

# Fake Tense in Conditional Sentences

## A modal approach

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Received: date / Accepted: date

**Abstract** Many languages allow for "fake" uses of their past tense marker: the marker can occur in certain contexts without conveying temporal pastness. Instead it appears to bear a modal meaning. Iatridou [2000] has coined this phenomenon *Fake Tense*. Fake Tense is particularly common to conditional construction. This paper proposes to explain Fake Tense in English conditional sentences as a certain kind of ambiguity: the past tense morphology can signal the presence of a temporal operator, but it can also mark the specific modal operator. The ambiguity is proposed to be the result of recategorization: the Simple Past develops a second, modal meaning because of structural similarities between the temporal and the modal/epistemic domain. The proposal is spelled out in the Generative Semantic framework [Heim and Kratzer, 1998] approaching conditionals using a modified version of the restrictor approach [Kratzer, 1979, 1991b] and building on von Stechow's et al.'s recent work on the English Tense system [Stechow, 2010, Romero and von Stechow, 2008].

**Keywords** Fake Tense · conditional sentences · compositional semantics · syntax/semantics interface · Tense · Mood

### 1 Introduction

The semantics of conditional sentences has always been a topic that attracted the attention of many linguists, philosophers as well as psychologists and computer scientists. A central problem of the majority of the proposals made for the semantics of conditional sentences is that they abstract away from the actual linguistic form of these sentences. Conditional sentences are analyzed as structures  $A > C$  where  $A$  (the antecedent) and  $C$  (the consequent) are full sentences and  $>$  is some conditional

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connective. From a linguistic point of view such an approach is not very satisfying, because it ignores to a large extent the actual linguistic form of these constructions.

During the last years one can observe a growing interest of linguists in the compositional semantics of conditional sentences.<sup>1</sup> Recent publications include Kaufmann [2005] and Stechow and Gronn [2010] on the semantics of English indicative conditionals, and Iatridou [2000], Ippolito [2003, 2006], Arregui [2007, 2009], Stechow and Gronn [2008] on the semantics of English subjunctive conditionals. The present paper is another example of this development. However, instead of providing a general approach, the paper focuses on a particularly famous problem for a compositional approach to the semantics of conditionals: the puzzle of *Fake Tense* (FT). This notion refers to the more general observation that in certain constructions of a wide range of languages the past tense marker appears not to be interpreted; at least not in the expected temporal way. Instead, the past tense marker seems to convey a modal meaning, often described as hypotheticality, unexpectedness or distance from reality. Because this paper is part of a larger project on the compositional semantics of conditionals, we will focus on Fake Tense in conditional sentences. But also if our main interest was to account for Fake Tense, conditionals would be a good point to start with. Despite of substantial cross-linguistic variation with respect to the linguistic contexts in which a Fake Tense can occur, apparently all languages that allow for FT have it in subjunctive conditional sentences (see James [1982] for a cross-linguistic study). Thus, conditional sentences seem to lie at the hart of the Fake Tense problem. Furthermore, the paper will only addresses English conditional sentences. Given the complexity of the problem and the substantial cross-linguistic variation, it cannot be expected that the approach to Fake Tense proposed here easily extends to all occurrences of Fake Tense in English, nor that it can directly be applied to all other languages displaying Fake Tense. This is left for future research.

The core idea driving the approach presented here is that the modal reading of the Simple Past is the result of re-categorizing a tense marker as mood marker. The re-categorization is made possible by the strong structural similarities between the temporal and modal (epistemic) domain. Because of these similarities the semantic function of the past tense operation can in a meaningful way be applied to the modal domain. This compatibility on the level of interpretation then drives the necessary changes in the grammar leading to Fake Tense.

The contribution made by this paper does not consist of presenting new observations, nor will the paper come forward with new ideas for how to account for certain sets of data. The observation of the problem of Fake Tense has a long history, reaching back at least to Jespersen [1924]. Also the idea driving the approach presented here has already a long tradition in the literature. But in contrast to other approaches to Fake Tense along similar lines [Palmer, 1986, Fleischmann, 1989, Dahl, 1997, Iatridou,

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<sup>1</sup> The notion *conditional sentence* is used very restrictively in this paper. A conditional sentence is a sentence that consists of a main or matrix sentence, called the *consequent*, and a subordinate sentence starting with *if*, called the *antecedent*. Other sentences sometimes analyzed as conditionals, such as cases where the antecedent comes without *if*, but starts with a finite verb form are ignored, as well as cases where the antecedent is given in another form than as subordinate sentence, or is left implicit in the context. Furthermore, the paper focusses on what Haegeman [2003] calls event-conditionals or Dancygier [1998] calls predictive conditionals, i.e. on conditionals that express some kind of factual dependence between antecedent and consequent. Haegeman [2003]’s relevance conditionals or Dancygier [1998]’s non-predictive constructions will not be discussed. The deviating syntax and semantics these constructions rise many issues of their own that cannot be address here.

2000], the present proposal aims at working out this idea in full detail, in the setting of a formally precise compositional semantics for English conditional sentences. Furthermore, in the paper we will not compare different approaches to FT with the goal to find out which of them does best. Instead, the research presented here aimed at answering the questions whether Fake Tense *can* be explained along the ideas sketched above, and what kind of repercussions such an explanation has on the grammatical framework in which it is spelled out.

In order to explore the latter, we will work within the framework of Generative Semantics [Heim and Kratzer, 1998]. This framework has been chosen because it is well established and has in contrast to other semantic approaches the advantage of a rather well studied syntax-semantics interface.<sup>2</sup> Another advantage of this framework is that a lot of work on the semantics of tense has been done in it. With respect to tense we will work with recent proposals of von Stechow and collaborators [Stechow, 2010, Romero and von Stechow, 2008]. This work has a particular wide coverage of data on the behavior of the tenses in English (and other languages). Finally, we will approach conditionals following the restrictor approach (Kratzer [1979, 1991b]).

The approach developed here will be conservative with respect to the grammatical framework. That means that we will follow the approaches mentioned above as close as possible. Certain aspects of the proposal developed here are consequences of this principle of conservativity. These aspects will explicitly be marked and discussed.

The remainder of the paper is structured as follows. We will start in section 2 with a more detailed discussion of the puzzle of Fake Tense. In section 3 a solution will be proposed that builds on the treatment of Tense in Generative Grammar. Section 4 applies the approach to a number of concrete examples and discusses the predictions made. Finally, section 5 summarizes the findings of the paper and discusses some open problems.

## 2 The puzzle of *Fake Tense*

### 2.1 General terminological remarks

Following an established praxis in English grammars, the paper distinguishes three different conditional constructions, although the terminology and definitions may differ. These three types are *indicative conditionals*, *would conditionals* and *would have conditionals*. We will refer to the latter two types together also as *subjunctive conditionals*. All three types are here defined based exclusively on formal properties, not based on their meaning. A *would conditional* is a conditional sentence that contains as finite verb in the main clause *would*, *could*, *might*, *ought* or *should*; not followed by *have* (see (1-b)). A *would have conditional* is a conditional sentence that contains as main finite verb in the consequent *would*, *could*, *might*, *ought* or *should*, followed by the perfect auxiliary *have* (see (1-c)). An *indicative conditional* is a conditional sentence that contains as main finite verb in the consequent none of *would*, *could*, *might*, *ought* or *should* (see (1-a)).

- (1) a. If Peter left in time, he will be in Frankfurt this evening.

<sup>2</sup> This should not be understood as implying that this approach is intrinsically better than other approaches.

- b. If Peter left in time, he would be in Frankfurt this evening.
- c. If Peter had left in time, he would have been in Frankfurt this evening.

## 2.2 The problem

The problem the present paper tries to solve is the interpretation of past tense morphology in English subjunctive conditional sentences. The basic observation is that in this context the past tense morphology does not appear to have any meaning related to temporal anteriority.<sup>3</sup> This can be illustrated with the previous examples (1-a) to (1-c), focussing on the antecedent of the three conditionals. The first sentence (1-a) is an indicative conditional. The verb in the antecedent is marked for the Simple Past. The tense morphology is interpreted as expected: the eventuality described in the antecedent is localized in the past with respect to the utterance time. Compare this to the second sentence (1-b). This *would* conditional has exactly the same antecedent as the indicative conditional (1-a). In particular, the finite verb form in this subordinate clause is marked for the Simple Past. But in this case the antecedent cannot be interpreted as referring to the past. Instead, Peter's leaving has to be understood as taking place in the future (relative to the speech time). It looks like the past morphology in (1-b) does not contribute to the meaning of the sentence; at least not in the expected way. Iatridou [2000] has introduced for this use of a past tense marker the notion *Fake Past* or *Fake Tense*. Thus, we can reformulate the first sentence of this section as follows: this paper tries to account for Fake Tense in English subjunctive conditionals.

The problem can also be illustrated using the consequent of subjunctive conditionals, though because of the involved modal the effect is less transparent.<sup>4</sup> The form *would* is at least historically the past tense form of a modal auxiliary *WOLL*.<sup>5</sup> Even though there are still some remaining uses of *would* in contemporary English that behave as expected from a past tense form (see (2-a), and also SOT examples like (2-b)), the temporal interpretation of (1-b) and (1-c) behaves clearly differently. Again, we miss any obvious reference to temporal anteriority.

- (2) a. My car wouldn't start yesterday so we replaced the battery. It wouldn't start today either. Both times the blower was running. What is the problem??? (Google search, US example)
- b. A child was born that would be king.

