



**HAL**  
open science

## Mixed (Non)veridicality and mood choice with emotive verbs

Anastasia Giannakidou, Alda Mari

► **To cite this version:**

Anastasia Giannakidou, Alda Mari. Mixed (Non)veridicality and mood choice with emotive verbs. CLS 51, Apr 2015, Chicago, France. <ijn\_01181251>

**HAL Id: ijn\_01181251**

**[https://hal.science/ijn\\_01181251v1](https://hal.science/ijn_01181251v1)**

Submitted on 30 Jul 2015

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

## **Mixed (Non)veridicality and mood choice with emotive verbs**

Anastasia Giannakidou and Alda Mari  
University of Chicago and Institut Jean Nicod, CNRS/ENS/EHESS

### **1 Emotive predicates and the subjunctive mood**

The puzzle in this paper is why emotive predicates in some languages, such as French and Italian, chose the subjunctive mood:

- (1) a. Jean *regrette* que Marie ait lu ce livre.  
John regrets that Mary have.3SG.SUBJ read this book.  
b. Gianni *rimpiange* che Maria abbia letto questo libro.  
John regrets that Mary have.3SG.SUBJ read this book.  
John regrets that Mary has read this book.

The subjunctive is unexpected because emotive verbs are thought to be *factive*, *presuppositional* ((Kiparsky & Kiparsky 1968), (Karttunen 1973)), and *veridical* ((Giannakidou 1998), 2006, 2013, 2015). Their non-emotive cousins meaning *know* take the indicative:

- (2) a. Jean *sait* que Marie a lu ce livre.  
John knows that Mary have.3SG.SUBJ read this book.  
b. Gianni *sa* che Maria ha letto questo libro.  
John knows that Mary have.3SG.SUBJ read this book.  
John knows that Mary has read this book.

The factive verb *know* selects the indicative, the mood of veridical sentences (Giannakidou *ibid.*). If emotives are factive like *know*, why do they take the subjunctive? If both *know* and emotives are veridical, how can we explain the contrast between the two vis-à-vis the subjunctive?

The usual way mood selection in complement clauses has been handled in the literature is by proposing a generalization about the decisive property that necessitates subjunctive or indicative. Simple generalizations have been proposed: for instance, that emotive verbs are veridical (see also (Marques 2004), (Baunaz 2015)); that they denote preference between two alternative propositions ((Villalta 2008)). Related notions have been used, e.g. epistemic commitment ((Smirnova 2012)), and contextual commitment ((Portner & Rubinstein 2013))— to mention just some of the most recent approaches. Unfortunately, none of the approaches offers a satisfactory way to address the emotives because the treatment is monolithic, i.e. the selecting predicate is veridical or nonveridical, or has or does not have the required property for the subjunctive. The problem becomes more acute when we consider that the emotive class varies wrt whether it takes the subjective or the indicative. (Giannakidou 2015) offers data and references indicating three types of languages:

1. Languages that require subjunctive (Spanish, Italian,<sup>1</sup> French, as above);
2. Languages that allow both subjunctive and indicative ((Brazilian) Portuguese, Catalan, Turkish);
3. Languages where emotives select indicative (Greek, Hungarian, Romanian, Bulgarian); the emotive complement may be distinguished in some other way.

Veridicality and epistemic commitment predict indicative after emotives (therefore capture the languages in 3), while preference accounts address the subjunctive in languages in group 1. The accounts are therefore at best partial, and no approach can be generalized to predict the observed variation, and the potential of dual patterns.

The variation illustrates, in the clearest way, the complexity one is confronted with when trying to establish a general pattern of mood choice across a number of languages—and how difficult it is to come up with a single generalization that will be able to handle all cases. In the present paper, we take the variation to suggest that a more nuanced approach is needed, one that might allow verb meanings to combine veridical with nonveridical components. This can be done if we distinguish between what a selecting verb *asserts* and what it *presupposes*. Once we make this distinction, we see that verb meanings can exhibit what we call *mixed* (non)veridicality, i.e. they can combine a nonveridical assertion with veridical presupposition and vice versa. Emotives, we argue are precisely one such case; (Giannakidou & Mari 2015a), in a larger detailed study of many selecting verbs, show that the number of predicates with mixed (non)veridicality is quite large. Upon closer scrutiny, it becomes clear that indeed many lexical entries are mixed, therefore flexible with respect to mood choice, as it indeed appears to be the case also in classes beyond the emotive one.

In the present paper, we use the emotive class as a window to rethink the fundamental issues arising with mood selection in complement clauses. We offer a two-tier theory that can explain the three patterns observed, extending the view that mood selection, as a grammatical phenomenon, is sensitive to the property of (non)veridicality. We offer two refinements: (a) we distinguish between (non)veridicality in the assertion vs. presupposition, and (b) we allow the subjunctive/indicative morphemes to be sensitive to (non)veridicality in either level.

Before we start with the analysis, let us offer one more piece of background. Emotive predicates are also well known for allowing negative polarity items (NPIs) to appear in their complements (see (Backer 1970), (Linebarger 1987); for more recent discussion (Giorgi & Pianesi 1996), (Giannakidou 2006)):

- (3) Ariadne regrets that she *ever* read that book.
- (4) Ariadne is glad that we got *any tickets* at all.

