The dependency of the subjunctive revisited:

temporal semantics and polarity

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Abstract

In this paper, I examine the syntax and semantics of subjunctive clauses in (Modern) Greek. These clauses are typically headed by the particle *na* and contain a dependent verbal form with no formal mood features: the perfective nonpast. I propose that the semantic contribution of *na* is temporal: it introduces the variable *now* (*n*) into the syntax, which then serves as the parameter for the temporal anchoring of the verb. At the same time, the perfective nonpast contains a dependent (in the sense of Giannakidou 1998, 2001) temporal variable, i.e. an anaphoric variable that cannot remain free, but must be identified with a previous time. It is the presence of this variable that renders the form polarity-like.

If this analysis is correct, it has a number of interesting implications. First, mood is no longer a "modal" category, but decomposable into a temporal semantics and directive illocutionary force (in main clauses). Second, the futurate orientation of the subjunctive arises *not* as an inherent contribution of *na* itself, but of the combination of its *n* with the perfective nonpast. Lastly, this analysis explains the polarity behavior of the subjunctive (both *na* and the dependent nonpast), namely the fact that they are selected by nonveridical elements, by appealing to their semantics, an obvious advantage over merely stipulated selection accounts. It is my hope that the analysis proposed here for the perfective nonpast will serve as the basis for the analysis of verbal subjunctives in Romance languages, and perhaps also infinitival forms in English, but investigation of this question will have be undertaken at some future time.

1   Introduction: mood choice and the dependency of the subjunctive

One of the recurring characterizations of the subjunctive mood is that it is dependent, as opposed to the indicative which is said to be independent, and is the mood *par excellence* of unembedded

assertions (Quer this issue). A corollary of this distinction renders the subjunctive usable only in complement clauses of verbs that share a particular semantic characteristic, and which *select* the subjunctive. In its strong form, the dependency thesis is not mere selection by a higher predicate, but claims that the subjunctive is "triggered" by certain semantic properties of the embedding context, pretty much the way polarity items (PIs) are triggered by their licensers; the subjunctive can thus be viewed as a PI of some kind (Giannakidou 1994, 1995 among others).

The formal study of the parameters regulating mood selection has a long history originating in the philosophical discussion of conditionals in possible world semantics (Anderson 1951, Stalnaker 1968, 1979), speech acts, and illocutionary force (Searle 1969, Searle and Vanderveken 1985, among others). In linguistics, the study of the semantics of mood has made use of the philosophical categories, and when it comes to complementation, has emphasized the role of the embedding propositional attitude verb. The aim has been to provide a coherent and relatively uniform characterization of the group of verbs that select the subjunctive and those which select the indicative. The traditional grammarian's view of the division corresponds to the *realis* (indicative) and *irrealis* (subjunctive) distinction; but the empirical problems with this division prompted refinements based on modality (Farkas 1985, 1992), nonveridicality (Giannakidou 1994, 1997, 1998, 1999), model shift (Quer 1998), illocutionary force (Rivero and Terzi 1995), and situation semantics (Portner 1997). Researchers also have exploited the idea that the subjunctive denotes a defective tense (Picallo 1985), or a null ordering source (Giorgi and Pianesi 1998). I will not summarize the various theories here (see Quer 1998, Portner 1998 for quite lucid overviews); instead I will follow my earlier work, and take the property of (non)veridicality (to be presented later on) to be the semantic factor regulating mood choice.

When we look at the actual realizations of the category "subjunctive" in European languages, we observe a typological split. On the one hand, we have languages where the subjunctive is expressed with a piece of morphology on the verb specific to this category (though it may turn out that verbal mood morphemes are not irreducible to tense or aspect); Romance languages exhibit the subjunctive of this kind which we may label *verbal subjunctive* (see also Quer this issue). On the other hand, we have languages where no specific verbal morphology is employed but the category is identified with uninflected particles that appear external to the verb, looking like complementizers (and often characterized as such). Balkan languages (e.g. Albanian, Bulgarian, Serbo-Croatian, and Rumanian) exhibit this pattern (see Rivero 1994, Terzi

1992, Roussou 2000 for general discussion). Ancient Greek exhibited a rich paradigm of non-overlapping verbal moods for the indicative, the subjunctive, and the optative; but Modern Greek aligns typologically with its Balkan neighbors and exhibits mood distinctions external to the verb. In particular, it employs the particle *na* for the subjunctive. Importantly, *na* is accompanied typically by a verbal form— the perfective nonpast (PNP)— which is itself also dependent (Holton et al. 1997): it cannot occur on its own, but needs *na* (and other nonveridical particles: *tha, as, an*) to "license" it. Both *na* and the PNP exhibit polarity-like behavior, then, and this will be the starting point our discussion.

In this paper, I address the question of what the meaning of the subjunctive is, and how exactly this meaning is responsible for the property of dependency. My main focus will be the particle subjunctive *na* of Modern Greek and the PNP. (Since we are not going to consider Ancient Greek, in what follows, I will use the term "Greek" to refer to Modern Greek). The goal will be to offer an account of these forms that will explain their dependency straightforwardly. I will argue that the semantic contribution of the subjunctive is to introduce the temporal variable *now (n)* into the syntax. This will be necessary because the apparent present tense in the PNP cannot introduce *n*. The PNP, instead, contains a *dependent* time variable. This viariable cannot be interpreted deictically, i.e. as a free variable – hence it cannot be identified with the utterance time of the context; instead, it can only be interpreted if identified with some other time. In other words, the PNP contains a temporal variable that is inherently anaphoric.

This analysis relies on two premises. One is the (quite influential) idea that pronouns and tenses are analogous creatures, i.e. interpretable by the same mechanisms in grammar (Partee 1973, 1984, Heim 1994, Kratzer 1998, and others). The other premise is that at least some polarity items are expressions that contain dependent variables (Giannakidou 1998, 2001), i.e. variables that cannot be intepreted deictically. In Giannakidou 1998, 2001 I suggested two kinds of such variables: (a) dependent individual variables, giving rise to PIs like *any,* Greek *kanenas,* and *wh-the hell* items (den Dikken and Giannakidou 2002); and (b) dependent world variables, creating intensional free choice items in various languages (an idea further implemented in Giannakidou and Cheng 2006). In the present work I am suggesting to enlarge the domain of phenomena that can receive a unified treatment across individuals, worlds, and tenses, and propose to treat the subjunctive mood as a non-deictic time, thus an instance of a polarity dependency of the temporal kind.

An attempt to explore the analogy between tenses and pronouns with somewhat similar typological concerns is Schlenker 2003, 2004. Schlenker 2003, in particular, suggested that not all indexical pronouns are intepreted in the same way. In his system, there are two types of indexicals: the *unshiftable* ones, i.e. those that can only be interpreted with respect to the context of the actual speech act, and the *shiftable* ones, i.e. those that can be evaluated in this context as well as in the context of the reported speech act. The driving idea in my paper is exactly the same: that not all *variables* are alike, in that not all of them are interpreted by the same procedures. I then go one step further and argue that there is a natural class of variables that cannot be interpreted deictically. These variables will be in need to be bound or identified with an antecedent, and will thus end up polarity items.

The discussion proceeds as follows. I present first the basic mood patterns in Greek, and discuss mood selection in section 2 based on the notion of (non)veridicality. In section 3 the syntax of mood is discussed within the Greek clause. I follow earlier work and treat *na* as a Mood head, linked further to the complementizer for directive illocutionary force. In section 4, I examine the semantics of aspect and tense, emphasizing the difference between past and nonpast, which will be crucial to the analysis of the dependent PNP. In section 5 I ask the question of what goes wrong with the perfective nonpast, and propose a semantics for *na* and the future *tha* that makes them necessary for the well-formedness of the PNP. In section 6, I consider briefly an extension of the main analysis to the conditional *an*. I conclude with the consequences of this analysis for the theory of mood, polarity, and some open questions.

2   Mood choice in Greek

2.1   Basic mood distinctions

An important characteristic of Greek is that, like other Balkan languages, it does not exhibit non-finite complementation. In this, Greek differs from Romance languages and English which employ infinitives with the verbs selecting subjunctive complements. Complementation in Greek is always finite, and we have three mood paradigms: subjunctive, indicative, and imperative. The imperative is used in main contexts only, a pattern agreeing with crosslinguistic observations (see e.g. Giorgi and Pianesi 1998, Portner and Zanuttini 2004), and is marked with specific morphology on the verb (Mackridge 1985, Holton et al 1997).

(1)   Pes   to.
        say.IMP.2sg   it
        'Say it.'

For the imperative, a special verb suffix is employed (*-s* in (1)), and a pattern of *enclisis* arises, suggesting that the verb moves to a position higher than TP (C as in Rivero and Terzi 1995, or MoodP as in Philippaki-Warburton 1984, 1993, 1998, and Giannakidou 1998). In the indicative and subjunctive, mood marking does not happen with verbal inflection (as was the case in Ancient Greek): apart from voice and agreement, the Modern Greek verb in indicative and subjunctive contains only aspectual and temporal information.

Traditional grammars as well as more recent theoretical works locate the subjunctive in the presence of the particle *na*, and often the optative *as*. (Again, unlike Ancient Greek, there is no distinct verbal optative paradigm in the modern language.). *Na* and *as* do not inflect and can be used in main clauses, preceding the inflected verb and clitic pronouns as illustrated in (2):

(2)   {Na/as}   to pis.
        subj   it say.perfective.nonpast.2sg
        'You may say it.'

These main subjunctives are used as requests, wishes, desires or orders, and are quite common in Greek (as well as Romance languages, Quer 1998). *As* is only used in main clauses, but *na* is the typical subordinator after verbs of volition, permissives, and the like, as we will see soon. The verbal form employed with *na* in (2) is in the perfective nonpast (PNP), as indicated in the gloss, and it cannot occur without *na* or *as*:

(3)   * To pis.   (PNP: * on its own)

Holton et al characterize PNP as a dependent form. Besides *na* and *as*, the PNP is licensed also after *tha* (future), the conditional *an,* and other nonveridical and future oriented connectives such as *prin* 'before' (Giannakidou and Zwarts 1999).