Before we continue with possible approaches towards Fake Past some clarifying remarks are in order. First of all, though the paper focusses on Fake Past in English conditional sentences, it is well known that Fake Past is not restricted to this context; it is not restricted to English, and even within English not restricted to subjunctive conditionals. Similar apparently non-temporal interpretations of the Simple Past can be observed in quite a number of different constructions of English. Examples are counter-to-fact wishes (3-a), complement clauses of a comparison starting with 'like' or 'as if' (3-b), the scope of verbs like 'suppose', 'assume' (3-c), and many other constructions (3-d).

<sup>3</sup> As mentioned before, the basic observation is well known and can be traced back at least to Jespersen [1931], for more references see James [1982], Fleischmann [1989].

<sup>4</sup> The interpretation of the different forms of the English modals are highly debated for independent reasons.

<sup>5</sup> We follow Abusch [1997] in the use of *WOLL* to refer to the shared stem of *will* and *would*.

- (3) a. I wish I owned a car.  
 b. He behaves like he was sick.  
 c. Suppose she failed the test.  
 d. It's time we left.

Furthermore, there is a large number of different languages that all display Fake Tense in certain contexts. James [1982] lists 13 languages from different language families that appear to use their past tense marker also non-temporally: English, French, Latin, Classic Greek, Russian, and Old Irish (Indo-European), Cree (Algonquian), Tonga and Haya (Bantu), Chipewyan (Athabaskan), Garo (Tibeto Burman), Nitinaht (Wakashan), and Proto-Uto-Aztecan (in the reconstruction of Steele). These languages employ the marker in similar contexts. "... they [the 13 Fake Past languages in James' study, the author] all use the device in the main or result clause of hypothetical conditionals in which the if-clause refers to present or past time or is gnomic ... such sentences are usually called counterfactual conditionals" [James [1982]: 377]. Many languages share other uses as well. Thus, there seems to be some pattern behind apparently non-temporal uses of past tense markers. It is certainly not convincing to argue that Fake Tense is the idiosyncratic behavior of past tense morphology in English.

A second issue that needs to be clarified is the relation between Fake Tense and Sequence of Tense (SOT). The way we have just introduced the notion of Fake Tense<sup>6</sup> it automatically includes also SOT phenomena.<sup>7</sup> A typical example for SOT is the sentence (4-a). This sentence allows for two readings: one where Tom believed at  $t_1$  that Karen loved him at  $t_2 = t_1$  (the simultaneous reading), and one where Tom believes at  $t_1$  that Karen loved him at some time  $t_2$  before  $t_1$  (the back-shifted reading). No matter whether one wants to defend a deictic approach to the tenses or favors a relative approach, the sentence is problematic. For a deictic approach there should be a third reading according to which  $t_2$  is a past time, but in the future of  $t_1$ . A relative approach cannot account for the simultaneous reading. Even worse are sentences like the famous example (4-b). The past tense morphology is here attached to the description of an eventuality that obviously takes place in the future with respect to the utterance time. We make the same observation as for example (1-b): the verbform *were* in the subordinated clause of (4-b) does not seem to convey temporal anteriority in any sense.

- (4) a. Tom believed<sub>1</sub> that Karen loved<sub>2</sub> him.  
 b. A week ago Tom decided that in 10 days he would tell his mother that they were having their last meal together.

Based on this observation, one could think that FP and SOT have to be treated as one phenomenon. However, such an approach is for a couple of reasons not convincing. First of all, all authors on SOT agree that SOT concerns past tense morphology embedded under another occurrence of past tense (within a local domain). In case of FP, however, the relevant occurrence of the Simple Past does not need to be embedded under a higher Simple Past (see (3-d)). In fact, one might argue that the past tense in the main clause of subjunctive conditionals shows that FP does not necessarily involve embedded tenses

<sup>6</sup> This is, for instance, also the definition given in Iatridou [2000].

<sup>7</sup> There is a certain variation in the way SOT is defined in the literature. See Abusch [1997], Ogiwara [1996], Stowell [1995], Stechow and Gronn [2010] for references where it is claimed that in sentences like (4-a) the past tense in the subordinate clause does not express temporal anteriority, more in particular, it does not contribute to the relative location of the evaluation time of this clause.

at all. Another argument showing that SOT and FP are independent phenomena is the fact that that a language does not need to have both at the same time. Russian (and Slavic languages in general) does have FP, but is not an SOT language.<sup>8</sup> Finally, there is also an important semantic difference. While the authors mentioned above (Abusch [1997], Ogihara [1996], Stowell [1995], Stechow and Gronn [2010] ) claim that the subordinate past tense in case of SOT does not contribute to the semantics at all<sup>9</sup>, FP is very often defined not only by the condition that the past tense marker does not have a temporal meaning in the relevant context, but by adding that the marker expresses something else instead (hyptheticality, distance from reality, etc.).<sup>10</sup>

At this point, one could still argue that we need to distinguish between the occurrence of the Simple Past in the *if*-clause and the main clause of a subjunctive conditional. While the second occurrence clearly has nothing to do with SOT, the occurrence of past tense markers in the *if*-clause could still be claimed to be a case of SOT (though we should then call it *sequence of mood*). There are a number of observations that speak in favour of such an analysis. Notice, for instance, that James [1982] explicitly states that all of the languages in her sample that do show FP display it in the *main* clause of hypothetical conditionals, however, not necessarily the *if*-clause. This would be expected if the occurrence of the past tense in the *if*-clause were due to SOT. Furthermore, conditionals are generally analyzed as intensional context, and the literature on SOT agrees that intensional constructions give rise to SOT phenomena.<sup>11</sup> But equally good arguments can be given against an SOT analysis of the past tense in the *if* clause. For instance, we have already mentioned that Slavic languages do have FT, but no SOT. However, they also generally have FT in the *if*-clauses of their conditionals. So, clearly not all occurrences of Fake Past in the *if*-clause of a conditional can be due to SOT. In order to make the second argument in favor of an SOT analysis work (conditionals as intension constructions), one would still need to show that the *if*-clause of subjunctive conditionals is embedded under the tense of the matrix clause. There is an ongoing discussion on the exact attachment site of the *if*-clause. Though for the class for conditionals discussed in this paper it has been argued that they are attached IP internally, if not even within the VP<sup>12</sup>, Franke [2009] gives examples of subjunctive Austin conditionals, see also (5). For these conditionals, it has been claimed that the attachment site of the *if*-clause is higher than the IP.<sup>13</sup> Hence, it is hard to argue that in this case the Simple Past in the *if*-clause stands in the right relation to the main clause tense to allow for SOT.<sup>14</sup>

- (5) a. If you had needed some money, there was some in the bank. (Johnson-Laird [1986])  
 b. If you had gotten worse, I would have had extra medicine in my car.

<sup>8</sup> See Khomitsevich [2007] and Altshuler [2008] for some challenges on the view that Russian is not an SOT language; and Stechow and Gronn [2010] for a defense.

<sup>9</sup> To be more precise, they do allow the marker to introduce a variable, but not to express the anteriority of the value of the variable.

<sup>10</sup> Just to give two examples: "... temporal distance in the direction of past is pressed into service to express modal distance" (Fleischmann [1989]:3). "... a morpheme which otherwise indicates past tense to be also used to indicate the hypothetical" (James [1982]:375).

<sup>11</sup> For Abusch [1997] this is in fact the crucial factor responsible for SOT.

<sup>12</sup> See Bhatt and Pancheva [2005] for more discussion.

<sup>13</sup> See, for instance, Haegeman [2003].

<sup>14</sup> The example (5-a) is particularly interesting, because it appears to have Fake Tense in the *if*-clause, but not in the main clause.

The purpose of this paper is not to decide whether the past tense in the *if* clause should be treated as SOT phenomenon. In the end, the proposal made below will analyze the fake past tense morphology in *if*-clauses very similar to SOT phenomena, but there will be also characteristic differences to standard SOT.

### 2.3 Previous approaches

The puzzle of Fake Tense has been discussed extensively in the linguistic literature. In general, two strategies of how to approach the problem can be distinguished: *Past-as-past* approaches (PAP) and *Past-as-modality* approaches (PAM).

The driving idea of PAP approaches is that even though it looks like the past tense is not interpreted temporally in cases of Fake Tense, it still is. Hence, these approaches aim at maintaining the standard semantics for the tense operator. To account for Fake Tense, PAP approaches claim that the past operator applies in these construction at a different place. Thus, the Logical Form of subjunctive conditionals like (1-b) is not what is expected. For instance, it has been proposed that the Logical Form of conditional like (1-b) or (1-c) is rather (6-b) or (6-c) than the expected form (6-a). The operator *PAST* is then proposed to contribute to the interpretation of the conditional connective (6-b) or the modal (6-c) instead to localize the described eventualities. Approaches that fall in this group, or at least make related claims are Tedeschi [1981], Ippolito [2003, 2006], Arregui [2007, 2009].

- (6) a.  $PAST(antecedent) \Rightarrow PAST(consequent)$
- b.  $PAST(antecedent \Rightarrow consequent)$  (Tedeschi [1981] for (1-b))
- c.  $PAST(MODAL(antecedent, consequent))$  (Ippolito [2003] for (1-c))<sup>15</sup>

PAM approaches constitute the majority of approaches to the problem of Fake Tense (see, Palmer [1986], Fleischmann [1989], Dahl [1997], Iatridou [2000] and many more). The claims made by proposals in this group diverge largely, but all of them have in common that they propose that the Simple Past is interpreted in (1-b) not as a tense but rather receives a mood or modality meaning, often paraphrased as distance from reality. The general problem of approaches along this line is that the proposals made stay on a very intuitive level and are not worked out in full detail.<sup>16</sup> In consequence, the approaches are hard to test and difficult to criticize. The goal of the research present here was investigate whether we can improve on this common shortcoming of PAM approaches.

