected with the verb phrase, as illustrated in the following examples:

- (31) $\llbracket(25)\rrbracket^{c,w}$ is true iff John is in Paris at $g_c(i)$ and $g_c(i)$ is included in the day of utterance.
- (32) $\llbracket(26)\rrbracket^{c,w}$ is defined only if $g_c(i)$ precedes the time of utterance. If defined, $\llbracket(28)\rrbracket^{c,w}$ is true iff John is in Paris at $g_c(i)$ and $g_c(i)$ is included in the day of utterance.

The anti-presuppositional analysis of the present tense tells us that it is not possible to use the present tense sentence (25) if it is presupposed that the reference time $g_c(i)$ precedes the time of utterance. In that case, we have to use the presuppositionally stronger yet contextually equivalent sentence (26).

2.2.1 *First counter-argument* Let us come back to our main argument. What happens with the anti-presupposition of the present tense when the speaker wants to convey that the reference time may be located either before the time of utterance, at the time of utterance, or in its future? In that case, (26) would not be contextually equivalent to (25), since it is a contextual entailment of (26) that $g_c(i)$ precedes the time of utterance. Therefore, the anti-presupposition of the present tense should be suspended: if the anti-presuppositional analysis of the present tense is correct, it ought to be possible to use the present tense without the inference that the reference time does not precede the time of utterance.

The following pair of discourses show that this prediction is not borne out. In each discourse, the second part of B's answer in (a) is interpreted as in (b). Now, note that at the point where B utters the second part of his answer, the past tense alternative to (33) in (34) is infelicitous. Indeed, in the context set by the first part of B's answer, the second part of the sentence is inconsistent with the common ground if the presupposition of the past tense is satisfied. As a consequence, the use of the present tense in (33) is not ruled out by anti-presupposition, and the second part of B's answer should be felicitous.

- (33) a. A: Has John ever been in Paris?
 B: I don't know, #but he is₁ there today.
- b. $\llbracket\text{John is}_1 \text{ in Paris today}\rrbracket^{c,w} = \mathbf{in}(w)(g_c(1))(\mathbf{Paris})(\mathbf{John})$

- (34) a. A: Has John ever been in Paris?
 B: I don't know, #but he was₁ there today.
 b. $\llbracket \text{John was}_1 \text{ in Paris today} \rrbracket^{c,w} = \mathbf{in}(w)(g_c(1))(\mathbf{Paris})(\mathbf{John})$
 Defined only if $g_c(1) < t_c$

If the anti-presuppositional analysis of the present was correct, we would expect that the present tense in B's answer in (33) could be used with the same meaning as the disjunction of the past, present and future tenses in (35).

- (35) A: Has John ever been in Paris?
 B: I don't know, but he either was, is or will be there today.

Of course, the present tense sentence in (33) is expected to be infelicitous if the present tense denotes the time of utterance, since in that case, B asserts that John is in Paris at the time of utterance, which is inconsistent with her previous assertion that she does not know whether John has ever been in Paris.

(33) and (34) should also be compared to (36) and (37), which are control sentences. In these examples, given the context that is set up by the first part of B's answer, the reference time of the second part may be either the time of utterance or a time that precedes it. As expected, both the present tense answer and the past tense answer are felicitous, and the present tense answer entails that John is in Paris at the time of utterance:

- (36) A: Has John ever been in Paris?
 B: Yes, he is there today.
 (37) A: Has John ever been in Paris?
 B: Yes, he was there today.

Finally, one may wonder whether the use of the present tense in (33) entails that the state of John being in Paris holds throughout the day. If that were the case, there would be an independent reason for the infelicity of (33). The following example shows that this is not the case:

- (38) John is in Paris today, but he will leave early in the afternoon.

The same argument can be made with the dialogues in (39) and (40). Given the context that is setup by the first part of B's answer, the use of the past tense in the second part is infelicitous. Consequently, the use of the present tense should not be ruled out by anti-presupposition. Yet the present tense answer is infelicitous:

- (39) A: Has John ever had the flu?
 B: I don't know, #but I'm certain that he has it this season.

(40) A: Has John ever had the flu?

B: I don't know, #but I'm certain that he had it this season.

If the anti-presuppositional analysis were correct, the present tense answer in (39) should be felicitous and should be synonymous to the disjunction in (41):

(41) A: Has John ever had the flu?

B: I don't know, but I'm certain that if he hasn't had it this season, he will have it before the end of the season.

Again, the reader can check that control sentences in (42) and (43) are felicitous:

(42) A: Has John ever had the flu?

B: Oh yes, I'm certain that he had it this season.

(43) A: Has John ever had the flu?

B: Oh yes, I'm certain that he has it this season.

2.2.2 Second counter-argument Consider the following pair of discourses. (44) is well formed and felicitous. It is given here as a control. (45) in contrast is clearly unacceptable. The issue for the anti-presuppositional analysis of the present tense is that the anti-presupposition in question should be suspended in (45), but if it were, the discourse should be acceptable:

(44) A: Has John already arrived?

B: Yes he has. According to his message, he arrived either yesterday or the day before.

(45) A: Has John already arrived?

B: I don't know. According to his message, *he arrives either yesterday or tomorrow.

Let us look at the second part of B's answer in more detail. For the argument, I will assume that these sentences are parsed with a non-sentential disjunction,⁴ that is as in (46), as opposed to (47).

⁴ The following example show that there is a non-sentential parse of disjunction in (46). This sentence is true in a context in which half of the set of relevant persons arrived yesterday, and the other half arrived the day before. In such a context, the sentence would be false if it was the reduction of a sentential disjunction:

(i) Everyone arrived yesterday or the day before.

(46) [$_{TP}$ PAST₁ [$_{VP}$ [$_{VP}$ he arrive] [$_{BoolP}$ yesterday [or the day before]]]]

(47) [$_{BoolP}$ [$_{TP}$ PAST₁ he arrive yesterday] [or [$_{TP}$ PAST₂ ~~he arrive~~ the day before]]]

Assuming this parse, (48) is interpreted as in (49):

(48) *He arrives₁ either yesterday or tomorrow.

(49) $\llbracket(48)\rrbracket^{c,w}$ is true iff John arrives at $g_c(1)$ and either $g_c(1)$ is included in the first day that completely precedes t_c , or $g_c(1)$ is included in the first day that completely follows t_c .

The question that occupies us is whether (48) should trigger an anti-presupposition that the reference time does not precede the time of utterance. To answer this question, let us compare (48) to its past tense alternative (50), interpreted as in (51):

(50) *He arrived₁ either yesterday or tomorrow.

(51) $\llbracket(50)\rrbracket^{c,w}$ is defined only if $g_c(1)$ precedes t_c . If defined, $\llbracket(50)\rrbracket^{c,w}$ is true iff John arrives at $g_c(1)$ and $g_c(1)$ is included in the first day that completely precede t_c , or $g_c(1)$ is included in the first day that completely follows t_c .

(50) is unacceptable. I propose that this is due to the fact that in every context where its presupposition is satisfied, (50) is equivalent to the simpler sentence (52). As a consequence, (52) contradicts one of its primary implicatures, namely that it is not the case that the speaker believes that John arrived yesterday (Sauerland 2004). Another way to cash out this intuition is that (50) is an unredeemable violation of the maxim of manner (Grice 1975): if the speaker believes (52), then why would she utter the more complex (50) instead? In other words, the use of the disjunction in (50) is misleadingly superfluous.

(52) He arrived₁ yesterday.

Keeping that in mind, let us come back to (48). The anti-presupposition of this sentence, if and when it is effective, prohibits the use of (48) in a context c only if (48) is contextually equivalent to its past tense alternative in c . Since its past tense alternative is contextually equivalent to (52), the anti-presupposition of (48) prohibits its use in a context c only if (48) is equivalent to (52) in c . Now, this cannot be the case in (45), which is repeated here as (53). At the point where B utters (48), that is after B's utterance of *I don't know*, it is common ground that both A and B ignore whether John arrived before the

time of utterance. In such a context, (50) and (52) are incompatible with the common ground, whereas (48) is compatible with it. It is clear then that the present sentence is not equivalent to its past tense alternative in this context.

(53) A: Has John already arrived?

B: I don't know. According to his message, *he arrives either yesterday or tomorrow.

As a consequence, the use of the present tense in (53) should not be blocked by anti-presupposition, and the sentence should not license the inference that the reference time does not precede the time of utterance. But in that case, it is not clear why the sentence is unacceptable. Indeed, (48) interpreted as in (49) is informative and compatible with the common ground.

On the contrary, if the present tense denotes the time of utterance in (48), the sentence is expected to be infelicitous, since it is contradictory:

(54) $\llbracket(48)\rrbracket^{c,w}$ is true iff John arrives at t_c and either t_c is included in the first day that completely precedes t_c , or t_c is included in the first day that completely follows t_c .

Finally, an anonymous reviewer reports that native speakers she consulted judge the following discourse with the progressive aspect in B's answer more acceptable than (53):

(55) A: Has John already arrived?

B: I don't know. According to his message, *he is arriving either yesterday or tomorrow.

In order to test this claim, I carried out an online experiment with 40 native speakers of English. The results, which are presented in Appendix, show that progressive sentences like (55) are not more acceptable than simple present sentences like (53), *pace* the reviewers' observations.

I conclude that the anti-presuppositional analysis of the present fails to account for the unacceptability of (48) in contexts where its anti-presupposition should be suspended, as in (45). Since (48) comes out as a contradiction in any context on the non-vacuous analysis, this failure suggests that the anti-presuppositional analysis of the present tense is wrong, and that we should fall back on a non-vacuous analysis. We are then left with the task of devising an alternative analysis of the truth and felicity conditions of Sauerland's examples (1) and (2). This is the topic of the rest of the article.

3 FUTURATE AND HABITUAL INTERPRETATIONS

In this section, I establish that Sauerland's examples are interpreted as futurates or habituals, and I sketch an alternative analysis of their felicity conditions that exploits this observation. The presentation of futurates follows Copley (2002, 2008, 2009) closely.

3.1 Identifying futurate readings

A prototypical futurate sentence describes a future eventuality, although it has a present tense morphology. This is illustrated in (11), from Lakoff (1971). Early references on futurates include Prince (1971), Vetter (1973), Wekker (1976), Huddleston (1977) and Dowty (1979). Also relevant is the work of Landman (1992), Portner (1998) and Cipria & Roberts (2000) on the interpretation of the progressive. In this article, I will focus on the analyses of Copley (2002, 2008, 2009) and Kaufmann (2005).

(56) Tomorrow, the Red Sox play the Yankees.

A characteristic property of futurates is that they are generally infelicitous with VPs that describe eventualities that cannot plausibly be planned or scheduled, as illustrated in (57), from Lakoff (1971), and (58):

(57) *Tomorrow, the Red Sox play well.

(58) *I miss my ride home tomorrow.

In this respect, futurates differ from true futures and habituals, which may be used to describe future eventualities that are not planned or scheduled:

(59) Tomorrow, the Red Sox will play well.

(60) The Red Sox usually play well.

(61) I will miss my ride home next Tuesday.

(62) I usually miss my ride home on Tuesday evenings.

We can use this fact to show that sentences like (2) can be interpreted as futurates. First, the VP *fast* may be used to form a futurate sentence, as illustrated in (63), which conveys that the speaker has a plan to fast on the day following t_c . Secondly, (64) and (65) show that sentences that are structurally similar to Sauerland's example, but that are constructed with predicates that do not satisfy the planning requirement of futurates, do not have the felicity conditions predicted by Sauerland's analysis. (64) is

felicitous in the indicated context only if it is understood that the speaker has a plan to miss her ride home on every Tuesday of the month, and (65) is felicitous in the indicated context only if it is understood that the relevant games are rigged:

(63) I fast tomorrow.

(64) Uttered on Sunday 1st July:

#Every Tuesday this month, I miss my ride home.

(65) Uttered on the first day of the MLB season, a Sunday:

#Every Tuesday this season, the Red Sox defeat the Yankees.

I conclude from these observations that (2) can indeed be interpreted as a futurate.

3.2 *Identifying habitual readings*

In addition to their futurate readings, Sauerland's examples also have a habitual reading, which is singled out in (66). The possibility of a futurate reading is eliminated by the assumption that B does not plan to miss her ride home. This assumption is facilitated by the presence of the adverbial *by all appearances*, which suggests that the speaker's claim is a generalization from experience, rather than an expression of her plans.

(66) Context: uttered between the third and the fourth Tuesdays of the month:

A: Will you come back in time for dinner next Tuesday?

B: I doubt so. By all appearances, on every Tuesday this month I miss my ride home.

That B's answer in (66) is interpreted as a habitual statement is suggested by the fact that it would be infelicitous if uttered before the first Tuesday of the month. A habitual statement would be unwarranted in such a context: it is known that habitual statements generally require that the habit they describe has been instantiated at least once.

(67) Context: uttered on Sunday 1st July:

A: Will you come back in time for dinner next Tuesday?

B: #I doubt so. By all appearances, on every Tuesday this month I miss my ride home.

Another example of habitual readings of Sauerland's examples is given in (68)

(68) Context: The speaker is a Red Sox fan who has been watching every Red Sox game of the ongoing MLB season. As the end of the season is approaching, the speaker notices a trend in the Red Sox games.

Funny, on every Tuesday this season, the Red Sox play well.

(68) should be compared to (69), which is infelicitous out of the blue. The unacceptability of (69) is explained by the fact that no single individual has control over whether the Red Sox will play well tomorrow, which prevents a felicitous interpretation of the sentence as the description of a plan, that is as a futurate. On the contrary, (68) is not interpreted as the description of a plan. It describes a generalization based on the observation of several games of the Red Sox during the MLB season, that is it is interpreted as a habitual sentence.

(69) The Red Sox play well tomorrow.