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(4)   Tha   to pis.

　　　 future it say.PNP.2sg

　　　 You will say it.

(5)   Prin   to pis,….   (*before*)

　　　 before it say.PNP.2sg

The dependency of the PNP and its relation to the particles that license it will be one of our central concerns in this paper. Greek nonpast differs obviously from equivalent forms in Slavic and Germanic where the nonpast can be used on its own, but with futurate meaning:

(6)   a   *Jan komt morgen*   (Dutch)

　　　 b   *Johan kommt morgen*   (German)

　　　 c   John arrives tomorrow.   (English)

　　　 d   * O Janis erthi (PNP) avrio.   (Greek)

　　　　　　 the John come.PNP.3sg tomorrow

As seen in the *d* example, the Greek PNP remains robustly unusable, and the adverbial *avrio* 'tomorrow' does not help improve it. The questions that immediate arise, then, are the following:

1. Why is PNP unusable on its own?
2. Why does the PNP improve with *na, tha* but not with just an adverbial? What is the relation between the particles and the PNP?
3. Why do we get a futurate meaning from an apparent non-future (PNP) form? Why is the shift not possible in Greek with PNP?

These questions will guide our discussion, and will prompt us to explain: (a) what the precise semantics of the nonpast is and how it is incompatible with the perfective, (b) what exactly it is that *na* contributes and yields improvement, and (c) what the link is between the PNP and the subjunctive *na*.

Let us now consider mood choice in embedded clauses, in order to establish the dependency of *na* itself.

2.2   Mood choice in embedded clauses

In embedded clauses, Greek designates mood choice in the complementizer system. For indicative complements, the complementizers *oti* and *pu* are employed:

(7)   O   Pavlos ipe   **oti**   efije   i   Roxani.
       the Paul   said.3sg   that left.3sg the Roxani
       'Paul said that Roxanne left.'

(8)   O   Pavlos lipate   **pu**   efije   i Roxani.
       the Paul   is-sad.3sg   that left.3sg the Roxani
       'Paul regrets that Roxanne left.'

Pu has been characterized as the factive complementizer, because it introduces the complements of factive verbs, e.g. emotive factives like *lipame, metaniono* 'regret', *xerome* 'be-glad' (cf. Christides 1981, Varlokosta 1994, Roussou 1994, 2000). Semi-factives like *thimame* 'remember' optionally take *pu* or *oti* complements:

(9)   Thimame   {pu/oti} ton sinandisa   sto Parisi.
       remember.1sg   that   him met.1sg   in Paris
       'I remember that I met him in Paris.'

The version of *thimame* "remember" with *pu* has a strong "subjective" dimension (Christides 1981), which means that in using the *pu* complement the speaker can re-live the fact in discussion; the indicative remains a neutral assertion. This difference is not important here.

With subjunctive complements the subordinator is *na*:

(10)   Thelo   na   kerdisi   o Janis.
        want.INP.1sg   subj   win.PNP.3sg the John
        I want John to win.

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Greek subjunctives after verbs of volition, desideratives, and directives correspond to English infinitives, hence the contrast *oti/pu* (indicative) versus *na* (subjunctive) maps, at least superficially, to a difference between *that* and *to* in English. Just like infinitivals, *na* complements can be dependent temporally on the tense of the higher verb (Picallo 1985, Abusch, Kamp and Reyle 1993, etc.), a point to which re return.

2.3   Mood choice and (non)veridicality

A recurring intuition about the subjunctive crosslinguistically is that it is "selected" by a particular class of predicates. Following my previous work, I treat this class as nonveridical (see also Borschev et al. 2007 for an extension to Russian subjunctive, and Quer 1998 for related approach with a slightly different implementation). I summarize the main details of the selection facts and analysis in this section.[1]

2.3.1 Basic verb classifications

 In a series of works (Giannakidou 1994, 1995, 1997, 1998, 1999) I proposed an account of mood choice based on the notion of (non)veridicality. This account incorporates the more traditional intuition about the role of *(ir)realis*, but avoids the empirical problems of it by positing a divide within the class of intensional verbs based on the availability of at least one truth inference, i.e. on whether at least one epistemic agent (the speaker or the subject of the main verb) is committed to the truth of the complement. If a propositional attitude verb expresses such a commitment, it will be veridical and select the indicative; if not, it will be nonveridical and select the subjunctive. Summarizing earlier classifications, the verbs that select indicative (*oti* and *pu*) complements are listed below:

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[1] In Giannakidou 1998 it is mentioned that *na* clauses can also occur (though not strictly speaking selected) by some veridical verbs such verbs of perception (*I saw John leave*), and aspectual verbs like arxizo 'start' and *stamato* 'stop' (*John {started/stopped} signing*). Such uses are distinguished syntactically from the "regular" subjunctive complements we will be considering in at least three ways (Giannakidou 1998), and I will take them to be a consequence of the necessarily finite complementation in Greek: in the absence of "smaller" complements, and given that the indicative in a tensed complement with independent tense, Greek will resort to the subjunctive for complements that correspond to "smaller" structures such as bare infinitives or gerunds.

(11)   *Indicative verbs*

    assertives: leo 'say', dhiavazo 'read', isxirizome 'to claim'

    fiction verbs: onirevome 'to dream', fandazome 'imagine'

    epistemics: pistevo 'believe', nomizo 'think'

    factive verbs: xerome 'be glad', gnorizo 'know', metaniono 'regret'

    semifactives: anakalipto 'discover', thimame 'remember'

Fiction and epistemic verbs are called *weak intensional* in Farkas (1985, 1992), and select the indicative in most European languages that allow mood choice (with the exception of Italian epistemic verbs in certain contexts; see Portner 1992 and Giorgi and Pianesi 1998).

    Verbs selecting *na*-complements, on the other hand, are the following[2] :

(12)   Directive *na- verbs*   (subjunctive proper, i.e., equivalent to *to*-infinitivals)

    volitionals: thelo 'want', elpizo 'hope', skopevo 'plan'

    directives: dhiatazo 'order', simvulevo 'advise', protino 'suggest'

    modals: (invariant) prepi 'must', *bori* 'may'

    permissives: epitrepo 'allow'; apagorevo 'forbid' (negative permissive)

    negative: apofevgho 'avoid', arnume 'refuse'

    verbs of fear: (verba timendi) fovame 'to be afraid'

These are known as *strong intensional* (Farkas 1985, 1992), and are nonveridical. With these verbs *na* embeds the dependent PNP form, and a futurate meaning arises (typical also of infinitival complements after the same class of verbs in English: *I want John to leave, I asked Bill to bring me flowers*). Certain verbs, e.g. *elpizo* 'hope", and verbs of fear, can take subjunctive as well as indicative complements— such shifts are common crosslinguistically among verbs classes, and are usually accompanied by a change in the verb meaning (Giannakidou 1995, Quer 1998), a fact supporting the idea that the higher verb somehow "licenses" the subjunctive.

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[2] The subjunctive may also be triggered in certain cases under negation (Giannakidou 1995; though this phenomenon is more marginal in Greek than it is in Romance; see also Siegel, this issue), a fact that supports further its polarity-like behavior.

Finally, the subjunctive can appear in relative clauses modifying indefinites after nonveridical verbs or in the scope of negation. Notice the contrast below with the indicative:

(13)　Dhen idha　　enan andra [pu **na**　forai　　　kokino kapelo.]　　　(subjunctive relative)
　　　not　saw.1sg a　　man　that subj wear.3sg red　　hat
　　　'I didn't see a man wearing a red hat.'

(14)　$\neg \exists x$ [man(x) $\wedge$ wear-read-hat (x) $\wedge$ saw (I,x)]

(15)　Dhen idha　　enan andra [pu　forai　　　kokino kapelo.]　　　(indicative relative)
　　　not　saw.1sg a　　man　that wear.3sg red　　hat
　　　'I didn't see a man wearing a red hat.'

(16)　$\exists x$ [man(x) $\wedge$ wear-read-hat (x)] $\wedge \neg$ saw(I, x)

(17)　Prepi　　na grapso　mia ergasia [pu **na**　ine pano apo 15 selidhes.]
　　　must.3sg subj write.1sg an essay　　that subj is　more　than 15 pages
　　　'I have to write an essay which has to be longer that 15 pages.'

With subjucntive, we are not sure if a man wearing a read hat exists in the context, but with the indicative it is asserted that such man exists and I didn't see him. Subjunctive licensing in relative clauses is observed in Romance languages (Farkas 1985) and elsewhere. Farkas suggested that subjunctive relative clauses are grammatical only if they modify NPs which are interpreted inside the scope of intensional operators. Negation, however is not intensional (Giannakidou 1998, Partee and Borchev 2004). Hence the generalization that subjunctive relatives are licensed by nonveridicality rather than intensionality (Giannakidou 1998) seems more plausible, although there are differences between selected *na* complements and relatives, as well as crosslinguistic differences, that are in need of an explanation. I hope that the ideas in the present paper will help guide future research in this area.

2.3.2   The subjunctive versus indicative and nonveridicality

The notion of veridicality is found first in Montague 1969, where it is defined in terms of existence: a verb like *see* is veridical because if *I see a unicorn* is true, then it must be true that a unicorn exists; a verb like *look for*, on the other hand, is nonveridical because if *I am looking for a unicorn* is true, it is not necessarily true that a unicorn exists. Giannakidou (1994, and sequel) and Zwarts (1995) further noticed that polarity items are excluded from veridical sentences but are allowed in nonveridical ones (see also Lin 1996 for the related proposal that *non-existence* as the relevant property for licensing NPIs in Chinese), and formalized definitions of veridicality based on truth rather than existence. Truth and existence are obviously related— as can be seen more clearly in the nonveridicality of determiners (Giannakidou 1998, 1999), and subjunctive relative clauses. We would surely like to have a clear formal like between the two, a task that will have to be left for another occasion.

