

IN THE (INDICATIVE OR SUBJUNCTIVE) MOOD¹

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Abstract

The object of this paper is the analysis of the Indicative and Subjunctive morphological mood marking on embedded verbs, in Italian and in other Romance languages. The problem to be accounted for is why some predicates, like *Verba dicendi*, select for an Indicative mood clause, whereas others, like Modals, require a Subjunctive mood clause; and, moreover, why some governing verbs, like Epistemics, display interlinguistic variation, in that they are followed by a Subjunctive proposition in Italian, and by an Indicative one in French. My proposal is that mood marking on (a verb *v* in) a sentence ϕ signals what the relationship is between (the proposition expressed by) ϕ and the context in which that sentence gets evaluated. In a nutshell, the idea is that if ϕ displays Indicative mood, then it counts as *assertible* with respect to its input context; if it shows Subjunctive marking, it is *non-assertible* in its input context. The notion of (*non*-)assertibility is a pragmatic notion, and it is defined as the (violation/) satisfaction of the conditions that Stalnaker claimed that a sentence ought to meet in order to count as felicitous (i.e., informative) with respect to a context of conversation. I then review the paradigm of mood selection and show how the association between mood and this assertibility feature can correctly account for it.

1 The Data

I will here concentrate on the phenomenon of Subjunctive and Indicative mood alternation within subordinate propositions, even if I argued elsewhere (Panzeri (2002)) that my observations are meant to account also for mood marking in matrix sentences and in the antecedent clauses of hypothetical statements. The paradigm of mood selection in *that*-clauses is as follows: if the governing predicate is Epistemic (e.g., *believe, think, suspect*, and so on), in languages like French and Spanish the embedded verb is expressed in the Indicative mood, but in Italian the verb is marked (at least preferably) with the Subjunctive mood; if the governing predicate belongs to the class of *Verba dicendi* (e.g., *say, write, maintain*, ...) or of Semifactives (e.g., *know, realize, discover*, ...), the verb in the subordinate clause displays Indicative mood marking; if the matrix verb is a Modal (e.g., *it is possible / probable / necessary*) or a True Factive (e.g., *regret, be sorry, be glad*, ...), the dependent clause is expressed in the Subjunctive mood:

- | | | | |
|-----|----|---|-----------------------------|
| (1) | a. | Gianni crede che stia piovendo.
John believes that it is _{SUBJ} raining. | EPISTEMIC + SUBJ in Italian |
| | b. | Jean croit qu'il pleut.
John believes that it is _{IND} raining. | EPISTEMIC + IND in French |
| (2) | | Gianni dice che sta piovendo.
John says that it is _{IND} raining. | VERBUM DICENDI + IND |
| (3) | | È possibile / necessario che stia piovendo.
It is possible / necessary that it is _{SUBJ} raining. | MODAL + SUBJ |

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|-----|--|---------------------|
| (4) | Gianni realizza che sta piovendo.
John realizes that it is _{IND} raining. | SEMIFACTIVE + IND |
| (5) | Gianni è contento che stia piovendo.
John is glad that it is _{SUBJ} raining. | TRUE FACTIVE + SUBJ |

2 The Proposal

2.1 The Plan

I propose to view morphological mood marking on (a verb v in) a sentence ϕ as signaling what the relationship is between ϕ and the context in which it gets evaluated: if ϕ displays Indicative mood, then it counts as *assertible* with respect to its input context; if it shows Subjunctive marking, it is *non-assertible* in its input context.

The term assertibility is meant to be reminiscent of Hooper's notion of assertivity, a feature that characterizes the class of predicates that may undergo the syntactic operation of complement preposing (an operation that fronts all or part of the complement clause), and which is possible only for assertive predicates. Thus, as (6) shows, only Epistemics, *Verba dicendi* and Semifactives are assertive – since their complements may be preposed; whereas Modals, True Factives and negated predicates are non-assertive because the operation of complement preposing leads to ungrammaticality.

- (6) You have already met Mr Livingstone, I suppose / he says / we found out.
* it's probable / * it's strange / * he didn't tell me.

Hooper maintains that: “The difference between these two types of predicates is termed assertive / non-assertive because the effect of complement preposing is to make the complement proposition the main assertion of the sentence while reducing the original main clause to parenthetical or secondary status. In sentences [containing an assertive predicate] there are two assertions, or two claims to truth”.²

As Hooper herself noticed there is a strong correlation between the property of assertivity and mood selection: the verbs that are assertive call for an Indicative mood clause; the predicates that are non-assertive require a Subjunctive mood clause. But Hooper's insight did not gain much attention, mainly because the notion of assertivity remained too vague to go beyond a descriptive level. Moreover, the problem of inter- and intra-linguistic variation (e.g., the case of Epistemics in (1)) was left completely unaccounted for.

My plan is to elaborate Hooper's observation and to try to solve the difficulties it encountered. As a first step towards this goal, I propose to explicate the property of assertivity in terms of Stalnaker's theory of conversation – by applying to an intrasentential level the considerations he reserved for felicitous full propositional clauses.