In view of these facts, one may wonder whether futurate and habitual readings of Sauerland's examples are in complementary distribution. Consider (2) again. It is reasonable to make the hypothesis that the sentence is interpreted as a futurate if it is uttered before the first Tuesday of the month, whereas it is interpreted as a habitual if it is uttered between the first and the last Tuesdays. However, the following argument shows that this is not the case. (70) can be uttered felicitously in context A but not in context B. The reason it cannot be uttered felicitously in context B appears to be that the speaker had too few opportunities to take part to the relevant kind of event (miss or catch her ride home) in the relevant period (the set of Tuesdays of the current year) to support a habitual statement.

(70) By all appearances, on every Tuesday this year I miss my ride home.

Context A: Sentence uttered on Wednesday 3rd July. On every Tuesday since January, the speaker missed her ride home.

Context B: Sentence uttered on Wednesday 2nd January. On Tuesday 1st January, the speaker missed her ride home.

On the contrary, the following example shows that futurate statements are attested in both kinds of contexts:

(71) On every Tuesday this year I take the B train home.

Context A: Sentence uttered on Wednesday 3rd July. On every Tuesday since January, the speaker took the B train home.

Context B: Sentence uttered on Wednesday 2nd January. On Tuesday 1st January, the speaker took the B train home.

This shows that one can use present futurates to describe a planned sequence of events, even when part of the sequence is already in the past.

I conclude from this argument that Sauerland's example (2) may be interpreted as a futurate at all times at which the sentence may be felicitously uttered: from the first day of the month (possibly not a Tuesday) until the last Tuesday of the month. In addition, a habitual interpretation is available when the speaker has witnessed enough events to support a generalization. How many events are enough will depend on contextual and lexical factors that will not be investigated in this article.

I have proposed that Sauerland's examples are ambiguous between a futurate and a habitual interpretation. An anonymous reviewer points out that the type of habitual sentences that I have discussed are non-intentional, for example *miss my ride home*. Such habituals are generalizations from observations, which is why they require that the habit described by the VP has verifying instances, and has enough of them to support the generalization. However, Carlson (1995) pointed out that not all habituals require the instantiation of the habit described by the VP, as illustrated in (72):

(72) Sally handles the mail from Antarctica.

Such habituals are intentional inasmuch as they describe rules or principles, rather than generalization from observations.

One may wonder whether Sauerland's examples can also be interpreted as intentional habituals of this sort. (73) might be a case in point. This sentence may be the expression of a rule that was decided by the local postmaster months ago, and which is still in place although the post office has not received any mail from Antarctica at the time of utterance, and will probably never receive any.

(73) On every odd day this year, Sally handles the mail from Antarctica.

Note however that it is not clear that (73) should not be treated as a futurate. Compare (73) to (74). Both sentences are intentional: (73) describe a rule that the postmaster intends to enforce, while (74) describes a resolution of the speaker. In both sentences, the content of the intention is that a sequence of event ought to be realized if certain conditions are satisfied. The most significant difference between (73) and (74) appears to be that the conditions under which the speaker of (74) ought to be fasting are trivially satisfied, while the conditions under

which Sally ought to handle the mail from Antarctica are unlikely to ever be satisfied.

(74) On every Tuesday this month, I fast.

Be it as it may, I will ignore this complication, and in the rest of the article I will only discuss futurate readings and non-intentional habitual readings. I think that this is a fair strategy, since my main objective is not to improve on existing theories of futurates and habitual sentences, but rather to show that the interpretation of sentences like (74) does not motivate a vacuous analysis of the present tense. To do so, it will be enough to focus on the two most salient readings of (74), and to show that one can derive their truth and felicity conditions from a non-vacuous analysis of the present and additional assumptions about futurates and habituals.

3.3 *Sketch of an alternative analysis of Sauerland's examples*

Our task is to explain why (2)/(74) is infelicitous when it is uttered after the last Tuesday of the month. I propose that this is due to the fact that (i) this sentence can only be interpreted as a futurate or as a habitual and (ii) futurates and habituals have conditions of use that are not satisfied when the sentence is uttered after the last Tuesday of the month.

I will argue following Copley (2002, 2008, 2009) that futurates are statements that some eventuality is planned or scheduled to happen. In present futurates, the plan or schedule is formulated at the time of utterance. This means that (2) under its futurate reading can be paraphrased as (75), assuming that it is the speaker who directs the plan described by the VP:

(75) Right now, I have a plan to fast on every Tuesday of the month.

The event that the speaker plans to realize according to (75) is a plural event that is composed of every singular event of the speaker fasting on some Tuesday of the month. Note that when the sentence is uttered after the last Tuesday of the month, this event lies entirely in the past of the time of utterance, that is it lies entirely in the past of the time at which the speaker is asserted to have its plan. But in that case, the speaker can only be said to have a plan to realize the event in a trivial sense: either the plan has been realized already, or it has not and never will. This, I propose, is the reason why (2) is infelicitous when uttered after the last Tuesday of the month, in its futurate reading.

I propose that on its habitual reading, (2) asserts that there is a sequence of events that is going on at the time of utterance, following

Ferreira (2005). This habitual reading may not be very natural with (2), so let us illustrate it with (76) instead:

(76) On every Tuesday this season, the Red Sox play well.

Interpreted as a non-intentional habitual statement, that is as an inductive generalization, (76) can be paraphrased roughly as follows:

(77) There is an ongoing event of the Red Sox playing well on every Tuesday of the current season.

I will propose that (77) is a modal statement, which asserts that the sequence of events has already begun at the time of utterance and will be completed in the future, provided nothing out of the ordinary happens. When the sentence is uttered after the last Tuesday of the season, the modality becomes vacuous: either the sequence has been realized already, or it has not and never will. I propose that the habitual reading of the sentence is infelicitous because of this vacuous modality.

In sum, I propose that both futurates and habituals should be analyzed as modal statements. Futurates involve quantification over a set of worlds that capture the contents of the plans of some agent, while habituals involve quantification over a set of worlds that capture the normal course of events. Sauerland's examples are interpreted as assertions that a sequence of event must be realized in every world of such a set. But when these sentences are uttered after a certain time, the use of the modality becomes vacuous, which explains the infelicity of the sentence.

The proposed analysis of the felicity conditions of Sauerland's examples relies on the possibility to analyze the VP as a description of plural events. In (2), the VP describes the sum of all events of the speaker fasting on some Tuesday of the month of utterance. In (76), the VP describes the sum of all events of the Red Sox playing well on some Tuesday of the MLB season. An important part of the analysis will be to explain how this description of event is built compositionally.

In order to implement these intuitions, I will make two formal assumptions. First, futurates and habituals are analyzed as circumstantial (and/or metaphysical) modal operators that are subject to the diversity condition of Condoravdi (2002), or its generalization by Werner (2003, 2006), the disparity principle. Second, the universal quantifier *every* introduces in the logical form the description of a plural event, following Schein (1993).

In the rest of the article, I will spell out the details of this analysis, building on independently motivated analyses of futurates and habituals.

In the next section, I will present my assumptions about tense, aspect and modality, and I will present an analysis of quantifiers in temporal PPs which accounts for the description of plural events that is manipulated in Sauerland's examples.

4 ASSUMPTIONS ON TENSE, ASPECT AND MODALITY

4.1 *Tense, aspect and modality*

I will analyze tense and aspect in an event semantics with temporal intervals. Model frames include a set of instants T that are ordered by a precedence relation $<$, which is a linear order on T . From T , we define a set of intervals I , which is the set of all convex subsets of instants in I (including singleton sets, i.e. instantaneous intervals). A set S of instants of I is convex if and only if for all instants i', i'' in S , if there is an instant i in I such that $i' < i < i''$, then i is a member of S as well. Model frames also include a set of events E . The function τ maps events to their runtime. Finally, model frames include a set of individuals D , a set of worlds W and the set of truth-values $\{0, 1\}$

I assume that verbs that describe processes have an event argument. Stative verbs and adjectives denote properties of intervals or relations between individuals and intervals (see Katz 1995):

$$(78) \llbracket \text{happy} \rrbracket^{c,w} = \lambda x. \lambda t. \mathbf{happy}(w)(t)(x)$$

$$(79) \llbracket \text{run} \rrbracket^{c,w} = \lambda x. \lambda e. \mathbf{run}(w)(e)(x)$$

Following Abusch (1998) and Condoravdi (2002), temporal operators are interpreted in terms of the AT relation, which I define as follows:

$$(80) \text{AT}(P)(w)(t) =$$

$$\begin{cases} \exists e [P(w)(e) \wedge \tau(e) \subseteq t] & \text{if } P \text{ is eventive, i.e. } P \in \{0, 1\}^{E^W} \\ P(w)(t) & \text{if } P \text{ is stative/temporal, i.e. } P \in \{0, 1\}^{I^W} \\ \text{undefined} & \text{otherwise} \end{cases}$$

Tenses are analyzed as a function from properties of events or properties of times to truth values. The past tense is indexed, and is defined only if the contextual assignment function g_c maps its index i to an interval that precedes the time of utterance t_c . If defined, it maps a property P in a world w to the truth value 1 iff $\text{AT}(P)(w)(g_c(i))$ is true. The present tense maps a property P in a world w to the truth value 1 iff $\text{AT}(P)(w)(t_c)$ is true. Therefore, the present tense is not a

presupposition trigger. This assumption is adopted for conciseness only, as my analysis is fully compatible with a presuppositional analysis of the present:

$$(81) \llbracket \text{PAST} \rrbracket^{c,w} = \lambda P : g_c(i) < t_c. AT(P)(w)(g_c(i))$$

$$(82) \llbracket \text{PRES} \rrbracket^{c,w} = \lambda P. AT(P)(w)(t_c)$$

The following sentence illustrates how a simple past tense sentence is interpreted in this framework. It is assumed that the VP combines with the past tense by intensional functional application:⁵

(83) John smoked.

a. $[_{TP} \text{PAST}_1 [_{VP} \text{John smoke}]]$

b. $\llbracket (83) \rrbracket^{c,w}$ is defined only if $g_c(1) < t_c$.

If defined, $\llbracket (83) \rrbracket^{c,w} = 1$ iff $AT(\lambda w. \lambda e. \text{smoke}(w)(e)(\text{John}))(w)(g_c(i))$

c. $\llbracket (83) \rrbracket^{c,w}$ is defined only if $g_c(1) < t_c$.

If defined, $\llbracket (83) \rrbracket^{c,w} = 1$ iff $\exists e[\text{smoke}(w)(e)(\text{John}) \wedge \tau(e) \subseteq g_c(i)]$

Following Kratzer (1981, 1991), modal operators are analyzed as quantifiers over sets of possible worlds whose domain is function of two conversational backgrounds: a modal base and an ordering source. A conversational background is a function that maps a world and a time of evaluation to a set of propositions. The function of the ordering source is to order the set of worlds that is obtained by intersecting the propositions in the modal base at the world and time of evaluation. The domain of quantification of a modal operator is defined as the worlds in this set that are optimal with respect to the ordering source. Given a modal base M and an ordering source O , this set is defined as follows:⁶

(84) For any world w, w', w'' and time t and ordering source O ,
 $w' <_{O(w)(t)} w''$ iff every proposition in $O(w)(t)$ that is true in w''

⁵ Intensional Functional Application (Heim & Kratzer 1998: 308):

If α is a branching node and $\{\beta, \gamma\}$ the set of its daughters, then, for any possible world w and any assignment a , if $\llbracket \beta \rrbracket^{w,a}$ is a function whose domain contains $\lambda w'. \llbracket \gamma \rrbracket^{w',a}$, then $\llbracket \alpha \rrbracket^{w,a} = \llbracket \beta \rrbracket^{w,a}(\lambda w'. \llbracket \gamma \rrbracket^{w',a})$.

⁶ These definitions are adapted from Portner (1998) with only minor notational modifications. They presuppose that given a modal base $M(w)(t)$, an ordering source $O(w)(t)$, there is a unique subset of $\cap M(w)(t)$ that contains all the worlds that are optimal with respect to the ordering provided by $O(w)(t)$. This is the so-called Limit Assumption (Lewis 1973). I adopt the limit assumption for convenience only, and the analysis could as well use the definition of ordering sources of Kratzer (1991).

is true in w' , and there is a proposition in $O(w)(t)$ which is true in w' but not in w'' .

- (85) $BEST(M(w)(t))(O(w)(t)) =$ the set of worlds w' in $M(w)(t)$ such that there is no w'' in $M(w)(t)$ such that $w'' <_{O(w)(t)} w'$.

4.2 Syntax of temporal PPs

Consider (86). This sentence is true iff there is an event of John dying that is included in some past interval, and event interval is included in *November 1st, 1975*. How do we get these truth-conditions compositionally? Following von Stechow (2002), I assume that the preposition *on* can be interpreted either as a relation between events and intervals or as a relation between intervals:

- (86) John died on November 1st, 1975.

$$(87) \llbracket \text{on} \rrbracket^{c,w} = \begin{cases} \lambda t. \lambda v. \tau(v) \subseteq t & \text{If } v \in E \\ \lambda t. \lambda v. v \subseteq t & \text{If } v \in I \\ \text{undefined otherwise} \end{cases}$$

Given this much, the temporal PP can be adjoined to the VP, where the two constituents are combined intersectively.

