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Non-argumental mixed projections

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Non-argumental mixed projections.[♣]

Abstract

This paper takes a comparative look at idiosyncratic instances of mixed categories in Korean, Japanese Hebrew and Greek, arguing them to be *genuine* mixed projections, despite their inability to function as arguments – which in turn is a well-known characteristic of mixed projections, such as English gerunds. After their syntactic behaviour is examined, it is argued that these non-argumental mixed projections are embedded within prepositional phrases headed by (null) temporal prepositions. This derives their peculiar properties while successfully capturing their differences from purely verbal / clausal projections such as infinitivals.

1. Introduction

This paper enquires into two issues: First, it argues that the so-called gerunds in Greek, Hebrew gerunds and verbal nouns in Korean and Japanese are indeed mixed projections, consisting of a nominal and a verbal / clausal part. This will lead us to the second question to be addressed: if the above configurations are truly instances of mixed

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projections, then why can they not appear in argument positions, as expected from more familiar cases of mixed projections, such as English gerunds, Turkish nominalised clauses and Dutch nominalised infinitives?

2. Gerunds as Mixed Projections

Let us start with the first question: are Greek and Hebrew gerunds as well as Korean and Japanese verbal nouns truly mixed projections? In order to answer this question, we need to clearly state what we mean by the term 'mixed projection', of which gerunds constitute a well-studied case. By way of definition, we can say that mixed projections are XPs displaying properties from more than one category, say both nominal and verbal / clausal properties.[1]

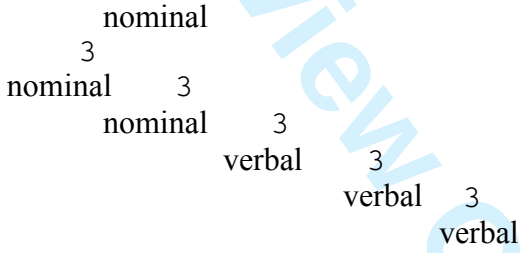
Research in mixed projections, and gerunds in particular, is vast and has been the focus of intensive research throughout the 70s and the 80s, although less so more recently. For reasons of space, I will base myself on meticulous overviews and critical reviews of the relevant literature by Bresnan (1997), Borsley & Kornfilt (2000), Malouf (2000) and Hudson (2003) in order to zoom into two important properties of mixed projections. A first one is that the markers of the two categories (e.g. nominal and verbal) giving a mixed projection its categorially dual character never intersperse. Put differently, mixed projections consist of (typically) two categorially uniform subtrees. In Bresnan (1997) (also in Malouf, 2000 and Ackema & Neeleman, 2004: 174), we find this observation expressed as the following generalisation:

[1] An anonymous reviewer reports that Latin grammarians already refer to the category of *gerundivium* (and supine and participle) as of "mixed nature". Here, the term 'mixed *projection*' is preferred over 'mixed *category*' exactly because mixed projections are not primitives such as 'noun' or 'verb', but syntactic structures containing material belonging to different categories. A disclaimer is also in place regarding the term 'gerund', which is simply used for convenience (and following the literature on Hebrew and Greek) and carries no theoretical implications, as is going to become clear. I wish to thank an anonymous reviewer for discussion of the terminology.

(1) *Phrasal Coherence*: the mixed projection "can be partitioned into two categorially uniform subtrees such that one is embedded as a constituent of the other" (Bresnan 1997: 4, after Malouf).

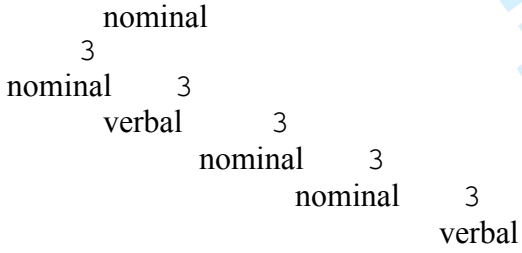
The state of affairs the generalisation above describes is that chunks of different categories, say nominal and verbal, in a mixed projection are distinct and occupy different 'sides' thereof. For instance, we never have alternating nominal and verbal projections making up a mixed projection. Consequently, there is a cut-off point where verbal / clausal characteristics end and nominal ones begin and there is no attested case of a mixed projection where verbal and nominal heads actually alternate or intersperse (Bresnan 1997). This purported state of affairs is schematically illustrated in the diagram below:

(2) A mixed projection abiding by Phrasal Coherence:



An impossible state of affairs:

*



Furthermore, the generalisation in (1) holds for mixed projections in a range of typologically unrelated languages: Hebrew, Arabic, Turkish, Kikuyu, Italian, Dutch, German, Dagaare (a Gur language of the Niger-Congo family) and others (Bresnan 1997).