The idea behind veridicality and nonveridicality is very simple. A propositional operator *F* is veridical iff from the truth of *Fp* we can infer that *p* is true according to some individual *x* (i.e., in some individual *x*'s epistemic model). This inference is typically an entailment of the sentence where *F* occurs, but it can also be given by a presupposition of that sentence (as is the case with factive verbs and determiners). If inference to the truth of *p* under *F* is not possible, *F* is nonveridical. Nonveridicality, then, captures a state of unknown (or as yet undefined) truth value. This basic idea is expressed in the definitions below:

(18)   **DEFINITION 1**. (Non)veridicality for propositional operators
i. A propositional operator *F* is veridical iff *Fp* entails or presupposes that *p* is true in some individual's epistemic model $M_E(x)$; otherwise *F* is nonveridical.
ii. A nonveridical operator *F* is *anti*veridical iff *Fp* entails that *not p* in some individual's epistemic model: $Fp \rightarrow \neg p$ in some $M_E(x)$.

Since (non)veridicality is based on truth values, only boolean functions can be taken to be nonveridical (Bernardi 2002: 132). (Non)veridical functions are thus proposition embedding functions: sentence adverbs, modal operators, tense, temporal adverbs, connectives, propositional attitude verbs, the question operator. Relativization of (non)veridicality to epistemic models is

motivated by the need to deal with the veridicality properties of propositional attitudes.

Epistemic models are sets of worlds anchored to an individual (the *individual anchor*; Farkas 1992) representing worlds compatible with what the individual believes. Without embedding, the only relevant epistemic agent is the speaker, and hers is the only model we consider. But with embedding under propositional attitudes, the model of the attitude subject is also relevant and plays a decisive role.

Assuming standardly that speakers are truthful, unembedded positive episodic assertions are veridical: unless lying or purposefully wanting to deceive, upon uttering them the speaker is committed to their truth. These are the typical indicative cases. Additionally, past assertions contain a (possibly covert) perfective past tense which is veridical: From *John found a snake (yesterday)* we can infer that it is true now that at some point in the past *John found a snake*.

Nonveridicality, on the other hand, characterizes the meaning of functions that do not ensure truth, e.g. volitional verbs like *want, suggest, insist,* all selecting subjunctive complements. From the truth of *John wants to find a snake* we can infer nothing as to whether John actually finds or found one. Modal verbs, the future, the question operator, as well as the connective *prin* '*before*' (Giannakidou and Zwarts 1999) are all nonveridical .

Since the details for each case mentioned have been discussed elsewhere, I am not going into the details here, but for the sake of clarity, let me elaborate a bit on the claim that indicative-selecting verbs are veridical. Consider *pistevo* 'believe'. Epistemic verbs express relations between individuals and propositions, for which it holds that the main clause subject is committed to the truth of the embedded proposition. Though the speaker might disagree, a prerequisite for p to be true in (19) is that Jacob's doxastic model (i.e. the set of worlds compatible with what Jacob believes) be a subset of the worlds where p is true: $M_E(\text{Jacob}) \subseteq p$, i.e. Jacob must be committed to *Ariadne loves Paul* if he believes it. The speaker may believe or even know that what Jacob believes is false, but this is irrelevant for Jacob's beliefs.

(19)   [[Jacob believes that Ariadne loves Paul]]$_c$=1 if

$\forall w \ [w \in \text{Dox}_\alpha \ (w) \rightarrow w \in \lambda w'. \text{Ariadne loves Paul in } w']$

where $\text{Dox}_{\text{jacob}} \ (w)$ is Jacob's epistemic model $M_E(\text{Jacob})$

Hence, *believe* is veridical according to our definition: $[[\text{pistevo (su, p)}]]_c = 1 \rightarrow [[\text{p}]]_{MB(su)} = 1$. The same holds for other epistemic verbs such as *think,* and *imagine,* as well as fiction predicates such as *dream.* With *dream*-equivalents, which are typical indicative verbs also in Romance, veridicality arises because the dream worlds replace the actual world (see also Farkas 1992), and in this case if *x dreams that p* is true then *p* must be true in the worlds compatible with x's dreams. Factive verbs are likewise veridical, and indeed *strongly: p* is true also in the speaker's model (factive complements are *presupposed* to be true); see Giannakidou 1998, 1999.

The directive class, on the other hand, contains future-oriented nonveridical verbs. Consider *thelo* 'want'. Intuitively, "wanting something is preferring it to certain relevant alternatives, the relevant alternatives being those possibilities that the agent believes will be realized if he does not get what he wants." (Stalnaker 1984: 89). In order to capture this, I use the subject's epistemic model as the anchoring model (instead of a buletic one, as in Portner 1997); and this model may be seen as including worlds representing future realizations of the actual world, designated as $M_{Efut}(su)$ (though desires can also be about the past, but I ignore these cases here as they do not seem to alter the overall picture). $M_{Efut}(su)$ is partitioned into two sets, say W_1 and W_2. W_1 includes worlds in which *p* is true, so the following holds: $\forall w'$, $w' \in W_1$ and $W_1 \subset M_{Efut}(su)$, $[[p]] = 1$ in w', therefore $W_1 \subseteq p$. W_2, the complement of W_1, contains worlds where *p* is false: $\forall w''$, $w'' \in W_2$ and $W_2 \subset M_{Efut}(su)$, $[[p]] = 0$ in w'', therefore $W_2 \cap p = \emptyset$. The worlds in W_1 are more desired alternatives than the worlds in W_2, but still, from *want (su, p)* we cannot infer that *p* is true in $M_{Efut}(su)$, because the truth of *p* comes about as an existential statement:

(20) $[[\text{Jacob wants that Ariadne leave}]]_c = 1$ if

      $\exists w [w \in Dox_\alpha(w) \wedge w \in \lambda w'.\ \text{Ariadne loves Paul in w'}]$

      where $Dox_{jacob}(w)$ is Jacob's epistemic model $M_E(\text{Jacob})$

We can also not infer that the actual world w_0 will be a member of W_1, the set of worlds where p is true. Hence directive verbs selecting typically *to*-infinitivals such as *want, hope,* and other members of the volitional and directive class, are nonveridical:

(21) $[[\text{thelo (su, p)}]]_c = 1 \ -\!/\!\rightarrow \ [[p]]_{MEfut(su)} = 1$ 'want'

A similar analysis can be given for the other subjunctive-taking attitude verbs and modal verbs.

3   The syntactic status of *na* and the Greek clause

In this section, I am going to propose that *na* has a double function as a mood and subordinator. I suggest a syntax of *na* as a Mood head linked to a complementizer C with the illocutionary force of the imperative. This analysis builds heavily on Philippaki-Warburton's (1998 and earlier work) ideas about the Greek clause structure, and combines these with the position that somehow *na* ends up looking like a complementizer (Agouraki 1991, Tsoulas 1993, Roussou 2000).

3.3   Background: is *na* Mood or C?

In the long history of the syntactic characterization of *na,* we distinguish two main approaches. In one approach, *na* is the head of the inflectional category Mood (MoodP; Philippaki-Warburton 1984, 1993, 1998, Philippaki-Warburton and Veloudis 1984, Tsimpli 1990, Giannakidou 1998). MoodP is distinct from T/AgrP, and directly preceding it, as supported below by the position of the clitics. If the auxiliary *ixes* 'had.2sg' plus the clitics occupy T/Agr^0, then it follows that *na* must be higher than T/AgrP.

(22)   Na   to   ixes   pi.
        subj it   had.2sg said
        'You should have said it.'

(Notice that *na* here combines with past tense verb, and no future or futurate reading arises). The structure of a main clause, in the MoodP analysis, looks as follows:

(23)   [C [Mood [T/Agr [Aspect [V]]]]]

.   The second approach claims that *na* is a complementizer C^0 (Agouraki 1991, Tsoulas 1993, and Roussou 2000). In this analysis there is no MoodP, and the structure looks as follows:

(24)   [CP *na* [T/Agr [Aspect [V]]]

(Roussou's account uses an extended C-domain, and we consider it shortly.). Characterizing *na* as a C captures the fact that *na* is in complementary distribution with the complementizer *oti* in embedded clauses (*na oti*, *oti na*), and is also consistent with the fact that *na* is not inflected.

The pure C-analysis of *na*, however, has to meet a number of challenges. First, it fails to capture the similarity between *na* and the so-called future particle *tha* (Roussou 2000), and the fact that *na* and the verb must be adjacent, unlike *oti*. Indeed, no lexical material may intervene (apart from pronominal clitics and negation), between *na* and the verb, as we see below, where the subject cannot appear between *na* and the verb; overt subjects must appear either preverbally, to the left of *na*, or postverbally:

(25)   a   * Thelo   na   o   Pavlos   erthi.
           want.1sg subj the Paul.nom   come.3sg
       b   Thelo   o   Pavlos   na   erthi.
           want.1sg the Paul.nom subj come.3sg
             'I want Paul to come.'

The adjacency requirement between *na* and the verb in a language like Greek with flexible word order cannot be explained if we take *na* to be a plain C^0, since complementizers such as *oti* and *pu* can indeed be separated from the verb by other material (e.g. the subject):

(26)   O Pavlos ipe   oti i Roxani   efije.
       the Paul said.3sg   that the Roxanne   left.3sg
       'Paul said that Roxanne left.'
(27)   O Pavlos lipate   pu i Roxani   efije.
       the Paul regrets.3sg that the Roxanne   left.3sg
       'Paul regrets that Roxanne left.'

Another problem for the C status of *na* is the fact that *na* can actually co-occur with complementizers: e.g. with *ja* 'for', *prin* 'before', *xoris* 'without', and *pu* in relative clauses, as we saw earlier*:*

(28) I Ariadne irthe   **ja** na   mas voithisi.   (purpose clause)

the Ariadne came.3sg for na   us help.PNP.3sg

'Ariadne came (in order to) help us.'

(29) I Ariadne milise   **xoris**   na xrisimopiisi mikrofono.   (*without*)

the Ariadne talked.3sg without   subj use.PNP.3sg microphone

'Ariadne talked without using a microphone.'

(30) I Ariadne efije   **prin**   na erthi o Janis.   (*before*)

the Ariadne left.2sg   before subj came.PNP.3sg the John

'Ariadne left before John arrived.'

