

When mixed projections cannot be arguments: evidence from (Greek) gerunds*

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Abstract

This paper takes a comparative look at idiosyncratic instances of mixed projections in Hebrew, Korean, Japanese and Greek, arguing them to be *genuine* mixed projections, despite their inability to function as arguments – which is a well known characteristic of other members of the class, such as English gerunds. By looking at their syntactic behaviour, I argue that these non-argument mixed projections are embedded within a prepositional phrase headed by a null temporal preposition. This derives their peculiar properties while successfully capturing their differences from infinitivals.

Keywords: gerund, mixed projection, mixed category, preposition, tense, argument, Greek, Hebrew

1. Introduction

This paper enquires into two questions: (a) are Greek gerunds *indeed* mixed projections, with a nominal and a verbal chunk? (b) if yes, why can they *not* appear in argument positions, as expected from mixed projections? These questions will turn out to be of relevance for both the syntax of Greek and that of Hebrew, Korean and Japanese.

2. Gerunds as Mixed Projections

Let us turn to the first question first: are Greek gerunds truly mixed projections? In order to answer this question, we need to clearly state what we mean by the term ‘mixed projection’ (or ‘mixed category’), of which gerunds constitute a type: mixed projections are XPs – what has been described as an ‘Extended Projection’ (Grimshaw 1991), more precisely – that display both nominal and verbal properties¹.

Research in mixed projections, and gerunds in particular, is vast and has been the focus of intensive research throughout the 70s and the 80s, although less so more recently. For reasons of space, I will base myself on meticulous overviews and critical reviews of the relevant literature by Borsley & Kornfilt (2000), Malouf (2000) and Hudson (2003) in order to zoom into two important properties of mixed projections. I will here call these properties generalisations and name them:

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¹ I will prefer the term ‘mixed *projection*’ throughout instead of ‘mixed *category*’, albeit treating them as equivalent.

- (1) *The ‘Cleft in Twain’ generalisation*: nominal and verbal properties in a mixed projection are distinct and occupy different ‘sides’ thereof.
- (2) *Nominal External Behaviour*: externally, mixed projections behave as nominals.

A few things need to be clarified with respect to the two generalisations above. As far as the ‘Cleft in Twain’ generalisation in (1) is concerned, the essence thereof is that verbal and nominal properties do not manifest themselves mixed; in other words, there must be a cut-off point where verbal characteristics end and nominal ones begin (Bresnan 1997; Malouf 2000; Ackema & Neeleman 2004: 174). Take, for example, English gerunds, where there is a cut-off point where verbal properties finish and nominal ones begin. Thus, just by focusing on Case-assignment facts, the higher part of the projection *may* assign Genitive Case, which we can fairly uncontroversially take to be the reflex of a Determiner in the language, whereas the lower part of a gerundive projection assigns Accusative, a tell tale sign of a light verb (*v*). There is no case of mixed projection where verbal and nominal heads actually alternate or intersperse (Bresnan 1997).

Regarding (2) now, it has been observed that mixed projections may display straightforward nominal behaviour (again, see Borsley & Kornfilt 2000; Malouf 2000; Hudson 2003): for instance, English gerunds and Turkish nominalised clauses can be arguments of verbs. No clear cases of mixed projections behaving externally as verbs are attested.

The above bring us to the first problem this paper will look into: how are we to analyse elements that look like mixed projections, such as Hebrew gerunds, Korean and Japanese verbal nouns as well as Greek gerunds, but can only appear as *adjuncts*? Three options present themselves: perhaps these are *not* mixed projections and their behaviour is to be explained otherwise; alternatively, they are indeed mixed projections and their peculiarity, i.e. their not appearing as arguments, falsifies (2); or, finally, they are indeed mixed projections and their peculiarity, i.e. their not appearing as arguments, is to be explained away.

I will argue here that the third solution is the correct one, taking the said constructions to be *bona fide* mixed projections and claiming that their non-argument status results from their involving more structure than meets the eye. But in order to clearly understand why such constituents do not appear in argument positions, we first need to look at their internal structure in detail.