A typical example of Phrasal Coherence can be seen in the extensively studied English POSS-*ing* gerunds, as in (3), where the higher part of the projection is headed by a possessive Determiner, a nominal element, whereas the lower one assigns accusative: the signature of the category *v*. There is no interspersion of verbal elements within the nominal 'chunk', or vice versa.

(3) [Bob's obsessively scolding us] traumatised everyone.

A second generalisation can be surmised by surveying the literature on mixed projections (Borsley & Kornfilt 2000; Malouf 2000; Hudson 2003), from where it emerges that mixed projections externally behave as nominals:

(4) *Nominal External Behaviour*: externally, mixed projections behave as nominals.

Mixed projections *externally* display straightforward nominal behaviour; for instance, English gerunds and Turkish nominalised clauses can be arguments of verbs, Spanish and Dutch nominalised infinitives are headed by articles – and so on. However, we have no clear evidence of *bona fide* mixed projections behaving externally as verbs or clauses, while containing a 'real' nominal element.[2]

The above two generalisations bring us to the first problem this paper will look into: how are we to analyse elements which look like mixed projections, such as Greek and Hebrew gerunds, or Korean and Japanese verbal nouns, 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, automatically falsifies (4); or,

[2] This is a matter that needs further researching into. Although I have so far not managed to find unambiguous instances of mixed projections that externally behave as verbs, an anonymous reviewer raises the issue of *nominalised verbs* in Australian languages. Given the relevance of such a possibility for the proper evaluation of Phrasal Coherence (1), this is a question that will feature prominently in follow-up research.

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 genuine mixed projections and claiming that their non-argument status results from their involving more structure than meets the eye. But in order to finally understand why such constituents do not appear in argument positions, we 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. They are morphologically simplex *nominal* elements (see Yoon & Park 2004 for a detailed argument on why VNs cannot possibly be derived from verbal sources), and no special nominalising morphology is attached to them, contrasting them, in the case of Korean at least, with 'syntactic' nominalisations suffixed by *–um* (Yoon & Park 2004, Ackema & Neeleman 2004:179). Verbal Nouns however display two prototypically verbal / clausal characteristics: the ability to assign verbal Case (Iida 1987) and the projecting of full argument structures (Tsujimura 1992, Manning 1993 for overview and analyses). An example from Korean (adapted from Yoon & Park 2004) illustrates this state of affairs:

(5) [Kim-paksa-ka woncahayk-ul yenkwu]-cwung-ey cencayng-i ilena-ss-ta.
Kim-Dr.-NOM atom.nucleus-ACC research-midst-LOC war-NOM broke.out-PST-DECL.
'The war broke out while Dr. Kim was researching the atom nucleus.'

In the example above, the VN *yenkwul* ('research'), a noun, is associated with functional material that assigns accusative to *woncahayk-ul* ('atom nucleus') and nominative to *Kim-paksa-ka* ('Dr. Kim').

Interestingly, and as already glimpsed in the example above, verbal nouns *cannot* be arguments but are typically embedded within modifying expressions with a temporal interpretation; to wit, observe the following Japanese example from Shibatani (1990:247). As in the Korean example in (5), the verbal noun *ryokoo* ('travel') 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.

(6) [Sensei-ga kaigai-o ryokoo]-no sai…
teacher-NOM abroad-ACC travel.VN-GEN occasion
'On the occasion of the teacher's travelling abroad…'

Alternatively, VNs can combine with a copula/light verb to yield the Light Verb Construction (Shibatani 1990:247 for Japanese; Yoon & Park 2004 for Korean, where the example below is taken from):

(7) John-i Yenghi-lul simha-key kongyek(-ul) hay-ss-ta
John-NOM Yengh-ACC severe-ADV attack(-ACC) do-PST-DECL.
'John severely attacked / criticised Yenghi

We will not look further into this particular syntactic context because too much depends on the proper analysis of Light Verb Constructions in Japanese and Korean.

