

On the syntax of temporal adverbs and the nature of Spec,TP

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In this paper I examine the relation between temporal adverbs and T°, a functional head, which is uncontroversially argued for to be present in the extended projection of the verb. I argue that temporal adverbs are verbal arguments and that their relation with T is one of agreement, parallel to the relation between subjects and Agr.*

1. Background and aims

Recent work on the syntax of adverbs has put forth the hypothesis that adverbial phrases are the unique specifiers of distinct functional projections (cf. Alexiadou 1997, Cinque 1999). This hypothesis is partly embedded within the framework of *Anisymmetry* (cf. Kayne 1994), and runs in parallel with research on the type and content of functional projections which constitute the clausal architecture. It crucially builds on the transparent semantic relation that can be observed crosslinguistically between projections and adverbs, which is very much suggestive of a Spec-head relation. It radically breaks with standard assumptions about adverbs, according to which these are adjuncts, freely generated in positions adjoined to verbal and/or functional nodes.

In (1) and (2) below, I briefly illustrate the mapping between adverbs and functional projections for Greek, a pro-drop language with V-to-I° movement. The hierarchy of functional projections that has been established independently, in the spirit of Pollock (1989), is the one given in (1) (cf. Rivero 1994, Tsimpli 1990, Philippaki-Warbuton 1989, Alexiadou 1997 among others). The interaction between adverbs and functional projections has been argued to be as in (2) (cf. Alexiadou 1997). The strings below precisely show that the different adverbs and the different functional heads have a systematic one-to-one relation:

- (1) [CP [MoodP [AgrSP [TP [(NegP) [AspP [(Asp2P?) [VoiceP [VP []]]]]]]]]]

- (2) CP^{efthos}-MoodP^{ithanos}-TP^{ktes}-(NegP^{ija})-AspP^{sinitos}-(Asp2P^{endelos})-VoiceP^{kala}
 fortunately probably yesterday anymore usually completely well

Perhaps one of the clearest advantages of the adverbs in specifiers hypothesis (henceforth ASH) is the fact that it accounts for the crosslinguistic ordering restrictions and specific scope relations among the various classes of adverbs relative to one another (cf. Travis 1988, Sportiche 1988, Alexiadou 1997, Cinque 1999). These follow straightforwardly from this approach, as the order of adverbs reflects the order of the projections in the clause, while it could not follow from an analysis of adverbs as adjuncts, since there is no clear mechanism that restricts the distribution of adjuncts.

While the ASH claims that all adverbs are located in specifier positions, Larson (1988) argues that certain adverbs are generated as the verb's innermost complements and contribute to event individuation. On this view, adverbs and arguments are analogous in both syntax and semantics (cf. Parsons 1985, Davidson 1967). This proposal can be re-interpreted in terms of the ASH, as requiring those adverbs that pattern like arguments to move to the functional domain, i.e. to the specifier of one functional projection for licensing/feature checking. That certain categories of adverbs show effects of movement has been shown in Alexiadou (1997) and Cinque (1999) for Greek and Italian manner adverbs respectively. However, it is not the case that all adverbs are amenable to a similar analysis. For instance, a modal adverb such as *probably* could not be argued to be strictly subcategorized by a given predicate, while this is the case for the manner and locative adverbials in the examples below (cf. McConnell-Ginet 1982, Grimshaw & Vikner 1991 among others).

- (3) a. John behaves *(very well)
 b. Liz resides *(in London)
 c. *John behaved probably
 d. (Probably), John left

It seems then more reasonable to make a distinction between argumental adverbs on the one hand, and *truly* functional specifier adverbs, on the other (cf. Lonzi & Luzzati 1993, Alexiadou 1997). The latter have their base position to the left of the verb (they are non-thematic adverbs, specifiers of NegPs, AspectPs and so on). Thus they are VP-external, i.e. they are directly merged as specifiers of functional heads. This group comprises the set of sentence modifiers and of verb-group modifiers, i.e. evaluative adverbs e.g. *honestly*, speaker

oriented adverbs e.g. *fortunately*, modal adverbs e.g. *probably*, domain adverbs e.g. *financially*, subject-oriented adverbs e.g. *cleverly*, frequency adverbs e.g. *frequently*, aspectual adverbs e.g. *always*, degree adverbs, and so on.

Complement-type adverbs, on the other hand, have their base position to the right of the verb, hence they are merged VP-internally. These are no different from argument DPs, and undergo movement to specifiers of functional projections. To this group belong the set of *verb-modifiers*, i.e. *manner/instrumental, temporal adverbs* and so on. On this view, in (2) above manner adverbs are moved to Spec, VoiceP, and temporal adverbs to Spec, TP.