3. Korean /Japanese verbal nouns

Verbal nouns (VN) in Japanese and in Korean share some very remarkable properties. Although they are morphologically simplex *nominal* elements (Yoon & Park 2004), they display two prototypically verbal characteristics: the ability to assign verbal Case (Iida 1987) and the projecting of full argument structures (Tsujimura 1992; Manning 1993, for overview and analyses). Moreover, they have no special nominalising morphology attached to them, contrasting them, in the case of Korean at least, with ‘syntactic’ nominalisations suffixed by *-um* (Ackema & Neeleman 2004: 179).

Interestingly, verbal nouns typically *cannot* be arguments but are embedded within temporal environments, as illustrated below (adapted from Shibatani 1990: 247 and Tsujimura 1996: 139):

- (3) Verbal noun (VN) with a temporal nominal: VN-*no ori* ‘(on) the occasion of VN’; VN-*no setu* ‘(at) the time when VN’; VN-*no akatuki* ‘(at) the happy occasion of VN’
- (4) Verbal noun (VN) with a temporal P: VN-*tyuu* ‘in the middle of VN’; VN-*go* ‘after VN’; VN-*sidai* ‘as soon as VN’; VN-*gatera* ‘the same time as VN’; VN-*izen* ‘before VN’

Generalising, we can say that verbal nouns appear as complements of temporal expressions and postpositions, as in (3) and (4) (see also references throughout this section). Alternatively, they can combine with the copula/light verb *suru* (in Japanese; cf. Shibatani 1990: 247). Before moving on, it is worth stressing that, while verbal nouns can be complements of postpositions behaving like *bona fide* nominals, they have full argument structure and must possess the relevant functional structure as well, given that they can assign accusative or even nominative to their arguments. Towards this, consider the example below (from Shibatani 1990: 247). In it, the verbal noun *ryokoo* (‘travelling’) is inside a temporal expression (‘on the occasion of’) from which it receives genitive Case, while itself assigning both nominative and accusative to its two arguments *sensei* (‘teacher’) and *kagai* (‘abroad’) respectively.

- (5) [Sensei-ga kaigai-o ryokoo]-no sai...
 teacher-NOM abroad-ACC travel_{VN}-GEN occasion
 ‘On the occasion of the teacher’s traveling abroad...’

In brief, verbal nouns qualify as mixed projections, with a nominal external character, despite their not occupying argument positions.

4. Hebrew gerunds

Gerunds in Hebrew display a very telling behaviour, similar to that of verbal nouns. Closely following Siloni (1997: Ch. 5) throughout this subsection, I will sketch it below.

Hebrew gerunds are minimally different from *infinitives* in terms of morphology. Actually, they are *exactly* like infinitives, minus the pre-verbal infinitival marker *le-*.

- (6) *le-’ašen infinitive* *’ašen gerund*
 to-smoke smoking

In this respect Hebrew gerunds are like Greek gerunds, in that they cannot appear in argument positions and that they completely lack nominal morphology and/or ϕ -feature marking. Moreover, they lack any overt *unambiguously* nominalising morphology, like English gerunds, Greek gerunds and verbal nouns; as Yoon (1996) and Ackema & Neeleman (2004: 175-179) have carefully shown, neither *-ing* (nor similar endings in mixed projections of Dutch, Spanish and Italian) constitute category-changing affixes.

Now, despite this morphological similarity between them, infinitives (i.e. clausal chunks, say TPs) and gerunds have *very* different behaviours. A tabulated summary (adapted from Siloni 1997: 165) follows:

Table 1. Comparison between Hebrew infinitivals and gerunds

	<i>Infinitivals</i>	<i>Gerund clauses</i>
distribution	argument position	with temporal Ps
overt subject	impossible	obligatory
<i>lo</i> -negation	possible	impossible

Gerunds also take adverbs instead of adjectives and cannot co-occur with articles. In a situation reminiscent of Korean, there are also clear differences between *nominalisations* in Hebrew and gerunds; the interested reader is referred to Siloni (1997), as well as Hazout (1994) for a different view.

In order to capture the above, along with Siloni, I will claim that Hebrew gerunds are indeed clausal chunks, albeit headed by a null Determiner. In other words, Hebrew gerunds are DPs consisting of a null D with a clausal chunk as its complement; they are syntactic nominalisations. That's why they can be complements of temporal Ps and they do not tolerate the article *ha-*: they are already headed by a null D. Turning to the nature of the clausal chunk Hebrew gerunds contain, we observe the following. First of all, they can take overt subjects – in fact they *must* take overt subjects. Whatever the reason for the obligatoriness of subjects, their presence would force us to think that the clausal (or 'verbal') part of the gerund involves a TP. Nevertheless, negation is disallowed in gerunds, as illustrated in (7) below (examples (9) and (10) in Siloni 1997: 163-4). So, T must be defective somehow.

