

Assertion, Belief and Mood Choice¹
Donka F. Farkas, UCSC

1. Introduction

This paper aims at relating the three notions in its title in a hopefully useful way and thereby contribute to a better understanding the semantics of complement taking predicates. Besides accounting for inference patterns, presupposition projection and other logical matters, we would expect such a semantics to help us understand mood distribution patterns in the complements of predicates, a matter that is clearly rooted in semantics (see Farkas 1992 for arguments to this effect).

In this paper I will be concerned with a small slice of the huge mood distribution problem which is sketched in the next subsection.

1.1 Mood distribution contrasts and similarities in French and Romanian

Mood distribution in Romanian

I will be concerned here only with indicative and subjunctive complements. The basic facts of Romanian are the following.

A. Indicative governors, which I will call *strong intensional predicates* divide in several subclasses. Below I list those that we will be concerned with here.

(i) positive epistemic predicates: *believe, know*

- (1) Maria crede/știe că Ion i-a scris.
 Maria believes/knows that Ion Cl-has.Ind written
 ‘Maria believes/knows that Ion wrote to her.’

(ii) predicates of assertion: *say, assert*

- (2) Maria a spus că Ion i-a scris.
 Maria has said that Ion Cl-has.Ind written
 ‘Maria said that Ion wrote to her.’

(iii) fiction predicates: *dream, imagine*

- (3) Maria a visat că Ion i-a scris.
 Maria has dreamt that Ion Cl-has.Ind written
 ‘Maria dreamt that Ion wrote to her.’

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B. The group of subjunctive governors, which I will call *weak intensional predicates*, include the following:

(i) desideratives: *want, wish, desire*

- (4) Maria vrea să-i răspundă.
Maria wants Subj-Cl answer.Subj
'Maria wants to answer him.'

(ii) directives: *command, request, instruct*

- (5) Maria i-a cerut lui Ion să-i scrie.
Maria Cl-has asked Dat. Ion Subj-Cl write.Subj
'Maria asked Ion to write to her.'

C. Factive-emotive predicates, such as *regret, be sorry/happy etc.*, govern the indicative in Romanian (as well as in other Balkan languages):

- (6) Ion e trist că Maria e bolnavă.
Ion is sad that Maria is.Ind sick
'Ion is sad that Maria is sick.'

Mood distribution in French

In French the facts are the same as in Romanian for strong and weak intensional predicates (modulo the use of the infinitive in case of subject identity in French and Spanish but not in Romanian). Factive-emotives on the other hand allow both the indicative and the subjunctive in their complements, favoring the latter.²

- (7) Jean regrette que Marie est/soit mal.
Jean regrets that Maire is.Ind/is.Subj badly
'Jean is sad that Marie is sick.'

A central task of this paper is to understand the similarities and contrasts sketched above.

1.2 Preview

It will be claimed here that a full characterization of the semantics of complements should include a characterization of their context change potential (CCP). The characteristics of the CCP of a complement are determined by the semantics of the matrix predicate, and therefore a full characterization of the semantics of matrix predicates should include the characterization of the CCP they impose on their complements. With respect to mood distribution, it will be claimed that complement characteristics that are close to main assertions correlate with the indicative. The areas of overlap and contrast across languages can be accounted for, it will be suggested, using an OT framework. The proposal will use crucially the assumption that complement taking predicates introduce embedded

²In other Western Romance languages these predicates govern the subjunctive as well. In earlier stages of French, however, factive-emotives governed the indicative.

(or derived) contexts, argued for recently in Schlenker (2003) and, less recently, in Karttunen (1973). We will claim that the complement of such predicates is added to the embedded context introduced by the predicate, and that the nature of this addition is determined by the matrix predicate. This view allows us to relate the CCP characteristics of complements to CCP characteristics of main utterances, which is a welcome result. We will identify below the core CCP of main assertions and defend the claim in [8]:

- (8) ‘Strong intensional predicates’ are predicates whose complements have assertive CCP relative to the embedded context introduced by the predicate.

We will identify two semantic characteristics that mood distribution is sensitive to: the assertive nature of the CCP of the complement (encoded as +/-Assert), and its status relative to the context set of the context to which it is added, (encoded as +/-Decided). These two features are then used to account for the slice of the mood distribution problem identified above.

We start in Section 2 by defining the notion of *assertive context change* as well as the relation between a proposition and a context that is encoded in the *Decided* feature. Section 3 is devoted to the two epistemic predicates *believe* and *know*; Section 4 gives the gist of the account of mood distribution. Section 5 concludes with a summary and a list of open problems.