This said, the exact relation between the class of complement adverbs and the functional heads these arguably relate to has to be worked out in detail. To this end, I examine here the relation between temporal adverbs, i.e. a group of complement-type adverbs and T^o, a functional head, which is uncontroversially argued for to be present in the extended projection of the verb. There are several reasons why this specific class is chosen. First, it can be shown that temporal adverbs behave like arguments, hence providing evidence for the view that there are two types of adverbs. Second, it can be shown that temporal adverbs interact with T^o, thus providing an illustration of the ASH. This, however, runs against the view held by several scholars that Spec, TP is a subject position. As a result, it is the relation between Tense, subjects, and temporal adverbs that needs to be looked at closely. The interaction between these elements will lead me to suggest that there exists a parallelism between Agr and subjects on the one hand, and Tense and temporal adverbs, on the other. This suggestion builds on the intuition that Tense is dependent on the accompanying adverbials, on the one hand, and that the morphological marking of tense on the verb can be analysed as a concord feature, on the other (cf. Cresswell 1973, Campbell 1991, Vlach 1993, Anagnostopoulou, Iatridou & Izvorski 1998 among others). I propose that it is precisely this property that makes it possible for Spec, TP to function as a subject position in some languages.

The paper is organized as follows. In section 2, I briefly give the background on TP and I examine the nature of temporal adverbs. In section 3, I show how temporal adverbs interact with T^o. In section 4, I demonstrate that temporal adverbs may occupy various structural positions. In section 5, I revisit the arguments in favor of Spec, TP as a subject position. In section 6, I offer a proposal that reconciles all the facts presented in sections 2 to 5.

2. Tense and temporal adverbs

2.1. Background

The interpretation of tense constitutes one central point of linguistic research. This is reflected in the diverse, syntactic and semantic, approaches to its grammar. For instance, Tense has been analysed as a semantic operator designating the time at which the truth of a sentence is to be evaluated, as a referential expression denoting the time of an event or a situation, and as a temporal predicate analogous to a verb.

Syntactically, Tense has been analysed in several ways: as an element in the expansion of Aux or Infl, as a specifier of VP, and since Ouhalla (1988) and Pollock (1989) as a functional head in its own right, heading the functional projection of T(ense)P(hrase). T° is assumed to host tense morphemes, which get associated with the verbal stem in languages like French or Greek via V-to-T raising. Generally, tense morphology is taken to manifest time differences. Arguments in favor of the split-Infl hypothesis were reproduced for a number of languages and need not occupy us in great detail here. Giorgi & Pianesi (1997) and Cinque (1999) further argue that the temporal relations (Event, Speech and Reference point) recognized in the Reichenbachian system each project a separate T° head. A different mapping associating time points with TP (speech), AspP (reference) and VP (event) respectively is put forth in Thomsen 1995 (see also Hornstein 1990; see Stowell 1993, and Demirdache & Uribe-Etxebarria 1998 among others for alternative views). In any case, it is uncontroversial that T° is (at least) one of the functional heads situated rather high in the extended projection of the verb (cf. (1)).¹

T° has been argued to bear a number of roles. Specifically, it has been claimed that Spec,TP is a subject position, T° contains the feature responsible for nominative case-checking, and also for checking of the extended projection principle feature (cf. Chomsky 1995). However, as already suggested by (2) and more generally by the ASH, subjects are not the only items that enter into a one-to-one relation with T. Temporal adverbs do so as well.

2.2. The nature of temporal adverbs

Let us now take a closer look at the class of temporal adverbs. Verbal tense is not the only manifestation of time in natural language.

Temporal adverbs (TAs) are also used to express temporal relations. TAs can be classified in a number of ways. Vlach (1993:250f) distinguishes four classes of TAs: punctual, inclusive, durative, and frequency ones. Punctual adverbs are expressions like *at 15.00*. Inclusive adverbs are expressions like *on Thursday, in June, yesterday, last week*. Durative adverbs are usually temporal measure phrases like *for an hour* and so on, and the class of frequency adverbs includes *seldom, rarely, frequently*. These have been shown to be related to Aspect and to behave like quantificational elements (Alexiadou 1997, Laenzlinger 1998, Cinque 1999). Hence they will not be discussed here. Smith (1981) suggests that TAs can be divided into three groups: deictic e.g. *yesterday, tomorrow, calendar-clock e.g. on Monday, at noon* and dependent e.g. *afterwards*. According to Smith, deictic adverbs are marked [\pm Past], calendar-clock ones, however, are unspecified. Dependent ones are always related to a certain context and will not be discussed here. Here I use the term TAs to refer to punctual/inclusive and deictic/calendar-clock adverbs.