2.2 Stalnaker

So let us briefly review Stalnaker's perspective on conversation: a dialogue takes place against a set of mutually shared assumptions (the presuppositions), that is, of propositions that the participants to that conversation believe to be true. By intersecting the presuppositions belonging to this *common ground* of the conversation, we obtain the *context set* of the conversation, that is, the set of possible worlds that constitute adequate representations of reality. When a speaker utters a sentence, if she is taken to be reliable (that is, if the audience accepts her statement as true) the initial context gets changed to a new one in which the

² Hooper (1975: 95).

information conveyed by that utterance is recorded. This operation of updating a context with a sentence (written as: $c + \phi$) consists in the elimination from the context of the worlds incompatible with the content of the utterance. Now, the goal of an informative dialogue is to increase our knowledge of the world, and this amounts to saying that informative utterances point to the reduction of the size of the context set, ideally aiming at being left with just one world – the actual world we live in.

From these preliminary remarks, Stalnaker concluded that for an informative utterance to do its job it must lead to an effective elimination of some – but crucially not all – worlds in the context. If the update operation $c + \phi$ leaves the context c unaffected, this means that the information conveyed by ϕ is already present in the context; if on the other hand the result of the update operation $c + \phi$ is the empty set, i.e., if the information conveyed by ϕ contradicts our assumptions, we are left with no possible worlds in the context set, and so we could not proceed in our conversation.

Stalnaker’s conditions for appropriate assertions:

For any context c and any sentence ϕ , the utterance of ϕ is appropriate in c only if:

- (i) $c + \phi \neq c$ and
- (ii) $c + \phi \neq \emptyset$

2.3 Mixing the ingredients

Up to now we have Hooper’s insight that assertive predicates select for an Indicative mood clause (but her notion of assertivity is left unexplained); and we have Stalnaker’s characterization of felicitous assertions as those that produce an effective change on the context of conversation (that is, whose evaluation leads to a shrinking of the context)³. My proposal is simply to put these observations together.

The first step is to reverse the perspective in Hooper’s observation: instead of claiming that assertive predicates select for an Indicative mood clause, I will view Indicative mood dependent propositions as signaling their “assertibility”. Secondly, I will explain this assertibility feature appealing to Stalnaker’s conditions for appropriate assertions: the assertion of a sentence ϕ is appropriate with respect to a context c only if the evaluation of ϕ in c leads to an effective shrinking of c . Thus, I will claim that a clause ϕ which meets this requirement is assertible. That is, a clause ϕ which added to a context c eliminates some (but not all) worlds of c counts as assertible in c . But Stalnaker’s observations were confined to full-propositional, matrix sentences, whereas here we are interested in clauses that are subordinate, and therefore we need to effect some changes. That is, we need to transpose Stalnaker’s observations to an intrasentential level. The notion of assertibility becomes relative not to the initial context of conversation, but to the intermediate input context the clause gets added to.

In fact, during the process of interpretation, other input contexts, different from the initial one, come into play. This is the case when the sentence to be processed is a molecular expression, requiring different updates to take place: a typical example is given by matrix clause predicates that select for a *that*-clause. Complex expressions of the form: “ α vs that ϕ ” require the evaluation of the subordinate clause ϕ as an intermediate step of the computation. That is, ϕ must be added to an input context, which is typically derived in a way indicated by the lexical entry associated to the matrix clause verb. This update operation leads to a new context. As for “ordinary” updates (that is, updates that have as input context the main context

³ But not to the empty set. Here and further on, when I talk about the update of a sentence leading to “an effective change”, or to “a shrinking of the context”, I intend to exclude the empty set as a possible outcome.

of conversation), the result of the operation can be: (i) the same context; (ii) the empty set; (iii) a new context, different from the input one.

Thus, summing up, when we assess (against a context set c) a sentence of the form “ α vs that ϕ ”, the lexical entry associated to the matrix verb v indicates the intermediate input context c' against which the subordinate proposition ϕ is to be evaluated. And, for any input context c' , if $c' + \phi = c''$ (where c'' is a proper subset – different from the empty set – of c'), then ϕ counts as *assertible* in c' ; if we have that $c' + \phi = c'$ or $c' + \phi = \emptyset$, then ϕ is *non-assertible* with respect to c' . And, coming back to the issue of morphological mood, I simply propose to view Indicative mood clauses as assertible, that is, as performing a “real” operation on their input context, and Subjunctive mood clauses as non-assertible, in the sense that they leave their input context unaltered or reduced to the empty set. Summing up:

If ϕ is in the Indicative mood, ϕ counts as assertible.

If ϕ is in the Subjunctive mood, ϕ counts as non-assertible.

ϕ is assertible wrt an input context c' iff $c' + \phi \neq c'$ and $c' + \phi \neq \emptyset$.

ϕ is non-assertible wrt an input context c' iff $c' + \phi = c'$ or $c' + \phi = \emptyset$.