Let us then return to the case where VNs appear embedded within a temporal expression. A number of such expressions in Japanese is listed below (adapted from Shibatani 1990:247 and Tsujimura 1996:139):

(8) 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'

(9) Verbal noun (VN) with a temporal Postposition: 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 can appear as complements of temporal expressions and postpositions like those in (8) and (9), as illustrated in examples (5) and (6). In brief, nouns functioning as verbal nouns externally still behave like nominals, as they can be complements of postpositions and/or receive Case. At the same time, they have full argument structure and must possess the relevant functional structure necessary to assign accusative and even nominative to their arguments. Thus, 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 in Japanese and Korean. Closely following Siloni (1997: Ch. 5) throughout this section, I will sketch some of their properties and characteristics below, through a comparison with both infinitives and nominalisations in the language. Let us begin with comparing gerunds and infinitives.

First, Hebrew gerunds form a morphological minimal pair with infinitives: gerunds look exactly like infinitives but lack the pre-verbal infinitival marker *le–*. They consequently completely lack nominal morphology and/or φ-feature marking.[3]

[3] Yoon (1996) and Ackema & Neeleman (2004:175-181) have shown that neither *–ing* nor similar endings in mixed projections of Dutch, Spanish and Italian constitute nominalising morphology, i.e. category-changing affixes.

(10) le-'ašen *infinitive* 'ašen *gerund*
to-smoke smoking

Second, gerunds take obligatory overt subjects, unlike infinitives, where overt subjects are impossible (Siloni 1997: 164-5):

(11) bi-r'ot *(-o / dan) 'et 'im-o, 'alac lib-o
in-seeing SUBJ.CL / Dan ACC mother-his exulted heart-his
'When he / Dan saw his mother, his heart exulted.'

Third, *lo-* negation, which is a par excellence verbal / clausal negation (see e.g. Shlonsky 1997: Ch. 2), is disallowed in gerunds, as illustrated in (12) below – example (12) in Siloni 1997: 165).

(12) a. dan bikeš 'otanu lo le-'ašen po
Dan asked us not to-smoke here
'Dan asked us not to smoke here.'
b. *'im lo havin-o 'et ha-macav, hitragaznu
with not understanding-SUBJ.CL ACC the-situation we.got.angry
'We were angered with him not understanding the situation.'

Finally, and crucially for our inquiry here, gerunds in Hebrew cannot appear in argument positions and can only be found in the complement of a temporal preposition, like in (11); "they constitute temporal adjuncts" (Siloni 1997: 164):

(13) *lo keday [’ašen dan gitane]
not worth smoking Dan Gitanes
‘It is not worth Dan smoking Gitanes’

Actually, gerunds in Hebrew appear to stand in complementary distribution with infinitives: it is simply not possible to have an infinitive in the complement of a temporal preposition, as the example below – Siloni’s (8) on p. 163 (ibid.) – shows:

(14) lifney (*la-)’alot ha-nos’im la-matos, hexel la-redet gešem
before (to) ascending the-passengers to.the-plane started to-fall rain
‘Before the passengers boarded the plane, it started raining.’

A tabulated summary (adapted from Siloni 1997: 165) follows:

Table 1. Comparison between Hebrew infinitivals and gerunds

	Infinitives	*Gerundival clauses*
distribution	argument position	with temporal Ps
overt subject	impossible	obligatory
lo-*negation*	possible	impossible

Let us now briefly turn to the differences between gerunds and nominalisations in Hebrew. Nominalisations are bona fide nouns and can (usually) pluralise, be modified by adjectives and appear in the complement of articles such as *ha–*; they can also license *šel* (‘genitive’) arguments. On the other hand, gerunds cannot pluralise, they take adverbs instead of adjectives and cannot appear in the complement of *ha–* or other

determiners, neither can they license *šel* genitives. The interested reader is referred to Siloni (1997: 172-5) for details and examples and to Hazout (1994) for a different take on the issue. This state of affairs is reminiscent of Korean, where *–um* nominalisations contrast with verbal nouns; crucially, Hebrew nominalisations, like Korean *–um* ones, can of course appear in argument positions, unlike gerunds and verbal nouns respectively, as shown in the example below, adapted from Siloni's (1997: 174) (29) and (30):

