Aspect and the Interpretation of Motion Verbs in L2 Greek

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Abstract

This study examines aspect in L2 acquisition within the framework of the Interpretability hypothesis (Tsimpli 2003; Hawkins & Hattori 2006; Tsimpli & Dimitrakopoulou 2007). Aspect in Greek is a grammaticalized, interpretable feature affecting the argument structure and the telic/atelic interpretation of manner-of-motion verbs. As such, aspect is relevant to the syntax-semantics and the syntax-discourse interfaces. Native speakers and L2 learners of Greek were tested on comprehension and production of manner-of-motion verbs. The results indicated that aspectual distinctions were appropriately used at both interface levels by the L2 learners, thus arguing in favour of the Interpretability Hypothesis. However, unlike NS, L2 learners rely more on lexical properties of prepositions and verbs than on grammatical aspect to encode (a)telicity. Moreover, L2 grammars of Greek seem to involve a one-to-one correspondence between perfectivity and telicity.

1. Introduction

Research on second language acquisition has concentrated on general issues such as whether UG is or is not involved in the construction of an L2 grammar, but also on more specific issues within a UG-constrained second language acquisition (L2A) approach such as the role of L1 and the constraints it imposes on the development of the second language. A number of alternative accounts proposed differ with respect to the extent of L1 transfer and its persistence through advanced levels of L2 competence (Schwartz & Sprouse 1996; 2000; White 2003), as well as with respect to the domain of L1 transfer, namely computational syntax or the interfaces: syntax-prosody (Goad & White 2006) and syntax-discourse (Belletti et al. 2005).

To begin with, the present paper assumes a UG-constrained approach to L2 acquisition. Furthermore, it adopts the Interpretability Hypothesis (IH), which is closely related to the Failed Functional Features Hypothesis (FFFH), in that both theories assume that adult L2 acquisition of uninterpretable features is problematic due to critical period constraints (Hawkins & Chan 1997; Tsimpli 2003; Hawkins & Hattori 2006; Tsimpli & Dimitrakopoulou 2007)[1]. Although in early stages of L2 acquisition L1 transfer of uninterpretable features is more obvious, in more advanced stages L2 learners appear to approximate target performance. According to IH, this is the result of some compensatory mechanism of the L2 grammar which accommodates the input using *interpretable* features, thus eliminating real optionality from the system (Tsimpli & Mastropavlou 2007). In IH, the distinction between interpretable and uninterpretable features is crucial with respect to learnability. Specifically, it is claimed that interpretable features, even if not grammaticalized similarly in L1 and L2, are accessible to the L2 learner since they are not subject to critical period constraints. Thus, both early sensitivity as well as ultimate attainment with respect to interpretable features are predicted to be attested.

In contrast to the above view on the accessibility of interpretable features, Belletti et al. (2005) and Sorace (2006) have argued that features relevant to the syntax-discourse interface are problematic in L2 acquisition due to L1 interference. In Tsimpli & Sorace (2006) a distinction between syntax-semantics and syntax-discourse interfaces is argued for and, hence, interpretable features are further differentiated. Accordingly, linguistic phenomena which involve formal features and operations within syntax and LF, such as focus, topic and quantification belong to the syntax-semantics interface whereas phenomena which involve 'higher' levels of pragmatic processing such as contextual appropriateness in the use of overt subject pronouns in a null subject language belong to the syntax-discourse interface. In the latter case, features such as [contrast] and [topic-shift] are involved.

Within the framework of FFFH and IH, the morpho-syntactic features investigated thus far are uninterpretable formal features with distinct values in L1 and L2: resumptive pronouns in relatives (Hawkins and Chan 1997), gender (Hawkins and Franceschina 2004), wh-feature in interrogatives (Hawkins & Hattori 2007), clitics and determiners (Tsimpli 2003, Tsimpli & Mastropavlou 2007) and resumptive pronouns in interrogatives (Tsimpli & Dimitrakopoulou 2007)[2]. In contrast, the

[1] In Minimalism interpretability is a notion that pertains to both interfaces, namely LF (Logical Form) and PF (Phonetic Form). In this paper we are concerned with interpretability at LF, i.e. the semantic interface.