But what is the intuitive motivation behind this characterization? As a rough approximation, mood marking on dependent propositions signals whether those clauses have an assertion-like nature. If a subordinate clause ϕ is marked with the Indicative mood, then it constitutes a “claim to the truth”, and, in Stalnaker’s picture, this amounts to saying that ϕ will perform a “genuine” operation on a context. That is, ϕ will be added to an adequate input context and it will cause the elimination of some (but not all) worlds of that context. On the other hand, if the subordinate clause displays Subjunctive mood, then it will *not* count as an assertion, and this means that ϕ will not eliminate worlds from the input context it gets added to. What is then the contribution given by the assessment of ϕ ? We will see that – when a clause ϕ is in the Subjunctive mood – the update operation “input context + ϕ ” performs a purely checking operation – that is, it checks whether the input context meets some requirements. But let us consider some examples.

3 Checking the Predictions

Recapitulating, in order to see what this theory predicts for mood selection in subordinate clauses, we must first analyze the lexical entries associated with the various predicates followed by a *that*-clause ϕ , and then verify the kind of operation ϕ is involved in. This means that we will have to introduce a formal system: in the last section of the paper, making use of Heim’s File Change Semantics, I will propose new lexical entries (in Heim’s terms, Context Change Potentials – CCPs) that are meant to translate the meaning of the various classes of predicates. These CCPs indicate the input context(s) c' against which ϕ is evaluated. It becomes then straightforward to see that when ϕ is in the Indicative mood it results as assertible with respect to c' (i.e., $c' + \phi \neq c'$ and $c' + \phi \neq \emptyset$), while when ϕ is in the Subjunctive mood it counts as non-assertible (i.e., $c' + \phi = c'$ or $c' + \phi = \emptyset$). But before entering into technical details, in this section I would like to present informally the intuitive idea behind this approach and to review the various classes of predicates in order to have a first understanding of the functioning of the assertibility property. Let us then start by analyzing the clear-cut cases of mood selection, that is, by taking into consideration the predicates that univocally select for one morphological mood – so we will begin with *Verba dicendi* that are interlinguistically followed by an Indicative mood clause, and with Modal predicates that select for a Subjunctive mood dependent proposition.

Hooper categorized *Verba dicendi* as assertive, and this means that sentences containing these predicates actually contain “two assertions or two claims to the truth”. That is, utterances like:

- (2) Gianni dice che sta piovendo.
John says that it is_{IND} raining.

can also be seen as containing two assertions: that John says something, and that that something is (the assertion) “it is raining”. (Or, alternatively, the assertion that “it is raining”, and “it is John who says so”).

And Hooper’s observation is reflected in what I take to be the application to an intrasentential level of Stalnaker’s conditions for appropriate assertions. In order to evaluate in a context of conversation the sentence “John says that it is raining”, we will have to perform two distinct update operations: we will have to record the information that John said something (first assertion), and we will have to represent that something John said. And, in a dynamic semantic framework, the content of a sentence – of “it is raining” in our example – is equated with the result of adding that sentence to an appropriate input context. That is, we will have to elaborate the clause “it is raining” with respect to an input context – and the result of this operation will be a proper subset of that input context. This step renders the dependent proposition “it is raining” *assertible* with respect to the input context, and therefore it explains the presence of the Indicative mood.

Once we take into consideration Modals, the situation is different. Hooper labelled modal predicates as non-assertives because sentences like those in (3):

- (3) È possibile / necessario che stia piovendo.
It is possible / necessary that it is_{SUBJ} raining.

cannot undergo the operation of complement preposing, and thus they do not contain two distinct “claims to the truth”.

Traditionally, Modal predicates like “it is possible that ϕ ” and “it is necessary that ϕ ” are analyzed as claiming that ϕ is true in, respectively, at least one world or in all worlds within a contextually determined modal base. What matters here is that, once we have individuated the appropriate (epistemic, deontic, ...) modal base, we must check whether the dependent proposition “it is raining” is true in at least one or in all worlds in that context. And this “purely” checking operation becomes formally translated as: there is a world w' within the modal base such that: $\{w'\}^4 + \text{“it is raining”} = \{w'\}$, in the case of “it is possible”; and: for all worlds w' within the modal base: $\{w'\} + \text{“it is raining”} = \{w'\}$, in the case of “it is necessary”. This means that the subordinate proposition “it is raining” counts as *non-assertible* with respect to its input context (the singleton $\{w'\}$), since its contribution is only to check whether the modal bases meet the requirements established by the Modal predicates. And this non-assertibility feature is tied to the presence of the Subjunctive morphological mood.

So, this is the general strategy that I propose to adopt for explaining the phenomenon of mood alternation in subordinate clauses: the mood on the dependent proposition signals what the relationship is between that proposition and its input context. Indicative mood marking suggests that the clause is assertible and therefore its update will operate a change in its input context; Subjunctive mood marking renders the clause non-assertible and this means that the operation it will perform is a checking operation that does not affect the input context.

⁴ That is, the worlds w' within the modal base are considered as singletons and thus become the input contexts to which ϕ is added.