(15) a. * hikans-o la-misrad hifti'a 'oti
entering-SUBJ.CL to.the-office surprised me
'His entering the office surprised me' *Gerund*

b. knisat-o la-misrad hifti'a 'oti
entering-his to.the-office surprised me
'His entrance to the office surprised me' *Nominalisation*

In order to capture the characteristics of Hebrew gerunds as well as their differences with both infinitives and nominalisations, I will claim along with Siloni (1997: 177-184) 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. Their being DPs externally – at this point recall Nominal External behaviour in (4) – explains how they can be complements of temporal Ps and why they do not tolerate the article *ha–*: they are already headed by a null D. Turning to the nature of the 'lower' clausal chunk Hebrew gerunds contain, we observe the following. Gerunds can take overt subjects – in fact they *must* take overt subjects, as in (11). Whatever the reason for the obligatoriness of subjects, their presence

would force us to think that the verbal / clausal part of the gerund contains a TP projection. However, the impossibility of *lo*– negation with gerunds, illustrated in (12), suggests that this must be a Tense head that is somehow defective, either because it lacks some feature or because it cannot be associated with a Complementiser (Siloni 1997: 165-175). Whichever direction the answer lies, observe that the morphological similarity between Hebrew infinitives and gerunds is compatible with an analysis of gerunds as containing a projection of a somehow defective T head.

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

5. Greek gerunds

Let us now turn to Greek gerunds, describing them first and then proceeding to offer an analysis. 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 appear in the complement of Complementisers, Determiners or Prepositions. As far as their morphology is concerned, they are formed from the imperfective stem of active paradigm verbs plus the indeclinable suffix –*ondas*.[4] They display no nominal morphology, either. Regarding the rest of their properties, Greek gerunds can be divided according to their function and position in the clause into *manner* and *absolute* gerunds.

[4] Manolessou (2005) on the history of the ending –*ondas*.

Manner gerunds are impossible with any overt subject. Actually, they can only have bound variable null subjects, say PRO ones, which must be bound by the subject of the main clause (Tsimpli 2000:156; Spyropoulos & Philippaki-Warburton 2002; Haidou & Sitaridou 2002:190-1; Tantalou 2004:4), as the following example illustrates:

(16) I ghonis$_i$ prosehan ta pedhia$_j$ [PRO$_{i/*j}$ pez-ondas skaki]
the parents watch.IMP the children play-GER chess
'The parents were watching 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 verb.

Absolute gerunds permit a range of interpretations: temporal, causal and other. Their exact interpretation in each context depends largely on pragmatics (Tsimpli 2000:137-9). As for the subjects of absolute gerunds, these can be null and they are usually coreferential with the main clause subject, but not obligatorily so. This characteristic makes them more like *pro* subjects; observe the following quite telling contrast:[5]

(17) a. [*pro* trogh-ondas] erhete i oreksi *Absolute gerund*
eat-GER comes the appetite
'(One's) appetite grows by (one's) eating.'

b. # Erhete i oreksi$_i$ [PRO$_{i/*j}$ trogh-ondas] *Manner gerund*
comes the appetite eat-GER
'Appetite grows while it (= the appetite) is eating.'

[5] See Tsimpli (2000:154-6) for discussion on controlled gerundival subjects. I wish to thank Anna Roussou and an anonymous reviewer for discussing this matter with me.

While the *pro* null subject of an absolute gerund in (17) takes a generic reference, such as 'one', the PRO subject of a manner gerund must be bound by the main subject, yielding the rather odd interpretation of the b. example.