- (7a) *lo keday le-'ašen gitane*
 not worth to-smoke Gitanes
 'It is not worth smoking Gitanes.'
- (7b) **lo keday 'ašen dan gitane*
 not worth smoking Dan Gitanes
 'It is not worth for Dan to smoke Gitanes.'

From the sketch above, the status of Hebrew gerunds as mixed projections combining a nominal (Determiner) part and a verbal-clausal one (a TP) should have become evident.

5. Greek gerunds

Let us now turn to Greek gerunds, describing them in detail first and then proceeding to offer an analysis of them. In this, I will mainly follow Tsimpli (2000), Haidou & Sitaridou (2002) and Tantalou (2004).

Greek gerunds cannot be arguments and can only function as adverbial adjuncts; unlike English gerunds, they cannot be headed by Complementisers, Determiners or Prepositions. As far as their morphology is concerned, they are formed from the perfective stem of active paradigm verbs plus the indeclinable suffix *-ondas*. Regarding the rest of their properties, they differ according to their function, falling into two categories: 'Manner' or 'Other' gerunds².

Manner gerunds can only have bound variable null subjects, which must be bound by the main subject (see Tsimpli 2000: 156; Spyropoulos & Philippaki-Warburton 2002;

² As will be shown below, both are just labels of convenience. I chose 'other' instead of 'temporal', because non-manner gerunds are far from being just 'temporal'.

Tantalou 2004: 4), as the following example (23) from Panagiotidis (2002: 149) illustrates:

- (8) I ghonis_i idhan ta pedhia_j [PRO_{i/*j} pez-ondas skaki].
 the parents.saw the children play-GER.chess
 ‘The parents saw the children while the parents were playing chess.’

Manner gerunds tolerate no temporal adverbs or the aspectual auxiliary *eho* (‘have’), with which periphrastic perfect tenses are formed in Greek. A manner gerund cannot be negated. Finally, manner gerunds typically *follow* the main clause.

‘Other’ gerunds permit a range of temporal, cause and other interpretations, the exact nature of which depends largely on pragmatics (cf. Tsimpli 2000: 137-9). As for their subjects, these can be null controlled subjects – but controlled more loosely than those of manner gerunds³. Interestingly, ‘other’ gerunds also license overt subjects in *nominative*, as well as true temporal adverbs (like ‘now’, ‘yesterday’ etc.). They also permit the aspectual auxiliary *eho* (‘have’), meaning that ‘other’ gerunds can appear in the Present Perfect. Finally, they can be negated using *mi(n)* negation (the one reserved for non-veridical modalities, roughly speaking). Finally, ‘other’ gerunds usually *precede* the main clause.

The following pair of examples illustrates the different behaviour of the two classes regarding negation; Manner gerunds in (9) and ‘Other’ in (10):

- (9) O Manos_i irthe [PRO_i (?*mi) mil-ondas sti Nina].
 the Manos came not talk-GER to-the Nina
 ‘Manos came (not) talking to Nina.’
- (10) [PRO_i idhi (mi) mil-ondas sti Nina] o Manos_i efiye.
 already not talk-GER to-the Nina the Manos left
 ‘Already (not) talking to Nina, Manos left.’

Only ‘other’ gerunds, like the one in (10), can be negated. Furthermore, the example below illustrates that ‘Other’ gerunds can have nominative subjects. They can also be modified by temporal adverbs, thus establishing quasi-independent temporal reference; none of these properties is available for Manner gerunds:

- (11) [Vlep-ondas htes o Manos_i ti Nina eki] PRO_i efiye simera.
 see-GER yesterday the Manos the Nina there left today
 ‘Manos seeing Nina there yesterday, he left today.’

A way to account for these differences between Manner and ‘Other’ gerunds is to say that only the *latter* have a T projection, roughly following Haidou & Sitaridou (2002: 194-6). The Tense head must be responsible for (a) licensing temporal (not just aspectual) adverbs, (b) sanctioning quasi-independent temporal reference, (c) enabling the appearance of *mi*-negation, and (d) assigning nominative to the subject⁴.