Now let us consider the more problematic cases of mood selection: the issue of interlinguistic variation, and the different mood selection properties of Factive predicates. We have seen that epistemic predicates require an Indicative mood clause in many Romance languages, but they are followed by a Subjunctive mood clause in Italian:

- | | | | |
|-----|----|--|---------|
| (1) | a. | Gianni crede che stia piovendo.
John believes that it is _{SUBJ} raining. | ITALIAN |
| | b. | Jean croit qu'il pleut.
John believes that it is _{IND} raining. | FRENCH |

In the perspective I am suggesting, this means that the object of the belief results both assertible (when marked with the Indicative) and non-assertible (when expressed in the Subjunctive). In my view, this depends on the peculiarity of doxastic predicates, that exhibit what I may call a double nature: on the one hand they are analogous to *Verba dicendi* in that they express a relation between an agent and a proposition (in the example in (1), John stands in a belief-relation with “it is raining”), and therefore they involve the retrieval of the content of the proposition that it is the object of the belief – and this step renders the subordinate clause *assertible*. On the other hand, as the traditional analysis of Epistemic predicates (i.e., “ α believes ϕ ” is equivalent to “ ϕ is one of α ’s beliefs”) makes clear, they are similar to Modal predicates in that their verification requires the checking that the proposition believed belongs to the agent’s doxastic set, and this checking operation (in our example, that John’s doxastic set is indeed a subset of the raining worlds) renders ϕ *non-assertible*.

As for Factive predicates, the problem they pose to any semantically based approach to mood selection is that even if they appear to have similar meaning properties (they are both traditionally viewed as presupposing the truth of the complement clause), Semifactives select for an Indicative mood clause, whereas True Factives require a Subjunctive mood clause:

- | | |
|-----|--|
| (4) | Gianni realizza che sta piovendo.
John realizes that it is _{IND} raining. |
| (5) | Gianni è contento che stia piovendo.
John is glad that it is _{SUBJ} raining. |

My strategy to account for these cases consists in arguing that Semifactives are in fact quite dissimilar from True Factives: the former behave like Epistemics and *Verba dicendi*, expressing relations between an agent and a proposition; the latter are to be analyzed as involving a belief in a counterfactual statement, along the lines suggested by Heim (1992). More precisely, a sentence like (4) is treated as equivalent to: there is a realizing-relation holding between John and “it is raining” – and the step necessary to compute the content of “it is raining” renders the clause assertible and explains the occurrence of the Indicative mood. On the other hand, (5) is to be paraphrased as follows: John believes that since it is raining he is in a more desirable state than the one he would be in if it were not raining.

4 Conclusion

I have presented a new approach to the phenomenon of mood alternation in subordinate clauses, an approach that, from a theoretical point of view, is based on the idea that the Indicative is the mood for a real “assertion-like” clause, while the Subjunctive shows up in clauses that do not (or would not) constitute assertions. The formal translation of this insight is an extension of some of the considerations put forth by Stalnaker for matrix clauses. The association between Indicative and Subjunctive morphological mood and assertibility features is not confined to the domain of subordinate clauses but it is meant to cover also their distribution in matrix sentences and within antecedent clauses of hypothetical statements.

5 The Context Change Potentials

5.1 Epistemics

The class of Epistemics contains propositional attitude verbs that describe the epistemic disposition of the agent with respect to the truth of their dependent clause. The paradigmatic case is the verb *believe*, whereas the other verbs add to the core *believe* meaning some nuances, that are encoded in the specification of the kind of relation that holds between the agent and the subordinate clause. The traditional analysis, inspired by Hintikka, views “ α believes ϕ ” as equivalent to “ ϕ is one of α ’s beliefs”. That is, ϕ must be entailed by the agent’s doxastic set, the set of worlds compatible with what the agent α believes to be the case in an evaluation world w , which, intuitively, corresponds to α ’s personal picture of reality:

Doxastic Modal Base (relative to α in w)

$$\text{DOX}_\alpha(w) = \{w' \in W : w' \text{ is compatible with what } \alpha \text{ believes in } w\}$$

Nevertheless, if we were to treat on a par also all the other predicates belonging to the class of Epistemics, such as *think*, *suppose*, *imagine*, we should be forced to hypothesize the existence of a set of worlds compatible with what one thinks, and another set of worlds that encode what one supposes, which, in its turn, will only partially overlap with what one imagines. Obviously, the risk is the unnecessary multiplying of modal bases, whose existence cannot receive an independent theoretical justification. Thus, I will partly depart from the traditional analysis, claiming that Epistemic predicates are analogous to *Verba dicendi*, inasmuch as their lexical entry specifies that the agent α stands in the relation encoded by the matrix predicate with what is expressed by α . For instance, the sentence “John thinks that it is raining” is viewed as “There is a thinking-relation holding between John and what ‘It is raining’ expresses”.

But, as we have noticed, all the predicates in the epistemic class share the same core meaning – that is, they all involve a *belief* in something –, and this is accounted for by recording as explicit condition that if a person stands in a thinking-relation (or supposing-, or imagining-, i.e., any epistemic relation) with what a clause ϕ expresses, then ϕ is also entailed by that person’s doxastic state. Then, as a first approximation, saying that α thinks ϕ is tantamount as saying that α is in a thinking-relation with ϕ , and this (i.e., the fact that there is this relation holding) implies that ϕ is one of the propositions that α believes, or, alternatively, that ϕ is implied by α ’s doxastic state.