Interestingly, absolute gerunds also license overt subjects in *nominative*, as well as true temporal adverbs (like 'now', 'yesterday' etc.). They also co-occur with the aspectual auxiliary *eho* ('have'), meaning that absolute gerunds can appear in the Present Perfect. Finally, they can be negated using *mi*(*n*) negation (the one reserved for non-veridical modalities). Finally, as also seen in (17), absolute gerundival projections usually *precede* the main clause.

The following pair of examples illustrates the different behaviour of the two classes regarding negation; of manner gerunds in (18) and of absolute ones in (19):

(18) 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'

(19) [*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 absolute gerunds, like the one in (19), can be negated. On top of that, the example below illustrates that absolute gerunds can take nominative subjects and be modified by temporal adverbs, thus establishing quasi-independent temporal reference; neither of these options is available for manner gerunds:

(20) [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 absolute 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,

d. licensing periphrastic perfect tenses with an auxiliary,[6]

e. permitting a *pro* subject,

f. assigning nominative to an overt subject.[7]

Such an approach, in the spirit of 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 (absolute gerunds), observe the following parallel in the behaviour of absolute gerunds and periphrastic tenses under conjunction, with respect to pronominal clitics:

[6] I am grateful to an anonymous reviewer for this observation.
[7] For Greek, nominative could nevertheless be a 'red herring': Tsimpli (2000: 153).

(21) I Nina ta idhe ke *(ta) akuse poles fores.
the Nina CL saw and CL heard many times
'Nina saw them and heard them many times.'

(22) I Nina ta ihe [dhi ki akusi] poles fores.
the Nina CL had seen and heard many times
'Nina had seen and heard them many times.'

(23) [[Vlep-ondas (ta) ki akugh-ondas] ta] i Nina, …
See-GER CL and hear-GER CL the Nina
'Seeing (them) and hearing them, Nina …'

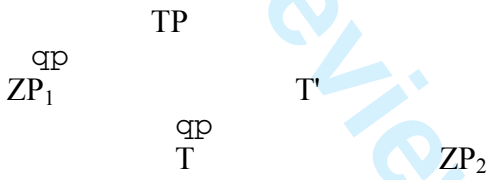
Regarding the clitic co-ordination possibilities above, we notice that absolute gerunds in (23) resemble the perfective (sometimes called 'participial') verbal forms such as *dhi* ('seen') and *akusi* ('heard') combining in (22) with an auxiliary to give perfect tenses in Greek. Unlike the situation with finite verbs in (21), it is obligatory for the verbal forms and possible for 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 the verbal forms must and the gerunds can stand as units *smaller* than TP, either because these units do not consist of TPs (possibly true of 'participles'), or because their T heads are somehow defective…[8]

Generally speaking, 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. An alternative, and much more convincing, range of treatments of the syntactic representation for Tense are developed in von Stechow (1995), Stowell (1996), Heim (1997) and Demirdache & Uribe-Etxebarria (2000), among others. Let's

[8] As Adriana Belletti (p.c.) points out, this situation is reminiscent of Italian absolute small clauses (Belletti, 1990). See also footnote 10.

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, Tense is a bit like a temporal preposition (e.g. *before* or *after*). *Zeit* on the other hand heads time-denoting expressions, which may be covert. Thus, Z is a temporal referential category, akin to Determiner, and when the ZP is covert, it is parallel to phonologically covert pronominals (e.g. PRO). Generally speaking, ZPs denote time intervals that T orders. The account is sketched in the phrase marker below:

(24) The Tense Schema:



With the above in mind, we can now divide Greek gerunds into two categories:

a. manner gerunds, lacking T; these are ZP_2's, expressions denoting a time interval;

b. absolute gerunds, which contain a TP headed by a (defective) T (Haidou & Sitaridou 2002: 194-6). By (24), these would consist of a T with a ZP_2 in its complement and a, PRO-like, null ZP_1 in a specifier of T.

7. What about 'mixed' projections?

Suppose that the above arguments are on the right track and that the two types of Greek gerunds essentially differ in size, with manner gerunds being ZPs and absolute gerunds

TPs. We still do not need to consider Greek gerunds as anything more than verbal / clausal chunks, like infinitives are: at this point, it would 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 contain. That much is clear for Greek, where manner gerunds behave like containing just a ZP_2, while absolute gerunds appear to also contain a TP projection. Despite this difference, however, both types of gerunds always behave *adverbially*, as modifiers, never as clausal arguments. Elaborating, consider that Greek gerunds are unable to function as anything but adverbials even if they contain Tense, a Tense head that licenses nominative subjects and temporal adverbs. Compare the situation with purely clausal chunks headed by a defective T, such as infinitives in other languages, and the range of positions they can appear in: these TPs can certainly function as arguments.