2 Assertion

2.1 Contexts Following a lot of recent and not so recent work, I take contexts to be constructs as in [9],

- (9) $\langle w, i, P, W', D \rangle$

where w is the world of the context, i is a possibly empty set of *individual anchors*, P is a possibly empty set of propositions such that for any $p \in P$, $w \in p$ and W' is the context set. If P is non-empty, $W' = \bigcap P$; if P is empty, $W' = W$ (the set of possible worlds in M). D is a possibly empty set of embedded contexts.³ The following constraints hold of the world of the context and the context set:

- (10) For any context c , $w \in W'$.

The consistency condition in [11] follows from [10].

- (11) *Consistency condition*
For any context c , $W_c \neq 0$

Following Stalnaker (2002), (1979) and much other work, I assume that the speech context is as in [12]:

³This is an oversimplification since at least for speech contexts we also have to recognize entities present in the discourse but since they will not play any role here they will be ignored.

$$(12) \textit{ Speech context}$$

$$c = \langle w_c, k, W_c, P_c, D_c \rangle$$

where k is a collective individual, the conversational community, made up of the participants in the conversation, P_c is the proposition set of c , known as the *common ground*, W_c , and w_c is the world of the context.⁴ In what follows the common ground will be ignored in order to keep matters as simple as possible.

The similarities between epistemic contexts and speech contexts have often been noted. I take it that these similarities are due to the fact the worlds in W_c are k 's candidates for w_0 in w_0 (the world in which the conversation takes place). A simplifying move would be to take w_0 to be the world of the speech context. I do not make it in order to be able to deal with fallible speech contexts, contexts whose common ground contains propositions that are not true in w_0 . Speech contexts, just like epistemic contexts, can be true/correct relative to w_0 iff $w_0 \in W_c$. Similarly, a proposition $p \in P_c$ is true/correct relative to w_0 iff $w_0 \in p$.

2.2 Assertive context change

I follow Heim (1992) in taking $c + \phi$ to represent the operation of adding an expression ϕ to a context c , i.e. of performing the CCP of ϕ on c . In order for this operation to be defined, c must meet the presuppositions of ϕ . I assume that the effect of the addition of ϕ to c depends on the sentential force of ϕ when ϕ is a matrix sentence, and on the embedding predicate when ϕ is a complement clause.

Main assertion

When a speaker s asserts ϕ with propositional content p (with falling intonation) relative to a speech context c , she achieves two effects: (i) the speaker is now publicly committed to p (see Gunlogson 2001); and (ii) the speaker has publicly proposed to change c to c' , such that the crucial component of the change is given in [13]:

$$(13) W_{c'} = W_c \cap p$$

The projected context c' will be called the output speech context. In the case of main assertions, the output context is of the form in [14], where c is the input context to which ϕ was added.

$$(14) c' = \langle w_c, k, W_c \cap p, D_{c'} \rangle$$

The world of the context and its individual anchor stay constant; whether $D_{c'}$ is different from D_c and if yes, how, depends on the make-up of ϕ .

We can now isolate a part of the context change of matrix assertions that we call *assertive* and define it as in [15]:

⁴Some important further additions to speech contexts that are ignored here are discussed in Gunlogson 2001.

(15) *Assertive context change*

$c + \phi$ is assertive iff $W_{c'} = W_c \cap p$, where c' is the output context.

In what follows I use $c@ \phi$ if $c + \phi$ is assertive. Note that since $@$ is a subtype of addition, it will be defined only if c meets the presuppositions of ϕ .

2.3 Complex context changes and embedded contexts

I take simple expressions to be n -ary predicate with n individual arguments. Adding a simple expression to c triggers a simple context change. Complex expressions are made up of simple expressions and operators, connectives or predicates. Adding a complex expressions to c triggers a complex context change that may involve embedded contexts.

2.3.1 Asserting a negative sentence

We exemplify complex context changes by looking at what happens when one asserts a negative sentence of the form $\neg\phi$, where ϕ has propositional content p . The steps involved are given in [16], where [16b] is an auxiliary step that involves adding ϕ to c .

(16) a. $c@ \neg\phi$

b. $c_n = c@ \phi$
 $\langle w_n, W_c \cap p \rangle$

c. $c' = \langle w_c, k, W_c - W_{c_n}, D_{c'} = D_c \cup c_n \rangle$

The context c_n created by the auxiliary step in [16b] is an element of the embedded contexts of the output context c' . Note that the overall change here is assertive because in going from the input context c to the output context c' ϕ worlds have been eliminated and therefore the context set of c' is made up of those worlds in W_c in which $\neg\phi$ is true.