In Heim’s Context Change Framework, in which the effect of adding a sentence to an input context is a new output context that contains only worlds compatible with what was said, we need to make the interpretation of sentences relative to all worlds in the context. Thus, we will have that updating a context c with a sentence of the form “ α thinks ϕ ” consists of those worlds w belonging to c such that in w α is in a thinking relation with what is expressed by ϕ (that for the moment we will indicate by “ ϕ ”); if this relation holds then ϕ is entailed by α ’s doxastic set:

Context Change Potential (CCP) for *think* (preliminary version):

$$c + \text{“}\alpha \text{ thinks } \phi\text{”} = \{w \in c : R_{\text{THINK},w}(\alpha, \text{“}\phi\text{”})\}$$

$$\text{where, if } R_{\text{THINK},w}(\alpha, \text{“}\phi\text{”}), \text{ then } \text{DOX}_\alpha(w) + \phi = \text{DOX}_\alpha(w)$$

Now, we have to face the question of what is an adequate translation of the notion of “what a sentence ϕ expresses”. In the Context Change Framework there is not an object such as “the proposition corresponding to a sentence ϕ ”, but we need to translate this concept into the result of an update operation of the logical form ϕ in an appropriately chosen set of worlds.

That is, the standard notion of the set of worlds verifying ϕ is only indirectly achieved by adding ϕ to a context. And the choice of the suitable context will eventually affect the final outcome of the operation. Thus, our task is to find a suitable context to which ϕ gets added.

Let us now pause for a moment and focus on the characteristics of the belief predicates. The clause ϕ which corresponds to the object of the belief may be incompatible with our context c . For instance, even if we are now currently assuming that it is *not* raining, there is nothing wrong in a sentence like:

(7) John thinks that it is raining.

But the question now becomes how we – the hearers who assume that it is *not* raining – can “represent” John’s false belief. We cannot simply add his belief to our context c , because the result would be the empty set (and the empty set cannot possibly be an adequate representation of anyone’s belief); but at the same time we do not consider the set of *all* worlds in which it is raining (that is, the set of all worlds W is not a suitable candidate to be the input context in which ϕ is assessed), because such a set would contain also worlds which are too far-fetched to be taken into account.⁵ Intuitively, to make sense of a belief we do not share, we need to suspend some of our assumptions. Nonetheless, we tend to drop the *least* number of assumptions as it is possible to grasp John’s thought.

What is interesting is that it looks like that the assessment of an agent’s belief has many points in common with the evaluation of the meaning of counterfactual statements. In these latter cases, the speaker asks us to conceive of a contrary-to-fact circumstance (hence incompatible with our presuppositions) expressed by the antecedent ϕ of the conditional; but, amongst all the worlds that verify ϕ , we take into account only those that are the *most similar* to (what we believe to be) the actual world. In other words, for the representation of the counterfactual situation set up by the antecedent ϕ , we drop the least number of assumptions as possible. I argued elsewhere⁶ that this can be achieved by defining a revision of the context c for ϕ (written as $REV_{\phi}(c)$), which consists, intuitively, of the intersection of the largest subset of presuppositions of the common ground that are compatible with the antecedent ϕ . In a similar way, we may now proceed by defining the revision of the context for the object of the belief (that is, for the clause ϕ dependent on the epistemic predicate), and then add ϕ to this new context, obtaining as final result the set of those worlds that verify ϕ *and* as many presuppositions of the common ground as possible.⁷ Thus, the Context Change Potential simply tells us that the agent α is in the epistemic relation with this output context:

CCP for *think*:

$$c + \text{“}\alpha \text{ thinks } \phi\text{”} = \{w \in c: R_{\text{THINK},w}(\alpha, REV_{\phi}(c) + \phi)\}$$

where, if $R_{\text{THINK},w}(\alpha, REV_{\phi}(c) + \phi)$, then $DOX_{\alpha}(w) + \phi = DOX_{\alpha}(w)$

And, returning now to the issue of morphological mood, it is straightforward to see that in such a definition the subordinate clause ϕ turns out to be *non-assertible* with respect to the

⁵ Intuitively, assuming that it is winter, we tend to exclude that John thinks that there is a summertime thunderstorm (that is, he may be wrong, but not *that* wrong). Or, consider presuppositional issues: assume that John knows that Fred is married with Wilma but wrongly believes that she is an actress. I may report his belief saying “John believes that Fred’s wife is an actress”. But to interpret the definite description “Fred’s wife” we need a context that contains the information that Fred is married with Wilma – and therefore the set of all worlds W is excluded, since it will contain also worlds in which Fred is not married.

⁶ Chapter 3 of Panzeri (2002).