The NPI licensing is typically attributed to some kind of negativity. (Backer 1970) says that emotives express a relation of *contrariness* between a fact and some mental or emotional state. He claims that "We say that we are surprised when a certain fact does not conform to our expectations; relieved when it does not conform to our fears; disappointed when it is not in line with our hopes. Likewise, we

---

<sup>1</sup>We will discuss later in the paper a few exceptions to this generalization.

say that a certain fact is odd or strange if it seems counter to our view of what is logical." (Giannakidou 2006), following (Linebarger 1987), argues that the NPIs *ever* and *any tickets* are sanctioned in the emotive clause via this contrariness, and suggests that the inference is "not merely a conversational implicature, but rather something stronger" (Giannakidou *ibid.*: 595). In this paper, we show that the contrariness of the emotives is *not* a defining element of all emotives, but what renders them nonveridical is their gradable nature. At the same time, they have a veridical presupposition, and this explains the observed variation in mood selection. Emotives, then, have what we call *mixed* veridicality and this category comes with flexible mood patterns. Predicates meaning *hope*, *be aware* are also mixed, as we show.

The licensing of the subjunctive, we will argue, is akin to NPI licensing which is also sensitive to nonveridicality. In pursuing this, we follow a constant line of thought (since the late 90s, see more recently (Giannakidou 2009) who argues that the subjunctive is a polarity item, and (Quer 2009) for overview and earlier references). In our analysis here, we cast the role of subjunctive and indicative, and their sensitivity to (non)veridicality via definedness conditions. These definedness conditions are presuppositions of the mood particles. In contrast to the subjunctive which is akin to an NPI, the indicative is understood as a positive polarity item (PPI), requiring veridicality—in the assertion or the presupposition, and this explains why Greek possesses two indicative particles, as we see next.

We start in section 2 by presenting the core selection patterns. In section 3, we present the framework of nonveridicality for mood choice, with particular emphasis on the objective and subjective dimension of (non)veridicality. In sections 4 and 5 we present our analysis of emotives. We argue that they combine a veridical presupposition with a nonveridical assertion. The latter emerges via an emotive scale.

## 2 Main selection patterns in Greek, Italian, and French

Mood choice has been a central issue in semantics, both formal and descriptive, but we will not attempt a general overview here (see (Farkas 1985); (Villalta 2008); (Quer 2009); (Portner & Rubinstein 2013), and (Giannakidou 2006), 2015 for recent overviews; also (Smirnova 2012), (Giannakidou 1998), 1999, 2006, 2009, 2015 for Greek; (Marques 2004) for Brazilian and European Portuguese; (Mari 2015) for Italian; (Quer 2009) for Catalan and Spanish; (Baunaz 2015) for French). The main selection patterns that we find in Romance languages and Greek are as follows.

- (5) Indicative verbs in Greek
  - a. assertives: *leo* (say), *dhiavazo* (read), *isxirizome* (claim)
  - b. fiction verbs: *onirevome* (dream), *fandazome* (imagine)
  - c. epistemics, non-factive: *pistevo* (believe), *nomizo* (think)
  - d. epistemic factive verbs: *ksero*, *gnorizo* (know)
- (6) Indicative verbs in French
  - a. assertives: *dire* (say), *lire* (read), *soutenir* (claim)
  - b. fiction verbs: *rêver* (dream), *imaginer* (imagine)

- c. epistemics, non-factive: croire (believe), penser (think)
- d. epistemic factive verbs: savoir (know)

Italian behaves like French and Greek, with the exception of *belief* predicates, which select the subjunctive by default (Giorgi and Pianesi, 1996; for more extended recent discussion, see (Mari 2015)). In the rest of European languages, as well as Turkish (Sarigul 2015), complements of belief and fiction verbs behave like complements of knowledge verbs: they select indicative.

In Greek, we have a system of complementizer particles: *na* is for subjunctive, *oti* for indicative. The subjunctive particle *na* precedes the tensed verb, but the indicative is unmarked in main clauses, i.e. past tenses (simple past, imperfective past, perfect tenses) and the present are indicative. In embedded clauses the indicative particle *oti* is used:

- (7) Thelo na/\*oti kerdisi o Janis.  
want.1sg SUBJ/IND win.NONPAST.3SG the John.  
I want John to win.
- (8) O Pavlos kseri oti/\*na efije i Roxani.  
the Paul knows.3SG that.IND/\*SUBJ left. 3SG the Roxani.  
Paul knows that Roxanne left.

*Na* is typically followed by the form glossed above as NONPAST, which itself is licensed— Giannakidou 2009 calls it the ‘verbal dependent’, and argues that it is a temporal polarity item. NONPAST only appears with *na*, the future particle, and other nonveridical particles. It is the form that gives future orientation (see (Giannakidou 2009), and (Giannakidou & Mari 2015a) for details).

The indicative pattern is challenging for the view that the indicative implies that the sentence is ‘true in the actual world’, because complements of belief, fiction, and assertive verbs are not true in this sense. Of the indicative complements, only complements of *know* are true of the actual world, but the grammar of mood selection appears to make no distinction between actual and imagined or believed truth. This motivates the notion of subjective veridicality that we discuss in the next section— and which also, we will argue, underlies emotive verbs.

With emotive verbs, Greek does not use *oti* or *na*, but another particle *pu*:

- (9) O Pavlos lipate pu/\*oti/\*na efije i Roxani.  
the Paul is-sad.3SG that left. 3SG the Roxani.  
Paul regrets that Roxanne left.

The *pu* complement contains a past tense, it is therefore indicative; but *pu* does mark the complement formally as distinct from the other indicative *oti*. *Pu* follows emotive verbs (cf. (Varlokosta 1994), (Giannakidou 2015)), but also memory verbs such as *thimame* ‘remember’, and occasionally *ksero* ‘know’. Giannakidou (*ibid.*) claims that it also has expressive content. Here, we will propose that *pu* is sensitive to veridicality in the presupposition.

Verbs selecting subjunctive belong to the following classes.