This takes us to another piece of evidence that Greek gerunds are nothing like simple clausal chunks. Such evidence 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. Compare:

(25) Me drink alcohol? Never.

(26) * (Egho) pin-ondas alkool? Pote.[9]
I drink-GER alcohol Never

[9] Greek uses *na* clauses (*na* being an irrealis particle, informally speaking) instead of nexus constructions, as two anonymous reviewers point out. See section 9 for some more discussion.

If we leave things here, we need extra assumptions about why Greek gerunds do not function *at least* like infinitives or nexus constructions, let alone as arguments. Otherwise, the suggestion that a purely clausal projection, especially one headed by T, *must* be inert is very odd. In other words, more structure than just the clausal chunk – irrespective of this clausal chunk's size and makeup – must be involved. Thus, if we go for the minimal hypothesis, namely that there is nothing *special* with these ZPs and TPs that would prevent them from functioning as arguments, infinitives or nexus constructions, we would be led to presume that they cannot do so because of the structure they are embedded in. This structure should consequently make the clausal chunks it embeds unavailable to function as a (quasi-)clause or as an argument.[10]

The suggestion I am going to put forward here is that Greek gerunds, like Hebrew ones as well as Japanese and Korean verbal nouns, are mixed projections and their properties, including their non-argumenthood, can be derived from exactly this fact. Towards this end, I will compare and analyse Greek and Hebrew gerunds on a par.

8. A (null) temporal P

[10] Interestingly, *Romance* gerunds (the *–ndo* forms in languages like Spanish, Italian and Portuguese) seem to behave like purely clausal chunks: they can act like complements to perception verbs, they can be introduced by prepositions, they function in the manner of a nexus construction, they may modify an object (adverbially but also attributively as secondary predicates), they can function as absolutes, and, crucially, they participate in the formation of periphrastic tenses. They must however minimally differ from infinitives, as they cannot function as arguments (except in the context of a perception verb):

(i) O João viu a Maria cantando o fado. *Portuguese*
the João saw the Maria sing-GER the fado
'João saw Maria singing the fado.'

(ii)*O João apreciou falando sobre o cinema. *Portuguese*
the João liked talk-GER over the cinema

My suspicion is that such Romance gerunds form a minimal pair with Greek and Hebrew ones, in that the former are not mixed projections but bare clausal chunks (a topic for future research). I wish to thank Rita Manzini, Ioanna Sitaridou, Vayos Liapis and Adriana Belletti for discussing the issue with me and an anonymous reviewer for extensive commentary (including the above examples).

Let us now look at some common properties of Greek and Hebrew gerunds: a) They contain clausal chunks but they are not infinitives; b) they cannot be arguments; c) they cannot be in the complement of *overt* Ds or Cs.

The last point can be easily explained: in both Hebrew and Greek gerunds there is no C-layer, as the clausal chunk finishes with T (or Z) and then is dominated by a *non-clausal* projection. As far as Hebrew is concerned, this non-clausal projection is no other than DP (Siloni 1997: 177-190). So Hebrew gerunds, far from being plain clausal chunks, are mixed projections (D is a nominal element) and look like this:

(27) Hebrew gerunds, Take One:

As noted, if (27) is correct, then the absence of C is justified. The absence of articles is derived, as well: the gerundival projection is already headed by a null D and therefore closed off regarding any more nominal material. 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 (27) 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) provides us with a way to explain away the following: as Tantalou (2004) observes, some speakers seem to (marginally) accept topicalisation, focus and *wh*-movement within gerundival projections. When we posit a D-layer in Greek gerunds, like in (27), limited *wh*-movement, focus movement and the presence of topic positions come for free, as Greek

D is indeed associated with Focus and Topic projections (Grohmann & Panagiotidis 2005). At the same time, the lack of a Complementiser field, a fully-fledged discourse-oriented set of projections, explains the *limited* acceptability of such operations within gerundival expressions, precisely as is the case within (other) DPs in Greek (for examples and an analysis see also Horrocks & Stavrou 1987, and much subsequent work).