(31) Theloume mia gramatea   pu **na**   milai   Italika.

want.1pl a secretary   that subj   speak.imperf.3sg Italian

'We want a secretary who speaks Italian.'

If *ja 'for'*, *prin 'before'*, and *xoris 'without'*, are complementizers, then the co-occurrence of *na* is not expected if *na* is also a C.

In a recent paper, Roussou (2000) refines the analysis of *na* as a C in the extended C-domain of Rizzi (1997). She proposes the following structure:

(32) [C *pu* [Topic /Focus [C_{op} *oti/an/na/as* [NegP *dhen/min* [C_M *tha/t$_{na}$* [*cl+V*]]]]]]

Roussou (2000: (19))

There are a couple of things that deserve comment here, the most obvious being that we have three C positions: $C_{M(odal)}$, C_{op}, and plain C. C_M is a C head which hosts complementizers that claimed to be modal: *na* and the future particle *tha* are assumed to be generated in this position. C_M corresponds to Rizzi's Fin (finiteness) head. C_{op}, on the other hand, corresponds to Rizzi's Force position and hosts subordinators proper (i.e. elements with clause typing properties that can also determine the illocutionary force of a clause). *Tha* is not a subordinator and remains in its base C_M position, but *na* moves further to C_{op} because it is a subordinator. The additional C position (Roussou's innovation on Rizzi), hosts *pu*, which is assumed to be a pure subordinator with no modal properties. Putting aside the third C layer, the important features of this analysis

are that there is a syntactic position in Greek where modality (*tha, na*) is captured: C_M, and that clause typing happens at a different position. Regarding the subjunctive, the insight that it captures is that the pragmatic and semantic functions of this category should not be collapsed. And this insight is correct.

3. 3 The syntax of *na:* Mood *and* C

In this section I will propose an analysis of *na* which incorporates the insight that we need to dissociate the pragmatic and semantic import of the subjunctive, while also reconciling the two apparently conflicting analyses of *na* as Mood or C head. I will suggest that it is plausible to argue that *na* is somehow both, in a way to be precise below.

Let us go back to Roussou's analysis. Though the basic insight regarding the subjunctive is correct, the conclusions that *na* is C throughout, and that *na* and *tha* start their lives at lower modal Cs are hardly justified. First, it is necessary that the modal head be a complementizer; in fact, given that modal verbs are typically inflectional elements, suggesting that the lower modality is C sounds at best counterintuitive. Second, the alleged modality remains undefined and no attempt is made to give at least a rough semantic approximation. Finally, there are important asymmertries between *na* and *tha* that suggest that it would be premature to treat them as realizations of the same "modality".

Two core differences between *na* and *tha* concern negation: negation appears to precede *tha*, but follow *na,* as indicated below. Moreover, *tha* is preceded by the indicative negation *dhen*, whereas *na* is followed by *min*, the non-indicative negation (see Giannakidou 1998: 52 for describing the division this way; *min* is also the negator of gerunds).

(33)   Na   *min*   to pis.

          subj   not   it say.1sg

          Don't say this.

(34)   Dhen tha   to po.

          not   future   it say.1sg

          I will not say this.

The reverse orders **min tha* and **tha dhen* are ungrammatical. Given the distinct selectional pattern, and that *tha* is negated by the indicative *dhen,* we must agree with Philippaki-Warburton that *tha* "as the exponent of the future tense, operates within the indicative" (Philippaki-Warburton 1998:169). Consider also that *tha* appears in *oti* and *pu* complements but not with *na*:

(35)   a   … {pu/oti}   tha erthi.

              that   tha come.3sg

           '…That he will come'.

     b   * na tha erthi

This difference is inexplicable in Roussou's account which must do something special to prevent coexistence of *na* and *tha* once the former has moved out of the lower C*;* but it follows if we assume that when we see *tha* the clause is indicative.

    In my earlier work (Giannakidou 1998), I argued that *dhen* and *min* head NegP in Greek, and that they are exactly parallel to the Italian sentential negations described in Zanuttini 1991: they take TP as their complement. If this is so, then *tha* must be generated as a separate T-related head— Future, as in Philippaki-Warburton, or *Now-T,* as I will suggest here. This explains the ordering *dhen tha* observed with negation, and it is also consistent with the semantic function of sentential negation, which applies to a proposition: the syntactic counterpart of the proposition is the TP. In this context, the Now-head is an extension of TP, and C remains, quite standardly, the domain of clause typing and force exclusively.

    Na then must be generated in a position directly above negation. Following Philippaki-Warburton and Giannakidou (1998: 55), I suggest that *na* projects MoodP. I will argue further, that *na* is linked to a null complementizer in C which gives directive illocutionary force in main clauses—and a null *ja* (the C of purpose clauses we noted earlier) in subordinate clauses (which remain assertions). Another idea would be to say that *na* itself moves to C (as argued in Giannakidou 1998), but we will see evidence that *na* is compatible with illocutionary force other than imperative in main clauses. If this is so, then we need *na* to stay in Mood.

    The resulting structure will be the following:

(36)   CP
          /\
         / C'
        / /\
   C: {oti/∅} MoodP
              /\
          Mood'
          /\
     Mood⁰   NegP
  {na/∅/imperative} /\
                  Neg'
                  /\
             Neg⁰   Now-TP
              | /\
         {min/dhen} Now-T'
                      /\
              Now-T⁰: *tha*   T/ArgP
                              /\
                          DP   T/AgrP
                          △   /\
                         to₁   T/AgrP'
                                    /\
                            T/Agr⁰   VP
                         ixes 'have.2sg'   △
                                    pro tᵥ t₁ pi 'said'
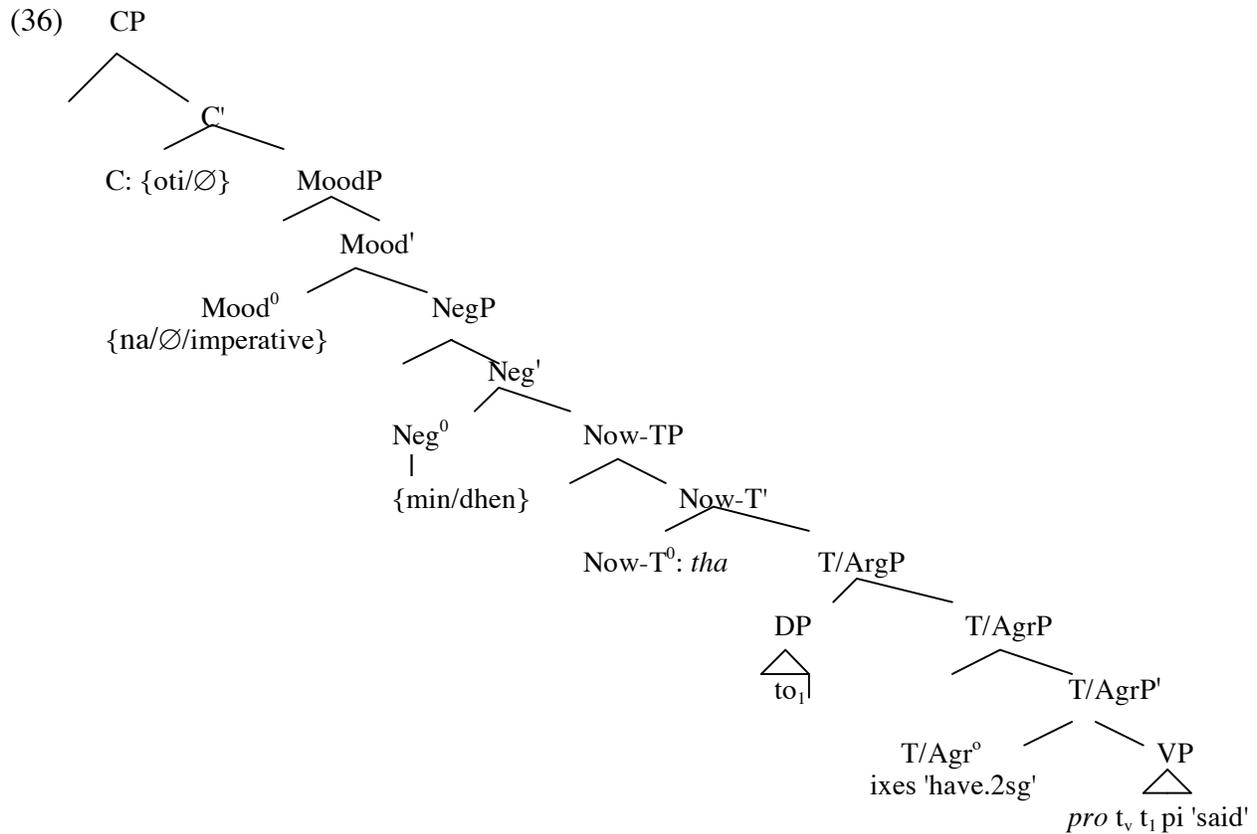
Placing NegP above tens accords with the fact that *dhen* and *min* take sentential scope, and accounts for the orders [*dhe(n) tha* verb] and [*na mi(n)* verb] observed with the indicative and the subjunctive, and suggest that a clause containing *tha* is indicative. The orders [*dhe(n)* clitics verb] and [*na mi(n)* clitics verb] are also predicted under the assumption that clitics are adjoined to T/AgrP. Crucially, Now-T is a contribution of *tha* only; if *tha* is not present, Now-T is not projected. Given that the indicative is a zero morpheme (Philippaki-Warburton) in Mood, an interesting consequence of (36) is that it links mood in Greek to two positions: C and Mood, with indicative being overtly realized in C, and subjunctive in Mood.

Finally, this analysis predicts correctly incompatibility of negation and the imperative:

(37)   * Min ela.

         not   come.imp.2sg

         ('Don't come!')