[2] In some of these works, the acquisition pattern of an interpretable feature is contrasted with the uninterpretable one under investigation, provided both are specified on members of the same paradigm.

present study is concerned with Aspect, a functional category with interpretable feature values (cf. Smith 1991). The FFFH in its current form does not make specific predictions for L2 acquisition of Aspect even in the case where the L1 differs from the L2 in the encoding of the relevant features. On the other hand, the IH claims that interpretable features should be accessible to L2 learners, even if their instantiation in L2 is different from L1. This is based on the assumption that interpretable features are not subject to maturation constraints for reasons that have to do with their dual representation in language and cognition (cf. Smith & Tsimpli 1995; Tsimpli 1996).

In Greek, Aspect is morphologically expressed in a binary way, namely perfective and imperfective. It has been argued that the semantic features involved in the perfective/imperfective distinction include [+/-bounded] and [+/-iterative] (e.g. Mozer 1994). Specifically, the imperfective is [-bounded] and [+ or -iterative], as shown by examples (1a) and (1b) respectively, whereas the perfective is [+bounded] (cf. 2). The examples in (1) and (2) include an activity predicate[3]:

(1) a. Htes oli mera zoghrafize.
yesterday all day painted.$_{\text{IMP.3S}}$
"Yesterday he was painting all day."
b. Persi zoghrafize kathe Kiriaki.
Last-year painted.$_{\text{IMP.3S}}$ every Sunday
"Last year he used to paint every Sunday."

(2) Htes zoghrafise.
yesterday painted.$_{\text{PERF.3S}}$
"Yesterday he painted."

The interpretability of Aspect is assumed for all languages with some aspectual marking. English marks aspect with the use of auxiliaries (3a), Russian with the use of lexical means (cf. (3b) from Babko-Malaya 1999) and Greek with morphological aspect (3c):

(3) a. John is writing / writes / has written a letter.
b. Ivan pisal / napisal pis'mo.
Ivan wrote.$_{\text{IMP}}$ / na-wrote.$_{\text{PERF}}$ letter
c. O Yanis egrafe / egrapse ena grama.
the.$_{\text{NOM}}$ Yanis wrote.$_{\text{IMP}}$ / wrote.$_{\text{PERF}}$ a letter
"Ivan was writing / wrote a letter."

The central role of Aspect in the clause-structure and in particular in the syntax-semantics interface via the projection of argument structure has led researchers to suggest that the mapping between syntax and thematic arguments is mediated by Aspect (Tenny 1987; Borer 1994; 2005; Travis 2000; for Greek see Mozer 1994; Chila-Markopoulou and Mozer 2001; Sioupi 2002; 2005; Tsimpli & Papadopoulou 2006). A strong version of this hypothesis is proposed by Borer (1994; 2005),

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For example, in Tsimpli & Mastropavlou (2007) the definite article is contrasted with the indefinite and the 3rd person clitic with 1st and 2nd person clitics.

[3] It is well known that the viewpoint aspect interacts with the situation type of the verb and in some cases leads to aspectual shifts (Smith 1991). Since motion verbs are activity predicates, we restrict our discussion to them and the aspectual shift they involve, namely from activity to accomplishment.

according to which verbs project arguments freely within VP and higher aspectual projections attract internal and external arguments.