In languages like English, but also Greek, German, French, Italian and Spanish, TAs are prepositional phrases (*on Monday*) or simple NPs (*yesterday*). Bare TAs can appear in NP-argument positions as shown in (4):

- (4) a. I hate Monday
 b. John was angry about Friday
 c. The afternoon turned out to be disastrous

The sentences in (4) suggest that TAs are amenable to an analysis that does not distinguish them from other NPs (cf. also Larson 1985). Expressions such as *on Monday* or in 1821 also have been argued to behave like bare NP adverbs, the preposition introducing them being semantically vacuous and purely required to assign case to the NP. Enç (1987) actually claims that TAs are just referential NPs marked [+TEMP] in the lexicon. In other words, TAs do not seem to correspond to a class distinct from NPs, either semantically or syntactically.

There are several arguments in favor of treating TAs as NP arguments. First of all, a number of tests diagnosing c-command relations indicate that TAs occupy a position low in a VP-shell structure (cf. Larson 1988). In fact the tests below show that TAs are V's closest complements, as they are c-commanded by the direct object of

the verb (cf. Larson 1988, Stroik 1992a, Pesetsky 1995). These diagnostics are:

(a) *Weak crossover*: as (5) shows, wh-extraction of a TA across a direct object containing a pronoun is not possible:

(5) *Which day_k did you read a poem about its_k sunset?

(b) *Negative Polarity*: as the contrast in the examples below shows, the TA containing the negative polarity item is licit when it occurs following, and arguably then in the c-command domain of, the direct object containing the negative quantifier.

(6) a. *Sue saw anybody on none of those days
b. Sue saw nobody on any of those days

(c) *Each-other construction*: a reciprocal reading is licit only when the distributor *each* heads the direct object and the reciprocal *other* is contained within the TA as in (7a). Otherwise, the result is ungrammatical:

(7) a. sineharika to kathe pedi tin imera ton genethlion tu alu
congratulated-1SG every child the day the birthday the other
'I congratulated each child on the other's birthday'
b. *sineharika to alo pedi tin imera ton genethlion tu kathenos

The behavior of TAs in *Antecedent-contained deletion* contexts can also be considered as evidence in favor of treating TAs as V's closest arguments (cf. Stroik 1992a). The TA in the following examples can be construed as being part of the elided VP:

(8) a. When did Mary read everything that Bill did?
b. On what day did Mary see everyone that Bill did?

Consider further their behavior under extraction. As is well known, arguments contrast with adjuncts with respect to extraction phenomena: adjuncts are sensitive both to weak and strong islands, while arguments are sensitive only to strong islands. As shown in Alexiadou (1997) for Greek, and Giorgi & Pianesi (1997) for Italian, extraction of temporal phrases from strong islands is ungrammatical, while their extraction from weak islands yields much better results and contrasts with the extraction of adjuncts. The examples below illustrate this point:

(9) a. *pia mera vrikes kapion pu ithele na figi CNPC
which day found-2S somebody that wanted subj go-3S
b. ?pia mera den efages? Negative island
which day neg eat-2S
'which day didn't you eat?'

(10) *pos den efages?
how neg eat-2S

(11) a. *in quale giorno hai trovato qualcuno che voleva partire? CNPC
in which day did you find somebody who wanted to leave
b. ?quale giorno non hai mangiato? Negative island
which day didn't you eat (Giorgi & Pianesi 1997:126)

There is a further piece of evidence that indirectly points to the argument status of TAs. This is due to Giorgi & Pianesi and is reproduced here for Greek. As is well known, TAs need not always be present in a given sentence. Thus both (12a) and (12b) are grammatical:

(12) a. o Janis efige stis tris
John-NOM left at three
b. o Janis efige
John left

One might wonder whether in (12b) there is an implicit temporal argument receiving special interpretation. Giorgi & Pianesi, building on the observation that in the case of indirect arguments the omitted argument always receives a deictic interpretation, point out that (12b) also receives a deictic interpretation, in a way similar to real arguments. In other words, it must be interpreted as meaning recently, strengthening the view that temporal phrases are arguments in the VP-shell.²

3. TAs and TP

In the previous section I argued that TAs are verbal arguments. In this section I show how TAs enter into a relation with T^o.

The interaction between Tense and TAs has been the topic of some debate in, mostly the semantic, literature, as it is an issue that raises a number of problems for any attempt to relate semantic interpretation systematically and explicitly to syntactic form (cf. Dowty 1979, Partee 1973, 1984, Comrie 1976, 1985, Eng 1987, Vlach 1993

among many others). One of the most intriguing problems concerning the interaction between Tense and TAs is the fact that tense sometimes seems redundant if there is an explicit adverb, but it does not seem redundant when there isn't. According to Comrie (1976), even though there are languages lacking tense morphology, there are no languages lacking temporal adverbs. Mandarin Chinese, Classical Hebrew and Malay are languages which lack tense and use TAs only (cf. the Chinese example below taken from Tang 1990):

- (13) Yohan zuotian ti-le nan-hai-tze
 John yesterday kick boy
 'John kicked the boy yesterday'

Cinque (1999) observes that languages, in which the tense system does not distinguish a past located earlier in the same day from one located within the previous day, or in the remote times, make such distinctions by using explicitly temporal adverbs. The issue that arises then is the following: why do most languages use both a morphological marking as well as TAs to mark temporal distinctions?