<sup>15</sup> This is a simplification of Ippolito [2003]. In the text she says that in the relevant reading the past tense feature is interpreted above the modal, but she also says: " ... if it is interpreted as the above the modal, our hypothesis is that it is interpreted as argument of the accessibility relation [a covert argument of the modal, the author]." [Ippolito [2003]:159]. It is not clear in which sense in this case [*past*] is *above* the modal, because the author does not give any details on the syntax-semantics interface. I've assumed that she intends an LF as given in (6-c), which comes very close to a similar proposal by Condoravdi [2002] for modal constructions.

<sup>16</sup> Iatridou [2000] is to some extent an exception to this rule.

### 3 The proposal

Following the lines of PAM approaches, we will propose that the Simple Past in subjunctive conditionals bears a non-temporal, modal meaning. More in particular, we will follow Iatridou [2000] and propose that in its modal reading the Simple Past expresses unexpectedness of the situation referred to. The past tense morphology will be treated as ambiguous between a temporal and modal reading. In this point we will deviate from a large subgroup of PAM approaches, which claim that the *PAST* operator is semantically underspecified and can, dependent on the context give rise to either a temporal or a modal reading. We, instead, propose that there are more operators than just the past tense operator *PAST* that can check for the uninterpretable feature [*upast*]. The feature can also be controlled by certain modal operators, that in consequence bear a semantic function basically identical to the one of the operation *PAST*, except that this function is now applied to the modal domain instead of the temporal domain. Diachronically, the idea is that the modal meaning emerged out of the temporal meaning in a process of re-categorization. This re-categorization is the result of applying the semantic function of the tenses to a modal domain. The latter is facilitated by the strong structural similarities between the temporal and modal domain. The details of this approach will be explained below.

#### 3.1 Generative Semantics

In order to spell out the idea sketched above we will generalize the treatment of tense in Generative Grammar [Stechow, 2010, Kusumoto, 2005] to mood. This and the next subsection is dedicated to explaining the basic framework for the interpretation of tense that the approach will use as a starting point. In the main lines we will follow Stechow [2010, 2009], who builds, in turn on [Heim and Kratzer, 1998] and Heim [1997]. The exposition of this theory will be short, focussing on central claims and not giving any motivation. We are only interested in how this framework can be used to spell out a PAM approach to Fake Tense and take it as given that it is an adequate framework to deal with the English tense system.

We follow the GB/Minimalist approach to the syntax/semantics interface [Chomsky, 1982, 1995] and assume that the syntax proper generates a syntactic structure called *Spell-Out* (SO) that is translated into a *Logical Form* (LF) which is then subject to interpretation. The syntax proper consists of a lexicon and syntactic rules. The lexicon contains lexical trees, i.e. words dominated by a syntactic category and a semantic type. The LF is formulated in a typed formal language. The translation of SO into LF happens via the rules of construal. In the reminder of the subsection we will discuss the parts of this basic framework in more detail.

*The grammar of LF.* In this section the typed language  $\mathcal{L}$  will be introduced that will serve for the representation of Logical Forms (LFs).  $\mathcal{L}$  is a standard intensional language. The basic types of  $\mathcal{L}$  are  $i$  (time intervals) and  $t$  (truth values). The functional types are generated by the rule: if  $a$  and  $b$  are types, then  $(ab)$  is a type. Outermost brackets are usually omitted. We have infinitely many variables for any type. For the syntactic rules of  $\mathcal{L}$  we follow Heim and Kratzer [1998] and assume that temporal variables are indexed. The  $\lambda$ -abstractor is represented by a bare index. The exact definition of the syntactic rules is given in the appendix.



The expressions of  $\mathcal{L}$  are interpreted with respect to a model  $\mathcal{M} = \langle \mathcal{E}, \mathcal{T}, \{0, 1\}, F \rangle$ , where  $\mathcal{E}$  is an epistemic structure,  $\mathcal{T}$  a time structure,  $\{0, 1\}$  are the truth values and  $F$  is a function that assigns appropriate meanings to the elements of the lexicon. Time  $\mathcal{T}$  is a structure  $\langle M, T, <, \subseteq, s^* \rangle$ , where  $M$  are the time points,  $T$  is the set of closed intervals formed from time points,  $<$  is the before relation defined both for points and intervals,  $\subseteq$  is the subinterval relation, and  $s^* \in T$  is the speech time.<sup>17</sup> The structure  $\mathcal{E}$  will be introduced in more details later; it does contain a set  $W$  of possible worlds. The system of semantic domains  $D_a$  for each type  $a$  is defined as follows:  $D_i = T$  (the set of time intervals),  $D_t = \{0, 1\}$  (the set of truth values), and  $D_{(ab)}$  is the set of (possible partial) functions from the set of possible worlds into function from  $D_a$  into  $D_b$ . The interpretation of the variables is given by an assignment  $a$  relative to a model  $\mathcal{M}$ . The definition of the function  $\llbracket \cdot \rrbracket^{\mathcal{M}, a}$  that interprets the complex expressions of  $\mathcal{L}$  follows standard practice and is given in the appendix.

*The rules of construal.* The next step we have to take is to link the SO to the LFs that can be expressed in terms of the formal language  $\mathcal{L}$ . For the interpretation of tense we need to make use of three principles that govern the translation of SOs into LFs. The first is PRO movement, which we need to generate the binding of temporal arguments. PRO movement is a special case of Quantifier Raising (QR) (see Heim and Kratzer [1998]). The second principle is the principle of full interpretation (FI): *An LF tree contains only material important for the semantic interpretation* (see Stechow [2009]). The third principle concerns feature transmission. We adopt from Heim [1997] and Stechow [2010] the principle of feature transmission under semantic binding: *A semantic operator transmits its interpretable features to the variable it binds. If the variable is an argument of a finite verb form, the feature has to agree with a corresponding uninterpretable feature of the verb* (see Stechow [2010]).

*Tense in Generative Semantics.* The final preparatory step we have to take is to lay down a treatment of the English tenses within the theory of grammar sketched above. As everywhere else in this subsection there is basically nothing original to the way we approach the tenses. A single exception is the way we approach the features of the present tense, see below.

With many others<sup>18</sup> we assume that verbs take temporal arguments. At SO the position of the temporal argument is occupied by a semantically empty pronoun, called PRO. Because of type-mismatch PRO adjoins to its immediate dominating VP, leaving an indexed trace in its previous site and giving rise to the insertion of a co-indexed variable binder at the adjunction site (QR). After movement PRO is deleted by the principle FI. Tense is marked on the finite verb, but the semantic tense is not interpreted at the verb. Semantic tenses are covert operators that syntactically are generated as heads of a functional projection TP which dominates the VP.<sup>19</sup> The covert operators license the morphology on the verbs via feature agreement. We adopt a feature theory in the style of Zeijlstra [2004]. There are two sorts of features, interpretable features [iF] and uninterpretable features [uF]. Interpretable features originate with certain logical operators, e.g. negation, tense, mood. They reflect the meanings of these operators.

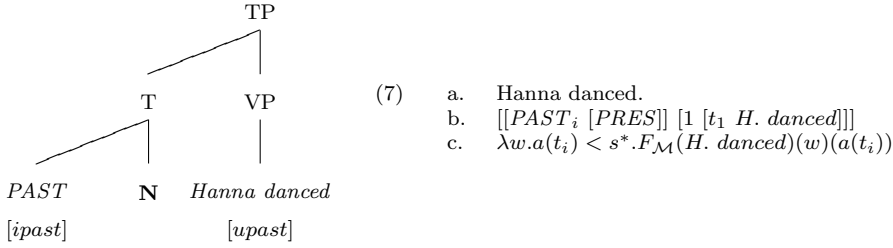
<sup>17</sup> The notation is adopted from e.g. Ogihara [1996], Stechow [2010].

<sup>18</sup> See, for instance, Kusumoto [2005], Romero and von Stechow [2008], Stechow [2010].

<sup>19</sup> We will not analyze the VP to a level that distinguishes the verb from its individual arguments, because the internal structure of the VP is not relevant for the present discussion.

The uninterpretable features are carried by other expressions that do not have the said meaning but may morphologically expose the meaning. An interpretable feature may check an uninterpretable feature under agreement.

Following Romero and von Stechow [2008] we assume for English at least two covert temporal operators: *PAST* and **N**. *PAST* carries an uninterpretable feature  $[upast]$ . In contrast to Romero and von Stechow [2008] and Stechow [2010] we do not assume that the **N** is also controlled by feature agreement. Instead we assume that for the tenses in English we have to distinguish a marked case (the past tense) and a unmarked case (**N**). Finite verbs can carry either an uninterpretable feature for the past tense or no feature.<sup>20</sup> Figure 1 gives the SO of the sentence in (7-a) and (7-b) its LF.



**Fig. 1** SO and LF translations of the sentence (7-a)

We do follow Romero and von Stechow [2008] w.r.t. the semantic treatment of the tenses. Thus, we assume that English does not have a present tense in the traditional sense, but instead a deictic temporal anchor that simply stands for the utterance time  $s^*$ . *PAST*, on the other hand, is analyzed as a relative tense: it takes a time and a property of times as argument and introduced a temporal variable that is presupposed to be before the argument time and evaluates the property at this time.<sup>21</sup>

**Definition 1** *The semantics of the tenses*

$$\begin{aligned} \llbracket \mathbf{N} \rrbracket^{\mathcal{M},a} &= \lambda w.s^* \\ \llbracket PAST_i \rrbracket^{\mathcal{M},a} &= \lambda w \lambda t \lambda P.a(t_i) < t.P(w)(a(t_i)) \end{aligned}$$

Letting *PAST* be a relative tense means that at some point *PAST* needs to be anchored. Without the anchor the sentence is for semantic reasons not interpretable. In our system this is what controls for the presence of the present tense, not the syntactic features of the past tense operator. The meaning of (7-a) relative to a model  $\mathcal{M}$  and an assignment  $a$  is given in (7-c).