³ The situation with Greek control is fairly complex; again, see Tsimpli (2000: 154-6) for discussion regarding control with gerunds. Moreover, as an anonymous reviewer comments, if the reference of the subject in ‘Other’ gerunds depends largely on pragmatics, it is perhaps not an instance of control at all, but an instance of (accidental) coreference. Nevertheless, coreference being the preferred state of affairs, it is hard to attribute it to accidental factors.

⁴ For Greek, nominative could nevertheless be a ‘red herring’ (Tsimpli 2000: 153).

Such an approach, in the spirit of the one in Tsimpli (2000), views Greek gerunds as clausal chunks and *not* as anything like mixed projections. Before examining some problems with a ‘clausal chunk’ approach, it is necessary to say a few more things about the Tense head in the next section.

6. An indispensable excursus on Tense

Supposing Haidou & Sitaridou (2002) are on the right track regarding their distinction between gerunds not projecting a TP (Manner gerunds) and those which do (our ‘Other’ gerunds), observe the following parallel in the behaviour of ‘Other’ gerunds and periphrastic tenses under conjunction, with respect to pronominal clitics:

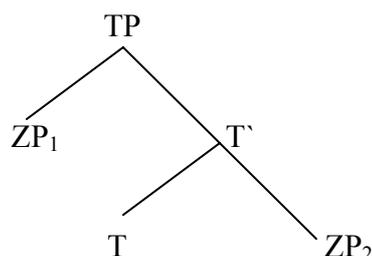
- (12) I Nina ta idhe ke *(ta) akuse poles fores.
 the Nina them-CL saw and them-CL heard many times
 ‘Nina saw them and heard them many times.’
- (13) I Nina ta ihe [dhi ki akusi] poles fores.
 the Nina them-CL had seen and heard many times
 ‘Nina had seen and heard them many times.’
- (14) [[Vlep-ondas ki akugh-ondas] ta] i Nina, ...
 see-GER and hear-GER them-CL the Nina
 ‘Seeing and hearing them, Nina ...’

Regarding the clitic co-ordination possibilities above, we notice that ‘Other’ gerunds, like the ones in (14), resemble the perfective (sometimes called ‘participial’) verbal forms such as *dhi* (‘seen’) and *akusi* (‘heard’) combining in (13) with an auxiliary to give perfect tenses in Greek. In both these cases, and unlike the situation with finite verbs illustrated in (12), it is possible for both the verbal forms and the gerunds to be conjoined under the scope of a single clitic. Taking clitics to attach to T (Kayne 1989, 1991; Terzi 1999), the conclusion is that both verbal forms and gerunds can stand as units *smaller* than TP, either because these units do not consist of TPs (certainly true of ‘participles’), or because their T heads are somehow defective⁵.

Now, there is much more to tense marking than a simplex T head, carrying, for instance, monadic [past] or [present] features and Tsimpli (2000) analyses gerunds in this spirit. Actually, there is an exciting and extensive range of ideas on the proper treatment of the syntactic representation for Tense (for general discussion, see von Stechow 1995; Stowell 1996; Heim 1997 and Demirdache & Uribe-Etxebarria 2000, among others). Let us follow Stowell (1996: 278-83) here in arguing that temporal interpretation involves the interaction of *two* categories: *T(ense)* and *Z(eit)*. We can think of them the following way, grossly oversimplifying: *Tense* is a predicative category that relates *two* time-denoting expressions. In that respect, it is a bit like a temporal preposition (e.g. *before* or *after*). *Zeit* heads time-denoting expressions, which may be covert. Thus, *Z* is a temporal referential category, akin to Determiner. When the *ZP* is covert, it is parallel to phonologically covert pronominals (e.g. PRO). The account is sketched in the phrase marker below:

⁵ The situation is reminiscent of Italian absolute small clauses (A. Belletti, p.c.), see Belletti (1990).

(15) *The Tense Schema:*



With the above in mind, we can now divide Greek gerunds into two categories: 1. Manner gerunds, lacking T; these are ZP₂s, or smaller constituents; 2. ‘Other’ gerunds, which contain a TP headed by a defective T (Haidou & Sitaridou 2002: 194-6).