Partee (1973, 1984) and Enç (1987) argue that tenses are much like person pronouns. The relation between Tense and TAs is similar to the relation between pronouns and their antecedents (cf. Partee 1984: 226). Evidence for this claim comes from the following facts:

- (14) a. I didn't turn off the stove
 b. She left me

In the examples above, the use of past tense mimics the use of the pronoun in (14b). Both can be used to refer to an understood particular time/person not introduced by previous linguistic context. Consider now the following sentences:

- (15) a. Sam is married. He has three children
 b. At 3 p.m. Mary had a brilliant idea

(15a) is the paradigm case for anaphora: there is an antecedent noun phrase that refers to a particular individual, and a subsequent pronoun which refers to the same individual. In (15b) the temporal adverb may be viewed as the antecedent for the past tense in the clause. In other words, the adverb functions much like a proper noun antecedent for a pronoun. In a way, the adverb serves to fix the refe-

rence time with respect to which the rest of the sentence is interpreted (cf. Hinrichs 1981).

However, Partee herself observes that temporal anaphora is much more subtle than nominal anaphora. Intuitively, noun phrases refer and tenses don't. While it is fair to say that tenses function like pronouns in that they can be construed with linguistic or non-linguistic antecedents, it does not follow that they refer to times to the degree that pronouns refer to individuals (cf. Partee 1984:275).

Giorgi & Pianesi (1997) building on similar observations and on Reichenbach (1947) suggest that actually tenses instantiate relationships between events. According to this approach, temporal expressions refer directly to temporal entities. Tenses are regarded as relational expressions that directly encode temporal relations between temporal entities. On this view, TAs actually restrict/fix the reference time.

A rather different approach is proposed in Vlach (1993) and Anagnostopoulou, Iatridou & Izvorksi (1998) building on Vlach (1993). According to these authors, there is no such thing as the semantics of tense. Temporal semantics is the semantics of TAs. When a TA is not overtly present, we must assume that one is covertly there (cf. also Smith 1981). In other words, only adverbs specify temporal distinctions in clauses. On this view, in the domain of temporal interpretation the adverbs determine the meaning, and if the verb inflects it must do so accordingly. Thus, Tense morphology is some species of agreement.

In support of this, note that it is true that the verb's tense morphology, when this is present e.g. in Greek, tends to be compatible, i.e. in agreement with TAs (Arabic is similar cf. Fassi-Fehri 1993):

- (16) a. Irthe ktes
 came-3S yesterday
 *irthe avrio
 came-3S tomorrow
 b. Erchete simera
 come-3S today
 Erchete avrio
 come-3S tomorrow
 *Erchete ktes
 come-3S yesterday

In the examples above we see that when the adverb itself carries the

specification [\pm past], agreement is obligatory. Adverbs like *yesterday* are compatible with past tenses only, as is shown in (16a) and (17c), while this is not the case for *tomorrow* in (16b). When the main predicate is inflected for present tense, the adverb refers to an interval following the moment of speech, and [-past] adverbs are legitimate.³

In (18) below we see that unspecified adverbs are compatible with both [+past] and [-past] verbal morphology. The function of the adverb is to locate the event of the main verb at a certain time. The relation is one of specification not one of agreement:

- (18) o Janis erhete/irthe stis tris
'John comes/came at three'

Campbell (1991) also argues in favor of the view that Tense is a species of agreement, and more specifically that Tense agrees with a temporal argument, just like Agreement agrees with the subject of the clause. T^o actually spells out the features of the verb's temporal argument. The notion of temporal argument in Campbell is the one used in Enç (1985). The role of the temporal argument is basically to establish the temporal reference of the clause. For Campbell (1991) and Stroik (1992b), the temporal argument is predicated of TAs. However, we have seen evidence in the previous section that TAs cannot function as predicates, but rather they pattern like real arguments.⁴ Hence, and given the agreement facts just examined, one could argue that it is actually the TAs that T^o agrees with. In other words, TAs are the instantiation of the temporal argument. When they are not present a covert TA must be assumed. On this view, TAs and T have a similar relation to the one Agr and subjects NPs have.

4. The structural position of TAs

In the previous section I showed that TAs and T^o interact. Specifically, I suggested that TAs and T have a similar kind of relation, as the one Agr and subjects DPs have. This being so, we would expect that TAs occupy necessarily the Spec,TP position. However, TAs tend to occupy mostly final positions in a number of languages, a behavior which is not entirely predicted.