Because this will be relevant for our treatment of the modal reading of the tenses we should mention that this is meant to be a specific analysis of the situation for English. Languages vary in the specific details of the tense semantics. For instance, for Russian

<sup>20</sup> We will not discuss the status of the future or perfect here. Though arguably also part of the tense system of English, they are not relevant for the present discussion. We will come back to the perfect in the conclusions.

<sup>21</sup> This is the second point where we deviate from Romero and von Stechow [2008], Stechow [2010], though it is not an essential deviation: the Simple Past is proposed to be referential.

Stechow and Gronn [2010] propose a relative present tense, following the pattern of the past tense in English:  $\llbracket PRES_i \rrbracket^{\mathcal{M},a} = \lambda w \lambda t \lambda P. a(t_i) \geq t. P(w)(a(t_i))$ .<sup>22</sup>

### 3.2 Conditional sentences

In this section we will extend the proposal with conditional sentences. This is quite a challenge, because the syntax and semantics of conditional sentences is still very much under debate. This paper will work with a compromise between established practice in semantics, some more recent developments and basic observations from syntax. When it comes to conditional sentences, the established practice of semantics is to adopt the restrictor approach of Angelika Kratzer [Kratzer, 1979, 1991b]. She proposes that bare conditionals have to be analyzed in the same way as conditional sentences with overt quantificational elements like an adverb of quantification (8-a) or a DP (8-b). More concretely, also bare conditionals are proposed to involve a modal quantifier – let's call it  $\Box$  – but one that is not visible in the surface structure of the sentence. The antecedent functions as restrictor of the quantifier and the consequent as its nucleus. We follow [Kratzer, 1979, 1991b] in assuming that a modal quantifier takes a contextually given argument  $\mathcal{R} = \langle D_{\mathcal{R}}, <_{\mathcal{R}} \rangle$ , where  $D_{\mathcal{R}}$  is a set of possible worlds (corresponding to the modal base in Kratzer's terminology) and  $<_{\mathcal{R}}$  is a partial strict order (corresponding to Kratzer's ordering source).<sup>23</sup>

- (8) a. If Peter comes home drunk, probably he went to the pub. [Lewis, 1975]  
 b. Most students pass the examen, if they did the homework. [Fintel and Iatridou, 2002]

Now we have to see how to derive the described semantic function that bare conditionals express from the form of these sentences.<sup>24</sup> We assume that the covert operator is the head of a adverbial phrase modifying the IP of the consequent. The *if*-clause modifies the adverbial similar to the way relative clauses combine with their head noun. Given that in our case the head of the adverbial clause is the covert modal operator, the analysis of the Spell Out of conditionals proposed here comes very close to certain analyses of free relatives proposed in the literature. That *if*-clauses should be analyzed as free relatives has been argued for, for instance, by Bhatt and Pancheva [2005], see also Lycan [2001]. Figure 3 sketches the resulting SO for the conditional sentence in (9-a).<sup>25</sup>

- (9) a. If Hanna dances, Simon will win.  
 b.  $[[\Box_R [H. \text{ dances}]] [S. \text{ will win}]]$

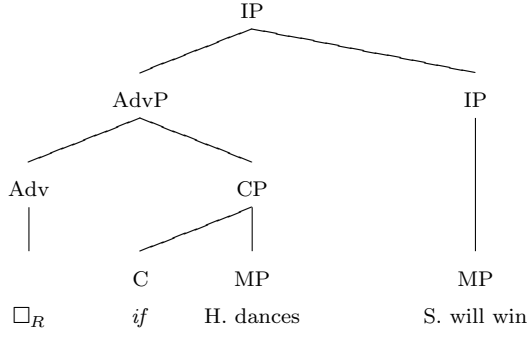
An assumption often made in the literature that we will adopt here is that *if* does not have any semantic function and is therefore erased by the principle of full interpre-

<sup>22</sup> Again, in contrast to Stechow and Gronn [2010] this is a referential variant of the relative tense operation they propose.

<sup>23</sup> In Kratzer's work the modal base and the ordering source are sets of propositions. The definition of  $\mathcal{R}$  chosen here fits better in the present context.

<sup>24</sup> This problem is not addressed by the restrictor approach, though Kratzer [1981] makes a step in this direction with her rule *conditional modality*. We will come back to this rule and how it relates to the present approach below.

<sup>25</sup> In this analysis we suppress the details of the IP's because they have been discussed already.



**Fig. 2** The Spell-Out of conditional sentences

tation in the transition from SO to LF.<sup>26</sup> Consequently, the CP denotes a proposition, type  $t$ . For the example (9-a), the LF is given in (9-b). Also for the interpretation of the LF we will follow the idea that conditionals work parallel to free relatives. Free relatives semantically function like definite descriptions. Thus, we will follow a proposal made Schlenker [2004] and analyze *if*-clauses as definite descriptions: the clause *refers* to the unique set of worlds in the modal base that make the antecedent true and are most similar to the evaluation world  $w_0$  according to the ordering source. If we follow Lewis' variant of the similarity approach and assume that there might be more than one most similar world, then this definite description will refer to a non-trivial set of worlds – it is thus a plural definite description. In order to check truth of the consequent in all of the worlds the *if*-clause refers to the semantics of  $\Box$  will still contain a universal quantifier, just as in case of the restrictor approach. We summarize this proposal in definition 2.<sup>27</sup>

**Definition 2** *The semantics of the covert modal quantifier  $\Box$*

$$\begin{aligned} Opt_{\mathcal{R}} &= \lambda w \lambda P. w \in D_{\mathcal{R}} \wedge P(w) \wedge \neg \exists w' \in D_{\mathcal{R}} [P(w') \wedge w' >_{\mathcal{R}} w] \\ [\Box_R]^{M,a} &= \lambda w \lambda P \lambda Q. \forall w' (\iota W [W = Opt_{a(R)}(w)(P)](w') \rightarrow Q(w')) \end{aligned}$$

Before we continue three remarks are in order. First, in the end the universal quantifier should probably not be part of the semantics of the operator  $\Box_R$ . One argument is that without it, the approach can handle stacking multiple *if*-clauses: each *if*-cause would introduce its own referent (a set of possible worlds) to which later *if*-clauses could refer back as modal base. Building on the idea that *if*-clauses are plural definite description, there is an appealing alternative for the place of the universal quantification. From the perspective of a plural approach its the distributivity of a property  $P$  that takes care that when  $P$  is applied to a plural entity  $X$ , then  $P$  is checked for every atom of  $X$ . This suggests to take the distributivity of the proposition

<sup>26</sup> This is a direct effect of adopting Montague-style intensional semantics. If we had assumed that the world variable of intensional semantics is present at the level of LF, then *if* could have been analyzed as a  $\lambda$ -abstractor over possible worlds, similar to *wh*-pronouns in Generative Semantics.

<sup>27</sup> *If*-clauses are analyzed as non-anaphoric plural definite description. That means they still come with a presupposition of existence of uniqueness. We will not describe this presupposition explicitly in the formula, because it is not relevant for the present discussion.

denoted by the consequent to be responsible for the quantification over all relevant antecedent worlds.

Second, the proposal made here comes very close to the interpretation rule proposed in Kratzer [1981] (see (10)), though from the definition alone this might not be obvious. A clear difference is that the composition of meaning in both cases is not the same: in (10) its assumed that the *if*-clause is attached higher than the modal to the main clause. But this difference is only superficial. We can read the interpretation rule *conditional modality* as changing the assignment with respect to a certain variable (the variable for the modal base). From this it is a small step to seeing (10) as letting the antecedent introduce a new discourse referent for the changed modal base, as much as in definition 2 the antecedent is taken to introduce a new referent by its definite character. The parallel goes even further. Given what has been said in the first remark one can see the modal lower down in the tree that the rule (10) implicitly assumes as referring to the distributivity of the consequent of the conditional. The main difference, then, is that as far as the interpretation rule in definition 2 can be understood as introducing a discourse referent, this referent denotes the set of optimal antecedent worlds within the modal base, while in case of (10) the new discourse referent is the new modal base, without optimization using the ordering source.

- (10)      *Conditional modality*  
             For any conversational backgrounds  $f$  and  $g$   
              $\llbracket If\alpha, \beta \rrbracket^{f,g} = \llbracket [\beta] \rrbracket^{f^*,g}$ , where for all  $w \in W$ ;  $f^*(w) = f(w) \cup \llbracket \alpha \rrbracket^{f,g}$ .

A final remark: there is strong evidence that whatever operator binds the world variables of the antecedent and consequent of conditional sentences also binds their evaluation time. This can be accommodated in the present framework by introducing an additional head for the TP: *TPRO*.<sup>28</sup> *TPRO* is semantically empty; it fixes the temporal center of *if*-clauses (see, for instance, Gronn and von Stechow [2011]). But given that this paper is not about the temporal interpretation of tense in conditional sentences, we will not introduce this extension of the system here.