- (88) $[_{TP} \text{ PAST}_1 [_{VP_2} [_{VP_1} \text{ John died }] [_{PP} \text{ on November 1st, 1975 }]]]$

$$(89) \begin{aligned} \llbracket \text{PP} \rrbracket^{c,w} &= \lambda e. \tau(e) \subseteq \mathbf{11/01/1975} \\ \llbracket \text{VP}_1 \rrbracket^{c,w} &= \lambda e. \mathbf{die}(w)(e)(\mathbf{John}) \\ \llbracket \text{VP}_2 \rrbracket^{c,w} &= \lambda e. \mathbf{die}(w)(e)(\mathbf{John}) \wedge \tau(e) \subseteq \mathbf{11/01/1975} \\ \llbracket \text{TP} \rrbracket^{c,w} &\text{ is defined only if } g_c(1) < t_c; \\ &\text{if defined, } \llbracket \text{TP} \rrbracket^{c,w} = 1 \text{ iff } \exists e[\mathbf{die}(w)(e)(\mathbf{John}) \wedge \tau(e) \subseteq \mathbf{11/01/1975} \wedge \tau(e) \subseteq g_c(1)] \end{aligned}$$

The situation is a bit more complicated with quantificational PPs. Consider (90). The DP *every Tuesday this month* denotes a property of sets of intervals. This expression is not of the right type to combine with the preposition *on* in situ, and therefore I assume following von Stechow (2002) that it is QR-ed out of its PP:

- (90) John called on every Tuesday this month.

$$(91) [_{TP} \text{ PAST}_1 [_{VP_2} [_{DP} \text{ every Tuesday this month }]]]] \text{ } 2 [_{VP_1} \text{ John call } [_{PP} \text{ on } t_2]]]]$$

The interpretation of quantifiers in temporal PPs is discussed in the next subsection.

Since the analysis of *every* in (97) is an essential element of my analysis of futurate and habitual interpretations of (92), I am committed to a similar analysis of *each*. That is to say, I assume that the constituent obtained by combining the adverbial quantifier with its VP complement in (101) denotes a property of plural events of the speaker fasting on each Tuesday in the month of utterance.

The worry is that this assumption will over-generate unattested cumulative readings in sentences like (102). (102) should be compared to (103) from Kratzer (2004). One of the possible interpretations of (103) is cumulative: under that reading, (103) is true if each reviewer caught some mistake, and every mistake was caught by some reviewer, although no single reviewer found every mistake. This interpretation is unavailable in (102), which entails that each reviewer caught every mistake.

(102) Three reviewers caught each mistake in the manuscript.

(103) Three reviewers caught every mistake in the manuscript.

In order to generate the cumulative reading of sentences like (103), Schein (1993) and Kratzer (2004) make a crucial use of the hypothesis that *every* introduces a plural event in the semantic representation. One may then worry that if we make the same hypothesis about *each*, we will generate the unattested cumulative interpretation in (102).

I think that this worry is unjustified. Indeed, the analysis of *every* in (97) is not the only ingredient in the analysis of the cumulative reading of (103). Another necessary assumption of Schein and Kratzer's analysis is that the subject of (103) is interpreted as the agent of a plural event over the part of which *every* distributes the mistakes. This second assumption presupposes a Neo-Davidsonian analysis of thematic relations, insofar as the agent thematic role must be introduced separately from the verb (see the extended discussion of the various available strategies in Kratzer 2004).

Knowing this, there are two ways in which one can block the cumulative reading in (102). First, one may reject the Neo-Davidsonian analysis of the cumulative reading of (103). This is only an option if there is an alternative analysis of the cumulative reading of (103), which does not extend to (102). As it happens, such an alternative was proposed by Champollion (2010). Champollion's analysis relies on the assumption that *every NP* but not *each NP* can be interpreted as the plural definite description *the NPs*. I refer the reader to Champollion's work for an exposition of this analysis.

A second strategy would be to preserve the Neo-Davidsonian analysis of the cumulative reading of (103), but to prevent the subject of (102) from being interpreted as the agent of the plural event in which every mistake is caught. Of course, we need to know why this option is not available with *each*, and I do not know of any analysis of cumulative readings that addresses this question. But the possibility exists at least in principle.

I conclude that extending the analysis of *every* in (97) to *each* does not force the over-generation of cumulative readings in sentences like (102).

I would like to close this section on a more positive note, by remarking that it is possible to produce a version of Schein's argument in (94) with *each* instead of *every*. Imagine that a group of monks got drunk before a Gregorian chant concert. When the concert begins, the monks get confused and each of them starts to sing the same chant, a Kyrie, using a different mode from the other monks. One may say:

(104) In a complete lack of harmony, each monk started to sing the Kyrie in a different mode.

The lack of harmony cannot be attributed to any atomic event of singing, but only to the plural event itself. Therefore, (104) supports the hypothesis that *each* introduces a plural event in the semantic representation, just like *every*.

5 A MODAL ANALYSIS OF FUTURATES

5.1 Copley's analysis of futurates

Consider (105). This sentence conveys that there is a plan for the Red Sox to play against the Yankees tomorrow. Following Copley, let us call the agent who makes the plan its *director*. In (105), the director of the plan is whoever has the authority on scheduling baseball games between the Red Sox and the Yankees, namely Major League Baseball. One might then think that what is wrong with infelicitous futurates like (106) is that there is no plan behind the futurate, but this would not be quite right. It might be that the speaker or even MLB have a plan for the Red Sox to defeat the Yankees tomorrow, and yet my utterance of (106) is not felicitous. The issue is that the director of the plan does not have the ability to realize it. Copley captures this idea by assuming that futurates trigger a presupposition that the director has the ability to ensure that her plan be realized.

- (105) The Red Sox are playing the Yankees tomorrow.
 (106) *The Red Sox are defeating the Yankees tomorrow.

This not enough however. Futurates also convey that the director is committed to the plan happening. One understands from (105) not only that the director of the plan is able to make a game between the Red Sox and the Yankees happen, but also that the director wants the game to happen—and therefore that the game will happen. The following examples show that this additional element of meaning is not a presupposition of futurates, but an assertion. (107) questions the existence of a plan for the Red Sox to play the Yankees tomorrow, and (108) is understood as an assertion that there is no such plan.

- (107) Are the Red Sox playing the Yankees tomorrow?
 (108) The Red Sox aren't playing the Yankees tomorrow.

The paraphrase of (105) in (109) summarizes these observations:

- (109) a. Presupposition: The director (MLB) has the ability to ensure that the Red Sox will play against the Yankees tomorrow.
 b. Assertion: The director is committed to the Red Sox playing against the Yankees tomorrow.

More generally, Copley proposes that a futurate that describes a plan *p* is interpreted as follows:

- (110) a. Direction presupposition: The director has the ability to ensure that *p* happens.
 b. Commitment assertion: The director is committed to *p* happening.

The question now is how to derive this interpretation compositionally. Following Copley, I will posit a silent modal operator PLAN in the syntactic representation of futurates.⁷ Simplifying somewhat her analysis, I will assume that PLAN combines first with a property of times denoted by the VP, and then with tense. The director argument will not be syntactically represented but will be provided contextually:

- (111) PRES [PLAN [the Red Sox play the Yankees tomorrow]].

⁷ Copley first uses the name 'PLAN' for this operator, and then renames it 'ALL'. I think 'PLAN' is more congenial, so I will stick with it.

PLAN is interpreted as a metaphysical modal operator. Following Thomason (1970), and Condoravdi (2002), we say that a world w' is metaphysically accessible from w at a time t iff w and w' have the same history up to t (see Thomason 1970, Condoravdi 2002). Metaphysical conversational backgrounds are defined in (113), in terms of the relation of historical equivalence in (112):

(112) $w \simeq_t w'$ iff the histories of w and w' are identical up to t .

(113) $Met(w)(t) = \{p : p = \lambda w'. w \simeq_t w'\}$

Both the presupposition and the assertion of futurates involve quantification over modal alternatives of the world of evaluation at the reference time of the sentence. I will now discuss Copley's implementation of the intuitions in (110), and propose some amendment to her implementation of the direction presupposition.

Let us assume that plans are formalized as properties of intervals. A futurate triggers the presupposition that an entity d directs a property of intervals P in a world w at a time t . This notion is defined in (114), from Copley's (2008):

(114) An entity d directs P in w at t iff:
 $\forall w'$ such that d has the same abilities in w' as in w :
 $[\forall w''$ that is metaphysically accessible from w' at t and consistent with d 's commitments in w' at t :
 $\forall w'''$ that is metaphysically accessible from w at t :
 $\exists t'[t' > t \wedge P(w'')(t')] \leftrightarrow \exists t''[t'' > t \wedge P(w''')(t'')]]]$.

(114) entails that for every world w' where the director has the same abilities as in w , if the director wants P to happen at some future time, then P does happen in every metaphysically possible future of w at some future time. Also, if the director wants P not to happen at any future time, then P does not happen at any future time in any metaphysically possible future of w . If the director does not care then anything goes.

This definition of direction certainly entails that the director has control over the realization of the plan P , but as it is it is too strong. To see this, consider first the abbreviation of (114) in (115-a).⁸ (115-a) is equivalent to (115-b), which entails (115-c). Since the relation of

⁸ $A_d(w)(w')$ stands for ' d has the same ability in w' as in w ,' $M_t(w)(w')$ stands for ' w' is a metaphysical alternative of w at t ' and $C_{d,t}(w)(w')$ stands for ' w' is consistent with d 's commitments in w at t '.

accessibility A_d is reflexive (d has the same ability in w as in w), (115-c) entails (115-d). (115-d) is equivalent to (115-e), which is equivalent to (115-f), which is equivalent to (115-g), which is equivalent to (115-h). Therefore, (115-a) entails (115-h).

- (115) a. $\forall w' [A_d(w)(w') \rightarrow \forall w'' [M_t(w')(w'') \wedge C_{d,t}(w')(w'') \rightarrow \forall w''' [M_t(w)(w''') \rightarrow [\exists t' [t' > t \wedge P(w'')(t')] \leftrightarrow \exists t'' [t'' > t \wedge P(w''')(t'')]]]]]$
 b. $\forall w' \forall w'' \forall w''' [A_d(w)(w') \wedge M_t(w')(w'') \wedge C_{d,t}(w')(w'') \wedge M_t(w)(w''') \rightarrow [\exists t' [t' > t \wedge P(w'')(t')] \leftrightarrow \exists t'' [t'' > t \wedge P(w''')(t'')]]]$
 c. $\forall w' \forall w'' \forall w''' [A_d(w)(w') \wedge M_t(w')(w'') \wedge C_{d,t}(w')(w'') \wedge M_t(w)(w''') \rightarrow [\exists t' [t' > t \wedge P(w'')(t')] \rightarrow \exists t'' [t'' > t \wedge P(w''')(t'')]]]$
 d. $\forall w' \forall w'' [M_t(w)(w') \wedge C_{d,t}(w)(w') \wedge M_t(w)(w'') \rightarrow [\exists t' [t' > t \wedge P(w')(t')] \rightarrow \exists t'' [t'' > t \wedge P(w'')(t'')]]]$
 e. $\forall w' \forall w'' [M_t(w)(w') \wedge C_{d,t}(w)(w') \wedge M_t(w)(w'') \rightarrow \forall t' [[t' > t \wedge P(w')(t')] \rightarrow \exists t'' [t'' > t \wedge P(w'')(t'')]]]$
 f. $\forall w' \forall w'' \forall t' [M_t(w)(w') \wedge C_{d,t}(w)(w') \wedge M_t(w)(w'') \wedge t' > t \wedge P(w')(t') \rightarrow \exists t'' [t'' > t \wedge P(w'')(t'')]]]$
 g. $\forall w' \forall t' [M_t(w)(w') \wedge C_{d,t}(w)(w') \wedge t' > t \wedge P(w')(t') \rightarrow \forall w'' [M_t(w)(w'') \rightarrow \exists t'' [t'' > t \wedge P(w'')(t'')]]]$
 h. $[\exists w' \exists t' [M_t(w)(w') \wedge C_{d,t}(w)(w') \wedge t' > t \wedge P(w')(t')]] \rightarrow \forall w'' [M_t(w)(w'') \rightarrow \exists t'' [t'' > t \wedge P(w'')(t'')]]]$

In other words, (114) entails that if $\lambda w. \exists t' [t' > t \wedge P(w)(t')]$ is metaphysically possible in w at t and is consistent with the director's commitments in w at t , then $\lambda w. \exists t' [t' > t \wedge P(w)(t')]$ is true in every metaphysical alternative of w , *without restriction*. In Copley own words, 'whether the director's commitment-worlds have the property determines whether the entire set of metaphysically possible worlds has that property or not' (Copley 2008). But remember that the set of metaphysical alternatives of w that are accessed at t is nothing more and nothing less than the set of worlds that share their history with w up to t , and whose history after t may differ from that of w in any respect whatsoever. This means that according to (114), an agent d directs a plan P only if she has absolute control over the realization of P in the future, no matter what happens. This will not do. When one utters (116), one does not commit oneself to the claim that the director (MLB?) has absolute control over every factor that may affect the realization of the plan for the Red Sox to play against the Yankees on the day after the utterance. In case of a terrorist attack at Fenway Park a few hours before the game is scheduled to

begin, the game may well be canceled in spite of the desires of MLB, but that does not mean that the speaker made wrong assumptions about the abilities of the director.

(116) The Red Sox are playing the Yankees tomorrow.

As a consequence, I would like to propose a weaker implementation of the notion of direction. The basic intuition is to analyze direction as a conjunction of conditionals, as in (117):

(117) If the director wants P to happen, then P should happen, and if the director wants P not to happen, then P should not happen.

Following Kratzer (1979, 1981), I assume that the function of *if*-clauses in conditionals is to add the propositional content of their pre-jacent to the modal base of a modal operator in the matrix clause. In (117), I assume that the modal operator *should* has a circumstantial modal base, composed of propositions that describe facts of the world of evaluation w that determine the abilities of the director d in w at t . Let us represent it as $A(d)(w)(t)$. In order to account for the fact that the direction presupposition does not require absolute control over any factor that may affect the outcome of the plan, I assume that $A(d)(w)(t)$ is restricted by a stereotypical ordering source, which is defined in (118) following Kratzer (1981):

(118) Stereotypical conversational backgrounds:

A stereotypical conversational background is a function f such that for any world w , $f(w)$ represents what is normal in w according to some suitable normalcy standard for w .