As Zanuttini (1991) observed for Italian, a negation that has the status of an independent head cannot negate a morphological imperative. This follows if we assume that the imperative is a bound morpheme generated under Mood^0 but must move further to C where it gets the illocutionary force (Rivero and Terzi). With negation, verb movement is barred because of the head status of negation. With *na* there is no problem because the verb stays in T/Agr.[3]

Let me close this section with a brief digression: the phrase structure in (36) allows a new position for preverbal subjects in Greek— Spec, MoodP (for an earlier suggestion for this position see Drachman and Klidi 1992). In most works since Philippaki-Warburton's original claim, Greek preverbal subjects are said to be topics; yet one hardly sees clear arguments for this position, and the intuitions of native speakers often disagree with it; e.g. sentences with preverbal subjects can indeed answer questions *what happened?*. In the absence of real topicalizations or focus movement, where the preverbal subject can appear even higher than CP (e.g. preceding the wh-phrase *pjos*; Tsimpli 1995), it makes more sense to place it in the specifier of MoodP, where it has no privileged discourse status, in agreement with intuition. The fact noted earlier, i.e. that overt subjects are excluded between *na* and the verb (*na o Janis erthi) follows easily: subjects are predicted canonically pre-*na* (at Spec, MoodP) or postverbally (perhaps as right dislocations). In other words, the fact that Spec, TP in Greek is not a subject position follows not from the (controversial) status of the preverbal subject as topic, but from the properties of Greek clause structure: TP is an unsaturated inflectional domain, the highest inflectional category being Mood, which appears outside the verb. In this set-up, Greek is not VSO (as is usually argued) but SVO.

We will explore next the temporal and aspectual properties of the verbal dependent (PNP), and offer in section 5 a compositional semantics for the syntax I just proposed.

4   Tense and aspect in Modern Greek

In order to examine the interaction between the subjunctive *na* and the verbal form PNP, we must first understand the specific contribution of tense and aspect in Modern Greek. The Greek verb is obligatorily inflected for tense and aspect. The four possibilities for the verb *grafo* 'I write' are given in (38) (cf. Mackridge 1985, Holton et al. 1997):

---

[3] This, incidentally would be an additional problem for Roussou's analysis: if *na*, a head, must move to the higher C positions past negation, why isn't this movement blocked by negation, just like in the imperative?

(38) a. graf- -o (INP)   b.   grap- s- -o (PNP)

write.**imperf** -1sg.nonpast   write- **perf**.1sg.nonpast

'I am writing (right now).'   [no English equivalent]

'I write (generally).'

(39) a. e- graf- -a (IP)   b.   e- grap- s- a (PP)

past- write.**imperf**. 1sg.past   past- write- **perf**.1sg.past

'I used to write.'   'I wrote.'

'I was writing.'

The basic temporal opposition is between a morphological past, which is usually marked by the prefix *e-* attaching to the verbal stem and specific inflection, and a nonpast which is signalled by the absence of the prefix *e-* (hence the label *nonpast*), and which has its own inflection.

Let us now spell out precisely the contribution of tense and aspect.

4j.1. Grammatical aspect in Greek

Following standard assumptions (and I am relying here on Kamp and Reyle 1993, Klein 1994, von Stechow 2002, Giannakidou 2003), I will take it perfective aspect (*Aktionsart* will be ignored for reasons that will become clear in a second), is a lower function that applies to the verb meaning first; then tense is applied. In order to achieve simpler types and syntactic structures, I am also assuming that the subject is in VP at least at LF, an assumption fully consistent with the fact that the Greek subject is generated in this position. Greek exhibits verb movement to T in declarative clauses, but for the purposes of semantics V is interpreted inside the VP, just like in English. T head gives temporal information, specifically temporal orientation (a time prior to the utterance time for the past morpheme; for the non-past we see below.) Following Abusch 2004 and others, I will also assume that the tenseless VP is a time abstract of type *i,wt* (for *i* the type of a time interval, and *wt* the type of propositions).

For Klein 1994, grammatical aspect concerns the relationship between *event time* and topic time, where "topic time" refers to Reichenbach's *reference time*. According to Comrie

(1976: 16), further, "perfectivity indicates the view of a situation as a single whole, without distinction of the various separate phases". Greek perfective follows these descriptions and exhibits the typical eventive meaning associated with the perfective: it creates statements that involve existential quantification over events. Such statements, depending on the internal composition of the VP, are often telic and bounded (again, as is typically the case). I will treat perfective aspect as the modifier function below: it takes the VP meaning P as its input and gives back a predicate of times such that an event characterized by P is included in those times:

(40) $[[\text{PFT}]] = \lambda P\, \lambda t\, \exists e\, [\, P\, (e) \wedge e \subseteq t\,]$

The condition 'e $\subseteq$ t' expresses that *e* takes place at *t*; the same thing can be expressed by including *t* as an argument of the verb. A typical sentence with past perfective is interpreted episodically. This is straightforward if the verb itself is eventive, but statives can also be modified by the perfective, triggering eventive readings (Giannakidou 2003):

(41)   a.   *I Ariadni* **agapise**   *ton Pavlo.*
              Ariadne love.PP**.**3sg   the Paul. =
              'Ariadne fell in love with Paul.'
       b. $\exists e\, [\textbf{love}\, (\text{Ariadne, Paul, e}) \wedge t{<}n \wedge e \subseteq t]$

(I am ssuming here the proniminal theory of tense, see dicussion in the next section). This produces an inchoative reading: there is a falling in love event. Such aspectual shifts are common in languages (see Zucchi 1998 for recent discussion and references), but in Greek they seem to be quite free (Giannakidou 2003): with the exception of very few statives (e.g. *ksero* "know" which appears with only one aspect), statives generally can be modified by perfective and yield eventive readings of the kind specified here. Given this systematicity, I believe it makes sense to treat these shifts as the result of aspect, rather than lexical ambiguities. Whether the Greek verb itself contains eventuality information is a question I would be hesitant to answer positively. In previous works (Giannakidou 2002, 2003) I suggested that the Greek V is unspecified (or underspecified) for lexical aspect; if it weren't, that is, if *agapo* came lexically as a stative, then we would expect either a type mismatch to arise above, just like in English, contrary to fact; or

we would have to posit systematic type shifting in order to fix the mismatch. Underspecification versus systematic type shifting make different learnability predictions which will in any case be exciting to test.

Imperfective aspect in Greek, on the other hand, is used for habitual/generic statements, as well as to denote progressive and ongoing events. Again, Greek is not unique in this respect, but pretty much follows the pattern observed in Romance and Slavic (Comrie 1967). In both functions, what makes the imperfective different from the perfective is that it is temporal and stative: it creates an interval during which an event is in progress (and is thus viewed as a state since culmination is not inlcuded; progressive), or it expresses a purely temporal generalization (generic). When the imperfective is used for the progressive, I will assume that it denotes the function PROG. Following common practice (while ignoring other aspects of the progressive relating to frames and modality (Landman 1992, Bonomi 1997)), PROG will be taken to have the semantics in (42) which builds on Bonomi (1997):

(42)   The imperfective progressive PROG

$\textbf{PROG} = \lambda P \lambda i \exists s \forall t [(t \in C \land t \subseteq i) \rightarrow \textbf{P} (s,t) \land s \text{ O } i]$

The condition *s O i* indicates that *s* overlaps with the interval *i*. Hence for the sentence (43a) below, with *filuse* "kiss.progressive.past", we end up with the meaning in (43b):

(43)   a   I Ariadni **filuse** ton Pavlo epi pende lepta.

'Ariadne was kissing Paul for five minutes.'

b $\exists s [\textbf{five-minutes} (i) \land i <n \land \forall t [(t \in C \land t \subseteq i) \rightarrow \textbf{kiss} (\text{Ariadne, Paul, s, t}) \land s \text{ O } i]]$

When used generically, the imperfective contributes GEN. The output is an interval during which generic quantification takes place.

(44)   The imperfective generic/habitual GEN (based on Krifka et al. 1995)

a. $\textbf{GEN} = \lambda P \lambda i \text{ GEN} t [(t \in C \land t \subseteq i; \textbf{P} (t)]$
b. PAST GEN (VP) = $\text{GEN} t [t \in C \land t \subseteq i; \textbf{write} (j, t) \land \underline{i <n}]$
(For *Egrafe o Janis* "John used to write")

To summarize, then, Greek verb forms, unlike English, are either eventive or denote progressive and generic intervals depending on whether they have perfective or imperfective aspect. This difference will be important when we consider why the nonpast is bad with the perfective but good with the imperfective.

4.2   Tense

Let us now spell out precisely the contribution of tense. I will assume the pronominal theory of tense (originating in Partee's 1973, 1984 seminal work, see also Heim 1994, Abusch 1998, 2004 and others). Tenses contribute temporal variables, and they also give temporal orientation. E.g. a past tense, denotes anteriority: it refers to a time prior to the utterance time, designated here as *n:*

(45) $[[\text{PAST}]]^{g, c}$ is defined only if $g(t) < n$, in which case $[[\text{PAST}]]^{g, c} = g(t)$

I am following Heim in representing the orientation as a presupposition, but in the formulas I will be using we also find it as part of the sentence. As pronominal elements, times can also be bound, for instance by existential quantifiers as in Bauerle 1979, von Stechow 1992, and Kratzer 1978. The past tense, as suggested above, expresses anteriority with respect to *n*, and it is this that makes the past function as a "real", independent tense. Present forms, on the other hand, are taken to denote simultaneity with respect to the utterance time— a claim that can be shown to be problematic for a number of reasons that I will not go to. But even if we accept that apparent presents express some relation to the utterance time, Greek nonpast, I will claim here, does not.

Consider first a Greek perfective past sentence:

(46)   Kerdise   o Janis.
       won.PP.3sg   the John
       'John won.'