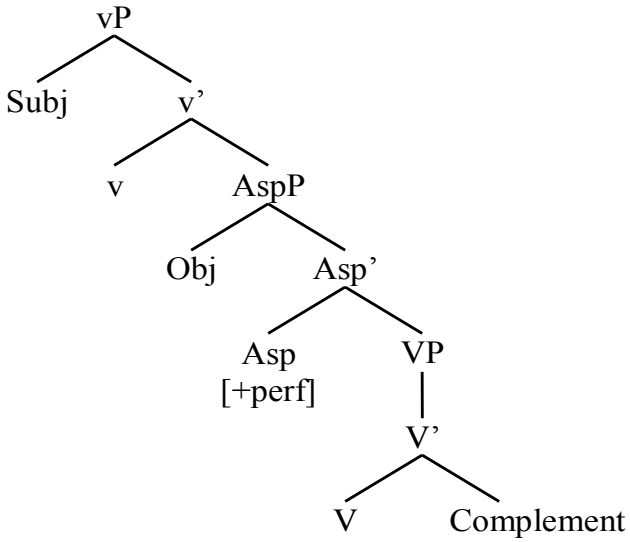
It is further claimed that the aspectual features of the verb interact with the specificity of the DP-complement in deriving the telic or atelic interpretation:

(4) I Maria zoghrafise to portreto.
the Maria painted.$_{PERF.3S}$ the portrait
"Maria painted the portrait."

(5) I Maria zoghrafize to portreto.
the Maria painted.$_{IMP.3S}$ the portrait
"Maria was painting the portrait."

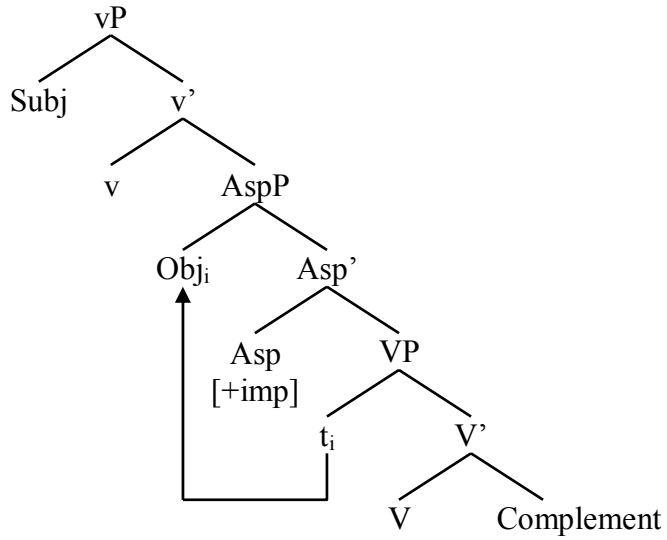
On the basis of this assumption, Tsimpli & Papadopoulou (2006) have argued that the telic/atelic distinction in the interpretation of (4) and (5) is formally captured by a difference in the Merge position of the DP-complement, as shown by the structures in (6) and (7) below[4]:

(6)



[4] In Tsimpli & Papadopoulou (2006) the phrase intervening between vP and VP is TransP (transitivity phrase) and Aspect is a feature specified on Trans.

(7)



The specific DP-complement of a perfective verb is merged in Spec,AspP, whereas the DP complement of an imperfective verb is merged in Spec,VP and is then moved to Spec,AspP. In both structures, the DP-complement eventually appears in Spec,AspP for Case reasons. Tsimpli & Papadopoulou (2006) report on an empirical study including an adult and a child group of native speakers of Greek, in which perfective verbs were found to strongly favour an overt object as opposed to imperfective verbs which were preferred as intransitive. We argued that this preference is due first to economy restrictions on the derivation of DP complements with perfective *vs.* imperfective verbs (cf. (6) & (7)) and secondly to an interpretative difference, namely that perfectivity includes an endpoint made visible through an overt object, thus rendering the predicate telic (cf. Horrocks and Stavrou 2003). The implication of the above is that telicity in Greek is relevant to the syntax-semantics interface as it is derived compositionally by the perfective form of the verb and the specificity of the DP complement. In this respect, the interpretation of an activity predicate with an overt DP-complement is *unambiguously* telic or atelic depending on the perfective/imperfective distinction. Note, however, that, given the role of the DP complement in determining the predicate's interpretation as being telic or atelic, it is concluded that (a)telicity cannot be *exclusively* determined by the aspectual form of the verb. This is in contrast to other languages, in which telicity is morphologically expressed in the verbal projection; for example, verbal particles in Germanic, the clitic *se* in Spanish (Zagona 1996; Sanz 2000) and verbal prefixes in Slavic (Filip 1999).