⁷ If the object of belief is in fact compatible with our assumptions (that is, if we are *not* taking for granted that it is not raining), the revision of the context for ϕ will leave the context unaltered.

update operation stating that the subordinate clause ϕ is entailed by α 's doxastic set (i.e., $\text{DOX}_\alpha(w) + \phi = \text{DOX}_\alpha(w)$); but, at the same time, ϕ counts also *assertible* when it is evaluated with respect to the revision of the context (i.e., with respect to the operation: $\text{REV}_\phi(c) + \phi$). And this double assertibility feature accounts for the variation in the selection of mood.

5.2 *Verba dicendi*

There are many similarities between *Verba dicendi* and Epistemics: they both designate a relationship between an agent and (what) a sentence (expresses) – thus, a sentence like “ α says ϕ ” is equivalent to “there is a saying-relation between α and what is expressed by ϕ ”. And also in the case of *Verba dicendi* what one says may very well be incompatible with our context of conversation: John may not only *think*, but also *say* that it is raining, and we can understand it even if we know that this is not the case. These preliminary remarks suggest a Context Change Potential for *Verba dicendi* which is parallel to the one proposed for Epistemics – but lacking the inference that states that ϕ (here, what is said by α) is also believed by the agent:⁸

CCP for *say*:

$$c + \text{“}\alpha \text{ says } \phi\text{”} = \{w \in c: R_{\text{SAY},w}(\alpha, \text{REV}_\phi(c) + \phi)\}$$

Focusing on the morphological mood issue, it is straightforward to see that in this Context Change Potential ϕ is involved in just one update operation – $\text{REV}_\phi(c) + \phi$ – and this step renders ϕ assertible, thus explaining its Indicative mood marking.

5.3 Modals

I will here focus on the analysis of *possible* and *necessary*.⁹ Let us take into consideration two examples:

- (8) It is possible that John is home.
- (9) It is necessary that a cab driver have a driving license.

In (8) we have an epistemic possibility, inasmuch as the sentence is read as “there is a world, compatible with what we assume to be the case, in which John is home”, whereas (9) has a deontic flavor, being equivalent to “in all the ‘legal’ worlds, a cab driver has a driving license”. Formally, we start by defining appropriate modal bases, that is the sets of worlds compatible, respectively, with what we assume to be the case in w (thus obtaining the context c itself); and with what the laws prescribe in w :

Epistemic Modal Base

$$\text{EPIST}(w) = \{w' \in W: w' \text{ is compatible with what we assume to be the case in } w\} = c$$

⁸ There is indeed what I take to be a natural inference from “ α says ϕ ” to “ α believes ϕ ” – but it cannot be an entailment relation, as the naturalness of (i) demonstrates:

- (i) John says that everything is alright – but he doesn't really believe it.

It could be considered as an implicature (following from the speaker's adherence to Grice's Maxim of Quality), but I will not explore this issue any further.

⁹ In what follows I will present highly simplified lexical entries for the modal predicates. Actually Kratzer showed how the “standard” analysis of “Possibly ϕ ” and “Necessarily ϕ ” as involving, respectively, existential and universal quantification over a set of accessible worlds cannot account for what she dubbed “graded modality” – e.g., for the analysis of predicates as “It is highly probable” or “It is scarcely conceivable”. In Panzeri (2002), I show how it is possible to implement Kratzer's considerations in the File Change Semantics, providing lexical entries that not only translate in an adequate manner the meaning associated to graded modality verbs, but that also make the correct predictions about mood.

Deontic Modal Base

DEONT(w) = $\{w' \in W: w' \text{ is compatible with what the laws prescribe in } w\}$

In the Context Change Framework terminology, adding (8) to a context c results in those worlds w of c from which we can derive an epistemic modal base that contains a world w' in which John is home (i.e., a world w' that renders ϕ true: such that $\{w'\} + \phi = \{w'\}$).¹⁰

CCP for *be possible* (with respect to an epistemic modal base):

$c +$ It is possible that $\phi = \{w \in c: \exists w' \in \text{EPIST}(w) \text{ s.t. } \{w'\} + \phi = \{w'\}\}$

Updating an initial context c with (9) has as output those worlds w of c such that a cab driver has a driving license in all the worlds w' , in which the laws of w are obeyed (or, proceeding step by step, for any world w in c , we first construct the deontic modal base grounded on w ; then we check whether the subordinate proposition ϕ , “a cab driver has a driving license”, is true in all the worlds within that modal base; if this is the case then we keep the world w ; otherwise we eliminate it):

CCP for *be necessary* (with respect to a deontic modal base):

$c +$ It is necessary that $\phi = \{w \in c: \forall w' \in \text{DEONT}(w) \text{ s.t. } \{w'\} + \phi = \{w'\}\}$

What matters here is that in both cases the clause ϕ is added to an input context (the singleton $\{w'\}$) to have as result the same input context back – and this operation renders ϕ non-assertible, thus allowing the occurrence of the Subjunctive mood on ϕ .