Nevertheless, this cannot be the whole story. Turning back to Hebrew, the picture is clearer because Hebrew gerunds "must be introduced by [overt] temporal prepositions" (Siloni 1997:164). 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 gerundival projection. But maybe there still is a preposition there, after all, albeit a null one. This is not as ad hoc as it may sound, given that in Greek there are adverbial expressions that look like bare noun phrases:

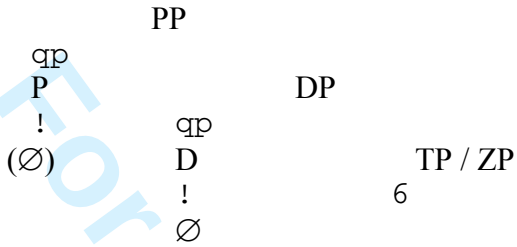
(28) irthe [∅ #(to) proi]
came the morning
'She/he came in the morning'

Expressions like the bracketed one in (28) cannot act as arguments, either: a plausible analysis would be that they are actually PPs, as Emonds (1987) claims for English (but see Larson (1985) for discussion of such expressions 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 in turn is the complement of a (null in Greek) temporal P.[11]

[11] A question at this point is how we know that it is a null D and not a null C that is selected by a P. The general lack of (overt) temporal Ps selecting overt Cs – in Greek at least – provides support against the idea. Moreover, in an example like (28), *any* overt P is impossible, a fact compatible with the hypothesised

Finally, in Greek we would have a manner gerund when the clausal complement is a ZP and an absolute gerund when it is a TP. Otherwise, Hebrew and Greek gerunds are structurally identical: *mixed projections embedded in a temporal PP*.[12] Mutatis mutandis, this is the general schema for Korean and Japanese verbal nouns, as well.

(29) Greek and Hebrew gerunds, Take Two:



The question that arises now is what the interpretation of this null temporal P is. Given it is a null one, we would be probably correct in guessing that it must be an 'elsewhere' preposition and take the default interpretation. At the same time, we can plausibly argue that the default interpretation of a temporal P would be that of *containment*. Looking at the null P in (28), we see that the null P relates two time intervals, 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 τ(ME), is contained within the morning interval, the 'prepositional' event T(PE): τ(ME) ⊆ T(PE).[13]

null P being a lexical item with specific interpretation. The Determiner, as illustrated, may be dropped in certain registers / idiolects.

[12] Given that their clausal chunk is a (defective) TP, Greek absolute gerunds are virtually identical to Hebrew gerunds. This in turn brings up the issue of the differences between the two languages, two anonymous reviewers point out. It must be admitted that the obligatoriness of subjects in Hebrew gerunds, as in (11), although a useful tell-tale sign of T's presence, is hard to explain. However, the impossibility of *lo-* negation can be probably linked to a comparable state of affairs in Greek absolute gerunds, where only non-veridical negation *mi* may be used (see section 5).

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

Let us claim that the *same* null P is present in Greek gerundival constructions. Clarifying, consider the following example with a *manner* gerund:

(30) irthe [∅ traghudh-ondas]
came sing-GER
'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 (30) relates two time intervals, 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 τ(ME), is contained within the singing interval, the 'gerundival' event T(GE): τ(ME) ⊆ T(GE). So, the null temporal P in (30), taking a mixed D-ZP projection as its complement, is identical to that in (28), which takes an 'ordinary DP' as its complement.

This presence of null P in *all* Greek gerunds, explains how the gerund in (16), although qualifying as a manner one, can receive a temporal interpretation – also witnessed by the *while* in the gloss of (16), for instance. However, there is still a clear difference in interpretation of manner and absolute gerundival projections. Where does this difference stem from?

