Futurity in Default Semantics

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1. The modality of *will* and the modality of the 'future': An overview
 This paper contributes to the ongoing debate concerning the status of the English *will* as a marker of (i) tense, (ii) modality, or (iii) ambiguous between the two (see e.g. Fleischman 1982; Enç 1996; Werth 1997; Hornstein 1990; Ludlow 1999). In particular, I concentrate on clearly modal uses of *will* as in (1) and (2) (epistemic and dispositional necessity respectively), as opposed to (3) where *will* is primarily a marker of future tense reference:

(1)   Mary will be in the opera now.
(2)   Mary will sometimes go to the opera in her tracksuit.
(3)   Mary will go to the opera tomorrow night.

I demonstrate that when we adopt an approach to temporality based on event semantics (e.g. Parsons 1990; Kamp and Reyle 1993; Pratt and Francez 2001), the classification of *will* as modal turns out to be the most satisfactory solution. For this purpose I combine the analysis in Discourse Representation Theory (henceforth: DRT, Kamp and Reyle 1993) with my theory of default interpretations (Jaszczolt 1999a, b; 2002a, forthcoming) and use the properties of (i) the intentionality of mental states and (ii) its pragmatic equivalent of communicative, informative and referential intentions in communication in order to show that the degrees of intentions involved result in different interpretations of *will*. The strongest referential intention directed at the eventuality (state, event or process) results in the strongest commitment to the communicated eventuality and by the same token to the 'weakest degree of modality'.
        The discussion of the properties of *will* is supplemented with a discussion of the semantic category of futurity. Sentence (3) is juxtaposed with expressions of futurity that use futurative progressive and tenseless future as in (4) and (5) respectively:

(4)   Mary is going to the opera tomorrow night.
(5)   Mary goes to the opera tomorrow night.

It is demonstrated that since the three readings differ as to the degree of modality, they can be given one overarching semantic representation. Since future *will* is best accounted for with reference to possible worlds (see e.g. Parsons 2002, 2003), it is not qualitatively different from modal *will*. Independently of using world-time units, the purely future *will* in (3) turns out as modal since it exhibits affinities with (1) and (2) on one hand, and (4) and (5) on the other, that are best explained by a scale of epistemic modality. The gradation of intentions strongly suggests that *will* is modal. Instead of the ambiguity/temporality/modality trilemma, there is a gradation of the strength of intending the eventuality that results in various degrees of modal meaning communicated by *will*.
        I corroborate this argument by placing *will* in the framework proposed in Grice (2001). According to Grice's Equivocality Thesis, alethic and deontic modalities are univocal, derived from one conceptual core of *acceptability*. I propose that Grice's acceptability can be introduced as a modal operator (ACC) to Discourse Representation Theory, replacing the current unsatisfactory treatment of *will* that relies on a linear structure of the future and on representing firstly tenses and only derivatively temporality.

2. Futurity in Default Semantics
The main claim of Default Semantics is that utterances come with default interpretations. The dominant view in recent semantics and pragmatics is that in order to explain multiple readings of, let us say, propositional attitude sentences, sentences with sentential conjunction *and*, or negation, we have to postulate that semantic representation is underspecified as to some aspects of meaning, and further pragmatic processes in the form of (i) the developments of the logical form or explicature (Relevance theory) or (ii) implicatures (neo-Griceans) produce one exact reading. In contrast to this view, the theory of Default Semantics contains only one level of representation, derived from the structure and

properties of mental states. The general picture is this. People have various mental states, such as believing, doubting, fearing, knowing. Some of these states, like for example the ones just enumerated, necessarily have an object. In other words, they are intentional. Intentionality means directness, being 'about' an object – be it real object, mental object, or an ontologically unspecified eventuality, depending on the particular view or a particular mental state. Now, language is one of the vehicles of mental states (and the most important one). The properties pertaining to thoughts, beliefs, etc. will then also hold of linguistic expressions associated with them. On the level of linguistic expressions, this property of intentionality is realised as a property of an utterance's coming with intentions. In particular, the speaker is assumed by the addressee to intend to communicate a message through this utterance, and derivatively to inform about something and to refer to an object or eventuality.

Intentionality can be stronger or weaker. For example, reports on people's beliefs or other propositional attitudes can be *de re*, about a particular, known individual and come with strong intentionality, or they can be *de dicto*, about the proposition as a whole, whoever its subject might be. In the latter case intentionality is weaker. Just as intentionality allows for degrees, so do their realizations in the forms of intentions in communication. I have discussed and supported this view by various examples elsewhere (e.g. Jaszczolt 1997; 1999a, b; 2000; 2002a, b; forthcoming) and will now refer to this statement as to an established principle called the principle of Degrees of Intentions (DI):

DI: Intentions come in various sizes, i.e. they allow for degrees.