Our presentation of the encoding of (a)telicity in Greek thus far involves activity predicates with a DP-complement. The linguistic phenomenon addressed in the present paper, however, concerns the structure and the interpretation of a subclass of activity predicates, namely, manner-of-motion verbs. These verbs can be followed by a PP, which can be either a complement (GOAL) or an adjunct (PATH) (Zubizarreta & Oh 2007; for Greek cf. Horrocks & Stavrou 2007).

(8) I ghata etrekse/etrehe ston kipo.
the cat ran.$_{\text{PERF.3S}}$ / ran.$_{\text{IMP.3S}}$ *s*-the garden
a. [$_{\text{IP}}$…[$_{\text{AspP [PERF/IMP]}}$….[$_{\text{VP}}$ V PP]]] PP complement
b. [$_{\text{IP}}$…[$_{\text{AspP [PERF/IMP]}}$….[$_{\text{VP}}$[$_{\text{VP}}$ V …] PP]]] PP adjunct

Notice that example (8) differs crucially from sentences such as (4) & (5), since DP-complements are merged in Spec,AspP or Spec,VP with perfective and imperfective verbs respectively, whereas PP complements are merged directly with the verb (in the complement position of structures (6) and (7) above). In other words, example (8) is ambiguous in terms of the structural position of the PP. In (8a), the PP complement denotes the endpoint of the motion event which can be understood either as reached (telic) or not (directional/atelic). On the other hand, in (8b) the PP adjunct has a locative interpretation and the predicate is atelic.

The first question that we address in the present study is whether the choice of perfective/imperfective affects native speakers' preference for structure (8a) or (8b), a syntax-semantics interface issue. On the basis of our previous findings from native speakers of Greek, structure (8a) will be preferred with perfective verbs and structure (8b) with imperfective verbs. The second question concerns native speakers' preferences for the telic over the atelic (directional *or* locative) reading, a syntax-discourse interface issue. Note that the telic reading is unavailable in sentence (8) with an imperfective verb. As far as perfective verbs are concerned, given that, as mentioned above, perfectivity implies telicity, the telic reading is predicted to be the default interpretation with perfective manner-of-motion verbs and thus strongly preferred over the directional.

The same questions arise in relation to non-native speakers of Greek. With respect to the first question, the present study investigates whether in L2 grammars aspectual distinctions interact with the complement *vs* adjunct status of the PP_{PATH}, as regulated by the syntax-semantics interface. With respect to the second question, we examine whether the syntax-discourse related preference for the telic over the directional reading with perfective manner-of-motion verbs is native-like. Both questions can be addressed provided L2 learners have mastered the morphological expression of aspectual distinctions (i.e. [+/-perfective]) at a certain stage of development. According to the IH, L2 acquisition of Aspect being an interpretable feature is predicted to be unproblematic. Any differences between the native and the non-native speakers could then be attributed to L2 problems related to the role of Aspect in the syntax-semantics, the syntax-discourse interface or both (cf. Belletti et al. 2005; Sorace 2006).

In the next section we present the structure and interpretation of motion verbs in Greek and compare them with the corresponding structures in the native languages of the L2 learners of this study. In section 3, previous L2A studies on the same phenomenon are briefly presented. In section 4, the empirical study is presented, followed by a discussion of the most important similarities and differences between the native and the L2 speakers of Greek. Finally, in section 5 the implications for IH with respect to the two interface levels to which aspectual distinctions are (in)directly relevant are discussed.