The proposed revision of the direction presupposition is given in (119), where $S(w)(t)$ is the stereotypical ordering source and $\lambda w.\mathbf{want}(w)(t)(d)(\lambda w.\exists t'[t' > t \wedge P(w)(t')])$ is the proposition that d wants $\lambda w.\exists t'[t' > t \wedge P(w)(t')]$ at time t .

(119) An entity d directs P in w at t iff:

$$\forall w'[w' \in \text{BEST}(A(w)(t)(d) \cup \{\lambda w.\mathbf{want}(w)(t)(d)(\lambda w.\exists t'[t' > t \wedge P(w)(t')])\})](S(w)(t)) \rightarrow \exists t'[t' > t \wedge P(w')(t')] \text{ and}$$

$$\forall w'[w' \in \text{BEST}(A(w)(t)(d) \cup \{\lambda w.\mathbf{want}(w)(t)(d)(\lambda w.\neg \exists t'[t' > t \wedge P(w)(t')])\})](S(w)(t)) \rightarrow \neg \exists t'[t' > t \wedge P(w')(t')]$$

Let us now have a look at the assertion of futurates. It is a statement that the director wants the plan to be realized. Following Copley, I will assume that this is a proposition that the plan is realized in those worlds

of a metaphysical modal base that rank best with respect to a bouletic ordering source relativized to the director:

- (120) An entity d in is committed to P in w at t iff:
 $\forall w'[w' \in BEST(M(w)(t))(Boul(d)(w)(t))] \rightarrow \exists t'[t' > t \wedge P(w)(t')]$.

The revised semantics for PLAN is therefore as follows:

- (121) Meaning of PLAN (preliminary version):
 $\llbracket PLAN \rrbracket^{c,w}(P)(t)$ is defined only if a salient entity d directs $\lambda w. \lambda t. AT(P)(w)(t)$ in w at t . If defined, $\llbracket PLAN \rrbracket^{c,w}(P)(t)$ is true iff d is committed to $\lambda w. \lambda t. AT(P)(w)(t)$ in w at t .

Let us go through an example in some details. (116) is parsed as in (122):

- (122) [_{TP} PRES [_{ModP} PLAN [_{VP} the Red Sox play the Yankees tomorrow]]].

The VP denotes a property of events of the Red Sox playing against the Yankees, and that are included in the day that follows the utterance. It combines with PLAN by intensional functional application:

- (123) $\llbracket VP \rrbracket^{c,w} = \lambda e. \mathbf{play}(w)(e)(\mathbf{the\ Yankees})(\mathbf{the\ Red\ Sox}) \wedge \tau(e) \subseteq \mathbf{tomorrow}$.

- (124) $\llbracket (122) \rrbracket^{c,w}$ is defined only if MLB directs $\lambda w. \lambda t. AT(\llbracket VP \rrbracket^{c,w})(w)(t)$ in w at t_c .
 If defined, $\llbracket (122) \rrbracket^{c,w} = 1$ iff $\forall w'[\llbracket w' \in BEST(M(w)(t))(Boul(d)(w)(t)) \rightarrow \exists t'[t' > t \wedge \exists e[\mathbf{play}(w')(e)(\mathbf{the\ Yankees})(\mathbf{the\ Red\ Sox}) \wedge \tau(e) \subseteq t' \wedge \tau(e) \subseteq \mathbf{tomorrow}]]]$.

$\llbracket (122) \rrbracket^{c,w}$ is defined only if MLB has the ability to make the Red Sox play against the Yankees on the day that follows the utterance. If defined, it is true iff in the metaphysical alternatives of w at t_c that rank best with respect to MLB's desires in w at t_c , there is an interval that follows t_c and that includes an event of the Red Sox playing against the Yankees on the day that follows t_c .

5.2 Issues raised by Sauerland's examples

Let us now try to apply this analysis to Sauerland's present tense example, repeated here as (125):

- (125) Every Tuesday this month, I fast.

Given the analysis of temporal PPs that I have adopted, the sentence must be parsed as in (126), with a covert preposition Θ . The preajcent of the PLAN operator is interpreted as in (127):

$$(126) \quad [_{TP} \text{PRES } [_{ModP} \text{PLAN } [_{VP} [_{DP} \text{every T. this month}] [2 [_{VP} [_{VP} \text{I fast}] [_{PP} \Theta t_2]]]]]]]$$

$$(127) \quad \llbracket \text{VP} \rrbracket^{c,w} = \lambda E. \forall t [[\text{Tuesday}(t) \wedge t \subseteq \text{this-month}(c)] \rightarrow \\ \exists e [e \sqsubseteq E \wedge \text{fast}(w)(e)(\text{speaker}(c)) \wedge \tau(e) \subseteq t]] \wedge \\ E = \sigma_e \exists t' [\text{Tuesday}(t') \wedge t' \subseteq \text{this-month}(c) \wedge \\ \text{fast}(w)(e)(\text{speaker}(c)) \wedge \tau(e) \subseteq t']]$$

(125) describes a plan to fast on the four Tuesdays of the month. By combining PLAN with this VP, we obtain the following interpretation, assuming that the contextually salient director is the speaker:

$$(128) \quad \llbracket (126) \rrbracket^{c,w} \text{ is defined only if at } t_c \text{ in } w, \text{ the speaker} \\ \text{directs } \lambda w. \lambda t. AT(\llbracket \text{VP} \rrbracket^{c,w})(w)(t) \text{ in } w \text{ at } t_c. \text{ If defined,} \\ \llbracket (126) \rrbracket^{c,w} = \forall w' [w' \in \text{BEST}(M(w)(t_c))(\text{Boul}(\text{speaker}(c))(w)(t_c) \rightarrow \\ \exists t [t > t_c \wedge \exists E [\forall t' [[\text{Tuesday}(t') \wedge t' \subseteq \text{this-month} \\ (c)] \rightarrow \\ \exists e [e \sqsubseteq E \wedge \text{fast}(w)(e)(\text{speaker}(c)) \wedge \tau(e) \subseteq t']] \wedge \\ E = \sigma_e \exists t' [\text{Tuesday}(t') \wedge t' \subseteq \text{this-month}(c) \wedge \\ \text{fast}(w)(e)(\text{speaker}(c)) \wedge \tau(e) \subseteq t'] \wedge \tau(E) \subseteq t]]].$$

If defined, (128) is true in w at t_c iff in the metaphysical alternatives to w at t_c that rank best with respect to the desires of the speaker in w at t_c , there is a time t after t_c that includes a plural event of the speaker fasting on every Tuesday in the month of utterance.

These truth-conditions are too strong: they predict that (125) should be false when uttered after the first Tuesday of the month. The problem appears to be that the definition of PLAN in (116) entails that the plan must be realized in the future of the evaluation time of PLAN, which in this case is the time of utterance. But Sauerland's examples demonstrate that present futurates can be used to describe plans that are on-going at the time of utterance. In the next section, I propose an amendment to the semantics of PLAN that deals with this issue. The proposal is simple: we should get rid of the quantification over future times in the lexical entry of PLAN. The correct temporal interpretation of futurates will instead be derived from an independently motivated constraint on the use of modal operators: Condoravdi's (2002) diversity condition, aka Werner's (2003) disparity principle.

6 FUTURATES AND THE DIVERSITY CONDITION

6.1 *Metaphysical modality and future orientation*

I propose that the future orientation of futurates is due to Condoravdi's (2002) Diversity Condition on the use of metaphysical modality. In this section, I summarize Condoravdi's proposal. The modal *might* in (129) can be interpreted as a metaphysical modal. In this interpretation, (129) means that there was a time in the past at which the world could have evolved to a point where John won the game. This reading is the only one that is available in (130).

(129) John might have won the game.

(130) At that point, John might still have won the game.

Note that the time of perspective of the modal is in the past then: (129) interpreted metaphysically and (130) do not mean that there is now a possibility that John won the game at some past time, but rather that there was a past time at which it was (still) a possibility that John would win the game, even though he actually came to lose it. Condoravdi (2002) points out that the metaphysical interpretation of *might* in (129) cannot be obtained when the modal has a present perspective, in which case the only available reading is epistemic. Under this reading, (129) means that for all we know at the time of utterance, the actual world might be such that there is a past time at which John won the game.

Why is it that the metaphysical reading of *might* is unavailable with a present perspective? It is of course conceivable that there are two lexical entries for *might*, one metaphysical and one epistemic, and that the differences follow from the lexical semantics of these operators. But Condoravdi proposes that the same modal operator is involved in each case, and that the sentences differ in the scope that the perfect operator takes with respect to the modal. (129) may be parsed either as (131) or as (132):

(131) [PRES [PERF [might [John won]]]]

(132) [PRES [might [PERF [John won]]]]

Given my assumptions about the interpretation of modality, I propose that *might* is interpreted as follows. $BEST(M(w)(t))(O(w)(t))$ is the set of worlds in $\cap M(w)(t)$ that are best ranked according to $O(w)(t)$. The modal base M can be epistemic or metaphysical. $[[\text{Might}]]^{c,w}$ combines with an evaluation world w and a perspective time t and asserts that there is some world w' in $BEST(M(w)(t))(O(w)(t))$, such that P is true in w' at

$[t, _)$, where $[t, _)$ denotes the interval that is bounded by t on the left (included) and that is not bounded on the right, that is the interval that stretches from t to infinity.

$$(133) \quad \llbracket \text{might} \rrbracket^{c,w} = \lambda P_{(s,it)}. \lambda t. \exists w' [w' \in \text{BEST}(M(w)(t))(O(w)(t)) \wedge AT(P)(w')([t, _))]$$

The perfect aspect is interpreted as in (134), and so (131) and (132) are interpreted as in (135) and (136) respectively, assuming PRES is interpreted as in (82):

$$(134) \quad \llbracket \text{PERF} \rrbracket^{c,w} = \lambda P. \lambda t. \exists t' [t' < t \wedge AT(P)(w)(t')]$$

$$(135) \quad \llbracket (131) \rrbracket^{c,w} = \exists t [t < t_c \wedge \exists w' [w' \in \text{BEST}(M(w)(t))(O(w)(t)) \wedge \exists e [\tau(e) \subseteq [t, _) \wedge \mathbf{win}(w')(e)(\mathbf{John})]]]$$

$$(136) \quad \llbracket (132) \rrbracket^{c,w} = \exists w' [w' \in \text{BEST}(M(w)(t_c))(O(w)(t_c)) \wedge \exists t [t < [t_c, _) \wedge \exists e [\tau(e) \subseteq t \wedge \mathbf{win}(w')(e)(\mathbf{John})]]]$$

$\llbracket (131) \rrbracket^{c,w}$ is true iff there is a time t in the past of t_c such in that some world in $\text{BEST}(M(w)(t))(O(w)(t))$, John won at t or at some interval after t . This is the desired interpretation of (129) under the metaphysical reading of *might*.⁹ $\llbracket (132) \rrbracket^{c,w}$ is true iff there is a world w' in $\text{BEST}(M(w)(t_c))(O(w)(t_c))$ and a time t before t_c such that John won in w' at t . This is the desired interpretation of (129) under the epistemic reading of *might*.

What must still be explained is why M cannot be a metaphysical modal base in (136) with the LF (132). Condoravdi's explanation relies on the notion of a proposition being settled at a certain time in a certain world.¹⁰ The definition of settledness invokes the auxiliary notion of worlds having the same history up to a time t : $w \simeq_t w'$ iff the histories of w and w' are identical up to and including t . We can now say that a proposition p is settled at a time t in a world w , if $p(w) = p(w')$ for every world w' that has the same history as w up to and including t :

(137) Settledness:

A proposition p is settled at a time t in a world w iff for every world w' such that $w \simeq_t w'$, $p(w) = p(w')$

⁹ We probably want to say that the sentence is infelicitous if John won at t . This is taken care of by the general constraint on the interpretation of metaphysical modality that I am about to introduce.

¹⁰ Condoravdi's original definition is not expressed in terms of propositions but in terms of relations between times and worlds. I have recast it and the related diversity condition in terms of propositions to obtain more general notions that will be useful in the study of futarates. See Condoravdi (2002) for the original definitions.

Let us illustrate this notion. The stative proposition *John had the flu*, interpreted as $\lambda w.\exists t[t < t_c \wedge \mathbf{have-flu}(w)(t)(\mathbf{John})]$ is settled at the time of utterance in the world of utterance w . Indeed, we might not know whether John had the flu or not, but we know that in every world w' that has the same history as w until t_c , either *John had the flu* is true at t_c in both w and w' , or *John had the flu* is false at t_c in both w and w' , since the truth of the proposition only depends on facts in the past of t_c . On the other hand, the proposition *John will have the flu*, interpreted as $\lambda w.\exists t[t > t_c \wedge \mathbf{have-flu}(w)(t)(\mathbf{John})]$, is not settled in w at t_c . Indeed, no matter whether John will ultimately have the flu or not, there is a world w' that has the same history as w until t_c , and such that *John will have the flu* has a different value in w and in w' at t_c .

Condoravdi proposes that the use of a modal operator¹¹ is infelicitous if its prejacent is settled in the evaluation world of the modal at its time of perspective.¹² More precisely, the use of a modal base M with respect to a proposition p and a time of perspective t is subject to the following diversity condition:

(138) Diversity condition:

The use of a modal operator with a world and a time of evaluation w , t , a modal base M and a prejacent p is felicitous only if there are worlds w' and w'' in $M(w)(t)$ such that $p(w') \neq p(w'')$.

Violation of the diversity condition triggers unacceptability. If M is metaphysical, this condition cannot be satisfied if p is settled in w at t , since for every world w' that is metaphysically accessible from w at t , w and w' have the same history up to and including t , by the definition of metaphysical modality. This explains why M cannot be metaphysical in (136): there, the perspective of the modal is t_c but its complement P is such that $\lambda w.P(w)([t_c, _])$ is settled at t_c , that is the proposition *that John won* is settled in the evaluation world w at t_c . We are now equipped to explain the non-past orientation of PLAN.