7. What about 'mixed' projections?

Suppose that the above speculations are right. We still do not need to consider Greek manner gerunds as anything more than clausal (like infinitives) and, certainly, it does not seem necessary to go all the way to saying they are mixed projections. Still, by arguing that Greek (or Hebrew for that matter) gerunds are just clausal chunks (call these TPs, ZPs, or whatever) we miss a number of points.

As suggested above, gerunds within the same language can differ in terms of the number and the type of projections they involve. That much is clear for Greek, where manner gerunds behave like containing just a ZP₂ and ‘Other’ gerunds seem to contain a TP projection, as well. Despite this big difference, both types of gerunds always behave *adverbially*, never as clausal arguments. To elaborate, consider that Greek gerunds are unable to function as anything but adverbials even if Tense is present, a Tense head that licenses nominative subjects and temporal adverbs. Compare the situation with clausal chunks headed by a defective T, such as infinitives in other languages, and the range of positions they can appear in, certainly including that of argument. Another piece of evidence that Greek gerunds are nothing like simple clausal chunks comes from the fact that they are unable to function even as ‘nexus constructions’ (Svenonius 1994), which are sometimes taken to be *vP* chunks – hence certainly smaller than either type of Greek gerund. Compare⁶:

(16) Me drink alcohol? Never.

(17) * (Egho) pin-ondas alkool? Pote.

I drink-GER alcohol never

If we leave things here, we need extra assumptions about why Greek gerunds do not function *at least* like infinitives or nexus constructions, as the idea that a purely clausal projection, let alone one headed by T, is inert is *very* odd. In other words, more structure than just the clausal chunk – irrespective of its size and makeup – must be involved. The suggestion I am going to put forward here is that Greek gerunds, like Hebrew ones as well as verbal nouns, are mixed projections and their properties, including their non-argumenthood, can be derived from exactly this fact.

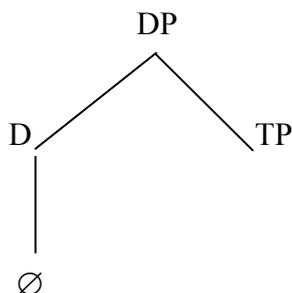
⁶ An anonymous reviewer wonders whether the *-ondas* inflection on the gerundive form in (17) plays a role in its unacceptability in nexus constructions. It all depends on the nature of this inflection, which is a moot point for this contribution.

8. A (null) temporal P

Let us now review some common properties of Greek and Hebrew gerunds: a) They are/contain clausal chunks but they are not infinitives (for Hebrew); b) they cannot be arguments; c) they cannot be headed by *overt* Ds or Cs.

The last point is easy to explain. In both Hebrew and Greek gerunds there is no C-layer, as the clausal chunk finishes with T and then is dominated by a *non-clausal* projection. As far as Hebrew is concerned, this non-clausal projection is, according to Siloni (1997:Ch. 5), a DP. So Hebrew gerunds, far from being plain clausal chunks, are mixed projections (D is a nominal element) and look like this:

(18) *Hebrew gerunds*, Take One:



If (18) is on the right track, then the absence of C is justified. The absence of articles and nominalisations, is derived, as well: the gerundive projection is already headed by a null D. Given that the properties reviewed above are shared by Greek gerunds as well, we only now need to extend the beginnings of the Hebrew analysis in (18) to Greek, claiming that Greek gerunds are clausal chunks (TPs or ZPs) embedded within a DP. In the case of Greek, the presence of a D (and its specifier) may even explain the topicalisation, focus and *wh*-movement within gerundive projections some speakers (see Tantalou 2004) seem to (marginally) accept, as Greek D is associated with Focus and Topic projections (Grohmann & Panagiotidis 2005). The fact that a Complementiser field is not there explains the limited acceptability of such operations within gerundive expressions, precisely as is the case within (other) DPs.