2. Manner-of-motion verbs in Greek

Motion verbs are activity predicates which can acquire an accomplishment reading in certain contexts (Talmy 1985). In Greek, as in other languages, motion verbs differ in whether they are compatible with a PP_{PATH} complement, thus denoting directed motion, or not. Accordingly, motion verbs are distinguished between unambiguously locative manner-of-motion verbs (without directed motion) (e.g. (9)), unambiguously non-locative motion verbs (with directed motion) (e.g. (10)) and

ambiguous manner-of-motion verbs between a locative and a non-locative reading. The last group of verbs will be presented in detail in the following section.

Consider the following examples[5]:

(9) I Maria xoreve / xorepse (mesa) sto spiti. *PP adjunct*
the Maria danced.$_{IMP.3S}$ / danced.$_{PERF.3S}$ (inside) *s*-the house
"Maria was dancing/danced inside/in/*to/*into the house."

(10) a. I Maria pijene / pije (mesa) sto spiti. *PP complement*
the Maria went.$_{IMP.3S}$ / went.$_{PERF.3S}$ (inside) *s*-the house
"Maria was going/went inside/into/to the house."
b. I Maria ebene / bike (mesa) sto spiti.
the Maria entered.$_{IMP.3S}$ / entered.$_{PERF.3S}$ (inside) *s*-the house
"Maria was entering/entered inside/into the house."

The unambiguously locative verbs such as *xorevo* (=dance)*, parapato* (=stagger, stumble)*, periplanjeme* (=wander) lack a directed motion feature. Thus, the PP_{PATH} *sto spiti* in example (9) can only function as a locative modifier of the motion event and, as such, it is a VP-adjunct. Accordingly, the verb structure in (9) is unergative. Crucially, the aspectual choice between perfective and imperfective does not affect the unambiguously locative interpretation of the event.

Notice that the corresponding verbs in English can have a directional reading:

(11) John wandered to the lake. (adapted from Zubizarreta and Oh 2007)

Zubizarreta and Oh (2007) distinguish between two types of manner-of-motion verbs in English: those that can take a 'distance' complement and those that cannot (cf. 'run a mile' and '*wander a mile'). In English, both classes can participate in structures that are ambiguous between a locative and a directional reading[6]. In contrast, in Greek, verbs which cannot take a 'distance' complement ('*xorevo ena mili' = dance a mile) are unambiguously locative, and, thus, lack a directional reading (cf. 9). Given that in both languages this class of manner-of-motion verbs cannot have an inherent directed motion feature, the difference must be attributed to the inherent directional meaning of the preposition 'to' in English[7], and lack thereof in the case of the Greek

[5] Notice that the difference between the perfective and the imperfective verb forms in (9) and (10) has to do with the boundedness of the event: the event is unbounded with the imperfective verb forms. However, in (9) the event is necessarily atelic and the adjunct PP is a path and not a goal. On the other hand, in (10) the PP complement provides the endpoint of the motion event which is reached when the verb is perfective. In this case the interpretation is telic. With the imperfective the interpretation is directional and atelic.

[6] According to Zubizarreta & Oh (2007), the ambiguity in English arises depending on the choice of the preposition (cf. ia&b), the choice of the motion verb (cf. iia&b), and the form used in combination with a locative P (cf. the gerund in (iiia&b)). (Examples adapted from Zubizarreta & Oh, op.cit):

(i) a. John ran *into / out of* the room. (only directional)
b. John ran *inside / outside / in* the house (locative or directional).
(ii) a. John ran / walked in /inside the house. (locative or directional)
b. John danced in/inside the house. (only locative)
(iii) a. John's running (in)to the house (directional)
b. John's running in/inside the house (locative)

[7] As an anonymous reviewer points out, the [+/-progressive] feature of an English verb affects the possibility of the telic reading of an otherwise directional atelic predicate:

preposition *s(e)* (Horrocks and Stavrou 2007). Thus, the Greek class of unambiguously locative verbs (cf. 9) is co-extensive with the class of manner-of-motion verbs which cannot take a 'distance' DP complement.