Consequences of the intermediary step in [16b]

The account sketched above differs from that of Heim (1992) only in keeping the auxiliary context c_n as part of the output context. We thus maintain Heim's result concerning the fact that negation is a presuppositional hole: the auxiliary step in [16b] involves adding ϕ to c . In order for this operation to be defined, c must meet the presuppositions of ϕ .

The presence of the embedded context c_n in the output context c' can be made use of to account for modal subordination cases. (See Roberts 1996 for a recent discussion.) Thus, note that [17a] may be felicitously followed by [17c] but not by [17b]:

(17) a. Mary does not have a car.

b. She parked it in front of the house.

c. She would have no place to park it.

I suggest that the well-formedness of the continuation in [17c] should be accounted for by assuming that its logical form is *would* ϕ and that in adding *would* ϕ to c , ϕ is added to an embedded context in c , a context whose context set includes W_c as a proper subset:

- (18) $c@woud\phi$: ϕ must be added to an embedded context $c_d \in D_c$ such that $W_c \subset W_{c_d}$.

After the addition of [17a], the context contains c_n as an embedded context. At the time of [17c], the input context then contains c_n , which is an appropriate context for the argument of *would* to be added to, and c_n meets the presuppositions of ϕ . In particular, in c_n there is a car that Mary has and which can function as the referent of the definite pronoun *it*. Note that it follows from [18] that the complement of *would* cannot be added to the current context c but it can be added to the embedded context introduced by the antecedent of an afactual conditional.

2.3.2 Deciding an issue

We can now define the step of deciding an issue as in [19].

- (19) Let W_i be a set of worlds, and S a sentence with propositional content p ,
- (i) S is positively decided in W_i iff $W_i \subset p$.
 - (ii) S is negatively decided in W_i iff $W_i \cap p = 0$.
 - (iii) S is decided in W_i iff either (i) or (ii); otherwise S is undecided in W_i .

Note that asserting S /not S in c is informative iff S is undecided relative to the input context set W_c . Furthermore, if one asserts S , S will be positively decided relative to the output context set $W_{c'}$; if one asserts the negation of S , S will be negatively decided relative to the output context set. Finally, note that ff S presupposes S' , $c + S$ is defined iff S' is positively decided in W_c .

We can define when a context change decides a sentence as in [20]:

- (20) A context change decides a sentence S iff S is necessarily decided in the output context but not in the input context.

If S presupposes S' $c@S$ decides S but not S' . Note that in this case both S and S' are positively decided in $W_{c'}$ but the conversational move consisting of asserting S decides S but not S' .

3. Two epistemic predicates, *believe* and *know*

3.1 The verb *believe*

I suggest that part of the context change triggered by asserting a sentence of the form x *believes that* S_1 relative to c involves adding S_1 assertively relative to an embedded context representing x 's epistemic state. The crucial property shared by main assertions and complements of *believe* is that of involving conversational moves that result in their being positively decided relative to a set of epistemic alternatives.

Let us start from sentences such as [21a] whose schematic form is [21b].

(21) a. John believes that Mary left.

b. Su believe S_1

A sentence of the form [21b] is true in w iff in w , S_1 is true as far as the referent of Su is concerned. In dynamic terms, asserting [21a] relative to c decides S_1 relative to John's worldview: in the output context c' , S_1 is positively decided as far as John is concerned. We give first the truth conditional account in detail and then the dynamic one.

3.1.1 Truth conditional terms

Traditionally, [21b] is said to be true in w iff S_1 is true in all the worlds compatible with what the referent of the subject believes in w . In other words, [21b] is true in w iff S_1 is true in $E^{i,w}$, the set of worlds epistemically accessible to i in w , where i is the referent of the subject. $E^{i,w}$ is the set of worlds compatible with what i believes in w .⁵

In order to implement this idea we need, as part of the model M , a function F from $\langle i, w \rangle$ to sets of propositions $E_{i,w}$. We can then define the notion of an individual i 's worldview in w as follows:

$$(22) \text{ } i\text{'s worldview in } w: E^{i,w} = \cap E_{i,w}$$

The worlds in $E^{i,w}$ are i 's candidates for w in w in the same way in which the worlds in W_c are k 's candidates for w_0 in w_0 . The role played by the set of propositions $E_{i,w}$ is analogous to the role of the propositions in the common ground. Given that the worlds in $E^{i,w}$ are i 's candidates for w , i assumes that w is in this set. It follows that worldviews cannot be empty:

$$(23) \text{ Consistency condition} \\ \text{For any } i, w, E^{i,w} \neq 0$$

The denotation of *believe* is as given in [24]:

$$(24) \text{ } \|\text{believe}\| = \lambda p \lambda x \lambda w. E^{x,w} \in p$$