Let us see how this theory applies to expressions of temporality. In the case of the English *will*, we have three possible standpoints as far as its meaning is concerned: (i) it expresses future tense (and tense is not subsumed under modality; (ii) it expresses modality; and (iii) it is ambiguous between tense and modal senses. The ambiguity position is easily rejected by Grice's (1978) methodological principle called Modified Occam's Razor: *Senses (linguistic meanings) are not to be multiplied beyond necessity*. Communicating modality by means of *will* can be intended very strongly, less strongly, or to various other degrees. If we accept this gradation of intentions, then Default Semantics renders this choice between (i) and (ii) unnecessary. Instead, various degrees of intentions correspond to various interpretations and neither ambiguity nor underspecification ensues.

In order to develop this approach, we need two more principles of Default Semantics: the Parsimony of Levels and the Primary Intention. In addition to degrees of intentions, Default Semantics adheres to a principle of parsimony with respect to the number of proposed levels of meaning. The original semantic representation (logical form) is the output of the compositional process of meaning construction and combines information coming from sentence structure and individual concepts. This representation is frequently in need of further enrichment before it can count as a faithful representation of the intended meaning. However, this does not yet mean that there is any need in our theory for such a level of underspecified representation. As we know from DI, utterances come with different strengths of intentions. This degree of intending is correlated with the strength of intentionality of the corresponding mental state. The information from this degree of intentionality merges with the information from compositionality (i.e. with the logical form) and produces a complete propositional representation. This economy of levels of meaning is summarised in the principle of the Parsimony of Levels:

POL: Levels of senses are not to be multiplied beyond necessity.

So, instead of adopting the underspecified semantic representation and the fully developed prepositional representation, we have a more economical alternative of one meaningful representation to which the properties of the linguistic expression and the properties of the underlying mental state contribute, as it were, on equal footing. Meaning is compositional, but more fundamentally, it is also a result of having a thought, a meaningful mental state. The only way to represent this seems to be to recognize the level of meaning to which both compositionality and intentionality contribute. This level is the propositional representation and it is the only level we need in the theory.

The strongest intentionality means the strongest commitment to the proposition and hence the 'weakest modality'. A mental state is 'strongly about' some objects or situations and it is only through some context-dependent dispersal of this intentionality that the intentionality can become weakened. Since the strongest intentionality means the strongest aboutness, the corresponding readings of utterances are the ones, which secure the referent of the speaker's utterance, be it an individual or a situation. This is summarised in the Primary Intention principle:

Primary Intention (PI):   The primary role of intention in communication is to secure the referent

(individual object or individual eventuality) of the speaker's utterance.

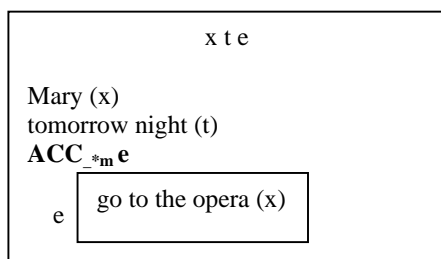## 3. Modal default and the ACC operator

Grice (2001: 90) proposed that modals are 'univocal across the practical/alethic divide'. He called this theory an Equivocality Thesis. In the formal argument he introduced a rationality operator 'Acc' meaning 'it is (rationally) acceptable that'. If this is the case, then it is at least plausible that *will*, being a species of modality for the reasons to do with avoiding unnecessary ambiguity or underspecification, can be subsumed under the same category of acceptability. Namely, there is epistemic *will*, derived from the concept 'it is acceptable that', followed by the specification of time. This will account for the modal status of *will* and allow for its differing time reference. Acceptability, meaning 'it is reasonable to think that', 'it is rationally plausible that', allows for degrees. An event can be more, or less, acceptable due to being more, or less, certain, allowing for more, or less, commitment on the part of the speaker. For example, dispositional necessity in (2) comes with stronger acceptability than epistemic necessity in (1), which in turn comes with stronger acceptability than the regular future *will* in (3). In (3), the reading is 'it is to be expected that she will go', 'she will probably go'.

In (3), it is not only the future time reference that we have to represent but also the degree of acceptability. First, we have to distinguish degrees of commitment to the proposition. In other words, we need degrees of modality. We can use here a device well known from hidden-indexical theory where the *type of mode of presentation* accounts for the differences between different readings of, say, propositional attitude reports (see Schiffer 1977, 1992, 1996). On Schiffer's (1992) account, sentence (6) has the logical form as in (7):

(6)   Ralph believes that Fido is a dog.
(7) $m(\_{*}m$ & Bel(Ralph, <Fido, doghood>, m))

where $\_{*}$ is 'an implicitly referred to and contextually determined type of mode of presentation' (Schiffer 1992: 503).