- (19) a. He bought the car yesterday
b. Il ira a Paris demain
He go-FUT to Paris tomorrow

- c. Mi occuperò di loro domani
me occupy-fut of them tomorrow
d. Agorase to aftokinito ktes
bought-3SG the car yesterday
'He bought the car yesterday'

In some languages temporal adverbs occupy pre-argumental positions. In particular they appear in a position immediately preceding aspectual adverbs. This is illustrated in (20) below for Greek:

- (20) taktiopiise ktes amesos telia to domatio tu
tidied up-3SG yesterday immediately perfectly the room his

Greek (and Spanish), however, differ from Italian where such adverbs can only appear in sentence initial or sentence final position.

- (21) *Gianni non ha ieri mai dormito (cf. Cinque 1999:150)
Gianni neg has yesterday ever slept

According to Cinque (1999), the only kind of adverbs that can appear in mid-sentence position are deictic adverbs (future and past), e.g. *allora* 'then', *ora* 'now'.

- (22) Lei c'era probabilmente anche allora stata
She had probably then been there too (cf. Cinque 1999:150)

The same holds also for English, although it is a bit more marginal than the Italian case:

- (23) The Prime Minister today described the relations between Persia and Britain as having reached a happy stage.

For Cinque, (22) above is taken as evidence that the adverb occupies the specifier of a temporal projection. A similar argument has been made for the Greek case in (20) (cf. Alexiadou 1997).

TAs also occur in initial positions, but it can be shown that in this case they are either CL(itic)L(eft)D(islocat)ed or focus moved. The Greek/Italian pairs of sentences below have a different reading (cf. Cinque 1990). In (24a) we are informed that something happened yesterday, contrary to (24b) which informs us that the buying took place yesterday. (24b) relates to the meaning in (19d), while (24a) does not:⁵

- (24) a. Ktes, agoraseto aftokinito
Yesterday, bought-3SG the-car-ACC
b. KTES agorase o Janis to aftokinito

Similarly, (25a) is synonymous with (25b) and not with (25c). In (25a) the adverb must be construed with the embedded sentence but the only possible interpretation is the one which corresponds to the embedded initial scope and not to the embedded VP scope. (26), where the adverb is focalized, is synonymous to (25c). That is expected, if focus-movement applies like wh-movement, and involves a different structure from CLLD.

- (25) a. Domani, mi ha promesso che verrà
Tomorrow, he me promised that he will come
b. Mi ha promesso, domani, che verrà
c. Mi ha promesso che verrà domani
(26) DOMANI mi ha promesso che verrà

Thus far, I have provided evidence that (a) TAs are verbal arguments, (b) TAs and T interact in a manner similar to that of Agr and NP subjects. Further, I have shown that, contrary to what point (b) predicts, TAs do not seem to always occur in Spec,TP. In the next section I turn to a problem posed by the view that Spec,TP hosts TAs.

5. Spec,TP for subjects

Recent work on clause structure and word order in a number of languages, e.g. Icelandic, Irish, Finnish (cf. Bobaljik & Jonas (1996) – henceforth B&J – Bobaljik & Carnie 1996, McCloskey 1996, Holmberg & Nikanne 1994 among others) has established that subjects can occupy a-position which is different from the VP-internal one, and also different from Spec,AgrSP. Specifically, B&J (1996) have proposed that the specifier of TP may host the subject NP under certain conditions. This position is necessary for an analysis of transitive expletive constructions in one group of the Germanic languages, e.g. Icelandic (cf. (27)).

- (27) það lúku sennilega einhverjir stúdentar alveg verkefni
there finished probably some students completely the assignment
'Some students completely finished the assignment.'

A number of tests establishes this conclusion. First, B&J note that

under the assumption that the adverb *completely* is adjoined to VP, example (27) indicates that the subject is in some position external to the VP, which is identified with Spec,TP. Assuming, as shown in (2), that the adverb is the specifier of some aspectual phrase, the argument can be made stronger. A perhaps clearer and more convincing diagnostic involves the interaction between object shift and the position of subjects in transitive expletive constructions. If shifted objects are in a VP-external position (cf. Holmberg 1986, Vikner 1994), then in a TEC with a shifted object, if the subject were VP-internal, the object should precede the subject. However, as B&J show, this is not the case:

- (28) *það lauk verkefniinu alveg einhver
there finished the assignment completely someone

For B&J, there are two types of languages: those that license Spec,TP for subjects, and those that do not. If a language allows Spec,TP, the subject may move to this position. This proposal is cast in Chomsky's (1993) Minimalist framework, and in terms of the proposal that the inflectional elements T and Agr include both N(ominal) and verbal features. Chomsky (1993) suggests that the requirement that all clauses have a subject can be reduced to strong N-features of T. These features must be checked by some NP that stands in the specifier-head relation to T by Spell-Out. In languages like Icelandic, the subject may raise overtly to Spec,TP, and then move to Spec,AgrSP to check the N-features of this head.