- (10) Subjunctive verbs in Greek

- a. volitionals: *thelo* (want), *skopevo* (plan)
  - b. directives: *dhiatazo* (order), *simvulevo* (advise), *protino* (suggest)
  - c. modal verbs: *prepi* (must), *bori* (may)
  - d. permissives: *epitrepo* (allow); *apagorevo* (forbid)
- (11) Subjunctive verbs in Italian
- a. volitionals: *volere* (want),
  - b. directives: *ordina* (order), *consiglia* (suggest)
  - c. modal verbs: *è necessario* (must), *è possibile* (may), *bisogna* (must).
  - d. permissives: *impedisce* (forbid)

As we see, a volitional component is not necessary for the subjunctive, e.g. modal verbs in both epistemic (12) (note the past tense in the embedded clause) and dynamic uses select the subjunctive.

- (12) a. *Bori/Prepi na kerdise o Janis.*  
 Can/Must that.SUBJ win.PAST.3SG the John.  
 It is possible that he has won.
- b. *È possibile che abbia vinto.*  
 Be.3SG.IND possible that have.3SG.SUBJ won.  
 It is possible that he has won.
- (13) a. *Ine pithano na kerdisi.*  
 is.3sg possible subj win.nonpast.3sg.  
 He may win.
- b. *È possibile che vinca.*  
 Be.3SG.IND possible that win.3SG.SUBJ.  
 He may win.

Logically, *May/can p* does not entail *p*, and *must* is also nonveridical, since *must p* does not entail that *p* either (see recent lengthy discussion in (Giannakidou & Mari 2015a)); apart from aleithic MUST, no other use of MUST validates the veridicality principle. Modals as a class are therefore nonveridical ((Giannakidou 1998), (Beaver & Frazee), (Condoravdi 2002)) and select the subjunctive.<sup>2</sup>

Empirically, it is also important to note that some verbs are compatible with both moods. *Elpizo* (hope) is one such verb in Greek and Italian.

- (14) a. *Elpizo na/oti kerdise o Janis.*  
 hope.1SG that.SUBJ/IND win.PAST.3SG the John  
 I hope that John won.
- b. *Spero che Gianni abbia vinto/vinca.*  
 Hope.1SG.PRES that John have.3SG.SUBJ won/win.3SG.SUBJ.  
 I hope that John has won.

Equivalents of ‘hope’ are also flexible in other languages (see e.g. a recent discussion of French ‘hope’ in (Portner & Rubinstein 2013), also (Anand & Hacquard

<sup>2</sup>The subjunctive also has modal uses itself, as a possibility modal ((Giannakidou 2015); for a similar idea see (Matthewson 2010))

2013)). We argue here that the different choice reflects sensitivity of the mood morphemes to the (non)veridicality of assertion and presupposition. Let us finally note that some emotives in Italian are also compatible with the indicative.

- (15) Sono contento che tu sia/sei qui.  
 Be.1SG.PRES happy that you be.2S.SUBJ/be.2SG.IND here.  
 I am happy that you are here.

This shows again that a simple generalization, even for one verb class, is not tenable. We need a more flexible account of the verb meaning, by distinguishing the presupposition vs. the assertion, and allow for mixed cases, i.e. veridicality on one level and nonveridicality on the other. But first let's lay out the basic framework.

### 3 Veridicality and Nonveridicality: objective and subjective

In this section, we present the framework of (non)veridicality for mood choice as it emerged from a number of works since the mid-90s ((Giannakidou 1998), and subsequent work; (Zwarts)). In these works, an important distinction emerges between *objective* veridicality, which has to do with actual truth, and *subjective* veridicality, which has to do with someone's belief that a proposition is true (see for recent discussion (Giannakidou 2013), (Giannakidou & Mari 2015a), (Giannakidou & Mari 2015b)). (Giannakidou 1998) called this *relativized veridicality*, but here we will call it subjective. We present first the core notions, and then proceed with the more specific discussion of mood.

The initial definition of veridicality is for natural language expressions (here, *functions* F), in terms of entailment such that F is veridical if it entails the truth of its complement *p*:

- (16) Def 1. Objective veridicality and nonveridicality ((Zwarts), (Giannakidou 1998)).  
 Let F be a monadic sentential operator. The following statements hold: F is veridical just in case  $Fp \rightarrow p$  is logically valid; if this does not hold, F is *nonveridical*.

Functions that have veridicality and nonveridicality are propositional functions. F is veridical iff  $Fp$  entails *p*, i.e. if whenever  $Fp$  is true, *p* is true too. F is nonveridical if  $Fp$  does not entail *p*, i.e. if when  $Fp$  is true, *p* may or may not be true. Note that nonveridical operators do not entail the falsity of *p*; this is a property of anti-veridical operators such as negation. Antiveridical functions are also nonveridical, since for them too the veridicality schema is not valid: *not p* does not entail *p*. This generalization allowed Giannakidou and Zwarts to explain why NPIs generally appear in the scope of negation and other nonveridical operators, a generalization relevant for the subjunctive mood too.

In definition 1, nonveridicality is the absence of truth entailment. A factive verb such as *know* is objectively veridical: If *i knows p* is true (where *i* stands for the attitude holder, i.e. the main clause subject), then *p* is also true. But *i wants p*, under normal circumstances, does not entail *p*, therefore *want* is objectively nonveridical. Modal verbs are also nonveridical objectively since, as we said earlier,

*must/may p* do not validate inference to *p*. So, we see immediately that the notions of objective veridicality and nonveridicality cover the core cases of selection we presented earlier.

However, we do have to explain why believe and dream verbs select the indicative in an overwhelmingly large number of languages. For this, we need the notion of *subjective* veridicality. Subjective veridicality is also on inference of truth, but it is *doxastic*, i.e. now veridicality is relativized with respect to an *individual anchor i*, and what *i* believes. In embedded clauses, the crucial anchor is the bearer of the attitude. Giannakidou defined *models of evaluation M* to describe the belief states of individual anchors. These models are sets of worlds, relative to *i*, corresponding to what *i* knows or believes. We can call those models now epistemic states, following (Giannakidou 2013) (though, as we said, they can also be purely doxastic):

- (17) Def. 2. *Epistemic state of an individual anchor i*  
An epistemic state  $M(i)$  is a set of worlds associated with an individual *i* representing worlds compatible with what *i* knows or believes.