Taking w_i to be an arbitrary element of $E^{i,w}$, we can define i 's epistemic context as in [25]:

$$(25) \text{ Epistemic context} \\ \langle w_i, i, E^{i,w} \rangle$$

We can now talk about truth relativized to individuals and worlds: in w , p is true as far as i is concerned iff $p \in E_{i,w}$.

3.1.2 CCP of the complement of *believe*

We now consider what the context change potential of sentences of the form in

⁵Note that in effect we have here universal quantification taking $E^{i,w}$ as the modal base in Kratzer's terms.

[21b] is. Note that if the assertion of such a sentence is informative relative to c , there must be worlds $w' \in W_c$ where p is not decided for i in w' ; as a result of asserting [21b], p is decided for i in all worlds in $W_{c'}$, where c' is the output context:

- (26) a. There is $w' \in W_c$ such that p is undecided relative to $E^{i,w'}$.
 b. In all $w' \in W_{c'}$, p is positively decided relative to $E^{i,w'}$.

The assertion of sentences of this form increases information concerning the worldview of their subject.

I suggest to make room among the possible embedded contexts in c for embedded context $e_{i,c}$ that represent an individual i 's worldview in c :

- (27) *i's worldview in c*
 $e_{i,c} = \langle w_i, i, E^{i,c} \rangle$

Here $E^{i,c}$ is the intersection of the propositions that have been established in c as being true for i . If a context c has a context $e_{i,c}$ as an element of D_c , the following condition must be met:

- (28) For any $w \in W_c$, $E^{i,w} \subset E^{i,c}$

This condition insures that for any w in W_c it will be the case in w that i believes everything c has established i as believing.

Turning now to the question of the CCP of sentences of the form in [24b], I suggest that they involve an auxiliary step in which the complement of *believe* is assertively added to i 's worldview in c , where i is the referent of the subject and c is the input context. In the output context c' i 's worldview has been changed by the assertion of S_1 relative to it. This is summarized in [29]:

- (29) a. $c@[John\ believes\ that\ S_1]$
 b. $e_{j,c'} = e_{j,c}@S_1$
 c. $c' = \langle w_c, k, W_{c'}, e_{j,c'} \in D_{c'} \rangle$

The auxiliary step in [29b] involves adding S_1 assertively to John's worldview in c . As a result of this step, all non- p worlds are removed from $E^{j,c}$. Consequently, the effect of asserting *John believes that S_1* relative to c is to project an output context c' whose context set meets the condition in [30]:

- (30) $W_{c'} = W_c \cap \parallel John\ believes\ S_1 \parallel$

In going from c to c' all worlds $w' \in W_c$ such that $E^{j,w'} \not\subset p$ have been removed from W_c .

We can now characterize the CCP of the complement of *believe* as in [31]:

- (31) CCP of complement of *believe*: $e_{i,c}@S$, where i is the referent of the subject of *believe* and S is the complement.

If x believes that S_1 is assertively added to c , S_1 is assertively added to x 's worldview in c .

3.1.3 Consequences for entailments

(i) *Conjunctive inferences*

Under the assumption that the CCP of conjuncts is computed as in [32]

$$(32) \quad c+(S_1 \text{ and } S_2) = (c+S_1)+S_2$$

it immediately follows that main assertions and complements of *believe* will exhibit the conjunctive entailment pattern exemplified in [33] and [34].

- (33) a. It is raining.
 b. It is Thursday.
 c. It is raining and it is Thursday.
- (34) a. John believes that it is raining.
 b. John believes that it is Thursday.
 c. John believes that it is raining and it is Thursday.

(ii) *Monotone increasing inference patterns*

Given the properties of intersection, it also follows immediately that main assertions and complements of *believe* will give rise to the monotone increasing inference pattern exemplified in [35] and [36]:

- (35) a. Mary teaches on Thursday.
 b. Mary teaches.
- (36) a. John believes that Mary teaches on Thursday.
 b. John believes that Mary teaches.