5.4 Factive predicates: Semifactives versus True Factives

Traditionally Factive predicates are considered as belonging a homogenous class: they are all viewed as presupposition triggers, whose utterance is allegedly appropriate just in case their dependent clause is one of the assumptions currently made in the context of conversation. Nevertheless, there are many clues that indicate their dissimilarity. In a 1971 article, Karttunen pointed out some differences that led him to postulate the existence of two distinct types of Factive predicates: the Semifactives and the True Factives. Hooper showed how the categories individuated by Karttunen correspond to the distinction based on the assertive nature of verbs: Semifactives are assertive; True Factives are non-assertive. Besides their different syntactic behavior in some environments, these classes differ also in the meaning component: True Factives express a subjective attitude of the agent about the complement proposition (they are largely “emotive”), whereas Semifactives describe processes of knowing or coming to know (or letting someone else come to know). They also behave differently with respect to the factivity properties: as also Karttunen highlighted, True Factives presuppose their complements under any condition; for Semifactives, however, it is possible to construct sentences in which the truth of their complements cannot be inferred from the entire sentence, e.g. when embedded under “it is possible that”.¹¹ Therefore, in what follows I propose to associate with Semifactives and True Factives two distinct kinds of lexical entries.

¹⁰ Or, alternatively, we can say that adding a sentence of the form “it is possible that ϕ ” to a context c eliminates from c those worlds w in which, intuitively, “it is possible that ϕ ” is false, that is, those w from which we derive a modal base that does not contain worlds that renders ϕ true.

¹¹ Consider the following pair of sentences: (a) contains True Factive predicates, and its utterance is felicitous only in a context in which the fact that “I have not told the truth” is indeed taken for granted. On the other hand, (b), that contains Semifactives, does *not* carry this presupposition anymore – leaving open the possibility that I was truthful:

- (i) a. It is possible that I will regret / be glad later that I have not told the truth.
- b. It is possible that I will find out / realize / learn later that I have not told the truth.

A similar behavior shows up also when True Factives and Semifactives are questioned or negated.

5.5 Semifactives

As was already alluded to, traditionally Semifactives are said to presuppose the truth of their complement clause: a sentence like “John knows that it is raining” is viewed by many scholars as appropriate just in case we already assume in our context of conversation that it is indeed raining. Nonetheless, I will maintain that the recourse to the notion of “standard” presupposition is in this case misleading – inasmuch as the truth of the subordinate proposition need not, in my view, be a shared assumption *before* the utterance takes place, but, at the same time, it does become mutually assumed *after* the sentence has been processed, in virtue of the meaning of *know*. In fact, one can only know / realize / discover things that are true; it is a property of the whole class of Semifactives that if a person is in a knowing relation with (what a sentence) ϕ (expresses), then ϕ must be true (i.e., one cannot know what is false). Thus, if we process a sentence that asserts that a person α stands in the Semifactive relation with “ ϕ ”, then, in the current context of conversation, we can assume that ϕ is true, and therefore we can treat it as a shared assumption. That is, ϕ then becomes a presupposition of the context, even if before the utterance took place it was not taken for granted.¹²

The considerations here made are formally translated by assigning to Semifactive predicates a Context Change Potential that states that there is a Semifactive-relation holding between the subject α and what the subordinate proposition expresses, and, moreover, the fact that there is this relation holding entails that ϕ is true, and as such it must be treated as a presupposition of the (new) context. For instance, if someone utters “John knows that it is raining” against a context set c , and if this sentence is accepted, then the resulting context c' will comprise those worlds w of c in which there is a knowing-relation between John and (what) “It is raining” (means). Moreover, if there is this knowing-relation, then we can also assume that it is true in w that “It is raining”:

CCP for *know* (preliminary version):

$$c + \text{“}\alpha \text{ knows } \phi\text{”} = \{w \in c: R_{\text{KNOW},w}(\alpha, \text{“}\phi\text{”})\}$$

where, if $R_{\text{KNOW},w}(\alpha, \text{“}\phi\text{”})$, then $\{w\} + \phi = \{w\}$

Also in this case, we need to translate the “ ϕ ” (i.e., what ϕ represents) in the definition, and this is achieved by providing an adequate input context ϕ gets added to.

Semifactive predicates describe the process of coming to know, and since when a person arrives at knowing something, s/he will also, as result, arrive at believing that thing, a candidate input context for the update of the dependent proposition ϕ is the agent’s doxastic modal base. That is, we add ϕ to the set of worlds compatible with what the agent believes, thus obtaining a new set of worlds that verify ϕ ; and then the definition states that the agent is in the relation expressed by the Semifactive with these worlds. The lexical entry for the verb *know* says that the result of updating an initial context c with a sentence of the form “ α knows ϕ ” is given by those worlds w in c in which α is in the knowing relation with (the representation in α ’s doxastic set of) ϕ , and from this relation we deduce that ϕ is true in all the worlds w (that belong to the new context).