Given  $M$ , we can now identify (non)veridicality subjectively as follows:

- (18) Def. 3. *Subjective veridicality*  
A function  $F$  with a proposition *p* as its argument is subjectively veridical with respect to an individual anchor *i* and an epistemic state  $M(i)$  iff:  
 $\forall w[w \in M(i) \rightarrow w \in \lambda w'\{w' \mid p(w')\}]$ .

This reflects the classical (since (Hintikka 1962)) treatment of belief. Believe and fiction verbs denote functions  $F$  that are subjectively, but not objectively, veridical because their main clause subject (the believer or dreamer) is in an epistemic state that fully supports *p*, regardless of whether *p* is actually true. Here we define *Support* as universal quantification over the entire epistemic state:

- (19) Def. 4. *Support of a proposition p in an epistemic state M*.  
a. A non-empty epistemic state  $M(i)$  of an individual anchor *i* supports a proposition *p* iff all worlds in  $M(i)$  are *p*-worlds.  
b. Epistemic states that support *p* are veridical.

A subjectively nonveridical function, on the other hand, imposes non-homogeneity on the epistemic state: it imposes that there is at least one  $\neg p$  world, and that  $M$  is partitioned:

- (20) Def. 5. *Subjective nonveridicality*  
A function  $F$  with a proposition *p* as its argument is subjectively nonveridical with respect to an individual anchor *i* an epistemic state  $M(i)$  iff:  
 $\exists w' \in M(i) : \neg p(w') \wedge \exists w'' \in M(i) : p(w'')$ .

Subjective nonveridicality thus means that *i* is in a state of uncertainty with respect to *p*.  $M(i)$  as a whole does not support *p*: some worlds in  $M(i)$  support *p* and some others don't. This immediately suggests a link between uncertainty operators and the subjunctive selecting verbs (e.g. modals, volitionals) and subjective nonveridi-

cality.<sup>3</sup> Importantly, subjective veridicality is Hintikkaean belief, and does not entail objective veridicality.

From the epistemic domain, we can move to generalize veridicality and non-veridicality to modal spaces (sets of worlds) in general, including various kinds of modal bases for modals (see especially (Giannakidou & Mari 2015a)). From the perspective of factives, we define the factive space as objectively veridical:

- (21) Def. 8 *Objectively veridical, factive space*  
The singleton set of worlds  $M = \{w\}$  is *objectively veridical* with respect to a proposition  $p$  iff  $\{w\} \in p$ .

We will use this for *know*, and simply write  $w \in p$ . On the assumption that the future is open, one can define metaphysical modal bases as objectively *nonveridical*, assuming a branching time model with a fixed past and present and an open future. This is needed future oriented attitudes, but we cannot expand more here.

#### 4 Presupposition vs. assertion in the factive class

Subjective veridicality indicates that the anchor  $i$  knows or believes  $p$ ; subjective nonveridicality, on the other hand, indicates that  $i$  does not know or believe  $p$ . For the indicative after belief verbs, subjective veridicality is crucial.

Following classic treatments of belief, for the evaluation of  $p$  in ‘ $i$  believes that  $p$ ’, it must be the case that some relevant  $M(i)$  fully supports  $p$ . Because we have third person belief, there are two potential anchors  $i$ : the speaker and the main clause subject. Their epistemic spaces need not coincide: the speaker need not believe that  $p$  is true, but for the sentence to be true the believer cannot have any  $\neg p$  worlds in her belief space.<sup>4</sup>

- (22) O Nicholas pistevi oti/\*na efije i Ariadne.  
the Nicholas believe.3SG that.IND left.3SG the Ariadne.  
Nicholas believes that Ariadne left.

- (23)  $\llbracket$ Nicholas believes that  $p$  $\rrbracket$  is true in  $w$  with respect to  $M(\textit{Nicholas})$  iff:  
 $\forall w'[w' \in M(\textit{Nicholas}) \rightarrow w' \in \lambda w''\{w'' | p(w'')\}]$

Since all worlds in  $M(\textit{Nicholas})$  being  $p$ -worlds is a truth condition for belief, the *belief* verb is subjectively veridical. Because  $M(\textit{Nicholas})$  is a doxastic space,  $M(\textit{Nicholas})$  does not make reference to the actual world  $w$ , and it does not guarantee that  $w$  is  $p$  world.

Subjective veridicality, as a notional category, covers also fiction verbs such as *dream*. In this case, we understand  $M$  to be the set of worlds compatible with the subject’s dream (which we note  $M_{\textit{dream}}$ ) (from now on, unless otherwise stated,  $M(i)$ , stands for  $M_{\textit{epistemic}}(i)$ ).

<sup>3</sup>Another related line of research uses the label ‘commitment’ ((Farkas 1985), (Giannakidou 1998), 2013). A fully committed anchor is in a veridical epistemic state. The term ‘commitment’ has also been used in a variety of other ways in the literature on mood; e.g. (Portner & Rubinsten 2013) use it as a discourse relative notion.

<sup>4</sup>Selection of the subjunctive in Italian with belief verbs is sensitive to shifts across epistemic anchors see (Quer 1998); (Mari 2015).