### 3.3 Another Past-as-modal approach

In this section we will generalize the treatment of the English tenses described in section 3.1 to a modal interpretation of the Simple Past and the Simple Present. The modal interpretation is proposed to be the result of applying the temporal operators to a different domain: the *epistemic domain*; in the model represented by the structure  $\mathcal{E}$ . This application is made possible by the strong structural similarities between the temporal and the epistemic domain. But though they are closely related, in certain aspects both domains differ. The fact that the objects of this domain are not times but possible worlds will change the type of the operation. The fact that language – at least according to the standard Montague approach – does not refer on the level of LF to possible worlds will mean that the direct referential aspect of the operator *PAST* disappears. On top of these more superficial differences that to a great extend dependent on the framework used, we will also propose two more substantial differences between the temporal and modal interpretation of temporal markers. The first is that the modal interpretation of the past tense morphology is deictic, referring back to an

<sup>28</sup> Here, we follow again Romero and von Stechow [2008].

parameter of the utterance context. Secondly, we will introduce no independent modal operators conveying the modal meaning (i.e. a  $PAST^M$  and  $PRES^M$  operation), but instead anchor the modal meaning in already present modal operators. In section 4 we will discuss arguments motivating this step.

Following the objectives underlying the present proposal, the introduction of the modal readings won't change any aspect of the grammatical framework introduced so far. Spell Out, Logical Form and interface conditions stay exactly as defined before, in subsection 3.1. We introduce no additional projections, features or semantic operators. Basically, there are only two things left to do. First, we will explain the details of the epistemic domain  $\mathcal{E}$ . Second, we will spell out the effects of applying the semantic function of the tenses to the epistemic domain and build this semantic function into the semantics of modal operators - more specifically the modal governing the meaning of conditional sentences.

*The epistemic domain  $\mathcal{E}$ .* We assume for the epistemic domain the following: it is a structure  $\mathcal{E} = \langle W, \mathcal{E} \rangle$ , where  $W$  is a set of possible worlds and  $\mathcal{E}$  is a set of spheres for  $W$ .<sup>29</sup> From the system of spheres  $\mathcal{E}$  one can reconstruct in a natural way a strict partial order (see definition 3). With this definition at hand it is very easy to reconstruct from  $\mathcal{E}$  a structure completely parallel to the temporal structure  $\mathcal{T}$ . Remember that  $\mathcal{T}$  was a structure  $\langle M, T, <, \subseteq, s^* \rangle$ , where  $M$  are the time points,  $T$  is the set of closed intervals formed from time points,  $<$  is the before relation defined both for points and intervals,  $\subseteq$  is the subinterval relation, and  $s^* \in T$  is the speech time. The relation  $\subseteq$  works on the modal domain the same way as on the temporal domain. Given the order defined in 3, we can define the set  $I$  of closed intervals in the epistemic domain:  $S$  is a closed interval of  $\mathcal{E}$  if  $\forall x, y, x[(x, z \in S \wedge x \leq y \leq z) \rightarrow y \in S]$ . Let  $E^*$  be the center of the set of spheres  $\mathcal{E}$ . It follows  $E^* \in I$ . The order  $<$  can in straight forward manner be extended to closed intervals.<sup>30</sup> Hence, an epistemic structure can easily be redefined as a structure  $\mathcal{E} = \langle W, I, <, \subseteq, E^* \rangle$ , where  $W$  is a set of possible worlds,  $I$  is the set of closed intervals over  $W$  w.r.t. the order  $<$ ,  $<$  is a strict partial order over  $W$  and  $E^*$  is the set of worlds in  $W$  minimal w.r.t.  $<$ .

**Definition 3**  $\forall w_1, w_2 \in W : w_1 \leq_{\mathcal{E}} w_2 \text{ iff}_{def} \forall E_i \in \mathcal{E} : w_1 \in E_i \rightarrow w_2 \in E_i$

But what does the structure  $\mathcal{E}$  stand for? Actually, any semantician working on the meaning of modal expression is familiar with this structure. It is the structure with respect to which (according to standard approaches following the lines of Kratzer [1981, 1991a]) epistemic modals, or epistemic conditionals referring to the beliefs of the speaker are interpreted. The order  $<$  of definition 3 compares which world the speaker takes to be more like what he/she thinks the actual world is. The worlds in  $E^*$  are accordingly the worlds the speaker takes to epistemically optimal. This certainly means that the worlds in this set have to be consistent with all beliefs of the speaker. But there is presumably more that counts for this order. Among those worlds consistent with all beliefs of the speaker some are more optimal than others because they are

<sup>29</sup> A set of spheres  $\mathcal{S}$  for  $W$  has to fulfill the following conditions: (i)  $\mathcal{S}$  is a subset of the powerset of  $W$ , (ii) the members of  $\mathcal{S}$  are indexed with natural numbers, and (iii)  $\forall i, j \in \mathbb{N}(i \leq j \rightarrow S_i \subseteq S_j)$ .

<sup>30</sup> The definitions are basically the same as in the temporal case. The only difference is that now we are not dealing with a total order.

$I_1 < I_2 \text{ iff}_{def} \forall x_1 \in I_1 \forall x_2 \in I_2 : x_1 < x_2$

$I_1 \leq I_2 \text{ iff}_{def} \forall x_1 \in I_1 \exists x_2 \in I_2 : x_1 \leq x_2$ .

more expected by the speaker; for instance, because facts behave in these worlds more according acknowledged regularities.<sup>31</sup> It can also matter how aware a speaker is of a certain possibility.<sup>32</sup> For the present purposes it is not necessary to explore the exact properties of the order in detail. What matters is that independent of how the order will be defined exactly, the  $<$ -best worlds will be worlds that the speaker takes to be possible and expects to be the actual world, and that not being optimal according to this order does not necessarily entail counterfactuality.

*Semantics: The modal reading of the tenses.* To obtain the modal interpretations of the tense morphology we just translate the meaning of the past tense to the modal domain. In contrast to the temporal situation, we do assume a true equivalent to a present tense for the mood system in English. Both, the modal past and the modal present are centered to  $E^*$ , i.e. the epistemic center of the utterance context, in other words, both moods are deictic. We could formalize this by applying the modal operations to a modal variant of  $\mathbf{N}$  parallel to the temporal case, but because we assume that the moods are intrinsically deictic, there is no motivation for such a step.

As said before, there will be no independent modal operators conveying the modal interpretation of the tenses. Instead, the modal interpretation of the tense morphology will be integrated in independently established modal operators. Below the components that will be added to modal operators described in more detail.  $X$  is a proposition, i.e. an object of type  $t$ . The operation  $OP$  binds the world parameter of this proposition. Thereby, the modal operator can transmit features to the structure giving rise to  $X$ . The first case, when the operator does not check an  $[upast]$  feature, corresponds to an indicative interpretation. It adds the presupposition that  $X$  is part of the epistemic center of the utterance context. In particular, the proposition is presupposed to be consistent with the beliefs and expectations of the speaker. The modal past adds to the proposition it is applied to the presupposition that it is not consistent with the epistemically optimal worlds.

The semantic contribution of the modal reading		
the unmarked case	$\rightsquigarrow$	$\lambda w \lambda \dots . X \geq E^*.OP(X)$
the feature $[ipast]$	$\rightsquigarrow$	$\lambda w \lambda \dots . X < E^*.OP(X)$

*The semantics of conditionals again.* The final step is to merge the proposed semantic contribution of the tenses to some modal operator. We are here particularly interested in conditionals, so we will merge it to  $\Box$ . The variable with respect to which the tense is interpreted is  $W$ : the referent of the definite description expressed by the *if*-clause. This results in two different modal operators, one for indicative conditionals and one for subjunctive conditionals.

**Definition 4** *Moody conditionals*

$$\begin{aligned} \llbracket \mathbf{I}_R \rrbracket^{M,a} &= \lambda w \lambda P \lambda Q. U \& E(W), W \geq E^*. \forall w' (\iota W [W = Opt_{a(R)}(w)(P)](w') \rightarrow Q(w')) \\ \llbracket \mathbf{S}_R \rrbracket^{M,a} &= \lambda w \lambda P \lambda Q. U \& E(W), W < E^*. \forall w' (\iota W [W = Opt_{a(R)}(w)(P)](w') \rightarrow Q(w')) \end{aligned}$$

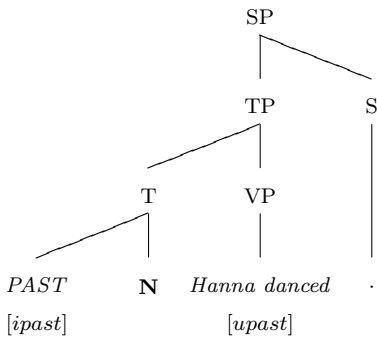
<sup>31</sup> In terms of probabilities, the speaker takes some worlds to be more probable than others. However, I do not want to claim that the order of the epistemic structure is build based on some probability distribution over the set of worlds  $W$ .

<sup>32</sup> For more on awareness see Franke and de Jager [2011].

In this proposal the difference between subjunctive and indicative conditionals is Traced back to a difference in the modal quantifier involved. Given that this concerns an covert operator this is a rather expensive assumption. However, a lot of the philosophical literature on conditionals claims that there is a substantial difference between the semantics of these two classes of conditionals; i.e. they involve different types of reasoning. Such an analysis would fit nicely with the approach adopted here.

*Simple sentence.* One question left open so far is how to account for simple sentences without modal operators. We do have plain sentences in the indicative, i.e. simple sentences in which the tense morphology is interpreted temporally. It is more difficult to say whether there are also simple sentences with a modal interpretation of the past tense morphology. The example (3-d) from page 5 might be analyzed this way. Other examples could be past tense in pretended play of young children in some languages, or past tense in story telling. But because these all are very special occurrences of Fake Tense, let us for the moment assume that a modal interpretation of the English past tense morphology in simple sentences is not possible. So we are left with the problem of simple indicative sentences. From one point of view, one could say that there is no problem, because in case the tense morphology is interpreted temporally, there is no mood feature [*upast*] that we have to account for. On the other hand, it seems reasonable to want the same semantic effect for these sentences as for indicative conditionals - they are to be treated as indicative clauses. But where to look for the operator that introduces the relevant presupposition?