The examples in (10) are similar to those in (9), in that the perfective / imperfective choice of the verbal form does not affect the inherent semantic feature (directed motion, in this case) of the verbs (Zubizarreta & Oh 2007). The motion events in (10) are unambiguously non-locative and as such, the PP_{PATH} is a complement of the verb[8].

2.1. Aspect and manner of motion verbs

The third class of motion verbs in Greek consists of activity predicates which can be optionally construed as either involving directed motion or not:

(12) a. I Maria etrexe (mesa) sto parko.
the Maria ran.$_{IMP.3S}$ (inside) *s*-the park
"Maria was running inside/in/to/*into the park."

b. I Maria etrekse (mesa) sto parko.
the Maria ran.$_{PERF.3S}$ (inside) *s*-the park
"Maria ran inside/in/into/to the park."

The manner-of-motion verbs exemplified in (12) can take a 'distance' complement ('trexo ena mili' = run a mile)[9]. As shown by the translation, these sentences are ambiguous between a locative and a non-locative reading in both the perfective and the imperfective form (cf. Horrocks & Stavrou 2007). However, (12a) is ambiguous between two atelic interpretations, the locative and the directional, whereas (12b) has an additional reading, which is telic and implies that the endpoint has been reached. In the locative reading, the PP_{PATH} is a VP-adjunct as in (9), while in the other two readings the PP_{PATH} is a complement ('goal') as in (10). We return to the syntactic

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(i) He was going into the house.
(ii) He went into the house.
In both cases the PP *into the house* is a goal complement but in (ii) the endpoint has been reached and the predicate is telic.

[8] As noted in the literature, there is a difference between the verb *pijeno* (=go) in (2a) and *beno* (=enter) in (2b) (Talmy 2000; Oh 2003). The former is a *neutral* motion verb whereas the latter is a *path* verb since it encodes, apart from motion, a path feature.

[9] It should be pointed out that some native speakers consider the structures in (12) unambiguously locative (cf. Horrocks & Stavrou (2007)). For these speakers, the directional or telic reading can be expressed unambiguously with structures consisting of a simple motion verb such as *beno* (=enter) or *pijeno* (=go) and the manner-of-motion verb as a gerund (e.g. (ia)). Alternatively, an unambiguous structure can include one of these manner-of-motion verbs with a preposition clearly specified for direction (e.g. (ib)):

(i) a. I Eleni ebene/bike sto dhomatio trexondas.
the Eleni entered$_{IMP.3S/PERF.3S}$ *s*-the room running
"Eleni was entering/entered the room running."

b. I Eleni etrexe/etrekse pros to dhomatio.
the Eleni ran.$_{IMP.3S/PERF.3S}$ towards the room
"Eleni was running/ran towards the room."

As shown in Papadopoulou's (1996) empirical study as well as in the data from the native speakers presented in this study, the ambiguity is indeed attested. We believe that the contrast in native speakers' judgements may be due to the strong preference for the unambiguous options in (i) above.

representation of each reading of the ambiguity in the following section. For the moment, it suffices to point out that the ambiguity between locative and non-locative readings is a phenomenon relevant to the syntax-semantics interface, since it involves differences in the predicate's argument structure. On the other hand, the difference between the directional and the telic reading is perceived at the discourse level.

On these grounds one could argue that atelicity – and not telicity – is grammaticalized in Greek, as the ambiguity in the imperfective form involves only atelic, i.e. locative and directional, interpretations of the predicate. We consider this an unwelcome suggestion because it would imply that imperfective aspect entails atelic readings in all cases, contrary to fact. In the example below, although the main verb is imperfective, the temporal reading is [+iterative] and the interpretation of the predicate is that of a series of telic events (Iatridou 2000):

(13) Otan itan mikros, etrehe sto parko se mia ora.
when was young, ran.$_{\text{IMP.3S}}$ *s*-the park in an hour
"When he was young, he used to run to the park in an hour."