- (24) a. O Nicholas onireftike oti efije i Ariadne.  
the Nicholas dreamt.3SG that.IND left.3SG the Ariadne.  
b. Nicholas ha sognato che Ariadne é andata via.  
Nicholas has dreamt that Ariadne be.3SG.PRES.IND gone away.  
Nicholas dreamt that Ariadne left.
- (25)  $\llbracket \text{Nicholas dreamt that } p \rrbracket^{w, M_{\text{dream}}(\text{Nicholas})}$  is 1 iff:  
 $\forall w' [w' \in M_{\text{dream}}(\text{Nicholas}) \rightarrow w' \in \lambda w'' \{w'' \mid p(w'')\}]$

When I dream or imagine something, the spaces are ‘private’ (in the sense of (Giorgi & Pianesi 1996)) and do not entail anything about the real world. My dream state fully supports  $p$ , it is therefore veridical. We can understand all context shifting verbs, including verbs of reported speech, to be likewise subjectively veridical (Giannakidou 1998, 1999), hence it is no surprise that they select indicative.

The belief and dream class appear to have no presupposition. Now let’s consider emotive verbs. These do have a presuppositional layer, but contrary to the usual wisdom, emotives do *not* have a presupposition of objective veridicality, but of subjective veridicality.

- (26) Falsely believing that he had inflicted a fatal wound, Oedipus regretted killing the stranger on the road to Thebes (Klein, 1975).

The sentence does not entail that Oedipus inflicted a fatal wound. Here are more examples:

- (27) John wrongly believes that Mary got married, and he regrets that she is no longer unmarried. ((Egré 2008): (30)).

These examples show that one can have an emotive attitude towards something that one *believes* to be a fact, but may actually *not* be a fact. Hence, the presupposition of emotive verbs is not of objective veridicality, but of subjective veridicality:

- (28) Subjective veridicality presupposition of emotives  
 $\llbracket i \text{ V-emotive that } p \rrbracket^{w, M(i)}$  is defined iff:  
 $\forall w [w \in M(i) \rightarrow w \in \lambda w' \{w' \mid p(w')\}]$ .

The presupposition of *know*, on the other hand, is objective veridicality:

- (29)  $\llbracket i \text{ knows that } p \rrbracket^{w, M(i)}$  is defined iff  $w \in p$ .  
If defined  $\llbracket i \text{ knows that } p \rrbracket^{w, M(i)} = 1$  iff:  
 $\forall w' [w' \in M(i) \rightarrow w' \in \lambda w'' \{w'' \mid p(w'')\}]$

This lexical entry captures the factivity of *know* as presupposition of objective veridicality— while at the same time distinguishing *know* from emotive verbs where the presupposition is merely belief of  $i$  that  $p$  without entailing or presupposing anything about the real world. *Know* is veridical in both the presupposition and the assertion.

Crucially, there other epistemic verbs with the factivity presupposition ( $w \in p$ ) are nonveridical in the assertion. This appears to be the case of consciousness verbs such as *be aware*. Without entering into unnecessary (for the purposes of mood)

philosophical debates, we assume that the set of worlds representing consciousness is a subset of worlds of the belief space (eg. (Franke & de Jager 2011)). It is generally assumed that one can hold beliefs without being conscious about them. We thus define a function *Con* that returns those worlds of  $M(i)$  that are the space of consciousness of the attitude holder. As a result, the belief-space is nonveridical, partitioned between consciousness (where  $p$  is true), and absence-of-consciousness worlds where  $p$  is not true or we simply don't know:

- (30)  $\llbracket i$  is aware that  $p \rrbracket^{w, M(i)}$  is defined iff  $w \in p$ .  
 If defined  $\llbracket i$  is aware that  $p \rrbracket^{w, M(i)} = 1$  iff:  
 $\forall w'' \in \text{Con}(M(i)(p(w'')))$ , and  $\exists w' \in M(i) : \neg p(w')$

Note that *be aware* selects the indicative in Greek and allows both subjunctive and indicative in Italian.

- (31) O Nicholas exei epignosi oti/\*na i Ariadne tou leei psemeta.  
 the Nicholas has awareness that.IND/\*SUBJ the Ariadne him says lies  
 Nicholas is aware that Ariadne is lying to him.
- (32) Sono consciente che Anna é/sia a casa.  
 Be.1SG.PRES.IND aware that Anna be.3SG.IND.SUBJ at home.  
 I am aware that Ann is home.

The entry of verbs meaning ‘be aware’, then, allows us to see two tiers of veridicality at work: a veridical presupposition like *know* but a nonveridical assertion. In one language (Greek), the indicative is chosen suggesting that the indicative is sensitive to the presupposition, and in the other (Italian) the subjunctive is chosen because of nonveridicality in the assertion, but the indicative is also possible in virtue of the veridical layer.

Emotives are also a mixed case: they have a presupposition of subjective veridicality (see (28)), and an assertion that is nonveridical, as we now show.

## 5 Emotives and nonveridicality

Because of NPI-licensing and Baker’s earlier observations, it has often been claimed that emotives carry a negative presupposition ((Giannakidou 2006)) or implicature ((Linebarger 1987)). We give below Giannakidou’s version of the presupposition:

- (33) Negative presupposition of factives (simplifying (Giannakidou 2015))  
 $i$  is surprised that  $p$  is defined if only if:  $i$  believed or expected that  $\neg p$ , at a time  $t' \prec t_u$  (where  $t_u$  is the the utterance time).

From this perspective, the emotive verb is again mixed: nonveridical in the presupposition, while being veridical in the assertion. The fact that nonveridicality in the presupposition can trigger subjunctive in Greek has also been demonstrated in (Mari 2014) for ‘manage to’, which is argued to presuppose nonveridicality and thus paves the way for rethinking nonveridicality and its effects at different levels of meaning. We can therefore parametrize languages such that the Greek-type allows the subjunctive only with logically (i.e. in the assertion) nonveridical verbs. Italian

subjunctive, on the other hand, is an NPI triggered by negation at the non-assertion (e.g. like *any* in *I am surprised he has any friends*).

The negative presupposition account, however, faces a challenge with the following example. Observe the continuation ‘and she always knew that’ in (34).