CCP for *know*:

$$c + \text{“}\alpha \text{ knows } \phi\text{”} = \{w \in c: R_{\text{KNOW},w}(\alpha, \text{DOX}_\alpha(w) + \phi)\}$$

where, if $R_{\text{KNOW},w}(\alpha, \text{DOX}_\alpha(w) + \phi)$, then $c + \phi = \text{same}$

¹² The effect we get is somehow analogous to the other conclusions, based on entailment relations, that we may draw from “ordinary” cases. That is, just like when one tells me “Leo is a dog”, (if I accept that sentence, and agree to update the context with it) I am entitled to draw the conclusion that “Leo is an animal” and add also that information to the context, here, where one says “John realizes ϕ ”, I will update the context also with ϕ itself.

It is easy to see that Semifactives require a double update operation, and that the clause ϕ is assertible in the step in which it gets added to the agent's doxastic set (this operation effects a real change because Semifactives describe processes of coming to know that have as consequence the “starting” to believe something); and ϕ is not assertible in the step that states that it is a presupposition of the context c .

5.6 True Factives

True Factives are not treated on a par with Semifactives. First of all, they are real presuppositional items, inasmuch as their utterance sounds inappropriate if their dependent proposition is not shared. Moreover, as for the meaning component, True Factives do not state a relationship between an agent and what a sentence expresses, but, as Heim (1992) suggested, they are better analyzed as involving a belief in a counterfactual statement. A predicate like *be glad* is resolved into the following elements: “ α is glad that ϕ ” is analogous to “ α believes that because ϕ is the case he is in a more desirable situation than the one he would be in if ϕ were false”. For instance, “John is glad that it is raining” becomes “John believes that because it is raining he is in a more desirable state than the one he would be in if it were not raining”. In other words, saying that John is glad that it is raining involves the comparison of two situations: the situation John believes to be in, in which it is raining and the one he would be in if it were not raining; and the predicate “be glad” simply tells us that the former situation is better than the latter situation.

Thus we can formulate the Context Change Potentials as follows. We start by defining a bouletic ordering $\geq_{\text{BOUL},w}$, that ranks the possible worlds according to their degree of desirability: $w'' \geq_{\text{BOUL},w} w'$ is read as: w'' is more desirable in w than w' . Then we have to compare the worlds in which (the agent believes that) ϕ is true with those in which (the agent believes that) ϕ is false. This is done by taking the worlds w' belonging to the agent's doxastic set in which ϕ is false (i.e., the worlds w' s.t. $\{w'\} + \phi = \emptyset$) and the worlds w'' belonging to the agent's doxastic set in which ϕ is true (i.e., the worlds w'' s.t. $\{w''\} + \phi = \{w''\}$).¹³ The last step simply tells us that the former (i.e., the worlds in which ϕ is false) are less desirable than the latter (i.e., the worlds in which ϕ is true):

$$c + \text{“}\alpha \text{ is glad that } \phi\text{”} = \{w \in c: \text{for all } w' \in \text{DOX}_\alpha(w) \text{ s.t. } \{w'\} + \phi = \emptyset \ \& \\ \text{for all } w'' \in \text{DOX}_\alpha(w) \text{ s.t. } \{w''\} + \phi = \{w''\}: w'' \geq_{\text{BOUL},w} w'\}$$

And we could treat in a similar way other True Factive predicates. “ α regrets / is sorry that ϕ ” would for instance become “ α believes that because ϕ is true he is in a less desirable situation he would be in if ϕ were false”:

$$c + \text{“}\alpha \text{ regrets / is sorry that } \phi\text{”} = \{w \in c: \text{for all } w' \in \text{DOX}_\alpha(w) \text{ s.t. } \{w'\} + \phi = \{w'\} \ \& \\ \text{for all } w'' \in \text{DOX}_\alpha(w) \text{ s.t. } \{w''\} + \phi = \emptyset: w'' \geq_{\text{BOUL},w} w'\}$$

¹³ Actually, since we can assume that the agent believes ϕ to be true (that is, since in “John is glad that it is raining” we can assume that John believes that it is raining), we can adjust the definition as follows: first of all, we do not need to specify that the worlds w'' must verify ϕ , since all the worlds belonging to the agent's doxastic set render ϕ true. Secondly, for the same reason, in order to find the worlds w' that falsify ϕ we must proceed to the revision of the doxastic set for *not* ϕ . Similarly for the analysis of “ α regrets that ϕ ”.

$$c + \text{“}\alpha \text{ is glad that } \phi\text{”} = \{w \in c: \text{for all } w' \in \text{REV}_{\text{not } \phi}(\text{DOX}_\alpha(w)) \text{ s.t. } \{w'\} + \phi = \emptyset \ \& \text{for all } w'' \in \text{DOX}_\alpha(w): w'' \geq_{\text{BOUL},w} w'\}$$

$$c + \text{“}\alpha \text{ regrets that } \phi\text{”} = \{w \in c: \text{for all } w' \in \text{DOX}_\alpha(w) \ \& \text{for all } w'' \in \text{REV}_{\text{not } \phi}(\text{DOX}_\alpha(w)) \text{ s.t. } \{w''\} + \phi = \emptyset: w'' \geq_{\text{BOUL},w} w'\}$$

Also in this case it is straightforward to see that the clause ϕ counts as non-assertible because it is involved in purely checking operations – and this explains the Subjunctive mood marking.

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