Again, we can draw from the treatment of the tenses to solve this problem. Just as the operation **N** is needed for the tenses to anchor the evaluation time of the main clause to the utterance time, at some point an operator has to anchor the evaluation worlds to the utterance world as well. This operator, which binds the world variable of the proposition in its scope, can then convey the epistemic presupposition responsible for the indicative reading. Lets try to spell this idea out in more detail. Unlike to what Romero and von Stechow [2008] propose for the temporal anchor **N**, the modal anchor has to apply higher up in the tree, because we need up to the level of CP the world parameter still to be available for binding. Lets assume for the moment that the anchor only comes in at the *SP* level with a speech act operator: *assertion*. For reasons of simplicity we take the sentence closure " . " as overt expression of assertion. The the Spell Out of simple sentences can be described as in figure 3.



**Fig. 3** The Spell-Out of simple sentences



The intensional framework we are working with here does not allow a final anchoring of the world parameter of evaluation. Every LF has to denote an intension. We therefore refrain from interpreting ”.” as an operator truly anchoring the world parameter to the utterance world, and just let ”.” add to its propositional argument the presupposition expressing the indicative mood, i.e. the evaluation world has to be part of the epistemic centrum of the utterance. This comes down to presupposing that the speaker is honest.

**Definition 5**  $\llbracket . \rrbracket^{M,a} = \lambda w \lambda P. w \geq E^*. P(w)$

## 4 Evaluating the predictions of the proposal

### 4.1 A simple example in detail

In this section we will discuss the predictions made by the account for Fake Tense developed in section 3. We will calculate the meaning assigned to some examples and discuss the plausibility of the results. Before we focus on complex examples let's calculate the semantics for a simple English sentence with past tense morphology: (7-a), repeated as (11-a). Given that we don't have an assertion operator carrying the feature  $[ipast]$ , the only possible interpretation of the past tense in the sentence is temporal, see the LF (11-b). The meaning of (7-a) is calculated in (11-c).

- (11) a. *Hanna danced.*  
 b.  $\llbracket [.] \llbracket [PAST_i[\mathbf{N}]] [i [Hanna danced at t_i]] \rrbracket \rrbracket$   
 $\llbracket VP \rrbracket^{M,a} = \lambda w \in D_s \lambda t \in D_i. \llbracket P \rrbracket^{M,a[i/t]}(w)(a[i/t])(t),$   
 $= \lambda w \in D_s \lambda t \in D_i. \llbracket P \rrbracket^{M,a[i/t]}(w)(t),$   
 c.  $\llbracket TP \rrbracket^{M,a} = \lambda w \lambda t \lambda P. a(t_i) < t. [P(w)(a(t_i))](\lambda w. s^*)(\llbracket VP \rrbracket^{M,a}),$   
 $= \lambda w \lambda P. a(t_i) < s^*. [P(w)(a(t_i))](\llbracket VP \rrbracket^{M,a}),$   
 $= \lambda w. a(t_i) < s^*. \llbracket P \rrbracket^{M,a[i/t]}(w)(a(t_i)),$   
 $\llbracket SP \rrbracket^{M,a} = \lambda w. w \leq E^*, a(t_i) < s^*. \llbracket P \rrbracket^{M,a[i/t]}(w)(a(t_i)),$

The meaning of the sentence is defined for a world  $w$  with respect to the model  $\mathcal{M}$  and the assignment  $a$  in case (i) the world is epistemically optimal according to the beliefs of the speaker, and (ii)  $a$  maps the index  $i$  to a time interval in the past of the utterance time. The sentence is true with respect to a world  $w$  in the epistemic center of the speaker if Hanna danced in  $\mathcal{M}$  in the world  $w$  at the past time-interval  $a$  assigns to  $i$ . These predictions appear to be correct.

### 4.2 Conditional sentences in the present framework

Let us now have a closer look at conditional sentences in this framework. Recall the examples (1-a) and (1-b) from section 2. Let's shorten *Peter left in time* with  $P$  and *Peter will/would be in Frankfurt this evening* with  $Q$ <sup>33</sup>.

- (1-a) If Peter left <sub>$i$</sub>  in time, he will be in Frankfurt this evening.  
 (1-b) If Peter left in time, he would be in Frankfurt this evening.

<sup>33</sup> We assume that the difference between *will* and *would* consists in the second bearing an  $[upast]$  feature. We will not discuss the meaning of this modal verb in the paper.

The global LF of (1-a) is  $[[[ \cdot ] \llbracket \mathbb{I}_R \rrbracket [antecedent]] [consequent]]$ , of (1-b) it is  $[[[ \cdot ] \llbracket \mathbb{S}_R \rrbracket [antecedent]] [consequent]]$ . In the first clause the past tense morphology in the antecedent is interpreted temporally, in the second sentence both, the past tense morphology in the antecedent and the consequent are interpreted as mood markers. Let us first focus on the indicative conditional (1-a).

$$\begin{aligned}
(12) \quad & \llbracket ant. \rrbracket^{\mathcal{M},a} = \lambda w. a(t_i) < s^*. \llbracket P \rrbracket^{\mathcal{M},a}(w)(a(t_i)) \\
& \llbracket cons. \rrbracket^{\mathcal{M},a} = \lambda w. \llbracket Q \rrbracket^{\mathcal{M},a}(w)(s^*) \\
& \llbracket \mathbb{I}_R(ant.) \rrbracket^{\mathcal{M},a} = \lambda w \lambda Q. W \geq E^*. \\
& \quad \forall w' (\iota W [W = Opt_{a(R)}(w)(\lambda w. a(t_i) < s^*. \llbracket P \rrbracket^{\mathcal{M},a}(w)(a(t_i))]) (w') \rightarrow Q(w')) \\
& \llbracket (1-a) \rrbracket^{\mathcal{M},a} = \lambda w. w \leq E^*, W \geq E^*. \\
& \quad \forall w' (\iota W [W = Opt_{a(R)}(w)(\lambda w. a(t_i) < s^*. \llbracket P \rrbracket^{\mathcal{M},a}(w)(a(t_i))]) (w') \rightarrow \llbracket Q \rrbracket^{\mathcal{M},a}(w')(s^*)) \\
& \quad = \lambda w. w \leq E^*, W \geq E^*, a(t_i) < s^*. \forall w' ((w' \in D_{a(R)} \wedge \llbracket P \rrbracket^{\mathcal{M},a}(w')(a(t_i))) \\
& \quad \wedge \neg \exists w'' \in D_{\mathcal{R}} [\llbracket P \rrbracket^{\mathcal{M},a}(w'')(a(t_i)) \wedge w'' >_{\mathcal{R}} w']) \rightarrow \llbracket Q \rrbracket^{\mathcal{M},a}(w')(s^*))
\end{aligned}$$

This proposition is defined for worlds  $w$  if (i)  $w$  is part of the epistemic center of the speaker, (ii) the worlds selected as the relevant antecedent worlds according to the contextually given modal base and ordering source are also part of the epistemic center of the speaker, and (iii) the time interval the past tense morphology in the antecedent refers to lies in the past of the utterance time. The proposition is true for all worlds  $w$  for which it holds all worlds where Peter left in time at some contextually given past time  $t_i$  that are optimal according to  $R$  and  $w$  are also worlds where at the utterance time it is true that Peter will be in Frankfurt this evening. The first presupposition captures the assumption that speakers are honest. The second presupposition relates to the proposal often found in the literature that indicative conditionals presuppose  $\diamond_S antecedent$ , i.e. that the speaker considers the antecedent to be possibly true. In our approach this assumption is stronger: there have to be for the speaker epistemically optimal worlds where the antecedent is true.

The meaning of the *would* conditional (1-b) is basically the same, the only difference lying in the temporal properties and the different presupposition of the conditional.

$$\begin{aligned}
(13) \quad & \llbracket ant. \rrbracket^{\mathcal{M},a} = \lambda w. \llbracket P \rrbracket^{\mathcal{M},a}(w)(s^*) \\
& \llbracket cons. \rrbracket^{\mathcal{M},a} = \lambda w. \llbracket Q \rrbracket^{\mathcal{M},a}(w)(s^*) \\
& \llbracket \mathbb{S}_R(ant.) \rrbracket^{\mathcal{M},a} = \lambda w \lambda Q. W \geq E^*. \\
& \quad \forall w' (\iota W [W = Opt_{a(R)}(w)(\lambda w. \llbracket P \rrbracket^{\mathcal{M},a}(w)(s^*))]) (w') \rightarrow Q(w')) \\
& \llbracket (1-a) \rrbracket^{\mathcal{M},a} = \lambda w. w \leq E^*, W \geq E^*. \\
& \quad \forall w' (\iota W [W = Opt_{a(R)}(w)(\lambda w. a(t_i) < s^*. \llbracket P \rrbracket^{\mathcal{M},a}(w)(a(t_i))]) (w') \rightarrow \llbracket Q \rrbracket^{\mathcal{M},a}(w')(s^*)) \\
& \quad = \lambda w. w \leq E^*, W \geq E^*. \forall w' ((w' \in D_{a(R)} \wedge \llbracket P \rrbracket^{\mathcal{M},a}(w')(s^*)) \\
& \quad \wedge \neg \exists w'' \in D_{\mathcal{R}} [\llbracket P \rrbracket^{\mathcal{M},a}(w'')(s^*) \wedge w'' >_{\mathcal{R}} w']) \rightarrow \llbracket Q \rrbracket^{\mathcal{M},a}(w')(s^*))
\end{aligned}$$