A similar case has been made to account for the VSO orders in Celtic languages and Arabic (cf. Bobaljik & Carnie 1996, Carnie 1995, McCloskey 1996, Demirdache 1988, Fassi-Fehri 1993, Benmamoun 1996 among others). In particular, McCloskey (1996) shows that postverbal subjects occupy the specifier position of a functional projection, i.e. they are situated outside the VP. Evidence for this comes from cases like the following example (from McCloskey 1996: 269):

- (29) Deireann siad i gcónaí paidir roimh am luí
say they always prayer before time li[FIN]
'They always say a prayer before bed-time.'

The postverbal subject precedes the aspectual adverb, situated in the specifier of Aspect Phrase. Placing the adverb before the subject would lead to ungrammaticality, as it is a well known fact about Irish

that the verb and the postverbal subject need to be structurally adjacent. ⁶ Similar arguments have also been provided for Arabic.

In later minimalism, Chomsky (1995) and especially Chomsky (1998), Agr is dispensed with, Spec,TP being the subject position across languages. ⁷ The arguments in favor of Spec,TP as a subject position are rather compelling, and run against the view that this position is reserved for TAs. In the next section I attempt to reconcile these two views.

6. The dual nature of Spec,TP

In principle there are a number of options one could take to deal with all the facts. One could assume, following Chomsky (1995, 1998), that projections can license multiple specifiers, taking TAs to be in a second specifier of T. However, this view is not compatible with the *Antisymmetry* assumptions made here.

Alternatively, one could assume, following Giorgi & Pianesi (1997) and Cinque (1999) among others, that there are several T heads in the clause structure, and argue that some specialize for TAs and others for subjects. As mentioned above, Cinque (1999) claims that each of the binary relations that are established within the revised Reichenbachian framework of Giorgi & Pianesi corresponds to a functional head of the extended projection of V, i.e. a separate T: T(anterior), T(future), T(past). The three tenses are in a particular scope relation to each other, with T(anterior) embedded under T(future), itself embedded under T(past). Apart from the fact that in Cinque's system each of these tenses actually hosts in its specifier a particular adverb, it is hard to see how these heads would vary depending on their case-assigning features. The question is: could T(past) for instance host a case-assigning feature that T(future) lacks, and on what grounds could such a parametrization be proposed? For this reason I will not consider this option any further. ⁸

Recall that in section 3, I suggested that the relation between T and TAs is similar to that between Agr and subject NPs. I take it that the relation between Agr and NPs is a reflex of Extended Projection Principle (EPP)-checking (cf. Alexiadou & Anagnostopoulou 1998a). In other words, NPs must appear in Spec,AgrSP to check the EPP feature. However, Agr is not the projection that contains a case assigning feature, which could erase the [-interpretable] case feature of the subject. This is located in T. Crucially, following Alexiadou & Anagnostopoulou (1998b), I assume that there are two features asso-

ciated with I (cf. Chomsky 1995): EPP (D) feature and Case (N); the former is checked in AgrS, the latter is in T. On this view, T is both related to the licensing of TAs, which, as we have seen, behave like arguments, and to subjects. In other words, T has a dual nature. I hold that the parameter proposed in B&J is valid. Languages do differ as to whether they allow Spec,TP for subjects. I propose that languages also differ as to whether they allow Spec,TP for TAs. Those that use Spec,TP for subjects will never permit TAs to appear there. One could say that TAs and subjects compete for Spec,TP, the difference between the two being that only the latter need some of their features, i.e. case, to be checked against those of T. The former carrying only interpretable features would not have to move to Spec,TP, although they may appear in this position in some languages. ⁹

At this stage we need to find a way to be able to predict the behavior of Spec,TP across languages in a way that conforms with T's dual nature. I believe that this can be done and also be brought together with the arguments concerning the semantic import of T and TAs under the following viewpoint. In the literature on the status of Agr, it has been proposed that there are two types of Agr, strong and weak. Strong Agr means that each agreement affix has its own individual listing in the lexicon, thus being available to the computational component. Weak agreement means that inflectional elements do not have independent lexical entries and they are inserted into syntactic derivations already attached to their host. Since strong agreement affixes have separate lexical entries they are independent, clitic-like pronominal elements, thus having a categorial feature [+D] (cf. Alexiadou & Anagnostopoulou 1998a, building on Rohrbacher 1994, and Speas 1995). In strong agreement languages, subjects are not present in Spec, AgrSP, EPP being checked by verbal agreement, while subjects must be there in weak agreement languages (cf. Alexiadou & Anagnostopoulou 1998a). In the former set of languages, the presence of overt subjects constitutes an instantiation of doubling. One could attempt to transfer a similar distinction to the temporal system: languages that lack or have deficient tense morphology behave like weak agreement languages. In this case, the presence of TAs would be obligatory so that the clause receives temporal reference. On the other hand, languages that have tense morphology would behave like strong agreement languages, the presence of TAs together with tense morphology signaling some form of doubling. I think that it is precisely this that is behind the more general intuition in Alexiadou (1997) and Cinque (1999) that functional projec-

tions may be manifested either by their specifiers (i.e. the adverbs) or by the presence of overt material in the corresponding functional head.