6.2 Deriving the temporal orientation of futurates

I propose to redefine PLAN as in (139). In this definition, PLAN takes two time arguments: an evaluation time t_E , which is the time at which the plan is made, and a plan time t_P , which is the time at which the plan

¹¹ Note that Condoravdi (2002) does not restrict the diversity condition to metaphysical modals.

¹² Condoravdi's original definition uses context sets rather than a single evaluation world. I will come back to this refinement in section 6.3.

is supposed to be realized. The plan time t_P is denoted by a free variable in the LF. :

- (139) $\llbracket \text{PLAN} \rrbracket^{c,w}(t_P)(P)(t_E)$ is defined only if d directs $\lambda w.(\lambda t.AT(P)(w)(t))(t_P)$ in w at t_E .
If defined, $\llbracket \text{PLAN} \rrbracket^{c,w}(t_P)(P)(t_E)$ is true iff d is committed to $\lambda w.(\lambda t.AT(P)(w)(t))(t_P)$ in w at t_E .

To make sense of this definition, we must redefine the notions of direction and commitment as follows:

- (140) An entity d directs p in w at t iff:
 $\forall w' [w' \in \text{BEST}(A(w)(t)(d) \cup \{\lambda w.\mathbf{want}(w)(t)(d)(\lambda w.p(w))\}) (S(w)(t)) \rightarrow p(w')]$ and
 $\forall w' [w' \in \text{BEST}(A(w)(t)(d) \cup \{\lambda w.\mathbf{want}(w)(t)(d)(\lambda w.\neg p(w))\}) (S(w)(t)) \rightarrow \neg p(w')]$
- (141) An entity d in is committed to p in w at t iff:
 $\forall w' [w' \in \text{BEST}(M(w)(t))(Boul(d)(w)(t) \rightarrow p(w))]$.

I will now argue that as a consequence of the diversity condition, t_P cannot precede t_E . That is to say, we predict that present futurates can describe plans whose time of realization includes the time of utterance or follows the time of utterance, but they cannot be used to describe plans whose time of realization precedes the time of utterance. Let us see why this is so.

$\llbracket \text{PLAN} \rrbracket^{c,w}(t_P)(P)(t_E)$ asserts that in the metaphysical alternatives of w at t_E that rank best according to the desires of the director, t_P includes a P -event. Therefore, if the proposition $\lambda w.(\lambda t.AT(P)(w)(t))(t_P)$ is settled at t_E in the evaluation world w , the use of PLAN violates the diversity condition. This predicts that the futurate is infelicitous if the truth of $\lambda w.(\lambda t.AT(P)(w)(t))(t_P)$ only depends on facts in the past of t_E . As we will see, this is enough to predict the attested temporal orientation of futurates and by the same device, to derive the felicity conditions of Sauerland's examples.

Consider first a plain futurate with a past tense frame adverbial, such as (142):

- (142) *Yesterday, I fast.

- (143) $[_{TP} \text{PRES } [_{ModP} [\text{PLAN } t_1]] [_{VP} \text{I fast yesterday }]]]$

- (144) $\llbracket \text{VP} \rrbracket^{c,w} = \lambda e.\mathbf{fast}(w)(e)(\mathbf{speaker}(c)) \wedge \tau(e) \subseteq \mathbf{yesterday}$

- (145) $\llbracket \text{TP} \rrbracket^{c,w}$ is defined only if the speaker of c directs $\lambda w.(\lambda t.AT(\lambda w.\llbracket \text{VP} \rrbracket^{c,w})(w)(t))(g_c(1))$ in w at t_c . If defined, $\llbracket \text{TP} \rrbracket^{c,w}$ is true

iff the speaker of c is committed to $\lambda w.(\lambda t.AT(\lambda w. \llbracket VP \rrbracket^{c,w})(w)(t))(g_c(1))$ in w at t_c .

Note that the use of *yesterday* in (142) parsed as (143) is not in contradiction with the use of the present tense, since t_c is not asserted to be part of yesterday. However, (142) violates the diversity condition. Let ϕ be the proposition $\lambda w.(\lambda t.AT(\lambda w. \llbracket VP \rrbracket^{c,w})(w)(t))(g_c(1))$. This proposition is the prejacent of the modal operator denoted by PLAN in (143), as defined in (139). Now, ϕ is settled in w at t_c for any value that g_c assigns to the plan time variable t_1 . Indeed, if $g_c(1)$ includes an event of John fasting yesterday in the evaluation world w , then $g_c(1)$ includes such an event in every metaphysical alternative of w that is accessed at t_c , and the prejacent is settled in w at t_c . If $g_c(1)$ does not include any event of John fasting yesterday in w , the prejacent is false in w and the same holds in every metaphysical alternative of w that is accessed at t_c . The prejacent is therefore trivially settled in w at t_c . As a consequence, (142) violates the diversity condition in any context of utterance, which explains its infelicity.

Let us now consider an example with a future temporal frame adverb:

(146) Tomorrow, I fast.

(147) [_{TP} PRES [_{ModP} [PLAN t_1] [_{VP} I fast tomorrow]]]

(148) $\llbracket VP \rrbracket^{c,w} = \lambda e.\mathbf{fast}(w)(e)(\mathbf{speaker}(c)) \wedge \tau(e) \subseteq \mathbf{tomorrow}$

(149) $\llbracket TP \rrbracket^{c,w}$ is defined only if the speaker of c directs $\lambda w.(\lambda t.AT(\lambda w. \llbracket VP \rrbracket^{c,w})(w)(t))(g_c(1))$ in w at t_c . If defined, $\llbracket TP \rrbracket^{c,w}$ is true iff the speaker of c is committed to $\lambda w.(\lambda t.AT(\lambda w. \llbracket VP \rrbracket^{c,w})(w)(t))(g_c(1))$ in w at t_c .

Again, let ϕ be the proposition $\lambda w.(\lambda t.AT(\lambda w. \llbracket VP \rrbracket^{c,w})(w)(t))(g_c(1))$. (146) is felicitous only if ϕ is not settled in w at t_c , that is only if $g_c(1)$ does not precede t_c . If $g_c(1)$ precedes the day after t_c (i.e. *tomorrow*), ϕ is false in any world, since there is no world in which $g_c(1)$ is included in the day after t_c . In particular, ϕ is false in every world of the modal base and the sentence is infelicitous due to a violation of the diversity condition. If $g_c(1)$ is included in the day after t_c , the truth of ϕ in $BEST(M(w)(t))(Boul(\mathbf{speaker}(c))(w)(t_c))$ depends on the contents of the speaker's desires in w at t_c . In any case, ϕ is not settled in the metaphysical modal base, since there are possible futures in the set of metaphysical alternatives to w at t_c in which the speaker does not fast on the day that follows the utterance (e.g. those futures in which the speaker dies unexpectedly shortly after uttering (146)). When (146) is a true statement,

these futures are not among the best worlds given the bouletic ordering source.

Note that the direction presupposition of (146) may be satisfied without violating the diversity condition. Following the definition of this presupposition in (140), if the director wants ϕ then ϕ is true in the metaphysical alternatives of w at t_c that rank best with respect to a stereotypical ordering source, and if the director wants $\neg\phi$ then $\neg\phi$ is true in the same set of worlds. No matter whether the director wants ϕ or not, this does not require that ϕ be true (or false) in every metaphysical alternative of w at t_c , but only in the subset of these alternatives where the normal course of events is followed. Furthermore, the conjunction of the presupposition of (146) and its assertion is consistent with the satisfaction of the diversity condition. Indeed, if the assertion is true, then the director wants ϕ in w at t_c , which together with the presupposition entails that ϕ is true in the metaphysical alternative that rank best with respect to the stereotypical ordering source $S(w)(t_c)$. Again, this is consistent with ϕ being false in some metaphysical alternatives not included in $\cap S(w)(t_c)$.

Finally, we can account for the felicity conditions of futurate readings of Sauerland's examples. Remember that in (150), the VP describes a property of plural events of the speaker fasting on every Tuesday of the month of utterance, as represented in (152). (150) asserts that the plan time denoted by t_2 includes such an event in all the metaphysical alternatives of the evaluation world w at t_c that rank best with respect to the desires of the speaker in w at t_c . Consequently, (150) is true only if the plan time $g_c(2)$ includes all the Tuesdays in the month of utterance:

(150) On every Tuesday this month, I fast.

(151) $[_{TP} \text{PRES } [_{ModP} [\text{PLAN } t_2]] [_{VP} \text{every Tuesday this month } 1 \text{ [I fast on } t_1]]]]$

(152) $\llbracket VP \rrbracket^{c,w} = \lambda E. \forall t [[\text{Tuesday}(w)(t) \wedge t \subseteq \text{this-month}(w)(c)] \rightarrow \exists e [e \sqsubseteq E \wedge \text{fast}(w)(e)(\text{speaker}(c)) \wedge \tau(e) \subseteq t]] \wedge E = \sigma e \exists t [\text{Tuesday}(w)(t) \wedge t \subseteq \text{this-month}(w)(c) \wedge \text{fast}(w)(e)(\text{speaker}(c)) \wedge \tau(e) \subseteq t]]$

(153) $\llbracket TP \rrbracket^{c,w}$ is defined only if the speaker of c directs $\lambda w. (\lambda t. AT(\lambda w. \llbracket VP \rrbracket^{c,w})(w)(t))(g_c(2))$ in w at t_c . If defined, $\llbracket TP \rrbracket^{c,w}$ is true iff the speaker of c is committed to $\lambda w. (\lambda t. AT(\lambda w. \llbracket VP \rrbracket^{c,w})(w)(t))(g_c(2))$ in w at t_c .

- (154) $\llbracket \text{TP} \rrbracket^{c,w}$ is defined only if the speaker of c directs ϕ in w at t_c . If defined, $\llbracket \text{TP} \rrbracket^{c,w}$ is true iff the speaker of c is committed to ϕ in w at t_c .

Where: $\phi = \lambda w. \exists E [\tau(E) \subseteq g_c(2) \wedge \forall t [\llbracket \text{Tuesday}(w)(t) \wedge t \subseteq \text{this-month}(w)(c) \rrbracket \rightarrow \exists e [e \sqsubseteq E \wedge \text{fast}(w)(e)(\text{speaker}(c)) \wedge \tau(e) \subseteq t]]] \wedge E = \sigma e \exists t [\llbracket \text{Tuesday}(w)(t) \wedge t \subseteq \text{this-month}(w)(c) \wedge \text{fast}(w)(e)(\text{speaker}(c)) \wedge \tau(e) \subseteq t \rrbracket]$

This time, we let ϕ be the proposition $\lambda w. (\lambda t. AT(\lambda w. \llbracket \text{VP} \rrbracket^{c,w})(w)(t))(g_c(2))$, as detailed in (154). (150) is felicitous only if ϕ is not settled in w at t_c . There are three cases to consider, depending on the relative location of the plan time $g_c(2)$, the utterance time t_c and the last Tuesday of the month of utterance. If all the Tuesdays in the month of utterance are in the past of t_c and are included in $g_c(2)$, then the proposition is settled in w at t_c , no matter whether $g_c(2)$ includes t_c or not. If all the Tuesdays in the month of utterance are included in $g_c(2)$ but at least one of these Tuesdays is not in the past of t_c , then the proposition is not settled in w at t_c , since the issue whether the speaker is fasting or not on that Tuesday is not settled then. Finally, if some Tuesday in the month of utterance is not included in $g_c(2)$, then the proposition is false in any world and therefore it is trivially settled in w at t_c . Hence, we predict that the sentence can be felicitously uttered until and including the last Tuesday of the month of utterance.

This shows that one can derive the felicity conditions of Sauerland's present tense examples without assuming that the present tense is vacuous. To do so, I had to adopt a modal analysis of futurates and to revise it by making the temporal orientation of the futurate operator follow from Condoravdi's diversity condition. This is not a high price to pay however, since the diversity condition has independent motivations (see Condoravdi 2002, Werner 2003).

In the next subsection, I show that this analysis allows us to rule out the counter-examples to Sauerland's anti-presuppositional analysis of the present that were discussed in section 2.

6.3 *Futurates in ignorance contexts*

Remember the examples that were used to argue against the anti-presuppositional analysis of the present tense:

- (155) A: Has John already arrived?
 B: I don't know. According to his message, *he arrives either yesterday or tomorrow.

The argument was that the anti-presuppositional analysis of the present tense predicts that B's answer in (155) is semantically well formed and felicitous, contrary to facts.

In order to convince ourselves that the analysis of Sauerland's examples that was developed in this section is a good substitute to the anti-presuppositional analysis, we must show that it rules out the use of the present in (155). That is to say, we must show that B's answer in (155) is unacceptable when it is interpreted as a futurate.

To this end, we must be able to represent the speaker's and hearer's ignorance about John's arrival in (155). A straightforward way to do so is to use a notion of context set. Following (Stalnaker 1972), the context set at any given time in a discourse is defined as the intersection of the common ground, which is the set of propositions that are collectively taken for granted by the discourse participants at that time. We may then model the information state of the discourse participants in (155) as follows: at the point where B utters the second sentence in his answer, the context set contains some worlds in which John arrived before the time of utterance, and others in which he did not.

Since we have reintroduced context sets in our semantic framework, we should redefine settledness and the diversity condition accordingly, as in Condoravdi's original formulation:

(156) Settledness:

A proposition p is settled at a time t in a context set CS iff for every world w in CS and every world w' such that $w \simeq_t w'$, $p(w) = p(w')$

(157) Diversity condition:

The use of a modal operator in a context set CS, with a modal base M , time of evaluation t and prejacent p is felicitous only if there is a world w in CS and w', w'' in $M(w)(t)$ such that $p(w') \neq p(w'')$.