We could use this principle of the type of *m* ($\_{*}m$) for futurity. Sentences (3)-(5) will now be represented by a partial DRS in *Fig. 1:

```
+-----------------------------------------+
|                 x t e                   |
|                                         |
|  Mary (x)                               |
|  tomorrow night (t)                     |
|  ACC _*m e                              |
|          +--------------------------+   |
|          |    go to the opera (x)   |   |
|       e  |                          |   |
|          +--------------------------+   |
|                                         |
+-----------------------------------------+
```

*Fig. 1

Fig. 1 will not suffice, though. Schiffer's $\_{*}m$ suffers from overdetermination, it provides more information than is necessary for getting the truth conditions right. I proposed instead the degrees to which *m* has to be specified. In other words, *m* can be coarsely-grained or finely-grained and we have to allow the varying degrees of detail through varying $\_{*}$. I introduce $\_{n}m$ for the degree *n* of fineness of detail of m, ranging from 0 (no relevance of m) to 1. The partial DRSs for (3)-(5) will now look as in Fig. 2, with the $\_{n}$ varying from, let us say, $\_{tf}$ for the tenseless future form in (5), through $\_{fp}$ for the futurative progressive in (4), to $\_{rf}$ for the regular future in (3):

```
+-----------------------------------------+
|                 x t e                   |
|  Mary (x)                               |
|  tomorrow night (t)                     |
|  ACC _n_m e                             |
|                                         |
|          +--------------------------+   |
|       e  |    go to the opera (x)   |   |
|          +--------------------------+   |
|                                         |
+-----------------------------------------+
```
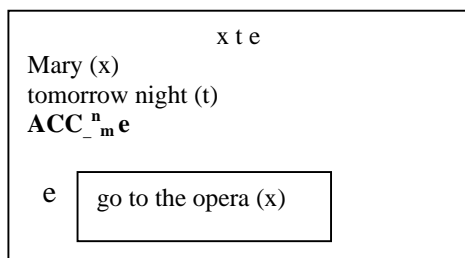
Fig. 2

These three indices correspond to three degrees of modality, derived from the three degrees of informative intention and at the same time three degrees of intentionality of the corresponding mental state, as summarized in the DI principle. In $\_^{tf}$, reference is made to the future event without expressing any degree of detachment from the proposition expressed. Hence, this is the case of the strongest intentionality. In $\_^{fp}$, the degree of commitment of the speaker to the proposition expressed is lower and hence a higher degree of modality is involved. Modality is in an inversely proportional relation to the degree of commitment or assertability, possibility, evidence, etc. It is also in an inversely proportional relation to the degree of intentionality of the corresponding mental state as well as to the degree of the communicative intention with which the proposition was uttered. In $\_^{rf}$, we have the highest degree of modality and the lowest degree of commitment.

In this proposal, I have departed from the DR-theoretic practice, on Kamp and Reyle's (1993) version, of representing *tenses*. Instead, I focussed on the dependencies between tenseless future, futurative progressive and regular future tense in relegating the differences to $\_^{n}m$. This move was dictated by the earlier proposal that temporality, at least with respect to the future, if not generally, is more adequately described as modality, degree of commitment, or ACC. I have combined (i) an investigation of *futurity* as a semantic category with (ii) an investigation of the auxiliary *will*. The first resulted in the representation in Fig. 2, with n of $\_^{n}m$ varying between tf, fp and rf. These values represent some, as yet unspecified, points on the scale of n ranging from 1 to 0 as in Fig. 3:
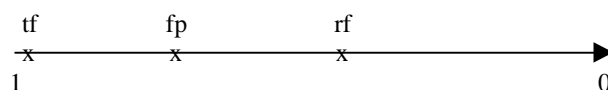
$$\begin{array}{ccc} \text{tf} & \text{fp} & \text{rf} \\ \times & \times & \times \\ 1 & & 0 \end{array} \longrightarrow$$

Fig. 3

The placement of the values on the scale is arbitrary as it has not been determined. While we know the relative positions of *tf*, *fp* and *rf* from the properties of use of these forms, their absolute placement on the scale will require a detailed empirical study.