- (34) Arianna è contenta/felice/triste/irritata/ . . . che Nicolas abbia  
 Arianna is happy/glad/sad/irritated/ . . . that Nicholas has.3sg.subj  
 partecipato alla maratona, e ha sempre saputo che lo  
 participate to-the marathon, and has always known that that  
 avrebbe fatto.  
 have.3sg.cond done.  
 ‘Arianna is happy that Nicholas participate in the marathon, and she always  
 knew that he would do it.’

(34) clearly does not convey that the speaker has an expectation or belief that  $\neg p$ ; and there is a contrast with *surprise* (*I am surprised that J. participated in the marathon, and I always knew that he would do it*), thus preventing a general characterization of the emotive class in terms of a negative presupposition. At best, it appears to be an implicature, highly sensitive to the lexical choice of the verb. In the present paper, we will rephrase the analysis, following suggestions by (Giorgi & Pianesi 1996), and incorporating them into our framework. We propose that emotives have a presupposition of subjective veridicality, as we just suggested, but their assertion is nonveridical because of their scalar, gradable nature.

No attention has been paid in the literature to the fact that emotives are gradable predicates, but we will take this as our starting point. Gradability is diagnosed by number of tests (see (Kennedy 2007) for an overview and references). First, gradable predicates are compatible with degree modifiers e.g. *very*; so are emotives:

- (35) a. John is very tall.  
 b. Gianni è molto alto.  
 Gianni is very tall.  
 c. O Janis ine *poli* psilos. the John is very tall John is very tall.
- (36) a. John is very irritated/happy that Mary came.  
 b. Gianni è molto irritato/contento che venga anche Maria.  
 Gianni is very irritated/happy that come.subj.3sg also Mary.  
 c. O Janis ine *poli* thimomenos pou irthe i Maria.  
 the John is very irritated that came the Maria  
 Joh is very irritated/angry that Maru came.

Second, gradable predicates and emotives can be used in comparative sentences:

- (37) a. John is taller than Mary.  
 b. Gianni è più alto di Maria.  
 Gianni is more tall than Mary.  
 c. o Janis ine psiloteros apo ti Maria. the John is taller from the Maria  
 John is taller than Mary.
- (38) a. I am more/less irritated than you.

- b. Sono più/meno irritato di te.  
Be.1sg.pres more/less irritated than you.
- c. Ime pio/ligotero thimomeni apo sena.  
am more/less irritated from you.acc.  
I am more/less irritated than you.

In all analyses of gradability, gradable predicates introduce degree scales and map individuals onto points on the scales. The scales are assumed to contain a designated degree that functions as a *threshold* (see especially Schwarzschild, 2008) between the positive extent of the scale and the negative extent. For instance, if I say *John is tall*, I am saying that John exceeds the degree  $d$  that is the threshold/standard of what counts as tall in the context. If John's height maps onto a degree  $d'$  below  $d$ , then John cannot be said to be tall, he is not-tall. There are nuances, of course, that we gloss over here, and which do not appear to play a role for the emotives; the important insight from the gradability literature that we want to adopt is that the scale contains a positive and a negative extent.

Let  $\mathcal{D}$  be a set of ordered degrees, and  $\mathcal{I}$  a set of individuals. We assume that a scalar predicate has the analysis in (39):

$$(39) \quad \lambda P.\lambda x.\lambda d.P(x) \geq d$$

Variables  $x$  and  $d$  take their value in the sets  $\mathcal{I}$  and  $\mathcal{D}$ . Given the threshold  $d$ , two equivalence classes are determined: one above  $d$  in which  $i$  has the sentiment, and one in which  $i$  does not have it (below  $d$ ). We are now going to map scales into modal spaces triggered by propositional attitudes. We propose that there is a morphism  $\mathcal{H}$  from degrees  $\mathcal{D}$  and individuals  $\mathcal{I}$  to worlds.

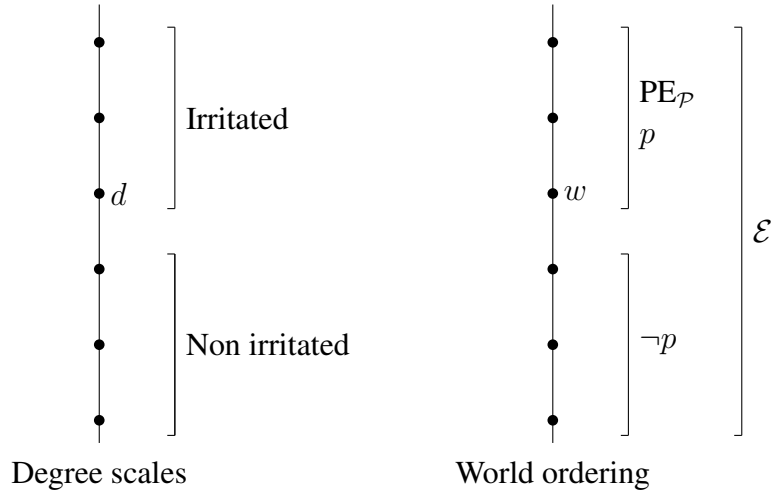
$$(40) \quad \mathcal{H}(\mathcal{D})(\mathcal{I}) = W$$

The modal base that we obtain via this mapping is nonhomogeneous. The worlds in the modal base are partitioned into those in which the attitude holder  $i$  has the emotion and those in which she does not. This partition is driven by the threshold  $d$ . In the worlds in the positive extent,  $i$  has the emotion; in the worlds in the negative extension,  $i$  does not have it. Note (see Figure 1), that the worlds in which  $i$  has the sentiment,  $p$  is true. In other worlds,  $W$  is a set of worlds ordered by  $\leq_{\mathcal{S}_i}$ . Viewing  $\leq_{\mathcal{S}_i}$  as the singleton set  $p$ , we see that just like with the scale, the set of worlds is partitioned into two equivalence classes of worlds. One is the set of worlds in which the attitude holder has the sentiment and  $p$  is true. The other one is the set of worlds in which the attitude holder does not has the sentiment and  $p$  is false.