Let us now ask how the revised formulation of the diversity condition rules out B's answer in (155). At first sight, it seems that the diversity condition does not block this discourse. The issue is the following. In the ignorance context in (155), the speaker does not know whether John arrived in the past or whether he will arrive in the future, but each of these cases are consistent with the common ground. Therefore, if the plan time $g_c(1)$ is large enough to include the day before the time of utterance and the day after that time, there are worlds in CS in which the plan time $g_c(1)$ of the futurate operator includes an event of John

arriving on the day before the time of utterance, and other worlds in which $g_c(1)$ includes an event of John arriving on the day that follows the time of utterance. But if this is so, the existence of a world w of the latter type in CS should guarantee that the diversity condition is satisfied, since the prejacent of the futurate operator is true in some metaphysical alternatives of w and false in others.

While these worries are legitimate, I maintain that the unacceptability of (155) is due to the application of the diversity conditions to the PLAN operator. However, the offending use of PLAN is not part of the literal meaning of the sentence, it is part of its implicatures.

To see this, let us first discuss implicatures triggered by the use of disjunction without an embedding modal operator. Consider (158). We can assume following Gazdar (1979) that (158) implicates (159) and (160), where *possible* is to be interpreted epistemically. Now, if sentences are evaluated in a context set rather than in a single world of evaluation, epistemic modals such as the ones in (159) and (160) should be given a dynamic interpretation. Following Veltman (1996) (see also Yalcin 2007, Portner 2009), I will assume that *it is possible that p* uttered against a context set CS checks that p is consistent with CS. If it is not, CS is updated to the empty set, and if it is, CS is unchanged. In the case of (159), this means that we must look for a world w in CS such that the proposition denoted by *John arrived tomorrow* is true in w . Of course, we won't find any such world, since any context in which the past tense presupposition of (158) is satisfied is such that the reference time of the sentence precedes the time of utterance in every world of CS. Therefore, the implicature (160) is infelicitous, which I propose is why (158) is unacceptable. This is expected if, following Sauerland (2004), we argue that (159) and (160) follow from the assertion of (158) together with its primary implicatures (161) and (162), and primary implicatures are mandatory (see Magri 2009, 2011, Sauerland 2004).

- (158) *John arrived yesterday or tomorrow.
- (159) It is possible that John arrived yesterday.
- (160) *It is possible that John arrived tomorrow.
- (161) It is not certain that John arrived yesterday.
- (162) *It is not certain that John arrived tomorrow.

Assuming this much, let us go back to (155), repeated below as (163). (163) has the primary implicatures in (164–a) and (165–a), which are

equivalent to (164-b) and (165-b) respectively.¹³ Taking again a dynamic view on epistemic modals, (164-b) is interpreted as an instruction to check whether (164-c) is compatible with CS. In the context given in (155), since the speaker is ignorant about the time of John's arrival, (164-c) is actually compatible with CS. However, by the definition of the diversity condition in (157), (164-b) is felicitous only if there is a world w in the context set such that there are metaphysical alternatives w' , w'' of w at the time of utterance, such that the prejacent of PLAN is true in w' and false in w'' . This requirement cannot be satisfied, since the use of the past adverb *yesterday* entails that the prejacent is settled at the time of utterance. Therefore, the unacceptability of (163) follows from the fact that one of its primary implicatures is infelicitous.

- (163) *John arrives yesterday or tomorrow.
- a. PLAN (John arrives yesterday or tomorrow)
 - b. (PLAN John arrives yesterday) or (PLAN John arrives tomorrow)
- (164)
- a. *It is not certain that PLAN John arrives yesterday.
 - b. *It is possible that it is not the case that PLAN John arrives yesterday.
 - c. *It is not the case that PLAN John arrives yesterday.
- (165)
- a. It is not certain that PLAN John arrives tomorrow.
 - b. It is possible that it is not the case that PLAN John arrives tomorrow.
 - c. It is not the case that PLAN John arrives tomorrow.

An important assumption here is that in order to verify whether PLAN satisfies the diversity condition in (164-c) and (165-b), one evaluates the PLAN modal in the context set, rather than in the modal base of the matrix epistemic modal. This assumption follows from the dynamic view according to which the matrix epistemic modal is interpreted as an instruction to check whether (164-c)/(165-c) is consistent with the context set.

In sum, in a dynamic setting using context sets, one can explain the infelicity of (155)/(163) by the fact that one of its primary implicatures violates the diversity condition.

¹³ Note that these implicatures are generated no matter whether the disjunction was wide or narrow scope with respect to the PLAN modal; again, *possible* is epistemic.

6.4 *Alternative analyses of futurates*

An anonymous reviewer points out that there is an alternative analysis of futurates, due to Kaufmann (2005) and Kaufmann *et al.* (2006), according to which the non-modal prejacent of futurate sentences must be settled in a modal base that may be either metaphysical or doxastic. Since the two analyses cannot be both right, one may want to know what reasons there are to adopt the analysis that I proposed, rather than Kaufmann's. I address this question in this subsection.

Kaufmann (2005) proposes that the present tense restricts a property of times denoted by the verb phrase, to a property of non-past times. After existential closure, this means that present tense sentences quantify over times that overlap with the time of utterance or follow it. At first sight, this analysis over-generates future oriented interpretations of present sentences: in contrast to (166), (167) is false in a context where it is known that John is not sick at the time of utterance, which suggests that the analysis of the present tense in (168) is not correct:

(166) John will be sick.

(167) John is sick.

(168) $\llbracket (167) \rrbracket^{c,w} = \exists t [t \geq t_c \wedge \mathbf{SICK}(w)(t)(\mathbf{John})]$

Of course, there are cases in which a present tense sentence may describe a future event, namely futurate uses of the present. Kaufmann's task is therefore to rule out future reference with the present tense in non-futurate cases. To do so, (Kaufmann 2005) assumes that every sentence with a bare tense (i.e. simple past or present episodic sentences without any overt modal operator), is embedded under a silent necessity operator, whose modal base may be historical (i.e. metaphysical) or doxastic/epistemic.¹⁴ This modal operator has no associated ordering source. As a consequence, a sentence like (167) is interpreted as in (169), where R stands for an accessibility relation that may be either metaphysical or doxastic/epistemic:

(169) $\llbracket (167) \rrbracket^{c,w} = \forall w' [R(w)(w')(t_c) \rightarrow \exists t [t \geq t_c \wedge \mathbf{SICK}(w)(t)(\mathbf{John})]]$

Since there is no ordering source in the covert modal in (169), the sentence asserts that its prejacent is true in every world of the modal base. In other words, the sentence is true if and only if the prejacent is settled in the modal base. (Kaufmann 2005) argues that this is sufficient

¹⁴ In Kaufmann's terminology, which incidentally is etymologically accurate, an epistemic accessibility relation is a reflexive doxastic accessibility relation, that is an accessibility relation that models true beliefs.

to rule out non-futurate uses of the present: (167) is false if John is not sick at the time of utterance because there exists an objective possibility that John will never be sick in the future (i.e. there are future courses of events that are metaphysically consistent with the actual past, in which John is not sick), and typically, the speaker cannot be absolutely certain that John will be sick either.

A consequence of this analysis is that futurate readings of present tense sentences are only possible with sentences that denote propositions that are settled either in a metaphysical modal base or in an epistemic modal base. Consider Lakoff's example again:

(170) The Red Sox play the Yankees tomorrow.

Kaufmann (2005) and Kaufmann *et al.* (2006) argue that both cases are possible, that is (170) can be interpreted as being metaphysically settled, or as being settled in a doxastic modal base. Furthermore, they argue that if a proposition is true in every world of the doxastic modal base associated with an agent at a time t , then this agent believes that the proposition is metaphysically settled at t .

Let us first assume that (170) is interpreted with respect to a metaphysical modal base, accessed at a world of evaluation w at a time of utterance t_c . The sentence asserts that the proposition that there is an event of the Red Sox playing against the Yankees on the day after t_c is true in every metaphysical alternative of w at t_c . This is a surprisingly strong requirement. Indeed, given a world and time of evaluation w and t_c , the worlds that are metaphysically accessible from w at t_c may differ in any respect provided their history up to t_c is identical to that of w . If we take this definition of historical necessity seriously, and if we assume that there is a set of propositions P that describe the history of w up to t_c exhaustively and that do not describe anything else (i.e. such that $\cap P = \lambda w'.w \simeq_{t_c} w'$), then any proposition p that is logically consistent with P must be true in some metaphysical alternative of w at t . But surely, both the proposition that the Red Sox play the Yankees tomorrow and its negation are *logically* consistent with the set of propositions that describe the history of the world of utterance up to the time of utterance, no matter what this history is (whether this proposition is likely to be true or not is a different issue). The kind of objective indeterminateness of future eventualities that is captured in the notion of historical or metaphysical modality is nicely described by Kaufmann *et al.* (2006) themselves in the following excerpt:

(171) The assumption is that the future course of events is literally not determined at present. Accordingly, our uncertainty about

the future is not solely due to ignorance of the relevant facts. Rather, it is impossible, even in principle, to know how things will turn out in the future. Even if we could resolve all of our uncertainty about past and present facts, some residual uncertainty about the future would necessarily remain. (Kaufmann *et al.* 2006)

If we want to admit that the prejacent of the covert modal operator in (170) is settled in a metaphysical modal base, we have to assume that it expresses that it is a metaphysical necessity that the Red Sox play against the Yankees on the day that follows the time of utterance. This seems dubious to me, but I will not dwell on this philosophical issue.

Kaufmann argues that futurate sentences may also express that the prejacent of their covert modal operator is settled in a doxastic or epistemic modal base. In this case, a sentence with a bare present tense is true iff the prejacent of its modal operator is true in every doxastic/epistemic alternative in the modal base, that is if the truth of its prejacent is certain given the body of information that is represented as the modal base. Applying this reasoning to (170), we predict that the sentence is true iff it is a certainty that there is an event of the Red Sox playing against the Yankees on the day that follows the day of utterance, given a certain body of information. Presumably, this body of information includes propositions about the plans of MLB and their authority on the scheduling of baseball games.

I have two objections to Kaufmann's analysis of futurates. The first one is related to the analysis of Sauerland's examples. Depending on the way we interpret the quantification over non-past intervals that is introduced by the present tense, (172) below is either predicted to be false, or predicted to be true, when it is uttered after the last Tuesday of the month of utterance. This will not do, since the sentence is infelicitous in this context:

(172) Every Tuesday this month, I fast.

Let me spell out the argument. I assume that the present tense quantifies over non-past intervals, as in (173). The question then arises how to define the relation \geq . There are at least two relevant ways to define this relation, in (175) a and b. Both assume that the precedence relation between intervals is defined as in (174), that is as complete precedence:

(173) $[[\text{PRES}]]^{G,w} = \lambda P. \exists t [t \geq t_c \wedge AT(P)(w)(t)]$

- (174) For any intervals t, t' , $t < t'$ iff for every instant $i \in t$ and for every instant $i' \in t'$, $i < i'$.
- (175) Two alternative definitions of \geq :
- For any intervals t, t' , $t \geq t'$ iff $\neg(t < t')$.
 - For any intervals t, t' , $t \geq t'$ iff $t = t' \vee t > t'$.

According to the definition in (175-a), $t \geq t'$ iff t does not precede t' . Since \geq is a relation between intervals, that is instants or convex sets of instants, this is equivalent to requiring that either t overlaps t' or t completely follows t' . According to the definition in (175-b) $t \geq t'$ iff either t is t' , or t completely follows t' . As a consequence, $t \geq t'$ in the (b) definition asymmetrically entails $t \geq t'$ in the (a) definition.

Let us see how we can interpret (172) with these assumptions. In both cases, the denotation of (172) is as in (176). If we define \geq as in (175-a), the sentence is true iff in every world of the modal base (metaphysical or doxastic/epistemic), there is a plural event E of the speaker fasting on every Tuesday of the month of utterance, such that the runtime of E is included in an interval t that either overlaps the time of utterance, or follows it completely. This is too weak, since the sentence is predicted to be true when it is uttered after the last Tuesday of the month, provided the speaker fasted on every Tuesday of the month of utterance and the speaker believes it. If we define \geq as in (175-b), the sentence is true iff in every world of the modal base (metaphysical or epistemic), there is a plural event E of the speaker fasting on every Tuesday of the month of utterance, such that the runtime of E is included in an interval t that is either identical to the time of utterance, or follows it completely. In that case, the sentence is predicted to be false when it is uttered after the last Tuesday of the month of utterance, rather than infelicitous¹⁵, as it should be (more on this below). Furthermore, the sentence is predicted to be false if it is uttered between the first and the last Tuesday of the month, since in that case any event of the speaker fasting on the four Tuesdays of the month would extend in time before the time of utterance. This analysis will not do, then.

$$(176) \quad \llbracket (172) \rrbracket^{c,w} = \forall w' [R(w)(w')(t_c) \rightarrow \exists t [t \geq t_c \wedge \exists E [\tau(E) \subseteq t \wedge \forall t' [\text{Tuesday}(t') \wedge t' \subseteq \text{this-month}(c)] \rightarrow$$

¹⁵ Note that it does not help to assume that the sentence presupposes $\Box\phi$ and asserts ϕ , since the presupposition would entail the assertion whenever the modal base is reflexive, which is the case with metaphysical modality and with realistic flavors of doxastic modality, that is epistemic modality in Kaufmann's terminology.

$$\begin{aligned} & \exists e[e \sqsubseteq E \wedge \mathbf{fast}(w)(e)(\mathbf{speaker}(c)) \wedge \tau(e) \subseteq t'] \wedge \\ & E = \sigma e[\exists t'[\mathbf{Tuesday}(t') \wedge t' \subseteq \mathbf{this-month}(c) \wedge \\ & \mathbf{fast}(w)(e)(\mathbf{speaker}(c)) \wedge \tau(e) \subseteq t']] \end{aligned}$$

Maybe the issue is that in (176), the present tense quantifies over an interval that includes the runtime of E . This follows from the definitions of the AT operator and the definition of the present in (173), but we may define these operators differently. Let us assume then that we can define these operators in such a way that (172) asserts that there is a plural event of the speaker fasting, whose runtime is a non-past interval (rather than being included in a non-past interval). (172) would be interpreted as follows:

$$\begin{aligned} (177) \quad \llbracket (172) \rrbracket^{c,w} = & \forall w'[R(w)(w')(t_c) \rightarrow \exists E[\tau(E) \geq t_c \wedge \\ & \forall t'[\mathbf{Tuesday}(t') \wedge t' \subseteq \mathbf{this-month}(c)] \rightarrow \\ & \exists e[e \sqsubseteq E \wedge \mathbf{fast}(w)(e)(\mathbf{speaker}(c)) \wedge \tau(e) \subseteq t']] \wedge \\ & E = \sigma e[\exists t'[\mathbf{Tuesday}(t') \wedge t' \subseteq \mathbf{this-month}(c) \wedge \\ & \mathbf{fast}(w)(e)(\mathbf{speaker}(c)) \wedge \tau(e) \subseteq t']]] \end{aligned}$$

Unfortunately, this new definition does not really help. If we define \geq as in (175)a), the sentence is true iff in every world in the modal base, there is an event of the speaker fasting on every Tuesday of the month that either overlaps the time of utterance or completely follows it. This predicts that the sentence is false rather than infelicitous when it is uttered after the last Tuesday of the month. If we define \geq as in (175)b), the sentence is true iff in every world in the modal base, there is an event of the speaker fasting on every Tuesday of the month whose runtime is either identical to the time of utterance or completely follows it. Again, this predicts that the sentence is false when it is uttered after the last Tuesday of the month, and also between the first Tuesday of the month and the last. In sum, it is not clear that Kaufmann's analysis of futurates captures the felicity conditions of Sauerland's examples.