This proposition is defined for worlds  $w$  if (i)  $w$  is part of the epistemic center of the speaker, and (ii) the worlds selected as the relevant antecedent worlds according to the contextually given modal base and ordering source are *not* part of the epistemic center of the speaker. In other words, the sentence presupposes that the speaker is honest, and that he/she does not expect the actual world to be among the closest antecedent worlds. The proposition is true for all worlds  $w$  for which it holds all worlds where Peter left in time at the utterance time that are optimal according to  $R$  and  $w$  are also worlds where at the utterance time it is true that Peter will be in Frankfurt this evening. This might seem to be incorrect, because one wants to allow for future

evaluation times as well. But this is an independent problem. First, as already pointed out at the end of section 3.2 there are strong arguments for letting the modal operator in conditionals bind the evaluation time of the clauses in its scope. We did not implement this in the present system, because it would complicate the system with details not central to the topic of the paper (i.e. the temporal properties of conditionals).<sup>34</sup> Second, a well-known puzzle of the interpretation of tense in conditional sentences is that indicative antecedents bearing the present tense can systematically refer to the future, while in simple sentences the Simple Present can only very restrictively be used with future reference. It appears very likely that a good solution to this problem would solve the present problem for subjunctive conditionals as well.<sup>35</sup>

The primary goal of this paper is to account for the puzzle of Fake Tense. From what has been said so far it should be clear how the present approach can explain Fake Tense. In subjunctive conditional sentences like (1-b) the Simple Past in antecedent and consequent appears not to be interpreted as tense, because the tense morphology is interpreted as mood marker. It contributes to a different and unexpected semantic dimension. Thus, according to the present proposal "*Fake Tense*" is actually a misnomer. The tense morphology in the critical examples is not fake. It is only interpreted on a different domain.

#### 4.3 Why not have a mood projection

When comparing the definitions 1 and 3.3 it is obvious that while in spirit the past operator and the present operator express the same thing, there are also substantial differences. One of the most obvious is the fact that there are no independent mood operators as in the temporal case. Why not? We could have proposed to introduce an additional functional projection  $MP$  with possible heads  $PRES^M$  and  $PAST^M$  and assigned them exactly the semantic properties now added to the modal quantifiers. This would have made the parallel between the temporal and modal interpretation of the past tense morphology more obvious and we could have done without introducing ambiguous modal operators. But there are strong arguments speaking against this option. Most importantly there is a serious semantic problem with having a mood operator in the antecedent. To understand the problem we have to go back to the interpretation rule for  $\Box$ , (definition 2, repeated here as (14)).

$$(14) \quad \begin{aligned} Opt_{\mathcal{R}} &= \lambda w \lambda P. w \in D_{\mathcal{R}} \wedge P(w) \wedge \neg \exists w' \in D_{\mathcal{R}} [P(w') \wedge w' >_{\mathcal{R}} w] \\ [\Box_R]^{M,a} &= \lambda w \lambda P \lambda Q. U \& E(W). \forall w' (\iota W [W = Opt_{a(R)}(w)(P)](w') \rightarrow Q(w')) \end{aligned}$$

If we interpret the past tense morphology in the antecedent as introducing an operation in the antecedent, then now matter how exactly the operation is defined, its semantic contribution will, together with the truth conditions of the antecedent, end up in the scope of the operation  $Opt_{\mathcal{R}}$ . Consequently, the contribution of the mood will restrict the domain from which  $Opt$  selects minimal worlds. Thus, the interpretation of the mood will affect the set of worlds for which eventually it is checked whether they make

<sup>34</sup> For a solution fitting the present framework, see, for instance Gronn and von Stechow [2011].

<sup>35</sup> Romero and von Stechow [2008] assume covert future operators to account for this problem. This is a solution one could make work here as well. An alternative that makes the covert modal responsible is Schulz [2008].

the consequent true. For the concrete proposal made here it would mean that in order for a subjunctive conditional to be true all the most similar worlds among those worlds making the antecedent true *and* not epistemically optimal for the speaker have to make the consequent true as well. To give a concrete example, suppose we don't know whether Peter left in time to catch the train to Frankfurt at 9 a.m., and we also have no expectations - we don't know the guy that well. We also don't know whether the train will be on time, but we expect it to be punctual. If it is punctual it will arrive in Frankfurt at 6 p.m. Having the proposed meaning of the mood in the antecedent and under the scope of the operator *Opt* would mean that we can use the mood to switch between reasoning over epistemically optimal antecedent worlds and non-optimal. So both, (15-a) and (15-b) should come out as true at the same time. This seems not to be correct.

- (15)    a.    If Peter left in time, he will be in Frankfurt at 6 p.m., but  
           b.    if Peter had left in time, he might not be in Frankfurt at 6 p.m.

This is a serious problem for the composition of meaning. There are a couple of options for how it could be addressed. For instance, the contribution of the mood could be neither part of the truth conditions, nor of the presuppositions, but part of a different meaning dimension and, thereby, scope out of the conditional operator. Indeed, it is difficult to fix the exact nature of the contribution made by Fake Tense, but in absence of a serious alternative, we would just have to stipulate a two-dimensional approach to meaning with the required projection behavior. This is not an option that looks particularly attractive. One could also argue, taking up the SOT discussion of section 2, that the mood marking in the antecedent is not semantically functional. But given that we argued earlier that at least an SOT approach is not completely convincing, it is difficult to make this line of approach concrete. A third option would be to embrace the predictions made by the sketched proposal. But this would mean that one had to come up with an additional (probably pragmatic) story for how to get from the predicted meaning to the one actually observed. Again, without independent arguments this is not a particularly attractive line of approach.

The conclusion defended here is that the mood markings are simply not interpreted in the subsentence bearing the marker itself, but by the modal operator binding the world variable of the subclause. In fact, there are a number of observations also pointing in this direction. First of all, it fits better with the principle of feature transmission under semantic binding. In the present analysis, the contribution of the mood consists entirely of a presupposition restricting possible values for the world argument of the proposition it is applied to. If this would be the meaning of an independent mood operator, as defined in (16), then there would be no binding involved, neither on the level of LF nor in the semantics. Still we would want the operator to carry an [*ipast*] feature and transmit it to the world argument of the verb. We would need a different explanation for feature transmission. Given the analysis proposed here that anchors the contribution of the mood in the modal quantifier, there is at least binding of the world variables involved, even though the binding takes place in the semantic interpretation and not at the level of LF.<sup>36</sup>

$$(16) \quad \llbracket PAST^M \rrbracket^{\mathcal{M},a} = \lambda w \lambda P. w < E^*. P(w)$$

<sup>36</sup> This diversion from the feature transmission principle disappears completely, if we assume the worlds arguments to be present at the level of LF.

Another advantage of the proposal is that it explains nicely a substantial difference between the modal and the temporal interpretation of the past tense morphology. We discussed already earlier that there are strong arguments showing that intentional operators bind not only the world variable of the proposition in their scope but also their temporal argument. Still, it is obvious that a past tense in temporal interpretation introduces another binder of the temporal variable in between the intensional operator and the property it takes scope over. This does not hold for the modal interpretation of the past tense morphology. Look at (17-a): the event time of Mary being in Frankfurt is not the time of Peter's believes, but in the past relative to temporal center of Peter's believes. However, if the past tense morphology is interpreted modally then the feature of "pastness" is attached directly to the world argument bound by the intensional verb. In (17-b), for instance, not the relevant world of Mary being in Frankfurt are remote relative to the worlds consistent with Peter's wishes, but the worlds consistent with Peter's wishes themselves are remote.

- (17)    a. Peter believes that Mary was in Frankfurt yesterday.  
          b. Peter wishes that Mary was/were in Frankfurt now.

A final argument in favor of the analysis proposed here and against introducing a separate mood projection is that the present approach can better account for the cross-linguistic variation of Fake Tense. As observed in section 2, though there is a certain pattern in where languages allow Fake Tense phenomena: they all have it in the main clause of counterfactual conditionals and often also have it in counterfactual wishes, there is a lot of variation with respect to the other contexts in which Fake Tense can occur. Furthermore, even within one language it is often very difficult to find one common semantic attribute that all these contexts share, and, therefore, could be the semantic contribution of the modal past tense in this language. If the semantic contribution of the modal interpretation is added independently at some step in the composition of meaning, then one would expect less variation. However, given the present proposal we can say that language vary strongly with respect to which intensional operators carry a [*ipast*] feature, and even within a language this feature might be added to an item for very different semantic reasons. It could also explain the observation shared by many students of Fake Tense, that the tense morphology is not really making an independent semantic contribution, but only marking a semantic feature already conveyed by other means in a specific construction. In other words, they are just agreement markers.

## 5 Conclusions and outlook

This paper develops a modal explanation of Fake Tense in English conditional sentences: in case Fake Tense is observed the Simple Past (or Past Perfect) receives a modal interpretation. The core idea driving the approach presented here is that the modal reading of the Simple Past is the result of re-categorizing a tense marker as mood marker. The re-categorization is made possible by the strong structural similarities between the temporal and modal (epistemic) domain. Because of these similarities the semantic function of the past tense operation can in a meaningful way be applied to the modal domain. This compatibility on the level of interpretation then drives the necessary changes in the grammar leading to Fake Tense.

A strong points of the proposal is the level of detail to which the proposal is fleshed out. The Past-as-modal proposals that already exist are generally too informal to make

predictions that can be tested. The level of detail reached here allows us to apply the approach to concrete examples and check the predictions made. This is an improvement compared to other approach along the same lines, but there are still things that one could wish for. In particular, the predictions made would be even more concrete if the notion of expectation used in the definition of an epistemic structure had been worked out in more detail.