(47)   TP: PAST $\exists$e [win (j, e) $\wedge$ e $\subseteq$ PAST]

T^0: : *kerdise*   AspectP: λt $\exists$e [win (j, e) $\wedge$ e $\subseteq$ t]
PAST
          Asp^0 :PFT=   VP: λt win (t,j)
          λP λt $\exists$e [P (e) $\wedge$ e $\subseteq$ t]
                                        t_v o Janis
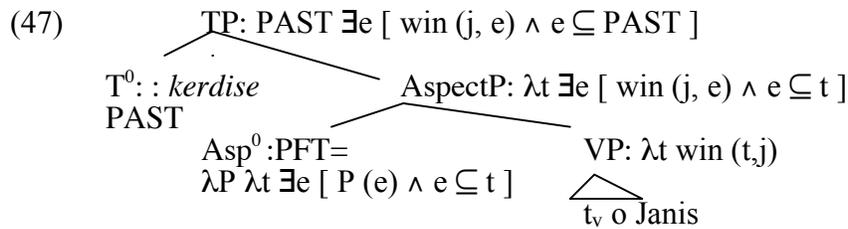
Aspect operates on the verb meaning first. The output of aspect serves as the input to Tense, which fills the interval argument (following Abusch 2004: 37), in this case with the PAST. So, a typical sentence with past perfective is interpreted episodically; and the past tense specifies independently a relation to the utterance time*:* anteriority. In this, it differs from the non-past, as will shall see, which specifies no relation to the utterance time.

Let us see now what the contribution of non-past is, and what goes wrong when we combine it with perfective aspect.

5   Subjunctive and the dependency of the nonpast

Recall that the PNP can never occur by itself in a sentence.

(48)   *Fiji   o Janis.

         leave.PNP.3sg   the John

In this, the Greek nonpast differs from equivalent forms in Slavic and Germanic, as mentioned at the beginning, where the nonpast can be used on its own as the future. Instead, the Greek PNP must be preceded by the subjunctive and other nonveridical particles in order to be grammatical. I repeat the relevant data below [4]:

(49)   b   **As** fiji   o Janis.

            as leave.PNP.3sg   the John

            'Let John go.'   (request or permission)

       c   **Na** fiji   o Janis.

            na leave.PNP.3sg   the John

---

[4]   The PNP occurs also in free relative clauses (Giannakidou and Cheng 1996, Staraki 2007) which are morphologically DPs in Greek. See Staraki for an account based on the theory outlined in this paper.

	'Let John go.'		(request or permission)
d	**Tha** fiji	o Janis.	
	future leave.PNP.3sg	the John	
	'John will leave.'		(future)
e	**An** fiji	o Janis.	
	if leave.PNP.3sg	the John	
	'If John goes away….'		(protasis of conditional)

With the particles, a futurate meaning arises. Two obvious questions must be addressed: Why is the Greek PNP unusable on its own? What exactly do the particles do that renders the PNP grammatical *and* licenses the future interpretation at the same time?

5.1 Non-past, perfective aspect, and the dependency of the PNP

The PNP was discussed in Giannakidou and Zwarts 1999 where it was argued that the problem with this form is that it is temporally ambiguous:

(50)   *Kerdisi   o Janis.
            win.PNP.3sg the John

(51) $\exists e$ [**win** (John, e) $\wedge$ e $\subseteq$ t $\wedge$ $\underline{\neg(t < n)}$]

The underlined contribution of non-past forces John's leaving to happen at a non-past time. This leaves two options: either *e* happens at the utterance time *n* ($e \subseteq n$), or it happens at a future time. The former would require *e* to be viewed as ongoing but this is expressed with the progressive. At the same time, the future reference with PNP is blocked, according to Giannakidou and Zwarts, by the existence of *tha*.

This account predicts that insertions of *simera* 'today' or *avrio* 'tomorrow', will improve the PNP since they will resolve the ambiguity. Recall, however, that this is not the case:

(52)   *Kerdisi   o Janis   {avrio/simera/se tris ores}.
            win.PNP.3sg the John   tomorrow/today/in three hours

Hence, it cannot be simply the ambiguity of the PNP that makes it unusable.

Here I am going to suggest that what goes wrong with Greek PNP is that it cannot introduce *n(ow)*, as is usually assumed to happen with present tenses. Rather, the PNP denotes a forward moving interval whose left boundary is a dependent variable t_d. This variable cannot be interpreted deictically (as a free variable). In containing such a variable, the Greek PNP is not special, but follows the pattern I identified for other PIs in earlier work— dependent indefinites (Giannakidou 1998), and intensional free choice items (Giannakidou 2001, Giannakidou and Cheng 2006), which contain dependent individual and world variables respectively. The PNP variable is part of this natural class of dependent variables, which is what underlies a significant portion of polarity phenomena (see Giannakidou to appear for more details). It is the presence of this dependent temporal variable that renders PNP a dependent form and polarity like.

I will propose the following semantics for non-past.

(53) $[[\text{non-past}]] = \lambda P\, \lambda t\, P((t_d, \infty))$

This semantics is inspired by Abusch's 2004 analysis of *will* as a substitution operator. According to Abusch, "in the substitution operator, *t* is a bound variable that corresponds to the tense argument of *will* [which is *n*, coming from the higher PRES; clarification mine]. For a top-level occurrence of *will,* the effect is to substitute (n, ∞) for n" (Abusch 2004: 39). However, with the Greek nonpast we will not be able to do this substitution because, unlike *will,* which is decomposed into the substitution operator plus PRES supplying *n* (Abusch 2004: (48)), the Greek nonpast contains no higher temporal information, that is, no PRES, it will thus require some other element to supply *n*; without it, t_d remains free at the top. But since t_d cannot be interpreted deictically (i.e. as a free variable referring to the utterance time) the structure becomes ill-formed:

(54)   * TP: $\exists e$ [win (j, e) $\wedge$ e $\subseteq$ (t_d, ∞)

    T^0: non-past: *kerdisi*   AspectP: $\lambda t\, \exists e$ [win (j, e) $\wedge$ e $\subseteq$ t]
    $\lambda P\, \lambda t\, P((t_d\ \infty))$

          $Asp^{0:}$:PFT=   VP: λt win (t,j)
          $\lambda P\, \lambda t\, \exists e$ [P (e) $\wedge$ e $\subseteq$ t]

                      t_v o Janis

The nonveridical particles, I will argue next, have precisely the function of supplying the needed *n*, thus fixing the "deficiency" of the nonpast by filling in *n* for t_d.

Before I proceed to show this, I would like to emphasize that the semantics I proposed here for the Greek nonpast rejects the view of non-past being equivalent to the present tense in the sense of containing the time PRES, which in most analyses indicates simultaneity and is identified with the utterance time *n*. In other words, I am proposing that there is a meaningful difference between nonpast and present, and that languages may vary with respect to what their surface 'present" forms denote: in languages like English, the surface form "present" denotes PRES and is capable of introducing *n*, which at the top will by defualt be idnetified with the utterance time. But in languages like Greek, the surface form "present" is really a nonpast and is not capable of making reference to *n*. This, I will argue, may be the basis for the dependency of verbal subjunctives too: we can hypothesize that they also contain what was defined here as nonpast (thus spelling out more precisely the intuition that verbal subjunctives contain "deficient" tense, Picallo 1985).

One final question is: why is the PNP OK with the imperfective? The key to understand this difference is first to understand what it means to be OK. Consider an imperfective sentence in the nonpast. Such sentences are vague, in Greek as well as English, due to ambiguity of the imperfective between the habitual and the progressive. However, by default, the reading of a plain imperfective sentence in Greek will be generic, as indicated below:

(55)   O Janis grafi .

        John writes.

(56)   GEN*t* [t∈ C ∧*t* ⊆ *i*; **write** (j, *t*)]

Generic statements in the nonpast are *not* about the present. Rather, they are "atemporal": John has the property (or the ability) to write. Here, the problematic interval (t_d, ∞) is replaced by the generic interval *i*, and the result is a statement with no reference to the utterance time.

The progressive reading, on the other hand, become salient when we add frame adverbials, e.g. *tora* "now", or *olo to pri* 'all morning":

(57)   a   O Janis grafi tora.

John is writing now.

b   O Janis grafi olo to proi.

John is writing all morning.

These adverbials, I will argue, provide either an interval that replaces the problematic one (t_d, ∞):

(58)   TP: $\exists$s $\forall t$ [(t$\in$ C $\land t \subseteq$ (*all morning*)) → **write** *j,s, t*) $\land$ s O (*all morning*)

olo to proi   TP: $\exists$s $\forall t$ [(t$\in$ C $\land t \subseteq$ (t_d, ∞)) → **write** *j,s, t*) $\land$ s O (t_d, ∞)

T^0: non-past: *grafi*   AspectP: λi $\exists$s $\forall t$ [(t$\in$ C $\land t \subseteq i$) → **write** (*j,s, t*) $\land$ s O i
        λP λt P((t_d, ∞))

All monring thus replaces (t_d, ∞)— by whatever mechanism establishes co-reference— and we get the reading that John is in a state of writing, which extends all morning (and possibly afterwards). This doesn't necessarily say that the writing started at the utterance time, and is probably the case that the writing started earlier. The utterance time is included in the *all morning* interval probably as an implicature triggered by the fact that a nonpast was used rather than a past. With an adverb like *tora* 'now', "now" must be interpreted as an extended interval including the utterance time. This will not work in the case of the perfective, as we saw (**O Janis grapsi tora* "John write.PNP now"), I suppose because the perfective does not contain a state to be mapped onto an interval, and *now* in this case will have to remain a point in time.

In sum, three things are important to explain why imperfective aspect, unlike the perfective, is compatible with the nonpast: first, the nonpast contains a dependent interval (t_d, ∞); second, the default interpretation of an imperfective nonpast is generic thus atemporal, and third, adverbials provide intervals that can serve as identifiers for (t_d, ∞) in the progressive.

5.2. **The contribution of *na* and *tha***

Given the dependent nature of nonpast and its inability to introduce *n* that I suggested, with perfective aspect, it becomes necessary to introduce *n* in the clause. This job is done typically by *tha* at Now-T*,* whose existence is thus motivated:

(59)   Tha kerdisi   o Janis.

   tha win.PNP.3sg   the John

   'John will win.'