Problem in (ii) concerns examples (1)-(3). (3) is well accounted for by ACC and $\_^{n}m$ as in Fig. 2. As far as (1) and (2) are concerned, we can now account for them by a relative comparison of the strength of ACC in (1) and (2) with that of the regular future in example (3). Firstly, from $\_^{n}m$ and Fig. 3, we adopt the position that temporal markers have their unmarked, default interpretations. Just as 'will go' by default expresses simple future and the strongest modality out of (1)-(3), so 'goes' by default expresses simple present and 'is going' continuous present. Kamp and Reyle's analysis works well for these default meanings. Where it becomes inadequate is the departures from these defaults such as tenseless future of (5), futurative progressive in (4), and also *will* of epistemic and dispositional necessity as in (1) and (2) respectively. As was presented above, the default sense of *will* is accounted for by ACC and $\_^{rf}m$. Now, just as the epistemic necessity *will* and dispositional necessity *will* are not the default uses of *will*, so tenseless future is not the default use of the form 'goes' nor futurative progressive a default use of 'is going'. Each of these expressions can be used with its default sense or with a sense that departs from this default. This departure corresponds to different strength of ACC, explained by different degrees of intentionality and relevant intentions as in the DI principle. In short, scales of intentionality are useful in two ways. Firstly, we can represent that future time reference is scalar, as in Fig. 3 for (3)-(5), adding other forms such as epistemic *may*, epistemic *can, might, could* with future-time reference towards the 0 end of the scale. But secondly, and more importantly, we can present the interrelations between different uses of a particular linguistic form such as 'will', 'goes' or 'is going'. Just as future time reference has its default expression in (3) rather than (4) or (5), so every such expression belongs to its own scale of defaults and departures from defaults. In this way, the sense of *will* in (3) is the default among (1)-(3), with the weakest intentionality and the strongest modality.

Regular future *will* acquires the DRS with the ACC operator and the mode of presentation m of the degree $\_^{rf}m$. *Will* of epistemic necessity in (1) can now be presented as overriding ACC $\_^{rf}m$ by the condition 'now (t)'. Even if the temporal adverb 'now' were not overtly present in the sentence, it would have to be recovered from the context. DRSs have means of accounting for this type of conversational inference. If 'now (t)' were not communicated, *will* would remain of the default, ACC $\_^{rf}m$ type.

In order to distinguish epistemic *will* from epistemic *must* etc, we specify in the DRS the route to ACC. We will represent it as $ACC\_^{rf}m\_cACC$. The symbol '$\_c$' stands for 'contextually results in'. The partial DRS for sentence (1), repeated below, is now as in Fig. 4:

$$
\boxed{
\begin{array}{l}
\qquad\qquad x\ t\ s \\
\text{Mary (x)} \\
\text{now (t)} \\
\mathbf{ACC\_^{rf}m\ \_cACC} \\
\text{ACC s} \\[2em]
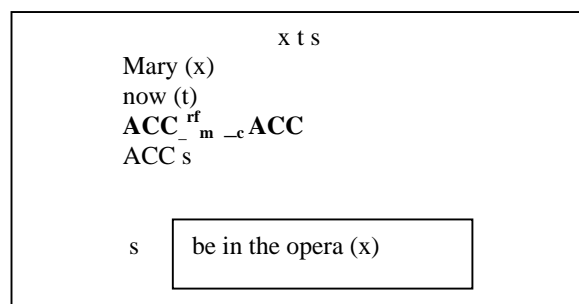\quad s \quad \boxed{\text{be in the opera (x)}}
\end{array}
}
$$

Fig. 4

The dispositional necessity *will* of (2) acquires an analogous representation. The route for ACC is $ACC\_^{rf}m\ \_cACC$ and the difference between epistemic and dispositional necessity is guaranteed by the information contained in the adverb – either overtly expressed or recovered from the context. The partial DRS for (2) is as in Fig. 5:
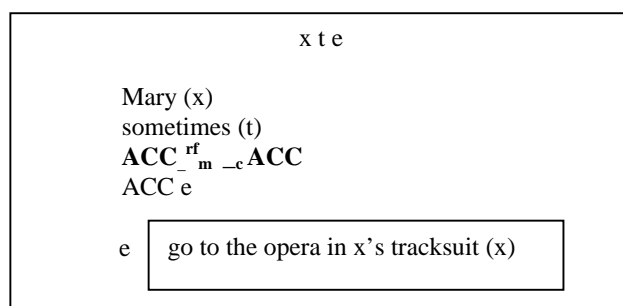
$$
\boxed{
\begin{array}{l}
\qquad\qquad x\ t\ e \\[1em]
\text{Mary (x)} \\
\text{sometimes (t)} \\
\mathbf{ACC\_^{rf}m\ \_cACC} \\
\text{ACC e} \\[1em]
\quad e \quad \boxed{\text{go to the opera in x's tracksuit (x)}}
\end{array}
}
$$

Fig. 5

The difference between 'will' and, say, 'would' is maintained by retaining the route $ACC\_^{rf}m\ \_cACC$ in the DRS.

4. Concluding remarks

Degrees of modality represented as different values of ACC_m account for the senses of *will* in (1)-(5). These degrees have been founded on the POL, DI and PI principles and on Grice's notion of acceptability that I translated into the DR-theoretic operator ACC_m. By introducing ACC to DRT, we can replace the listing of DRSs associated with different interpretations of *will* by correlated DRSs founded on the default representation as for sentence (3) and departures from this default as in (1)-(2). At the same time, we can establish interrelations between different expressions of temporality by means of adding values of ACC to the relevant DRSs as has been done above for (3)-(5).

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