This argument takes for granted that (172) is infelicitous rather than false when it is uttered after the last Tuesday of the month. To see that this assumption is correct, consider (178). One infers from this sentence that the speaker believes that the time of utterance precedes or is included in the last Tuesday of the month. A related observation is that if the sentence is uttered after the last Tuesday of the month, we feel that it would have been appropriate to use the past tense instead of the present, as in (179). These observations are unexplained if the complement of *doubt* in (178) merely entails that its reference time does not follow the last Tuesday of the month of utterance. On the other hand,

these observations are expected if this is a presupposition of the complement, which is projected as a presupposition that the speaker believes that the time of utterance does not follow the last Tuesday of the month.¹⁶

(178) I doubt that John fasts on every Tuesday this month.

(179) I doubt that John fasted on every Tuesday this month.

Let us now consider the second argument. In short, I will argue that Kaufmann's analysis has issues with embedded futurates. As in the first argument, the issue is that Kaufmann's analysis equates infelicity with falsity of a universally quantified modal statement.¹⁷ First of all, note that futurates can be embedded under verbs of attitudes, as in (180) from *Wekker (1976)*, *apud Dowty (1979)*. Secondly, note that sentences that are not felicitous as matrix futurates are still degraded when they are embedded, as illustrated in (181). In other words, constraints on futurate interpretations of present tense sentences in matrix environments are carried over to complements of verbs of propositional attitudes:

(180) I'm not sure whether I get my paycheck tomorrow.

(181) *I'm not sure whether the Red Sox play well tomorrow.

Let us now ask how we can use Kaufmann's analysis to derive the truth-conditions of (180) while still ruling out (181). According to Kaufmann's analysis, (182) asserts that in every world of a metaphysical or epistemic modal base, it is true that the speaker gets her paycheck on the day that follows the utterance:

(182) I get my paycheck tomorrow.

What happens when the sentence is embedded under a verb of propositional attitude? We can adopt one of two strategies. First, we can assume that the prejacent of the covert modal operator in (182) is asserted to be true in every attitude world. That is to say, we drop the covert modal operator that Kaufmann assumes is present in (182), and we assume that the set of worlds over which the embedding verb quantifies plays the same role. As a consequence, (180) would be interpreted simply as an assertion that it is not the case that the speaker gets her paycheck on the day that follows the utterance in all of her doxastic alternatives. The issue with this analysis is that it does not rule

¹⁶ See also *Copley (2002, 2008, 2009)*, who uses this test to argue that (part of) the requirement that futurates described planned events is presupposed.

¹⁷ I am grateful to an anonymous reviewer for pointing out the parallels between the two arguments and suggesting this general characterization of the issue.

out (181): there is nothing wrong with the assertion that the speaker is not certain that the Red Sox will play against the Yankees on the day that follows the utterance. Remember that Kaufmann's explanation for the unacceptability of (183) is that in most scenarios, the speaker cannot be certain that the Red Sox will play well in some future game. This explanation cannot be carried over to (182) in the strategy under discussion.

(183) *The Red Sox play well tomorrow.

The second strategy is that the covert modal operator that Kaufmann's analysis posits in (182) is part of the complement of the embedding verb in (180) and (181). In that case, (180) can be paraphrased as (184).

(184) I'm not sure whether it is certain/necessary that I get my paycheck tomorrow.

More precisely, (180) is interpreted as follows, where $Dox(\mathbf{speaker}(c))(w)(w')(t_c)$ is true iff w' is consistent with the beliefs of the speaker in w at t_c , and MB stands for the modal base of the embedded covert modal, that is MB is either epistemic or metaphysical:

$$(185) \quad \llbracket (184) \rrbracket^{c,w} = \forall w' [Dox(\mathbf{speaker}(c))(w)(w')(t_c) \rightarrow \exists w'' [MB(w')(w'') \wedge \neg \exists t [t \geq t_c \wedge \exists e [\mathbf{get-paycheck}(w'')(e)(\mathbf{speaker}(c)) \wedge \tau(e) \subseteq t]]]]$$

This analysis faces the same problem as the previous one: it does not rule out the unacceptable futurate in (181), which would be analyzed as (186). To see this, assume that MB is epistemic/doxastic in (186). Assuming furthermore that doxastic accessibility relations are transitive (following Kaufmann 2005, Kaufmann *et al.* 2006), (186) entails that there is a world among the doxastic alternatives of the speaker in w at t_c in which the Red Sox do not play well on the day that follows the time of utterance. Consequently, one cannot rule out the sentence by arguing that it conflicts with the assumption that the speaker cannot be certain about the truth of its prejacent.

$$(186) \quad \llbracket (181) \rrbracket^{c,w} = \forall w' [Dox(\mathbf{speaker}(c))(w)(w')(t_c) \rightarrow \exists w'' [MB(w')(w'') \wedge \neg \exists t [t \geq t_c \wedge \exists e [\mathbf{play-well}(w'')(e)(\mathbf{Red-Sox}(c)) \wedge \tau(e) \subseteq t]]]]$$

In sum, Kaufmann's analysis of futurates faces issues both with the analysis of embedded futurates and with the analysis of Sauerland's examples. While it might be possible to address these issues within the

analysis, I prefer to stick with Copley's analysis of futurates, which is free from these problems.

7 HABITUAL INTERPRETATIONS OF SAUERLAND'S EXAMPLES

In this section, I go back to habitual interpretations of Sauerland's examples. Following Ferreira (2005), I analyze the habitual aspect as a form of progressive aspect that manipulates plural events. This allows us to exploit Condoravdi's Diversity condition to derive the felicity conditions of Sauerland's examples.

7.1 *Habitual aspect, imperfectivity and modality*

7.1.1 *The two components of habitual aspect* Ferreira observes that habitual sentences have several properties in common with progressive sentences. First, they appear to involve the same viewpoint aspect: just as progressive sentences describe ongoing events, habitual sentences describe ongoing sequences of events. Consider (187) for instance. For this sentence to be true, there must have been past events of John smoking, and it must be the case that John is at least disposed to smoking again in the future:

(187) John smokes.

As a first approximation, we might therefore interpret (187) as follows:

(188) There is a plural event of John smoking whose run time includes the time of utterance.

A welcome consequence of this analysis is that it predicts the weirdness of sentences like (189): in the proposed analysis, this sentence asserts the existence of a plural event in which some cigarette is smoked, which entails that there is a cigarette that John smokes repeatedly.

(189) *John smokes a cigarette.

Another respect in which habitual sentences are similar to progressive sentences is that both may describe events or sequences of events that are not completed in the actual world. A sentence like (190) certainly tells us something about future events of John playing soccer. However, it does not entail that John will play soccer no matter what happens. It is understood that, if something out of the ordinary happens (e.g. if John breaks one of his legs), John may not be able to play soccer in the future, without (190) being judged false.

(190) John plays soccer.

The same phenomenon is observed in progressive sentences. Dowty (1979) pointed out that (191) can be uttered truthfully provided Mary is in the process of building a house at the time of utterance, even if this event is interrupted at a later time and Mary never gets to finish the house in the actual world:

(191) Mary is building a house.

In view of these facts, Ferreira (2005) argues that habitual sentences should be analyzed as progressive sentences that describe ongoing sequences of events. Ferreira bases his analysis of the habitual aspect on top of Portner's (1998) analysis of the progressive, to which I now turn.

7.1.2 *Portner's analysis of the progressive aspect* Portner (1998) develops a modal analysis of the progressive aspect, in the tradition of Dowty (1979) and Landman (1992). His analysis aims to improve on previous modal analyses by taking advantage of the distinction between modal bases and ordering sources in Kratzer's theory of modality (Kratzer 1979, 1981, 1991).

In order to appreciate Portner's analysis, it will be useful to consider how it allows us to solve three classical puzzles of the progressive aspect, which following Landman (1992) I will refer to as the imperfective paradox, the problem of interruptions, and the problem of non-interruptions.

The imperfective paradox is the fact that past imperfective sentences entail their perfective counterparts with activities but not with accomplishments, as illustrated in (192) and (193):

(192) a. Mary was pushing a cart.
b. Mary pushed a cart.

(193) a. Mary was drawing a circle.
b. Mary drew a circle.

The problem of interruptions is the fact that progressive sentences may describe ongoing events that are not completed in the actual world, as we observed already in (191). This problem is complicated by Vlach's (1973) observation that the interruption might be part of the normal course of events. Consider (194). This sentence can be uttered truthfully in a context in which it was expected that Mary would be hit by the truck, because she started to cross the street in the past of the incoming truck, which was driving too fast to stop before the collision would happen. In this case, we want to say that the normal course of events at

the time when Mary started crossing the street was that she would be hit by the truck and her crossing the street would be interrupted.

(194) Mary was crossing the street when the truck hit her.

Finally, the problem of non-interruptions is the fact that some past progressive sentences are judged to be true if the event they described was completed in the actual world, no matter how unlikely it was that the event would be realized. Imagine that I witness Mary, a person of average physical capacities, enter the Atlantic ocean in La Baule in France and start swimming westwards with the intention to reach the American shore in Boston. A couple of hours afterwards, Mary gets exhausted and drowns a few miles away from the French coast. She never gets to cross the ocean. In this context, my utterance of (195) would be false. Now, suppose that I utter this sentence in a similar context, except that Mary actually managed to reach Boston alive. In that context, my utterance of (195) would be true.

(195) The last time I saw Mary, she was crossing the Atlantic.

Let us now see how Portner's analysis solves these puzzles. Consider the following example:

(196) Mary was climbing Mount Toby.

According to Portner, (196) asserts that there exists in the actual world a certain event e whose runtime includes the reference time of the sentence. It also asserts that in every world in a certain set S , e develops into a complete event of Mary climbing Mount Toby. This set of worlds is defined using a pair of modal base and ordering source. Portner models these conversational backgrounds as functions from events to sets of propositions, but I prefer to model them as functions from worlds and properties of events to sets of propositions. This will facilitate the discussion of Ferreira's (2005) extension of Portner's analysis to habitual sentences. The modal base is circumstantial. It maps a world of evaluation w and a property of events P to a set of propositions that describe certain facts of w 'about' P that are relevant in the context of utterance. Which facts should enter the modal base is to a great extent context dependent, but the intuition is that only facts that are about the parameters of the events described by P are relevant. By parameters of an event, I mean its participants (agent, patient, etc.) and its spatio-temporal coordinates. In (196), these circumstances include facts about Mary's physical and mental state when she starts climbing the mountain, as well as facts about her immediate environment. The ordering source

ranks worlds in the modal base according to a principle of non-interruption. It maps a world of evaluation w and a property of event P to a set of propositions that express that accidental events that may interrupt the development of a P event do not happen. In (196), the propositions in the ordering source express that Mary manages to avoid all the ways in which her climbing Mount Toby could be interrupted: she does not slip and break her ankle, she does not collapse out of exhaustion, she is not eaten by a bear . . . (196) is true in a world w if and only if there is an event e in w whose run time includes the reference time, and in all the worlds of the circumstantial modal base that rank best according to the ordering source, there is an event of Mary climbing Mount Toby that has e as a non-final subpart.

Portner develops a compositional implementation of this analysis in which the progressive aspect is interpreted as a function from an event and a property of events to a truth-value. However, given the treatment of tense that I have adopted, I prefer to analyze the progressive aspect as a function from a property of events to a property of times (an option that Portner also considers in a footnote).