This partitioning allows us to define *Positive-Extent-worlds* (PE) for  $p$ :

$$(41) \quad \text{PE}_{\mathcal{P}} = \{w' \in \mathcal{E}_{\mathcal{P}} : w' \text{ where the propositions in } \mathcal{P} \text{ are true} \}$$

Here, the set  $\mathcal{P}$  is the singleton set  $\{p\}$ . So  $\text{PE}_{\mathcal{P}}$  contains all the worlds in which  $p$  is true. In  $\text{PE}_{\mathcal{P}}$   $i$  has sentiment  $\mathcal{S}$ . But not all worlds in  $\mathcal{E}$  are PE worlds for  $p$ ,  $\mathcal{E}$  only partially supports  $p$ .  $\text{PE}_{\mathcal{P}}$  is a subset of  $\mathcal{E}$  (the emotive space). The complement of  $\text{PE}_{\mathcal{P}}$  contains  $\neg p$  worlds. The semantics we propose here may remind the reader of



the Best ordering used for modals ((Portner 2009), (Giannakidou & Mari 2015a)), but our ordering source merely contains  $p$ .

Hence, the gradability of the emotive predicate triggers a modal space  $\mathcal{E}$ , and partitions it into  $p$  and  $\neg p$  worlds. The emotive space is thus a nonveridical space. Now that we have the semantics for the emotive component, let us put it together with the presupposition, and provide our lexical entry for emotives.

- (42)  $\llbracket i \text{ V-emotive } p \rrbracket^{w, M(i)}$
- a. is defined iff  $\forall w' [w' \in M(i) \rightarrow w' \in \lambda\{w'' \mid p(w'')\}]$  (subjective veridicality)
  - b. If defined,  $\llbracket i \text{ V-emotive } p \rrbracket^{w, M(i)} = 1$  iff  $\forall w'' \in \text{PE}_{\mathcal{P}}(\mathcal{E})(p(w''))$ , and  $\exists w' \in \mathcal{P}: \neg p(w')$ .

$\mathcal{E}$  is a nonveridical space containing supporting worlds, but also non-supporting worlds. This lexical entry indicates that  $M(i)$  is relevant for the presupposition of emotives, but in the assertion they work like modals, in triggering the modal base of emotion.

Importantly, epistemic *be aware* (also with mixed (non)veridicality, as mentioned earlier) is also gradable. And recall that In Greek, in contrast to Italian, it selects indicative:

- (43) È molto/poco cosciente che tu sia stanco.  
Is very/little aware that you are tired.  
'He is very/little aware that you are tired.'
- (44) Maria é più cosciente di Gianni dell'accaduto.  
Maria is more concious than Gianni of-the-happened.  
'Maria is more aware of Gianni of what has happened.'
- (45) O Janis exei (elaxisti) epignosi oti vriskomaste se megalo kindino.  
the John has little awareness that find.1pl in great danger.  
John has little awareness that we are in big danger.

Since the gradable consciousness predicate can be a subjunctive selector, gradability per se cannot be the key in determining mood (*pace* (Villalta 2008)). Instead, gradability provides the necessary structure for nonveridicality because it offers a threshold for  $p$  and  $\neg p$  worlds that mirrors the positive and negative extent of the scale. Gradability thus appears to be the foundation for the creation of a nonveridical modal space.

We consider, finally, the role of the mood particles. As we said at the beginning, and following our more expanded account in (Giannakidou & Mari 2015a), we take it that the mood morphemes are polarity like elements that have definedness conditions that make reference to (non)veridicality, like all polarity items. In addition, the two linguistic systems are regulated by two meta-principles— *Veridicality wins* (Greek), and *Nonveridicality wins* (Italian). These determine differing defaults: subjunctive in Italian, indicative in Greek, as is indeed the case.

Here are the definedness conditions of IND(icative) and SUBJ(unctive) in Italian in embedded sentences.

- (46) Definedness conditions of indicative, subjunctive in embedded sentences
- a. IND is defined in the scope of a predicate that is veridical either in the assertion or in the presupposition.
  - b. SUBJ is defined in the scope of a predicate that is nonveridical either in the assertion or in the presupposition.

We immediately see that one and the same predicate can both license the indicative and the subjunctive, given the assertion and the presupposition. It is thus necessary to determine in addition a system of preferences for the optimal choices in each language (and this is what we do in (Giannakidou & Mari 2015a)).

In Greek, we have three particles *oti* (indicative), *na* (subjunctive), and *pu* (indicative).

- (47) Definedness conditions of indicative and subjunctive in embedded sentences
- a. *oti*-IND is defined only in the scope of a verb that is objectively veridical in the presupposition or a verb that is subjectively veridical in the assertion.
  - b. *na*-SUBJ is defined only in the scope of a predicate that is objectively or subjectively nonveridical in the presupposition.
  - c. *pu*-IND is defined only in the scope of a verb that is subjectively veridical in the presupposition.

Regarding *pu*, it is indeed quite remarkable that a language has a form sensitive to presupposition only. *Pu* appears to be like a real PPI: it ignores the nonveridicality of the assertion, and gets licensed by the veridicality of the presupposition. The fact that it is triggered by a property of non-assertion is in line with observations in the literature, for instance about the German Konjunktiv that it contributes itself conventional implicature ((Potts 2005)) and about *pu* itself that it has expressive content ((Giannakidou 2015)).