(60)   Now-TP: $\exists$e [win (e,j) $\wedge$ e $\subseteq$ (n, ∞)

   Now-T: *tha*: *n*   TP:λt $\exists$e [win (j, e) $\wedge$ e $\subseteq$ (t_d, ∞)

      kerdisi o Janis   "John wins"

Now we have *n* to replace t_d. The event of winning will thus be located in the interval that starts at now (which by default in an unmebedded sentence will be the utterance time), and stretches into the future. This analysis explains immediately the future meaning of *tha+PNP*; however, it does so without saying that *tha* itself is future. *Tha*, instead, is equivalent to a PRES, and this is why it is needed.

   When Now-TP is not projected, *n* will be given by the next inflectional head: Mood.

(61)   Na kerdisi   o Janis.

   subj win.PNP.3sg   the John

   Let John win!   (i.e. I wish that John wins).

(62)   [[na]] = n

Na thus introduces *n* in the subjunctive clause. Given that in indicative clauses *n* is given by *tha*, an additional overt exponent in Mood becomes redundant, and this is why there is no overt indicative particle. In C further resides the directive force, designated below as "!" which assigns to the sentence the illocutionary force of a request or a command:

(63)   CP: ! $\exists$e [win (e,j) $\wedge$ e $\subseteq$ (n, ∞)

   C^0: $\varnothing$ MoodP: $\exists$e [win (e,j) $\wedge$ e $\subseteq$ (n, ∞)
   λp !p
      Mood^0: *na: n*   TP:λt $\exists$e [win (j, e) $\wedge$ e $\subseteq$ (t_d, ∞)

         kerdisi o Janis   "John wins"

Here *n* is introduced by the Mood head which hosts *na*. At C^0 we have the operator that gives the illocutionary force of a request or a command: $\lambda p \ !p$. This function is also performed by the imperative morpheme, and occurs only in main clauses; imperative force is not embeddable.

Occurrences of *na* with other illocutionary forces, as the one below, support further the observation that directive force is not an inherent contribution of *na:*

(64)   Pjos na   kerdise   (araje)?
       who subj   win.PP.3sg   question particle
       Who (do you think) won?

Here we have a question, and C hosts the interrogative function which turns a proposition into a question. *Na* questions of this kind have been described as dubitative (Rouchota 1994), a flavor due to the particle *araje* (used only in questions), and captured in the translation here by using an epistemic attitude.

Let us consider, finally, cases of *na* with past tense— a possibility for both *na* and *tha*. In these cases, as mentioned earlier, no future meaning arises:

(65)   a   (Mallon)   Tha efije   o Janis.
            likely   tha left.PP.3sg   the John
            It is likely that John left; or
            (For all I know), John must have left.
       b   Isos   na efije   o Janis.
            perhaps/possibly   subj left.PP.3sg the John
            Perhaps John left.

Here we have epistemic statements about the past, indicated in the translations. Both sentence are assertions, a fact again supporting the idea that *na* by itself does not contribute directive illocutionary force. Epistemic modality arises because of the adverbials *mallon* 'likely' and *isos* 'possibly/perhaps' (the use of which is optional with *tha* but obligatory with *na*). If we were to assign inherent future meaning to *na* or *tha,* we would have to posit ambiguity to capture these cases, which would miss the fact that here a past tense is used. The fact that *tha* is not always

future is not a novel observation; it is often mentioned in the grammars, and emphasized in Tsangalidis (1999). Likewise, the statement with *na* and the past is epistemic in (65b), this time, however, with the necessary presence of the epistemic adverbial *isos* 'perhaps'.

The perfective past will assign the following meaning to TP:

(66) $[[$TP $]]$ $= \exists e [$ win $(j, e) \wedge e \subseteq$ PAST $]$

PAST is a time prior to *n* (and requires no overt reference time). *Na* will then introduce *n* which will now be used as the temporal index for the modal adverbial:

(67)   MoodP: $POSS_n [\exists e [$win $(e,j) \wedge e \subseteq$PAST$]$

 isos 'perhaps'   MoodP: $\exists e [$ win $(j, e) \wedge e \subseteq$ PAST $]$

                    na: n   TP: $\exists t \exists e [$ win $(j, e) \wedge e \subseteq$ PAST $]$

                    kerdise o Janis   "John won"

POSS is the possibility operator that the modal contributes, i.e. an existential quantifier over epistemic alternatives, taken here to be adjoined to MoodP. I will suppress more details about modality as they are not relevant to our discussion here; the important thing is that we assume that modality is always relativized with respect to a time (for recent discussion see Ippolito 2003), and that *na* provides the time for the modal, indicated here by indexing *n* to POSS. The same applies to *tha*:

(68)   TP: $POSS_n [\exists e [$win $(e,j) \wedge e \subseteq$ PAST$]$

   mallon 'likely':   Now-TP: $\exists e [$ win $(j, e) \wedge e \subseteq$ PAST $]$

                    tha: n   TP:

 In case no modal is used (recall that *mallon* is optional with *tha)*, I will assume a covert modal. Modality is thus not inherent to *tha* but is due to the epistemic modal. We end up, then, with a very simple semantics for *tha* that can capture its core uses (future as well as epistemic modal).

What we have seen so far is that *na* and *tha* have the function of introducing *n* into the syntax. They need to do so because the Greek nonpast itself cannot introduce *n*. At this point it is helpful to elaborate a bit on the nature on *n*. For Abusch (2004:38) and others, *n* is a variable, but

the lexical entries of tenses contain free occurrences of it (thus referring to the utterance time). This we saw to be the case with the past tense in Greek; and in main clauses the *n* from *na* and *tha*, I suggested, can also be identified with the utterance time. In complement clauses, however, we will find that *n* is bound by a lamda binder that resides in C (Abusch 2000), and which is needed independently in order to create a property of times (*iwt*; the type of CP). It will be helpful to look at a case of embedding to see what consequences this assumption has for the interpretation of the embedded *n* of the *na* clause.

5.3   The subjunctive in complement clauses

When it comes to complement clauses, it is important to remember that there is no directive illocutionary force. This is consistent with the fact that the imperative force is not embeddable (Portner and Zanuttini 2004) that I mentioned earlier. I will assume, then, that above embedded *na* a lamda binder rests in C. Consider embedding under a higher past:

(69)   Ithela   na   kerdisi o Janis.

   wantPP.1sg   subj   win.PNP.3sg the John

   I wanted John to win.

   With the past tense *ithela* "want.past.imperf." the top T contributes a time $t_2 < n$ (past). If the *na*-clause is interpreted in the nonpast we get the mixed reading where I wanted in the past that there be an event of John's winning that is not in the past. [5]

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[5] This sentence also has the past anaphoric reading where the time t_2 of wanting is located in the past, and the time t of John's winning is also located in the past. I will assume that this reading is derived by a sequence of tense rule, but space prevents me from extending further on this here.

Past (mixed reading)

(70)   TP : [want (j, t$_2$, λn ∃e [win (e,j) ∧ e ⊆ (n, ∞) ∧ t$_2$≤n]

T: wanted 'ithela'
t$_2$ <n   CP: λn ∃e [win (e) ∧ e ⊆ (n, ∞)]

        C⁰: MoodP: ∃e [win (e,j) ∧ e ⊆ (n, ∞)
        λ
                Mood⁰:n   TP: ∃e [win (j, e) ∧ e ⊆ (t$_d$, ∞)
                na
                T⁰: non-past: *kerdisi*   AspectP: λt ∃e [win (j, e) ∧ e ⊆ t]
                λP λt P(t) ∧ P((t, ∞))
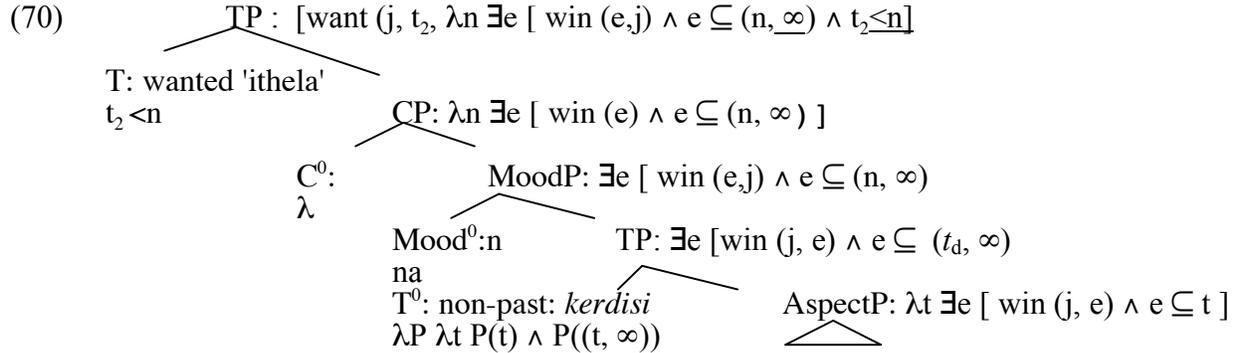
Would this imply that I wanted at t$_2$ that John's winning happen either at the utterance time or in any time after that? (Many thanks to Barbara Partee for raising this point.). This would ascribe to me a very strange desire. Instead, my desire seems to be better expressed in the following paraphrase:

(71)   The time t$_2$ of my wanting is located in the past, but the time t of John's winning is located in the interval that starts from t$_2$ and extends to ∞.

That interval, then, would be the one that starts at the internal *now* of the attitude (which can be identified with t$_2$) and moves forward to include the actual utterance time and times after that. Hence, when embedded, the lamda bound *n* of *na* cannot refer to the utterance time, but to the relative *n* of the attitude. This is consistent with the fact that embedded *na* is *selected* by the attitude verb: it is interpreted inside its scope as a well behaved polarity item.

How about the free occurrences of *n* in main clauses? Do these contradict the narrow scope property that I just identified? The answer is an emphatic no. Recall first that in main clauses, *na* is always embedded under a nonveridical function -- usually under illocutionary force (imperative or interrogative, as we saw), or a modal adverbial. We could rewrite the formulas and generalize that in these cases too we have a lamda binder for *n* and then identify *n* with the speaker's *n* which would be, in the absence of an attitude, the utterance time. Hence in both cases, *n* is interpreted as relative, only in main clauses the result will never guide us to a time other than the utterance time.