3.1.4 Consequences with respect to presupposition projection

With respect to presupposition projection, it follows that the presuppositions of main assertions have to be met by the input context, while the presuppositions of the complement of *believe* have to be met by the $e_{i,c}$, the subject's worldview in c . It therefore follows that *believe* will be a presuppositional 'plug' in Karttunen's terms:

- (37) a. Mary got well.

b. Mary was sick.

(38) a. John believes that Mary got well.

b. John believes that Mary was sick.

Thus, as part of the CCP of [38a], *Mary got well* is added to John's worldview in c . This means that D_c must contain an embedded epistemic context, $e_{j,c}$ that meets the presupposition of *Mary got well*, namely, *Mary was sick*. This amounts to [38b] being true in c .

To conclude then, the CCP of the complement of *believe* is assertive because it is assertively added to the the epistemic context of the subject. As a result, the CCP of *believe* decides the complement sentence relative to the subject's contextual worldview; it leaves it undecided relative to the immediately superordinate context, i.e., the context *Su believes S_1* is added to. In the output context c' the referent of the subject is committed to the truth of the complement but the conversational community or the speaker are not.

3.2 The verb *know*

The essential difference between *believe* and *know* is that the latter presupposes its complement. This means that the complement has to be positively decided relative to the input context to which *x believes that S_1* is added. Thus, if one asserts [39] relative to c ,

(39) John knows that Mary was sick.

Mary is sick is assertively added to $e_{j,c}$ as in the case of *believe*. The extra requirement is that *Mary is sick* has to be true relative to c . Thus, the CCP of *know* decides the complement relative to the subject's contextual worldview, but not relative to the immediately superordinate context, c .

The account sketched here has welcome consequences for presupposition projection. It predicts that *know* will be a 'hole' in Karttunen's terms. In a simple case such as [40],

(40) John knows that Mary was sick.

the presupposition has to be satisfied by the speech context since that is the context to which *John knows that Mary was sick* is added. In the more complex case in [41a], however,

(41) a. Sam believes that Mary was sick last week and that John knows that she was sick.

b. John knows that Mary was sick.

c. Mary was sick.

the presupposition *Mary was sick* has to be satisfied not by the speech context but rather, by Sam’s worldview in the speech context. This is so because while [41a] is added to the speech context c , [41b] is added to $e_{s,c}$, Sam’s worldview in c and [41c] is added to $e_{j,e_s,c}$, John’s worldview in $e_{s,c}$. This last step requires [41c] to be in $e_{s,c}$, which is what the first conjunct in [41a] achieves.

3.3 Main assertions and complements of *believe* and *know*

We briefly compare here main assertions and the complements of the non-hedged epistemic predicates *believe* and *know*.

Note first that main assertions are assertively added to the epistemic context of the speech act. As a result, in the output context c' they are true as far as k is concerned, and the speaker is publicly committed to their being true. The complements of *believe* and *know* are assertively added to an embedded epistemic context rather than the main context. They are true as far as the referent of the subject is concerned. The two predicates contrast in that *know* but not *believe* requires its complement to be true in the matrix context and therefore the individual anchor of the matrix context is also committed to the truth of the complement. Common to main assertions and the complements of *believe* and *know* is that they are assertively added to an epistemic context. The difference is that main assertions are added to the main context, while the complements are added to an embedded context.

3.4 Extension to fiction predicates and reported assertion predicates

3.4.1 Fiction predicates

Fiction predicates such as *dream* and *imagine* exemplified in [42],

- (42) a. Mary dreamt that John wrote to her.
 b. Mary imagined that John wrote a long letter.

introduce a fictional embedded context which differs from epistemic contexts in that its world is not a candidate for reality for the individual anchor (the referent of the subject). Thus, the truth of the sentences in [42] does not commit Mary (or anyone else) to the truth of the complement. The complement is, however, assertively added to the fictional context introduced by the predicate and therefore it is positively decided relative to these contexts. Common to epistemic predicates and fiction predicates is that their complement is assertively added to a context introduced by the predicate and anchored by the referent of the subject. The difference concerns the relation of the anchor to the context set. In the case of epistemic contexts, the anchor takes those worlds to be candidates for reality, while in the case of fictional contexts this is not the case.

3.4.2 Reported assertion predicates: *say*, *assert*, *state*

Predicates that denote an assertive speech act introduce an embedded speech context. The subject of the predicate plays the role of speaker in the ‘reported speech act’. The complement of such predicates is assertively added to the embedded speech context.