We thus conclude that morphological aspect alone is not specified with respect to the (a)telic interpretation; for the atelic interpretation to hold, the imperfective needs to be [-iterative].

With respect to the ambiguities observed in (12), Papadopoulou (1996) found that adult native speakers of Greek prefer the telic reading with perfective manner-of-motion verbs than the atelic and the directional readings, while with imperfective verbs they prefer the atelic locative interpretation. Moreover, the status of the preposition, simple (*se*) or complex (*mesa se*) (cf. (12)) was also shown to affect native speakers' preferences: the simple preposition is more strongly associated with non-locative readings whereas the complex preposition favours locative readings. This is probably due to the fact that the complex preposition has a richer semantics and lexicalizes the path more clearly. The simple preposition is underspecified for either direction or location and allows the aspectual features of the verb (situation type and viewpoint aspect) to interact more transparently with the noun of the PP (see fn. 6).

Based on Papadopoulou's (1996) study, Table 1 summarizes the (un)available interpretative options for the ambiguous class of Greek manner-of-motion verbs exemplified in (12) with the simple preposition *se*. Preferences are marked with a double tick:

Table 1. Preferred readings with manner-of-motion verbs in Greek

Aspect	**Atelic**		**Telic**
	Locative (PP adjunct)	**Directional (PP complement)**	**(PP complement)**
Perfective	√	√	√√
Imperfective	√√	√	X

Notice that the directional reading is not the preferred one either for the perfective or the imperfective form. This is probably due to the lack of an inherent directed motion feature on the simple preposition *se* in Greek, along the lines suggested in Horrocks

and Stavrou (2007)[10]. However, we expect direction to be more strongly preferred with perfective than imperfective verbs for reasons to do with the overall preference for transitive readings with perfective verb forms (Tsimpli & Papadopoulou 2006).

To summarize the discussion so far, morphological aspect on Greek ambiguous manner-of-motion verbs affects (a) the predicate's representation of arguments and (b) the strength of preference associated with each reading of the ambiguity involved. (a) is a property of the syntax-semantics interface and distinguishes between manner-of-motion verbs with complement *vs* adjunct PP_{PATH}. (b) is a syntax-discourse interface issue, whereby the perfective verbs acquire a pragmatically preferred interpretation for the telic over the directional reading.

Before we provide the structure corresponding to the examples in (12), we briefly present how the distinction between directional and locative readings is captured in the L1s of the L2 learners participating in this study.

In German, some manner-of-motion verbs are compatible with either a directional or a locative reading, but unambiguously so[11]:

(14) Der Wurm kriecht in die / der Tasse.
the worm crawls in the.$_{ACC}$ / the.$_{DAT}$ cup
"The worm crawls into / in the cup."

The directional reading is encoded by the accusative case marking of the DP complement of the preposition *in*, whereas the locative reading is encoded by the dative case marking.

Russian motion verbs encode direction or location morphologically[12]:

(15) a. let-e-tj
fly^{IMP}.$_{DIR.INF}$
b. let-a-tj
fly^{IMP}.$_{NDIR.INF}$

Directed motion verbs cannot be used to express repeated or habitual motion events (Romanova 2006: 16-17):

(16) Ja begun a zanjatija
I run^{IMP}.$_{DIR.1SG}$ on clases.$_{ACC}$
"I am running to the classes."

(17) a. *Ona často letit v Moskvu.
She often flies^{IMP}.$_{DIR}$ in Moscow.$_{ACC}$
"She often flies to Moscow."
b. Ona často letajet v Moskvu.
She often flies^{IMP}.$_{NDIR}$ in Moscow.$_{ACC}$
"She often flies to Moscow."