Hence a welcome result of the idea that *na* denotes a relative *now* is that it offers a way to link its interpretation with its limited distribution under nonveridical attitudes and operators. In this sense, we have succeeded in providing a dependency analysis of *na* where its polarity status is not stipulated, but is consistent with its lexical semantics. This is a welcome result that, to my knowledge, no previous analysis of the subjunctive has achieved.

6   The verbal dependent and *n* in conditionals

In this final section, I wanted to extend the *n*-analysis to the conditional *an*. Let me first note that the conditional protasis constitutes a nonveridical context (Giannakidou 1998, 1999): the *an* clause is then equivalent to the restriction of a universal quantifier, on a par with restrictions of quantifiers like *every* and *all* which are also nonveridical. *An* thus belongs naturally to the class on nonveridical particles that we are discussing.

Here I wanted to consider briefly a puzzle posed by the following cases:

(72)   An **epine**   o Janis   afto to siropi tha jinotane   kala.
        if drink.imperfP.3sg   the John   this syrop   fut be.imperf.P.3sg well
        If John drank this syrop he would get well.

This is the case known as mismatched past counterfactual (Ippolito 2003), or future less-vivid conditional (FLV, Iatridou 2000, which cites literature on Classical Greek for the term). In Greek as in English, the apparent past tense in the antecedent is interpreted as futurate, more or less equivalent to the PNP versions we just discussed. (The sentence also has the literal past reading, as well as a counterfactual in which case John didn't drink this syrop). The FLV, crucially, involves imperfective aspect along with the past, and the interesting thing about it is that the tense and aspect shift to an interpretation inconsistent with either past or imperfective: the sentence is not generic or habitual, nor is it progressive-- as expected by imperfective aspect; it also doesn't refer to a past event, as is expected by the past. Rather, imperfective past in the FLV reading seems to be near-equivalent to the PNP reading.

How does this equivalence come about? Since the FLV reading is given by a simple past and not a pluperfect, attempts to explain it by invoking a second layer of past like Ippolito (2003,

relying on earlier work by Ogihara) cannot handle it successfully. A more plausible starting point would be Iatridou (2000) who suggested that the past tense in the conditional is interpreted as ranging not over times, but worlds, and expresses the following condition:

(73)   The topic worlds w exclude the world w' of the speaker.

This is called the exclusion feature of the past (Iatridou 2000: 46). This condition says that the actual world is not among the topic worlds, and since there is no further temporal specification, it could very well be that the event in the *an*-clause is ongoing at the utterance time:

(74)   An **epine**   o Janis **tora**   afto to siropi   tha jinotane   kala.
        if drink.imperfP.3sg   the John now   this syrop   fut be.imperf.past.3sg well
        If John drank this syrop now he would get well.

Hence we predict correctly the present meaning of the past form, triggered here with *tora* 'now'.
        Plausible though it may seem, this account can be questioned on three counts. The first problem is conceptual: why is it that a time morpheme switches to quantification over worlds in the conditional? Allowing this flexibility in the meaning of the past tense is very close to treating the past tense morpheme as ambiguous between a modal and a temporal operator, but unless we have independent evidence for it, it is hard to see this move as something more substantial than mere stipulation. Instead, a more conservative strategy seems desirable by adhering to the idea that the past as a tense and refers (or quantifies over) times always; in the conditional, the time of the past will be the time relative to which the conditional worlds will be considered.
        The second objection is empirical: if the meaning of the past is indeed this flexible exclusion function, it is predicted that past should generally have the ability to shift to futurate meanings in restrictions of adverbial quantifiers, e.g., introduced with *otan* "when":

(75)   **Otan** epine   o Janis (#**tora)**   afto to siropi tha jinotane kala.
        when drink.imperfP.3sgthe John (*now)   this syrop fut be.imperf.past.3sg well
        (In some past interval) When John drank this syrop he got well.
(76)   Qw,t [t<n ∧ John drank this syrop at t in w] [∃t' following t in w: John got better at t']

But this is not the case, as we see. The sentence here is a past habitual statement (notice the ill-formedness of *tora* "*now*")* denoting a generalization that whenever John drank this syrop at some interval in the past he got well. Tense and aspect are then interpreted literally in the *when* clause. Likewise with the conditional *efoson:*

(77)   Efoson epine   o Janis (#**tora)**   afto to siropi tha jinotane kala.
         when drink.imperfP.3sgthe John (*now)   this syrop fut be.imperf.past.3sg well
          # If John drank this syrop (now) he would get well.

This is indeed a conditional sentence, but it is incompatible with "tora" *now*, our diagnostic for the FLV reading. The crucial fact here is that we have *efoson* 'if' instead of *an* 'if". If the shift allows us to explain the *an*-sentence, then what accounts for the past only meaning of *efoson*? We seem to miss the generalization here that the shift to FLV happens only in *an* clauses.

Finally, apart from some comments on genericity, the role of imperfective aspect remains unclear in Iatridou's account. Our analysis, on the other hand, capitalizes precisely on the use of imperfective and the fact that it introduces an interval:

(78)   [[epine o Janis to siropi]] =
              $\exists i$ **drank** (j, the syrop, i) $\wedge$ i<n]
              (John *drank.imperfective* the syrop)

This is the literal interpretation of the imperfective past, which is of course possible as an independent assertion, and would yield either a habitual statement (e.g. with an adverbial like *kathe proi* "every morning"), or a progressive (e.g. with an adverbial like *epi dio lepta* "for two minutes"). When we add *an,* a relative *n* will be introduced which can be used as the left boundary for the imperfective interval *i*; given no additional information, the imperfective interval will be taken to stretch forward, producing the futurate meaning.

(79)   [[**an** epine o Janis to siropi]] =
         drank (j, the syrop, i) $\wedge$ $\underline{i=(n, \infty)}$

In other words, the presence of *n* that *an* contributes changes the temporal orientation of the imperfective interval from [*t,n*] to the underlined i = [n, ∞]. Once this information is added, the past condition *i<n* must be suppressed to avoid contradiction; this accounts for the intuition that the past meaning is lost. Finally, the reason why the FLV meaning arises with *an* and not *otan, efoson* is that these are regular complementizers and do not contribute *n*, unlike *an* which does. (This, I suppose, would entail an analysis of *an* as, starting at least, a lower head, a hypothesis worth exploring in future work.).

In this account, two factors are decisive: the ability of the particle to introduce *n*, and the use of imperfective aspect in the *an*-clause to create an interval. If our premises are correct, then we expect futurate readings to be triggered generally by the whole class of *n* expressions, i.e. with *na, as,* and *tha*, if they are accompanied by a past verbal form with imperfective aspect. This is exactly what we get:

(80) {As/na}   xtipouse   to tilefono (tora)!

as na   rang.imperf.3sg   the phone now

If only the phone rang now!

(81) Tha   erxotane   tora.

tha   came.imperf.3sg   now

He was going to come now.

(82) {Thelo/tha ithela}   na   erxotane   tora.

I would like   na   came.imperf.esg   now

I would like (him or her) to come now.

Hence *as, an, na*, and *tha* behave as a natural class in allowing the nonpast reading with imperfective past, and this reading is not "fake" or deviant, but derived from the literal meanings of the particles and imperfective aspect in the system I've laid out in this paper.

7   Conclusion

In this paper, I proposed a syntax-semantics for two dependent forms in Greek: the subjunctive particle *na*, and the verbal form perfective nonpast (PNP) which cannot occur in positive unembedded assertions and requires *na* (*tha*, and the like) for well-formedness. Given that the PNP is dependent on *na*, it occurs in contexts where *na* occurs. Following my previous work, I argued that these contexts are nonveridical. My goal in this paper was to explain the dependency of both *na* and the PNP as the result of their lexical semantic contribution.

I proposed that the semantic function of the subjunctive *na* is temporal: *na* itself introduces a *now* variable *n*. In main contexts, *n* can be identified with the utterance time *n*, which then serves as the parameter for the temporal anchoring of the PNP. This results in the futurate reading. In embedded contexts, *n* remains a variable bound by lamda, and gives the relative *now* of the attitude. This is consistent with the fact that in embedded contexts *na* is selected and not freely occurring.

The nonpast, on the other hand, introduces an open interval that depends on some other time to anchor its left boundary. In main clauses this time will be provided by the *n* of *na*, *tha*, and *as*, thus yielding a time that starts now and moves forward open-ended. In the absence of particles, the left boundary of the nonpast interval remains unspecified, i.e. unbound or unidentified with a previous time, and this renders PNP ungrammatical. The PNP was thus identified as another instance of a dependent variable in the sense of Giannakidou (1998, 2001, to appear), that is, as a variable that cannot be interpreted deictically (but needs to be identified with an antecedent in this case). The analysis here relied on the important insight that tenses are pronominal elements, just like pronouns (Partee 1973, 1984), and unified polarity behavior of temporal expressions with polarity behavior that we observe in the nominal domain (e.g. with NPIs and free choice items).

This analysis also has a number of revealing implications for our understanding of mood, tense, and polarity in Greek as well as in other languages. For one thing, I suggested that there is no modality involved in mood: semantically, *na* and the PNP are just tenses. I also suggested that the temporal *n* of the subjucntive in embedded claues remains a relative *now*, an idea consistent with the fact that embedded *na* is triggered by a higher predicate. The temporal dependency analysis of the PNP, at the same time, is proposed as a likely foundation for the analysis of mood forms in Romance languages (and perhaps *to* infinitival in English), though future research is needed to establish how far this analysis can be extended to these cases. It is important to

remember, in this connection, that the relation between the subjunctive and tense has not gone unnoticed in the literature, as indicated in the recurring intuition that the subjunctive tense if somehow "deficient" (Picallo 1984, Quer this volume). What I tried to do in this paper is argue that the deficiency of the tense of the subjunctive is in fact a very precise form of temporal dependency anchored to the *now*. It remains to be seen how this idea can capture some of the puzzles left open, for instance, the use of the subjunctive in relative clauses.

Acknowledgements

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