In order to characterize the CCP of complements of speech acts other than assertions we would have to have a good characterization of the CCP of sentences with non-assertive sentential force, a matter that is by far not settled. I will speculate here only on main interrogative sentences and interrogative predicates, such as *ask*, and *inquire*. Main interrogatives do not commit the speaker to anything. They do, however, project a set of future contexts in which their propositional content is decided. These contexts involve the assertive addition of the propositional content of the question (or of its negation) to the current context. I will say then that questions have *delayed assertive CCP* relative to the current context. Interrogative predicates introduce an embedded speech context. Their complements have delayed assertive CCP relative to that context.

3.5 Desideratives and directives

3.5.1 Desideratives

I will not even attempt to do justice to the complexities of understanding the truth conditional and dynamic semantics of desideratives, and will only give a sketch here based on Heim (1992). The complement of desideratives is added to the subject's epistemic context, but the addition is not assertive. It does not result in the complement being decided relative to any context. The type of change triggered is *evaluative*: worlds in the embedded context set in which the complement is true are ordered higher (as far as the anchor is concerned) than worlds in the context set in which the complement is not true. In going from the input context to the output context, one eliminates contexts where this ranking does not obtain. This contrasts with assertive changes, where what one eliminates is contexts where the complement is not true. An evaluative context change does not decide the sentence relative to any context. We therefore do not expect the entailment patterns of desideratives to parallel those of epistemics. We do expect, however, the presuppositions of the complements of desideratives to have to be met by the contextual worldview of their subject. As readers of Heim (1992) will recall, the main difficulty desideratives give rise to is that of establishing the right set of worlds that one evaluates. Fortunately, for our current purposes, all that is needed is that the CCP of these complements is not assertive and that they remain undecided relative to the output context.

3.5.2 Directives

Directive predicates, such as *order*, *command*, *ask*, *request*, denote directive, or imperative speech acts and their understanding goes hand in hand with understanding the CCP of imperatives. Even speculating on this issue is beyond the scope of this paper. I will only note here that just like with interrogatives, imperatives do not commit the speaker or anyone else to the truth of their propositional content. They are instructions for action and thus attempt to shape the future actions of the addressee. Their CCP therefore is not assertive, and neither is the CCP of complements of directive predicates.

5. Mood choice

5.1 Complexities of mood choice

We return now to the slice of the mood choice problem identified at the beginning and attempt to solve it. We first establish that the task is not simple by showing that some simple alternatives do not work. Let us start with the simple hypothesis in [43]:

(43) *Hypothesis 1*

A complement that is true in the world of a context is in the indicative.

Under this hypothesis strong intensional predicates are correctly predicted to be indicative governors and desideratives and directives are correctly predicted to be subjunctive governors. The problem is that factive-emotives are predicted to be indicative governors as well. Since a factive emotive such as [44a] presupposes its complement,

(44) a. John is sorry that Mary is unwell.

b. Mary is unwell.

if [44a] is true in w , [44b] is true in w , as well as in all the worlds in $E^{i,w}$, where i is the referent of *John*. As you recall, this prediction is true for Romanian (and its Balkan neighbors) but false for French and Spanish.

One might try to avoid this problem by assuming that in French and Spanish (but not in Romanian) we also have the restriction in [45]:

(45) Presupposed complements are not in the indicative.

This, however, gives the wrong result for the French and Spanish equivalents of *know*, which govern the indicative although the complement is presupposed.

Another attractive attempt is to assume that what we need to establish is which complements are in the subjunctive, and to try to do that by adopting the hypothesis in [46]

(46) *Hypothesis 2*

Complements involving an evaluative component are in the subjunctive.

This hypothesis predicts that desideratives and factive-emotives will pattern together because of their common evaluative component. This prediction is borne out in Spanish (and to a lesser extent, French) but is, of course, problematic for Romanian where factive-emotives and desideratives do not pattern together: the former are solid indicative governors, the latter are solid subjunctive governors. We have to abandon both hypotheses though both are quite attractive. In the next subsection I suggest a way of capturing what is true in them within an OT framework.

5.2 Proposal: an OT solution

5.2.1 Assumptions

I will give here an account of the corner of the mood distribution problem we are faced with and suggest ways in which it could be extended to the larger issues.

The account is couched in OT terms and is based on the following assumptions:

(i) There is a universal set of moods, the mood menu. I simplify here and assume that this menu has only two choices, indicative and subjunctive.

(ii) Semantics provides a language-independent list of characteristics of complements given the semantics of the predicates and of the immediate linguistic environment.

(iii) The relevant candidate list given by GEN is made up of relevant complement characteristics paired with all possible moods.

(iv) The grammar provides a set of non-arbitrary soft constraints connecting mood and semantic characteristics of complements as well as a language specific ranking of these constraints.