Finally, regarding the nature of mood licensing, our definedness conditions are *not* scope conditions, like those typically used with NPIs and PPIs. (Giannakidou

1998) and earlier literature tend to identify polarity sensitivity with scope, but what we observe with mood calls for a broadening of what licensing is. Since the lexical entries of verbs may contain both veridicality and nonveridicality, it becomes impossible to formulate conditions that would say e.g. "the subjunctive must be in the scope of a nonveridical operator", or "the indicative must be in the scope of a veridical operator". In mixed cases both hold. Our reinterpretation of mood licensing acknowledges a presuppositional contribution to all mood particles, and it says that mood choice is (non)veridicality matching between the verb and the lower mood, thus setting the basis for a grammar of matching, wherein modal concord can generally be understood.

## 6 Conclusions

In this paper, we proposed a novel analysis of emotive predicates that can explain the variation in their mood selection patterns: indicative in Greek, (mainly) subjunctive in Italian. We distinguished two levels of semantic representation where sensitivity to veridicality applies— (non)veridicality in the assertion vs. presupposition—and we allowed the subjunctive/indicative morphemes to be sensitive to this property in either level. Our two-tier theory predicted mixed veridicality predicates thus explaining multiple mood patterns within a language, as well as variation across languages. Overall, the emerging picture of the various verbs and selection patterns necessitates an OT semantic framework for mood selection (which we develop further in (Giannakidou & Mari 2015a)).

Regarding emotive predicates themselves, we argued that they do not have a factivity presupposition but a presupposition of subjective veridicality, which explains the indicative in Greek. Their assertion, at the same time, is nonveridical because their gradable structure maps onto a modal emotive space which is partitioned into worlds where the sentiment holds and those where it doesn't. Gradability is therefore the foundation for nonveridicality for emotives, and for the selection of subjunctive.

## References

- Anand, P., & V Hacquard. 2013. Epistemics and attitudes. *Semantics and Pragmatics* 6.
- Backer, C. 1970. Double negatives. *LI* 6.
- Baunaz, L. 2015. On the various sizes of complementizers. *Probus* .
- Beaver, D., & J. Frazee. Semantics. In *The Handbook of Computational Linguistics*. OUP.
- Condoravdi, C. 2002. Temporal interpretation of modals. *The construction of meaning* 59–88.
- Egré, P. 2008. Question embedding and factivity. *GPS* 77.
- Farkas, D. 1985. *Intensional Descriptions and the Romance Subjunctive*. New York: Garland.
- Franke, M., & T. de Jager. 2011. Now that you mention it: Awareness dynamics in discourse and decisions. In *The Handbook of Computational Linguistics*, ed. by Ebert C. Jäger G. Benz, A. & R. van Rooij, 60–91. Berlin: Springer-Verlag.

- Giannakidou, A. 1998. *Polarity Sensitivity as (Non)veridical Dependency*. Dordrecht: John Benjamins.
- . 2006. Only, emotive factive verbs, and the dual nature of polarity dependency. *Language* 575–603.
- . 2009. The dependency of the subjunctive revisited: temporal semantics and polarity. *Lingua* 119.1883–1908.
- . 2013. Inquisitive assertions and nonveridicality. In *A festschrift for Jeroen Groenendijk, Martin Stokhof and Frank Veltman*, ed. by F. Roelofsen Maria Aloni, Michael Franke, 115–126. Amsterdam: .
- . 2015. Evaluative subjunctive as nonveridicality. In *Tense, mood, and modality: new answers to old questions*, ed. by Blaszack J. et al. Chicago: CUP.
- , & A. Mari. 2015a. Future and universal epistemic modals: reasoning with non-veridicality and partial knowledge. In *Tense, mood, and modality: new answers to old questions*. CUP.
- , & A. Mari. 2015b. Predicting the future in greek and italian: subjective and objective dimensions.
- Giorgi, A., & F. Pianesi. 1996. *Tense and Aspect*. Oxford: OUP.
- Hintikka, J. 1962. *Knowledge and Belief*. Cornell: Cornell University Press.
- Karttunen, L. 1973. Presuppositions of compound sentences. *Linguistic Inquiry* 4.575–603.
- Kennedy, C. 2007. Vagueness and grammar: The semantics of relative and absolute gradable adjectives. *Linguistics and philosophy* 30.1–45.
- Kiparsky, P., & C. Kiparsky. 1968. *Fact*. Linguistics Club, Indiana University.
- Linebarger, M. 1987. Negative polarity and grammatical representation. *Linguistics and philosophy* 10.325–387.
- Mari, A. 2014. Actuality entailments: broadening the space of the possibilities.
- . 2015. Credere, essere sicuro, sapere and the subjunctive.
- Marques, R. 2004. On the system of mood in european and brazilian portuguese. *Journal of Portuguese Linguistics* 3.89–109.
- Matthewson, L. 2010. Cross-linguistic variation in modality systems: The role of mood. *Semantics and Pragmatics* 3.9–1.
- Portner, P. 2009. *Modality*. OUP.
- Portner, Paul, & Aynat Rubinstein. 2013. Mood and contextual commitment. In *Semantics and Linguistic Theory*, 461–487.
- Potts, Christopher. 2005. *The logic of conventional implicatures*. Oxford University Press Oxford.
- Quer, J. 1998. *Moods at the interfaces*.
- . 2009. Twists of mood: The distribution and interpretation of indicative and subjunctive. *Lingua* 119.1779–1787.
- Smirnova, A. 2012. Evidentiality in bulgarian: Temporality, epistemic modality, and information source. *Journal of Semantics* p. ffs017.
- Varlokosta, S. 1994. *Issues on Modern Greek Sentential Complementation*.
- Villalta, E. 2008. Mood and gradability: an investigation of the subjunctive mood in spanish. *Linguistics and Philosophy* 31.467–522.
- Zwarts, F. Nonveridical contexts. *Linguistic Analysis* 25.