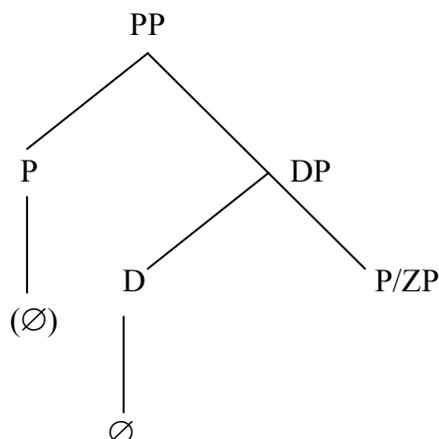
Nevertheless, this cannot be the whole story. Turning back to Hebrew, where the picture is clearer, Siloni (1997: 164) points out that Hebrew gerunds “must be introduced by temporal prepositions”. Recall that this is also the common way of introducing Japanese and Korean verbal nouns (see section 3). In Greek there is no overt temporal preposition heading the gerundive projection. But maybe there is a preposition, albeit a null one. This is not as ad hoc as it may sound: in Greek there are adverbial expressions that look like bare noun phrases:

(19) Irthe [∅ to proi].
 came the morning
 ‘She/he came in the morning.’

Expressions like the one in (19) cannot act as arguments, either: a possible analysis is that they are actually PPs, as Emonds (1987) claims for English (see also Larson (1985) for discussion in a different spirit). So, we could extend the Hebrew analysis to cover Greek gerunds as well: they are clausal complements of a D, which is the complement

of a (null in Greek) temporal P⁷. In Greek we have a manner gerund when the clausal complement is a ZP and an ‘Other’ gerund when it is a TP:

(20) *Greek and Hebrew gerunds, Take Two:*



The question to answer now is what the meaning of the null temporal P is. Given it is a null one, we would be probably correct in guessing that it must have the default interpretation. What would the default interpretation of a temporal P be? That of *containment*. Looking at the null P in (19), we see that the null P relates two times, that of arriving (expressed by *irthe* ‘came’) and that of the morning (expressed by *to proi* ‘the morning’). The null P arranges the two times in a containment relation: the arriving interval, the main event $\tau(\text{ME})$, is contained within the morning interval, the ‘prepositional’ event $T(\text{PE})$: $\tau(\text{ME}) \subseteq T(\text{PE})$ ⁸.

The *same* null P must be involved in gerunds. Clarifying, consider the following example with a manner gerund:

(21) *Irthe* [\emptyset traghudhondas].
 came singing
 ‘She/he came singing.’

Once more, the two intervals, that of arriving and that of singing, are in a containment relation. The postulated null P in (21) again relates two times, that of arriving (expressed by *irthe* ‘came’) and that of singing (expressed by the gerund), with the null P arranging the two intervals in a containment relation: the arriving interval, the main event $\tau(\text{ME})$, is contained within the singing interval, the ‘gerundive’ event $T(\text{GE})$: $\tau(\text{ME}) \subseteq T(\text{GE})$.

This presence of null P in *all* Greek gerunds, explains how the gerund in (8), although qualifying as a ‘Manner’ one, can receive a temporal interpretation, as witnessed by *while* in its gloss. Still, there is a difference in interpretation between ‘Manner’ and ‘Other’ gerunds. Where does this difference stem from? The answer can be, from the interaction of the null temporal P with the temporal T or Z head of the gerund’s clausal part.

⁷ An anonymous reviewer enquires how we know that it is a null D and not a null C head that is selected by a P. I would think that, although this is a possibility, the lack of (overt) temporal Ps selecting overt Cs, in Greek at least, could provide some support against the idea.

⁸ I wish to thank Winnie Lechner for discussing the semantics of the null P with me, with errors and misconceptions remaining, as ever, mine.

So the null temporal P may *order* the main time interval and that of the gerund ZP in a containment relation $\tau(\text{ME}) \subseteq \text{T}(\text{GE})$: this is the *manner* reading. In the presence of a T head, the P *binds* the gerund's T; main aspect as well as the aspect of the gerund may come into play, with the many interpretations discussed by Tsimplici (2000: 142-8): these are the 'Other' readings.

Finally, viewing gerunds as, ultimately, temporal PPs, naturally answers the question of why they cannot function as arguments. It is for the same reason expressions like *to proi* ('(in) the morning') in (19) cannot: exactly because they are temporal PPs.

9. Conclusion

Greek Gerunds are PPs, headed by a null temporal P ordering its two arguments in a containment relation. The complement of this P may contain either a T-less ZP or a TP, giving rise to the 'Manner' and the 'Other' reading respectively. We hence unify them with Hebrew gerunds and Japanese and Korean verbal nouns. Neither of these can ever be arguments, as they are temporal PPs, which explains their exclusively adverbial functions.

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