(v) The optimal mood choice is that found in the highest ranked candidate

5.2.2 Relevant complement characteristics

A. One relevant semantic characteristic of complements concerns the type of CCP that characterizes them. I assume the existence of a binary feature +/-Assert defined as in [47]:

(47) A sentence is +Assert iff its CCP is assertive.

Complements of strong intensional predicates will be +Assert. These predicates will be called assertives. Within the set of assertive predicates we can further distinguish various subgroups depending on the nature of the contexts they introduce. Thus, epistemic predicates introduce contexts whose context sets are alternative realities as far as their individual anchors are concerned, while fictional predicates introduce contexts that do not share this characteristic. Assertive predicates, like all other predicates, will be *factive* if the complement is required to be true in the input context and non-factive otherwise.

Complements of desideratives and directives are -Assert because their CCP is evaluative rather than assertive. Complements of factive-emotives are -Assert for the same reason. Their special property, however, is that they are factive.

B. Another relevant complement characteristic concerns the status of the complement relative to the output context, information encoded in the binary feature +/-Decided defined in [48]:

(48) A sentence is +Decided iff it is decided in the output context to which it is added.

Given what was said so far, if a sentence is +Assert, it is +Decided. Note also that if S is presupposed it is +Decided and -Assert.

5.2.3 The constraints

The constraints that are operative in the account below are given in [49].

- (49) a. *SUBJ/+Decided
 b. *IND/-Assert

*SUBJ/+Decided penalizes the use of the subjunctive with a complement that is +Decided. *IND/-Assert penalizes the use of the indicative with a complement whose CCP is not +Assert.

Justification of the constraints

One way of justifying these constraints is by assuming that there is a connection between the indicative mood and main assertions. Accordingly, we expect semantic characteristics shared by main assertions to be connected with the indicative and semantic characteristics that diverge from those of main assertions to be connected with the subjunctive. Note now that +Assert and +Decided characterize main assertions. The constraints in [49] therefore are as we would expect, while those in [50] are impossible:

- (50) a. *IND/+Decided
 b. *IND/+Assert

Deriving the constraints in terms of markedness hierarchies

Within OT, these constraints would be derivable if we assumed the markedness hierarchies in [51] under a harmonic alignment approach as worked out in Aissen (2003), for instance.

- (51) a. Indicative > Subjunctive
 b. +Assert > -Assert
 c. +Decided > -Decided
 d. Main > Subordinate

5.2.4 Mood distribution in Romanian

The facts of Romanian follow under the assumption that our two constraints are ranked as in [52]:

- (52) *SUBJ/+Decided \gg *IND/-Assert

The table below gives the results for complements of strong intensional predicates, which are +Assert and +Decided. The winning candidate is in bold-face.

	*Subj/+Decided	*Ind/-Assert
+Assert, +Decided Ind		
+Assert, +Decided Subj	*	

The indicative choice is optimal here because it violates no constraint; the subjunctive is suboptimal because it violates *Subj/+Decided.

The next table gives us the results for complements of desideratives and directives, which are -Assert, -Decided.

	*Subj/+Decided	*Ind/-Assert
-Assert, -Decided Ind		*
-Assert, -Decided Subj		

Here the subjunctive choice is optimal because it violates no constraint, while the indicative is suboptimal because it violates *Ind/-Assert.

The table below gives the results for complements of factives- emotives, which are -Assert, +Decided

	*Subj/+Decided	*Ind/-Assert
-Assert, +Decided Ind		*
-Assert, +Decided Subj	*	

Each candidate violates a constraint. Because of the ranking we assume for Romanian, the indicative choice is optimal.

5.2.5 Mood distribution in French

For French (and Spanish) I assume the ranking in [53] (the reverse of that in Romanian).

(53) *IND/-Assert \gg *SUBJ/+Decided

The analysis predicts that French will differ from Romanian only in the case of factive- emotives, which is the only case where the ranking mattered. With the reverse ranking, the winner will be the subjunctive rather than the indicative:

	*Ind/-Assert	*Subj/+Assert
-Assert, +Decided Ind	*	
-Assert, +Decided Subj		*

In fact, in French the two constraints are quite close, allowing for variation, but with the subjunctive winning. In Spanish, however, the subjunctive is the only good choice here. The difference between Romanian and its Balkan neighbors on the one hand, and its Western sisters on the other is reduced in this analysis to a difference in constraint ordering, which is where cross-linguistic differences reside in OT.