Let us now see whether there is any empirical support for this view. One language that obligatorily uses Spec,TP for subjects is Irish. In Irish TAs follow all arguments (cf. (30) below from McCloskey 1991: 260):

- (30) Chonaic _{[TP DP na gasraí]₁} _{[AgrOP DP capall nór bán]₂} _[VP t₁ t₂ ansin inné]]
 saw the boys horse big whitethere yesterday

The adverb cannot intervene between the verb and the postverbal subject, as is illustrated by the ungrammaticality of (31):

- (31) *Chonaic inné na gasraí capall nór bán ansin

That is, in Irish, which licenses Spec,TP for subjects, TAs can only appear in their VP-internal position. Note that Irish is a language that has Tense particles:

- (32) D' éirigh go maith leofa
 Tense rise.PAST well with them
 'They did well'
 (McCloskey 1996:271)

Arabic is another subject Spec,TP language. Although Arabic marks past vs. non-past distinctions with verbal morphology (cf. Demirdache 1988, Fassi-Fehri 1993 among others), it achieves absolute time reference with TAs only. The verbal inflection and the TAs must agree. Crucially specific time reference in Arabic is mediated by a combination of T° and TAs, a pattern which is reminiscent of the semantic import of clitic doubling of argument NPs:

- (33) katab-a r-rajul-u r-risaalat-a amsi
 wrote-3SG.M the man-NOM the letter-ACC yesterday
 'The man wrote the letter yesterday' (Fassi-Fehri 1993:145)

Greek, which does not license Spec,TP for subjects and which has Tense morphology, shows evidence that TAs can appear overtly in Spec,TP (cf. example (20), repeated below).

- (20) taktiopiase ktēs amesos telia to domatio tu
 tidied up-3sg yesterday immediately perfectly the room his

The appearance of TAs in Spec,TP is analysed as a movement process, linked to considerations about lightness in Alexiadou (1997). Movement to Spec,TP of a bare TA is seen as a means to escape the VP-domain, which is, in Greek as well as in the Romance languages a focus domain. Perhaps, this is why also in Italian only very light TAs can appear in mid-positions. In other words, this movement has the flavour of a 'prosodic' process (cf. Zubizarreta 1994), which is, however, possible due to the fact that Spec,TP is not a subject position in Greek.

On the other hand, in a language such as Chinese, i.e. a language that lacks Tense morphology, Spec,TP is the canonical TA position. In Chinese, the normal word order is S-TA-V. Consider (34) below:¹⁰

- (34) Zhangsan qu nianqu-le Xiang Gong
 Zhangsan last year go-LE Hong Kong
 'Zhangsan went last year to Hong Kong'

The adverb can appear also sentence initially:

- (35) Qu nian Zhangsan qu-le Xiang Gong
 Last year Zhangsan go-LE Hong Kong

However, in (35) the adverb behaves much like a CLLDed element as was the case with the Greek and Italian examples (24) and (25) discussed in section 4.

To sum up, in this paper I examined the nature of temporal adverbs and their relation to T°. I provided evidence for the view that temporal adverbs are much like NP-arguments, and that their relation with T° is one of agreement. I further suggested that crosslinguistically the availability of Spec,TP for temporal adverbs depends on the nature (strong vs. weak) of temporal morphology.

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Notes

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 1 I will not enter into a detailed discussion about temporal relations and the composition of Tense(s) here. My analysis of TAs is more compatible with the syn-

tactic structure proposed in Hornstein (1990), Thompson (1995), Stowell (1993) and Demirdache & Uribe-Etxebarria (1998) among others, without necessarily adopting the specifics of their analyses.

² If TAs are treated as normal arguments of the verb examples such as the ones shown in (i) seem to point to a difference between TA arguments and nominal arguments:

- (i) a. *He ate the apple the bananas
 b. I met her on Monday last week

The ungrammaticality of (ia) has been attributed to a violation of the theta-criterion. If TAs are similar to nominal arguments (ib) should also be ungrammatical contrary to fact. However, as Hornstein (1990) points out in (ib) the two adverbs do not refer to different points in time, rather the reference of the one adverb is included in the reference of the other, thus forming a complex TA.

³ However, the possibility of present tense to combine with a future adverb is restricted to the class of activity verbs, while it is odd with stative verbs. For further discussion see Enç (1991):

- (i) a. Fevgt avrio
 leaves tomorrow
 b. *Kseri tin apandisi
 knows the-answer-ACC tomorrow
 4 Note that there seem to be contexts in which an analysis of TAs as predicative expressions is plausible. For example, TAs can occur as predicates in copular constructions, showing also agreement with Tense:
- (i) a. The party will be tomorrow
 b. The party was yesterday
 c. The party will be on Friday

This is also what we find with other nominal expressions, though not referential/definite ones:

- (ii) John is a boy.