A second strength of the approach is its conservativeness. The present approach differs from other approaches in that it explains Fake Tense with commonly known and well-established assumptions about the syntax and semantics of English sentences. Firstly, the framework for the syntax/semantics interface is a standard approach building on Generative Grammar. Secondly, the assumptions made about the syntax of English conditional sentences are to a large extent standard assumptions. Finally, also the semantics of tense adopted here is well-established. The advantage of a conservative approach is that it can build on the work already done to establish these standards. Furthermore, a conservative approach can be more easily integrated in other proposals that explore the same standards.

Except for the fact that the proposal can explain Fake Tense, it also accounts for central observations on the difference between indicative and subjunctive mood. This distinction is exactly what is expressed by the modal interpretation of the past tense morphology in English. For instance, the present approach predicts that conditionals in which the Simple Past is interpreted as mood marker presuppose that the speaker does not expect the antecedent to be true. That means in particular that a *would* conditionals can also be used if the antecedent is according to the beliefs of the speaker counterfactual. This appears to be correct (see (18)). The approach also can explain why only few counterfactuals are expressed with *would* conditionals. According to the present approach *would* conditionals cannot be used to specifically talk about the past, because the past tense morphology is interpreted as mood marker. But while we have expectation about what will happen in the future, we normally cannot completely exclude possibilities. Therefore, a subjunctive conditional referring to the future will presuppose unexpectedness of the situation described but rarely counterfactuality.

(18) If I were you, I wouldn't do that.

There are also a number of points on which the present proposal can be improved. For instance, there are still observations that we cannot account for immediately. To give an example, it seems that also the Past Perfect can give rise to Fake Tense phenomena. The standard Reichenbachian compositional approach to the Past Perfect says that the past tense morphology shifts the reference time to the past relative to the speech time, while the Perfect takes care that the described eventuality is localized before the reference time. Thus Past Perfect expresses a double shift to the past. This analysis certainly runs into trouble with examples like (1-c), here repeated as (19-a). Even though the antecedent of this conditional carries Past Perfect morphology, the antecedent is not interpreted as claiming that the eventuality described in the antecedent is localized at some point lying in the past of some contextually given past time. In fact, the eventuality described in the antecedent of a *would have* conditionals can be localized at any time in the past, present or future. In sentence (19-b) the eventuality described in the antecedent is localized as overlapping the utterance time. In the conditional (19-c) the eventuality described in the antecedent is even localized in the future of the utterance time.

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- (19)    a.    If Peter had left in time, he would have been in Frankfurt this evening.  
           b.    If Peter had been here right now, he would have been smiling.  
           c.    If you had been in Paris next week, we could have met.

As in the case of Fake Past, the apparent lack of any temporal or aspectual interpretation of the perfect in *would have* conditionals referring to the present or the future, comes with the observation that the sentence carries an additional modal meaning. While for *would have* conditionals about the past examples can be found where the antecedent is still considered to be possibly true (the speaker does not know whether the antecedent is true or not), this does not hold for *would have* conditionals like (19-b) and (19-c), which refer to the present or the future (see also Ippolito [2006]). For this subgroup of subjunctive conditionals cancellation of counterfactuality appears to be impossible. These observations point to the conclusion that English displays also Fake Past Perfect.

As in the case of Fake Tense for the Simple Past, again we can choose between a PAP and PAM approach towards this problem. In fact, we could approach Fake Past Perfect using a PAP strategy, while still proposing a PAM explanation for Fake Past. We will not explore any of these options in full detail in this paper, but it should be mentioned that a PAM approach along the same lines as defended here for Fake Past looks very appealing. Semantically, the Past Perfect is often analyzed as moving two steps backward in time. One could propose that in case of Fake Past Perfect the Past Perfect it is doing the same in the modal dimension: moving two steps away from the epistemic deictic center, i.e. the worlds the speaker expects. One can define the order on the epistemic domain  $\mathcal{E}$  by a system of spheres  $\{S_0, S_1, S_2\}$ , where  $S_0$  is the set of all worlds,  $S_1$  is the set of worlds consistent with the beliefs of the speaker, and  $S_2$  the set of worlds consistent with the expectations of the speaker, then moving two steps backward from the epistemic center of the speaker ( $S_2$ ) would mean ending up in the set  $S_0 - S_1$ . In other words, in its modal interpretation the Past Perfect would express counterfactuality. Because this reading would be predicted only in case the Simple Past as well as the Perfect in a sentence are interpreted modally, we could account for the observation that *would have* conditionals referring to the present or the future are counterfactual by their semantics. We leave the details of such a proposal for future work.

Related this topic, it would be also very interesting to discuss in the framework provided here the semantics of *may*, *might*, and *might have* (conditional) construction. Given the particular epistemic order introduced above, one could consider relating the three modal constructions with expected worlds, worlds consistent with beliefs, but not the expectation and counterfactual worlds respectively.

Finally, this proposal has only provided an account of the situation we have in English right now. We have only hinted at an explanation for how this situation might have emerged over time. This part of the theory needs to be worked out in more detail. One reason this hasn't been done in the present paper is that though there is a substantially amount of cross-linguistic data on this subject, the same cannot be said for the diachronic part. Thus, future work on this topic will have to start with empirical investigations into the history of tense markers in languages with Fake Tense. Another problem is that so far not so much work is available on language change in the context of formal semantics, though there are notable recent developments. The problem of Fake Tense might be a good subject to give a boost to the development of formal theories of language change.

**Acknowledgements** Parts of this paper have been presented at the Amsterdam Colloquium 2007, The 18th International Congress of Linguistics, Korea and during a class I taught at Rutgers University in April 2009. I would like to thank the audiences at these events for their comments. Special thanks to Maria Bittner, Robert van Rooij, and Hedde Zeijlstra for stimulating and encouraging discussions on the subject of the paper. An anonymous reviewer provided detailed comments which were very helpful. None of the above is responsible for any remaining shortcomings. The work reported here has been made possible by a grant of the Netherlands Organization for Scientific Research (NWO).

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## 6 Appendix

**Definition 6** *The Syntax of  $\mathcal{L}$ .*

- L:** If  $\alpha$  is a lexical entry, then  $\alpha$  is a tree of type  $a$ .
- V:** If  $x$  is a variable,  $i$  a natural number, and  $a$  is a type, then  $[_a x_i]$  is a tree of type  $a$ .
- FA:** If  $\alpha$  is a tree of type  $(ab)$  and  $\beta$  is a tree of type  $a$ , then  $[_b \alpha \beta]$  is a tree of type  $b$ .
- PM:** If  $\alpha$  and  $\beta$  are IL-trees of type  $(at)$ , then  $[\alpha \beta]$  is an expression of type  $(at)$  (predicate modification).
- IFA:** If  $\alpha$  is an IL-tree of type  $(sa)b$  and  $\beta$  is an IL-tree of type  $a$ , then  $[\alpha \beta]$  is an IL-tree of type  $b$ .
- $\lambda$ :** If  $\alpha$  is a tree of type  $b$ ,  $i$  is a number and  $a$  is a type, then  $[_{ab} i. \alpha]$  is a tree of type  $(ab)$ .

**Definition 7** *The semantics of  $\mathcal{L}$ .*

For any tree  $\alpha$  the meaning of  $\alpha$  with respect to model  $\mathcal{M}$  and assignment  $a$ , i.e.  $\llbracket \alpha \rrbracket^{\mathcal{M}, a}$  is defined as follows:

- L:** Let  $\alpha$  be a constant of type  $a$ . Then  $\llbracket \alpha \rrbracket^{\mathcal{M}, a} = F(\alpha)$ .
- V:** Let  $x$  be a variable of type  $a$  with index  $i$ . Then  $\llbracket x_i \rrbracket^{\mathcal{M}, a} = \lambda w. a(i)$ , if  $a(i) \in D_a$ , undefined otherwise.
- FA:** Let  $\gamma$  be a branching tree of type  $b$  with daughters  $\alpha$  of type  $(ab)$  and  $\beta$  of type  $a$ . Then  $\llbracket \gamma \rrbracket^{\mathcal{M}, a} = \lambda w. \llbracket \alpha \rrbracket^{\mathcal{M}, a}(w)(\llbracket \beta \rrbracket^{\mathcal{M}, a}(w))$ .
- IFA:** Let  $\gamma$  be a branching tree of type  $b$  with daughters  $\alpha$  of type  $(sa)b$  and  $\beta$  of type  $a$ . Then  $\llbracket \gamma \rrbracket^{\mathcal{M}, g} = \lambda w. \llbracket \alpha \rrbracket^{\mathcal{M}, g}(w)(\llbracket \beta \rrbracket^{\mathcal{M}, g}(w))$ .
- PM:** Let  $\gamma$  be a branching tree of type  $b$  with daughters  $\alpha$  and  $\beta$  both of type  $at$ . Then  $\llbracket \gamma \rrbracket^{\mathcal{M}, g} = \lambda w. \lambda x_a. [\llbracket \alpha \rrbracket^{\mathcal{M}, g}(w)(x) \wedge \llbracket \beta \rrbracket^{\mathcal{M}, g}(w)(x)]$ .
- $\lambda$ :** Let  $\alpha$  be a tree of type  $(ab)$  of the form  $[_{ab} i. \beta]$ . Then  $\llbracket [_{ab} i. \beta] \rrbracket^{\mathcal{M}, a} = \lambda w. \lambda u. \llbracket \beta \rrbracket^{\mathcal{M}, a[i/u]}(w)$

Given any assignment  $a$ , index  $i$  and  $u \in D_b$  the assignment  $a[i/u]$  is defined as the function that is identical to  $a$  for all  $j \neq i$  and  $a[i/u](i) = u$ .