5.2.6 Possible extension: subjunctive as signal of lack of speaker commitment

It is well-known (see Schlenker 2003, Giorgi and Pianesi 1997) that subjunctive

is used in German and Italian to mark the absence of speaker commitment to the complement in cases of complements of epistemic predicates and reported assertion predicates (but not fiction predicates). We could account for this fact by first noting that main assertions involve public commitment of the speaker to the asserted sentence. We can then see this use of the subjunctive in German and Italian as a way of maximizing contrast between the presence of speaker commitment and lack thereof in cases where an individual anchor other than the speaker is committed to *p* but the speaker is not. This happens when the complement is assertively added to an epistemic embedded context that is not necessarily the same as that of the speaker's current epistemic context.

Let us assume that a sentence is marked with the feature $+Com_{i,c}$ in case *c* is the context to which *S* is added, *i* is its individual anchor, *i* is not the speaker and *c* is not the main context, and the addition of *S* to *c* commits *i* to *S*. Obviously, main assertions will be $-Com_{i,c}$ and therefore the constraint we expect is the one in [54],

(54) *IND/ $+Com_{i,c}$

penalizing the indicative in the presence of non-speaker commitment. I suggest that this constraint is operative in German and Italian, but ranked too low in Romanian, French or Spanish to have its force felt.⁶ The effect of [54] is to bar the indicative in the complements of non-factive epistemic and reported assertion predicates except in the case when the subject of these predicates is first person singular, and the tense of the predicate is present. Turning this suggestion into a firm analysis is, however, beyond the scope of this paper.

Before concluding, note that the line of analysis sketched here achieves an important result in that it is a step toward accounting for areas of cross- (and intra-) linguistic stability and variation with respect to mood distribution. For the simplified case we looked at above, the analysis predicts cross-linguistic stability in the case of strong intensional predicates and desideratives and directives. The former have semantic characteristics that favor the indicative and no characteristics that favor the subjunctive. The latter have only characteristics that favor the subjunctive. Factive-emotives, on the other hand, have mixed characteristics and therefore we correctly predict cross- and intra- linguistic variation, as well as historical instability. These predictions are summarized in [55].

- (55) a. $+Assert, -Com_i$: stable indicative
 b. $-Assert, -Decided$: stable non-indicative (subjunctive/infinitive)
 c. $+Decided, -Assert$: variation

⁶The full analysis of course would have to take into account the whole range of mood choices. In fact, there is evidence that this constraint is operative in Romanian as well, but it leads to the (optional) use of the conditional, rather than the subjunctive.

6. Conclusion

Building on the proposal that predicates may introduce embedded contexts, I have argued here for the usefulness of recognizing that complements have their own CCP. This allows us to draw parallels between main sentential force and the CCP of complements, which is useful in tackling the thorny problem of mood selection. One important distinction we are able to make from this perspective is that between assertive and non-assertive CCP, which we found to be operative in accounting for mood distribution. There are various other areas where it might prove useful, such as in distinguishing between the CCP of antecedents and consequents of conditionals. Antecedents set up a derived context, and consequents are asserted in that context. Within nominal semantics, the role of the Restrictor is analogous to that of the antecedent, and that of the NS is analogous to the role of the consequent.

An advantage of the dynamic perspective we took concerning complements is that it allowed us to capture both what is common and what is different between complements whose CCP is assertive and complements that are presupposed. This was useful in our account of the choice between the indicative and the subjunctive in Romanian and French.

An important part of the proposal in this respect is to adopt an OT perspective to mood distribution. This perspective promises to account for areas of historical as well as cross- and intra-linguistic stability and instability, which would be an important result. In order to fill in our oversimplified picture other moods have to be brought in. The infinitive will have to be connected to subject and tense dependency, characteristics that are also divergent from those of main assertion. From an OT perspective, the competition between the infinitive and the subjunctive (which was lost by the infinitive in Romanian and by the subjunctive in English) can be accounted for by assuming the constraints *SUBJ, *-FINITE whose relative order varies. The fact that there is no language where the indicative is lost would be accounted for by assuming that *IND universally outranks all simple mood constraints, a fact connected to main assertions being the least marked expressions. Further extensions will have to refine the +/-Decided distinction in order to take into account hedged assertions and epistemic modality. Another major complication involves accounting for the interaction of mood selection and negation. The work ahead concerns both isolating the relevant semantic characteristics, which is a hard-core semantics/pragmatics matter, and figuring out how they interact and what their relative weight is when it comes to mood choice, where the OT perspective is crucial.

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