- (197) $\llbracket \text{PROG} \rrbracket^{c,w} = \lambda P. \lambda t. \text{there is an event } e \text{ in } w \text{ whose run time includes } t, \text{ and in all worlds } w' \text{ in } \text{Best}(\text{Circ}(w)(P))(\text{NI}(w)(P)), \text{ there is an event } e' \text{ that includes } e \text{ as a non-final subpart such that } P(w')(e') \text{ is true.}$
- (198) $\text{Best}(\text{Circ}(w)(P))(\text{NI}(w)(P)) = \text{the set of worlds } w' \text{ in } \cap \text{Circ}(w)(P) \text{ such that there is no world } w'' \text{ in } \cap \text{Circ}(w)(P) \text{ such that } w'' <_{\text{NI}(w)(P)} w'$

We may now come back to the three puzzles of the progressive and see which solutions this analysis has to offer. In order to solve the imperfective puzzle, we must assume that if P is a property of activities, e' is a P -event in some world, and e is a non-final subpart of e' in w , then e is a P -event in w . On the other hand, if P is a property of accomplishments, e' is a P -event in some world, and e is a non-final subpart of e' in w , then e is not a P -event in w . In Krifka's (1989) terms, properties of activities are divisive, while properties of accomplishments are quantized. Given these assumptions, we are in a position to explain the contrast between (192) and (193), repeated here as (199) and (200). (199-a) entails that the actual world contains an initial subpart of a (possible) event of Mary pushing the cart, which precedes the time of utterance. Since the property of events of Mary pushing the cart is divisive, the subparts of such an event are also events of Mary pushing the cart, which explains why the inference from (199-a) to (199-b) is

valid. This is not so in (200), since the property of Mary drawing a circle is not divisive.

- (199) a. Mary was pushing a cart.
 b. Mary pushed a cart.
- (200) a. Mary was drawing a circle.
 b. Mary drew a circle.

The puzzle of interruptions, illustrated in (201), is solved thanks to the definition of the circumstantial modal base of the progressive aspect. (201) entails that there is a certain event e in the actual world that does not follow the time of utterance such that in every world in a certain set S , e develops into a complete event of Mary crossing the street. In order to explain the puzzle of interruption, we must show that the actual world is not necessarily a member of this set. S is of course $Best(Circ(w)(P))(NI(w)(P))$, where P is the property of events of Mary crossing the street. This set is in turn a subset of $\cap Circ(w)(P)$. Now, Portner argues that the circumstantial modal base makes no mention of the truck that would hit Mary in the actual world. Therefore, the actual world itself is not a member of $Best(Circ(w)(P))(NI(w)(P))$.

- (201) Mary was crossing the street when the truck hit her.

Finally, Portner's analysis must explain the problem of non-interruptions, which is illustrated in (202). (202) is judged false unless Mary actually crossed the Atlantic ocean. Portner argues that this judgment is due to the fact that in (202), the circumstances that prevent Mary from crossing the ocean in the actual world are internal to the event in progress, namely they are due to the physical limitations of its agent (Mary is too weak to cross the ocean) and the properties of its theme (the ocean is too large for any normal human being to swim across). Therefore, under the assumption that Mary is a normal human being, there is no world in the circumstantial modal base of the progressive aspect that contain a complete event of Mary crossing the ocean:

- (202) The last time I saw Mary, she was crossing the Atlantic ocean.

However, if we know that Mary managed to cross the ocean, then our assumptions about Mary's physical abilities are different. In such a context, we would judge that the sentence is true.

7.1.3 *Application to habitual aspect* Following Ferreira (2005), I analyze the habitual aspect as a progressive aspect that manipulates plural events. I define the habitual aspect operator HAB in (203). This lexical entry

differs from the one that is proposed in Ferreira (2005) in several respects, but I believe that the two proposals have the same spirit:

- (203) $\llbracket \text{HAB} \rrbracket^{c,w} = \lambda P. \lambda t. \text{ for every world } w' \text{ in } \text{Best}(\text{Circ}(w)(P))(\text{NI}(w)(P)), \text{ there is a plural event } E \text{ such that } \tau(E) \text{ includes } t \text{ as a non-final part and } P(w')(E) \text{ is true.}$

$\text{HAB}(P)(t)$ is true if and only if in all the worlds of the circumstantial modal base that rank best with respect to the non-interruption ordering source, there is a plural P -event whose run time includes the evaluation time t as a non-final part. (203) requires that the habit described by property P will go on after the evaluation time in the worlds of the circumstantial modal base that rank best according to the non-interruption ordering source. This explains why (204) may be uttered truthfully even if it turns out that John will no longer play soccer after the utterance time, due to some ‘external’ factor (e.g. John may break one leg and may no longer be able to play). However, (204) does entail that John will continue to play soccer if no external factor prevents him from doing so.

- (204) John plays soccer.

In the next subsection, I will show that the application of the diversity condition to circumstantial modal bases also allows to account for the fact that (non-intentional) habituals must have been instantiated before the reference time. I will also derive the fact that habitual readings of Sauerland’s fasting example are infelicitous when uttered after the last Tuesday of the month of utterance.

7.2 Habitual interpretations of Sauerland’s examples

I would like to explain the conditions of felicity of habitual readings of Sauerland’s examples by invoking Condoravdi’s Diversity Condition:

- (205) Diversity condition:

The use of a modal operator with a world and a time of evaluation w, t , a modal base M and a prejacent p is felicitous only if there are worlds w' and w'' in $M(w)(t)$ such that $p(w') \neq p(w'')$.

The modal base of a habitual operator is circumstantial but not metaphysical. However, metaphysical modal bases can be seen as a particular type of circumstantial ones. A circumstantial modal base is a function that maps a world (or a pair of world and a time) to a set of proposition that describe facts in that world (or facts in that world up to the evaluation time). A metaphysical modal base is a circumstantial modal base

that maps a pair of world and time to the set of proposition that describe every fact of that world up to the evaluation time (see Werner 2006).

Despite this fact, it is not obvious that the Diversity Condition can be used to derive the future orientation of modals with a circumstantial modal base that is not metaphysical. To see this, consider (206). Our goal is to use the Diversity Condition to explain why the sentence is infelicitous when it is uttered after the last Tuesday of the month. To do so, one must ensure that if there is a plural event of the speaker fasting on every Tuesday of the month, in the world of evaluation and before the time of utterance, then there is such an event in every world of the modal base. This is guaranteed if the modal base is metaphysical, since the alternatives to the world of evaluation at the time of utterance are then identical to that world up to that time. However, there is no such guarantee with a circumstantial modal base, which does not include every circumstance of the evaluation world up to the evaluation time. The history of the accessible worlds may differ from the history of the evaluation world at any point in time. As a consequence, it appears that the occurrence of some event in the evaluation world before the evaluation time does not guarantee that this event occurs in every alternative of that world.

(206) On every Tuesday this month, I fast.

Substituting the circumstantial modal base by a metaphysical one in the analysis of the habitual aspect is not an option. The motivation for the adoption of a circumstantial modal base is that it allows us to solve the interruption puzzle with progressives and habituals, by keeping certain facts of the evaluation world out of the modal base. In (206) for instance, we want to make no mention of the bus in the relevant circumstances of Mary's crossing the street:

(207) Mary was crossing the street, when a bus hit her. She was killed before she could reach the opposite sidewalk

Luckily, these worries about circumstantial modal bases are irrelevant to the analysis of the cases that concern us. Let us examine the meaning of the habitual operator once again:

(208) $[[\text{HAB}]]^{c,w} = \lambda P.\lambda t.$ for every world w' in $\text{Best}(\text{Circ}(w)(P))(NI(w)(P))$, there is a plural event E such that $\tau(E)$ includes t as a non-final subpart and $P(w')(E)$ is true.

First, let us explain why the habitual reading of (206) is infelicitous when the sentence is uttered after the last Tuesday of the month of

utterance. In this sentence, the prejacent of the modal operator denoted by HAB is the proposition that there is an event of the speaker fasting on every Tuesday of the month of utterance, whose runtime includes the time of utterance. If the sentence is uttered after the last Tuesday of the month, any event of this kind must precede the time of utterance. In other words, the runtime of such an event does not include the time of utterance, which is the time of evaluation of the HAB modal operator. Therefore, the prejacent of this operator is contradictory, and in particular it is false in every world of the circumstantial modal base. As a consequence, the sentence violates the diversity condition in this context.

By the same device, we can explain why the habitual reading of (206) is not attested when the sentence is uttered before the first Tuesday of the month. In this context, the time of utterance necessarily precedes the onset of a plural event of the speaker fasting on every Tuesday of the month—this onset being the left boundary of the first Tuesday. This entails that the prejacent of the modal operator denoted by HAB is contradictory, and therefore that the sentence violates the diversity condition.

This completes the demonstration that one does not need to assume that the present tense is vacuous in order to explain the conditions of use of Sauerland's examples.

8 CONCLUSION

In this article, I have argued that one can explain the conditions of use of sentences like (210) without resorting to the assumption that the present tense is vacuous:

(209) Every Tuesday this month, I fast.

(210) Every Tuesday this month, I fasted.

My argument relied on the observation that (210) can be interpreted either as a futurate sentence or as a habitual sentence. I argued that both the futurate reading and the habitual reading depend on the presence of a modal operator in the logical form of the sentence. Although these operators differ, they are both interpreted with respect to a circumstantial modal base (and more specifically a metaphysical modal base for futurates), which I propose is subject to Condoravdi's (2002) Diversity Condition. The conditions of use of (210) in each interpretation were derived from the application of this condition, independently of our assumptions about the present tense. This undermines Sauerland's (2002) argument in favor of the anti-presuppositional analysis of the present

tense, since his argument depends on the premise that one cannot account for the felicity condition of (210) if one assumes that the present asserts or presupposes that its denotation is simultaneous to or overlap with the time of utterance.

In addition, I argued that the anti-presuppositional analysis of the present tense makes incorrect predictions in contexts where the presupposition of the past tense alternative to a present tense sentence are not satisfied. In such contexts, we expect that the meaning of ‘now-ness’ of the present should disappear, contrary to the facts.

In conclusion, it appears that the specific analysis of the present as a null tense that was proposed in Sauerland (2002) lacks empirical support. On the other hand, the analysis of futurate and habitual readings of (210) that I have proposed is compatible with any analysis of the present tense, and the argument against the anti-presuppositional analysis that I have discussed may not apply to other ‘vacuous’ analyses of the present.

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APPENDIX

In order to test the hypothesis that the meaning of the present is obtained by anti-presupposition, I carried out an experiment on Amazon Mechanical Turk, with 40 native speakers of English from the USA. The location of the subjects was filtered by IP address. The subjects were asked to indicate whether their native language was English, and from which country (USA, Canada, United Kingdom, Australia, New Zealand, India, other). The subjects were told the answer would not affect their payment.

Design

Each item of the experiment was a short dialogue consisting of a question and answer. The experiment had a 2×2 within-subjects factorial design, one factor being the use of the simple present (SIM) v. the progressive present (PRO) in the answer, and the other the use of a future oriented adverbial (FUT) v. a temporally ambivalent adverbial (AMB) in the answer. The following examples illustrate each condition for one lexical item (*arrive*):

- (211) Condition: SIM, AMB
 A Has John already arrived?
 B I don't know. According to his message, he arrives either yesterday or tomorrow.
- (212) Condition: SIM, FUT
 A Has John already arrived?
 B I don't know. According to his message, he arrives either today or tomorrow.
- (213) Condition: PRO, AMB
 A Has John already arrived?
 B I don't know. According to his message, he is arriving either yesterday or tomorrow.
- (214) Condition: PRO, FUT
 A Has John already arrived?
 B I don't know. According to his message, he is arriving either today or tomorrow.

Four different lexical items (*arrive*, *defend*, *begin* and *miss*) were used, for a total of 16 dialogues. In addition, four filler items were included, which also consisted of a question and an answer.

Procedure

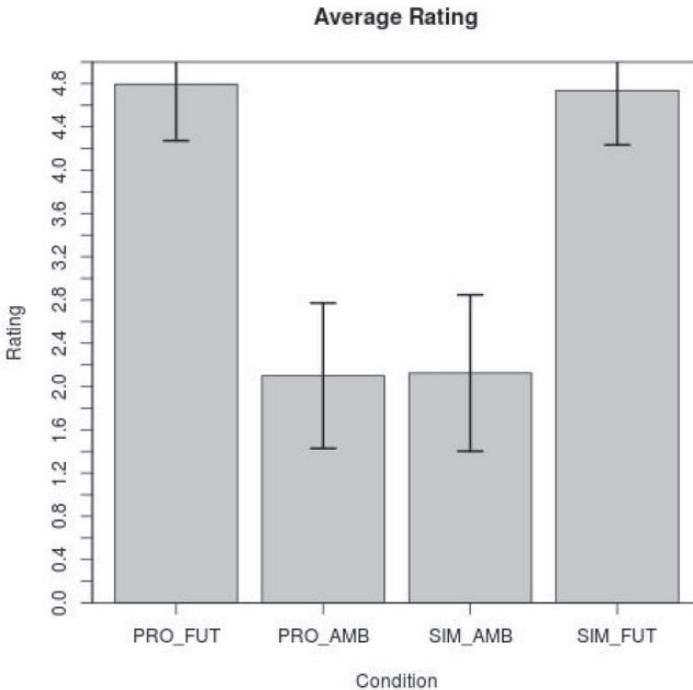
Each subject was asked to provide acceptability judgments of eight (four target items + four filler items) items on a five point Likert scale (extremely unnatural, somewhat unnatural, possible, somewhat natural, extremely natural). The target items were counterbalanced across subjects using a Latin square design so that each subject saw each condition just once, and each lexical item in just one condition. The filler items were identical across subjects. This resulted in 40 versions of the experiment (generated using *turkolizer* from Gison *et al.* 2011), each of which was completed by just one subject.

- (215) Filler:
 A Has John already arrived?
 B I think so. According to his message, he arrived yesterday.
- (216) Filler:
 A Has John already arrived?
 B I don't think so. According to his message, he will arrive tomorrow.

A total of 40 questionnaires were generated using the *turkolizer* python script from Gibson *et al.* (2011).

The following bar plot shows the average acceptability for each of the four conditions:

- (217) Rating of acceptability (1-5) by condition:



	Simple present	Progressive present
Ambivalent adverbial	SIM_AMB	PRO_AMB
Future oriented adverbial	SIM_FUT	PRO_FUT

Clearly, there is only a main effect of the choice of adverbial on the acceptability of the dialogues. The choice of aspect does not affect the ratings.

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