The null temporal P *orders* the main time interval and that of the gerund ZP in a containment relation τ(ME) ⊆ T(GE): this is the *manner* reading. Turning to absolute gerunds, the temporal P c-commanding the gerund's T will also interact with it, albeit differently: recall from (20) that absolute gerunds have (quasi-)independent temporal reference anyway. In the spirit of Tsimpli (2000: 142-8), the available readings of absolute gerunds arise from pragmatics. However, the different adverbial readings an

absolute gerund may receive must supervene on the interaction between the temporal P and the gerund's T (and its imperfective aspect), and also on the interaction between the whole gerundival PP and the main event T.

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 (28) cannot: exactly because they are temporal PPs.

9. Two loose ends

Before concluding, it is necessary to address two of the broader consequences raised by the analysis, as also raised by the reviewers.

A first one concerns the status of the *null* D and why it must be null in gerundival projections. As already noted, 'nominal-style' limited *wh*-movement, focus movement and the presence of topic positions within gerundival projections suggest that there they contain a D-layer instead of a C-layer.

Now, in a language like Greek overt articles can be found with a wide range of complements, from fully-fledged clauses to proper names, they are however impossible with gerunds. Departing from Siloni (1997: 183-4), where she addresses the equivalent question for Hebrew calling these null Ds "inert", it could be speculated that there is a variety of null determiner in Greek (and Hebrew) exclusively for 'adverbial' uses, i.e. to appear inside the complement of the semantically default and phonologically null temporal P. This null D could be either the lexical entry for the indefinite D, which is null in Greek, or a *morphologically* zero variant of the underspecified article '*to*', which takes clausal complements – cf. example (28). In other words, gerunds would take the 'temporal adverbial' article. If this is independently on the right track, then the following

minimal pair could be analysed as the contrast between 'direct' adverbial modification (in the a. example) and modification by an adverbial inside a temporal PP (in the b. one):

(31) a. irthe [argha]
came slowly
'She / he came slowly.'

b. irthe [$_{PP}$ ∅ [$_{DP}$ ∅ [argha]]]
came slowly
'She / he came late.'

A second matter is why the particular types of TPs and ZPs show up only in the complement of temporal Ps (embedded in the projection of a null D). I think that, again, we have to consider the bigger picture:

We saw in section 4 that the Hebrew gerund is, essentially, the version of the infinitive for use with temporal prepositions, a situation reminiscent of the alternation between infinitive (a clausal chunk) and gerund (a nominalised clausal chunk) in Latin. We also saw in (26) that Greek gerunds cannot function as nexus constructions, a role taken up by *na* clauses (see footnote 9). Now, Modern Greek possesses no infinitives and every role that infinitives fulfil in other languages (and Greek gerunds cannot fulfil) is taken up by *na*-clauses in this language: *na*-clauses can even appear in the complement of an article (like other clauses). We could once more draw a rough sketch of why we only find 'gerundival' TPs and ZPs inside a PP: whatever the status of *na* (a Mood head or C; see Philippaki-Warburton 1994 and Roussou 2000), a *na*-phrase is apparently the smallest possible clausal chunk that can stand alone or as a verbal complement in Greek. Smaller clausal chunks, like 'gerundival' TPs and ZPs, can only be licensed inside the null

temporal preposition expressing containment: *na*-clauses and the clausal chunks within gerunds are in complementary distribution in Greek.

In brief, I suggest that the existence of mixed projections appearing exclusively inside temporal Ps must be correlated with the role (or lack) of infinitives and the size of the smallest possible clausal chunk that can stand alone or act as a complement.[14]

10. Conclusion

We have seen that Hebrew and Greek Gerunds are PPs headed by a temporal preposition. This preposition is null in Greek, ordering its two arguments in a containment relation. Crucially, the complement of this temporal preposition is a mixed projection made up of a Determiner layer and a clausal subtree (a T-less ZP or a defective TP). We hence unify them with Japanese and Korean verbal nouns, which are subtrees under nominal structure, in turn selected by temporal expressions such as adpositions. None of the above elements can ever be arguments or (quasi-)clauses, as they externally behave as temporal expressions, which captures their exclusively function as adverbial modifiers.

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[14] A comparable state of affairs seems to hold with Korean and Japanese verbal nouns: apparently, outside their (overt) adpositional shell they can only act as complements of light verbs, see (7) and the discussion about it.

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