⁵ Assuming that involves base generation in initial position (Cinque 1990 and others), in (24a) an empty pronominal could be assumed to be present within the clause.

⁶ While for Icelandic the argument for Spec,TP was related to the extended projection principle, for Irish the argument is related to case-driven movement, i.e. not-EPP related movement.

⁷ In Chomsky (1998) in particular, Spec,TP is claimed to be the position in which expletives are directly merged and subjects are merged after being attracted to satisfy the EPP, a selectional requirement of T.

⁸ Perhaps such a parametrization could be argued to occur in languages that show ergative splits dependent on tense, e.g. Georgian, where Nominative Case occurs in Past Tenses, while in non Past Tense the language exhibits an ergative/absolutive pattern. The issue awaits further research.

⁹ Sabine Iatridou observes that pushing the claim about the similarity between agreement and tense would have a radical consequence. In Chomsky (1995), Agr is argued to lack any semantic features. It is the phi-features of noun phrases that are actually interpreted at LF. If one were to see the relation between T and TAs in a similar manner, as is actually explicitly suggested in Vlach (1993), one could conclude that T need not be present in the extended projection of the verbal head. That would be a rather radical claim.

¹⁰ In principle there are several ways to derive (34). For instance the temporal adverb raises to Spec,TP and the subject to Spec,AgrSP. The subject checks Case and EPP in AgrS. Or, Chinese being a pro-drop language, (34) involves a CLLDed subject and an empty pronominal in Spec, AgrSP. In any case what should be blocked is a derivation where the subject moves first to Spec,TP and then to Spec,AgrSP; in this case the TA could never land in Spec,TP which would be occu-

ried by the copy/trace of the subject. In the recent literature it has been argued that Chinese might be a type of language that lacks AgrSP altogether (Spears 1995). In this case in (34) the subject occupies a Topic position and the TA is located in Spec,TP.

Bibliographical References

- ALEXIADOU, Artemis (1997), *Adverb Placement: a Case Study in Antisymmetric Syntax*, Amsterdam, John Benjamins
- ALEXIADOU, Artemis & Elena ANAGOSTOPOULOU (1998a), "Parametrizing Agr: Word Order, V-movement and EPP-checking", *Natural Language and Linguistic Theory* 16.3:491-539
- ALEXIADOU, Artemis & Elena ANAGOSTOPOULOU (1998b), "Restrictions on argument placement: an adjacency on Case-assignment and an ambiguity with Attract-F", *GLoW Newsletter* 40:18-19
- ANAGOSTOPOULOU, Elena, Sabine IATRIDOU & Roumiana IZVORSKI (1998), "On the morphosyntax of the Perfect and how it relates to its meaning", to appear in *Proceedings of NELS 26*
- BENMAMOUN, Elabbas (1996), "Spec-Head agreement and Overt Case in Arabic", unpublished manuscript, SOAS
- BOBALJIK, Jonathan & Diane JONAS (1996), "Subject positions and the role of TP", *Linguistic Inquiry* 27:195-236
- BOBALJIK, Jonathan & Andrew CARNIE (1996), "A minimalist approach to some problems of Irish Word Order", in B. BORSLEY & I. ROBERTS (eds.), *The Syntax of Celtic Languages, a Comparative Perspective*, Cambridge University Press:223-240
- CAMPBELL, Richard (1991), "Tense and agreement in different tenses", *The Linguistic Review* 8:159-183
- CARNIE, Andrew (1995), *Non-verbal Predication and Head-Movement*, unpublished Ph.D. Dissertation, MIT
- CHOMSKY, Noam (1993), "A Minimalist Program for Linguistic Theory", in K. HALE & S. KEYSER (eds.), *The View from Building 20*, Cambridge Mass., MIT Press:1-52
- CHOMSKY, Noam (1995), *The Minimalist Program*, Cambridge Mass., MIT Press
- CHOMSKY, Noam (1998), "Minimalist inquiries", unpublished manuscript, MIT
- CINQUE, Guglielmo (1990), *Types of A'-Dependencies*, Cambridge Mass., MIT Press
- CINQUE, Guglielmo (1999), *Adverbs and Functional Heads: a Crosslinguistic Perspective*, Oxford, Oxford University Press
- COMRIE, Bernard (1976), *Aspect*, Cambridge, Cambridge University Press
- COMRIE, Bernard (1985), *Tense*, Cambridge, Cambridge University Press
- CRESSWELL, Max (1973), *Logics and Language*, London, Methuen
- DAVIDSON, Donald (1967), "The logical form of action sentences", in N. RESCHER (ed.), *The Logic of Decision and Action*, Pittsburgh, University of Pittsburgh Press:81-95