[10] As Horrocks and Stavrou (2007) claim, Greek has a clearly directional preposition *pros* (=towards) which explicitly marks direction in motion structures. These authors, however, suggest that the directional readings of PPs headed by *se* may be more readily available with some manner-of-motion verbs such as *trexo* (=run) due to their lexical / encyclopaedic properties.

[11] The examples are from Rothweiler et al. (2007).

[12] Aspect marking in the Russian examples is part of the stem (shown as superscript in the gloss).

In addition, directed motion verbs and non-directed motion verbs can combine with PPs headed by the same preposition. However, the object of P is marked for accusative and the PP denotes the goal with directed motion verbs, while the object of P is in the locative case and the PP has a locative reading with non-directed motion verbs[13] (Romanova 2006: 131):

(18) a. Žuk polz v korobku.
beetle.$_{NOM}$ crept^{IMP}.$_{DIR.SG.M}$ in box.$_{ACC}$
"The beetle crept into the box."
b. Žuk polzal v korobke.
beetle.$_{NOM}$ crept^{IMP}.$_{NDIR.SG.M}$ in box.$_{LOC}$
"The beetle crept in the box."

The addition of perfectivizing prefixes, like *vo* in (19b), to a directed motion verb renders the predicate telic (Romanova 2006: 143):

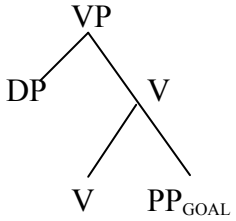
(19) a. idti v magazin
walk^{IMP}.$_{DIR.INF}$ in shop.$_{ACC}$
"walking to the shop"
b. vojti v magazin
in-walk^{PERF}.$_{DIR.INF}$ in shop.$_{ACC}$
"walk into the shop / enter the shop"

To summarize, contrary to the Greek class of manner-of-motion verbs which are ambiguous between a locative (adjunct PP) and a directional/telic (complement PP) reading, in English, German and Russian (non)directed motion is unambiguously expressed with manner-of-motion verbs either through the lexical choice of the verb root or the preposition, and/or the case marking of the prepositional complement. Accordingly, the task of English, German and Russian learners of Greek is to acquire the preference effects of the interaction between perfective and imperfective aspect with the complement *vs.* the adjunct option in the representation of the PP_{PATH} as well as with the telic *vs.* the atelic readings of the predicate.

2.2 The syntax of manner of motion verbs

According to Zubizarreta & Oh (2007), the 'bare' motion verb *go* has the structure in (20) below:

(20)



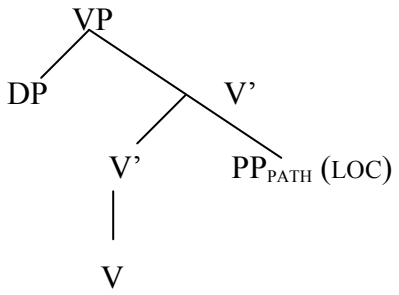
[13] Notice that non-directed motion verbs can co-occur with directional PPs when they have a repeated or habitual reading (cf. 17b).

O Yanis pije sto parko
the Yanis went.$_{\text{PERF.3S}}$ *s*-the park

We assume that the structure of unambiguously non-locative verbs (e.g. (10) above), such as *vgheno* (=exit), *beno* (=enter), *vutao* (=dive) is also the one in (20), the difference being that all of these verbs with the exception of *pijeno* (=go) encode 'path' as well as directed motion. The similarity remains, however, that the PP is a goal complement of V and that the reading is necessarily non-locative. The perfective form of these verbs renders the complement PP the endpoint of the motion event and the predicate is interpreted as telic. In the imperfective form, the PP-complement is still the goal but the unboundedness of the event leads to the interpretation of the predicate as directional/atelic.

The second class of manner-of-motion verbs, exemplified in (9) above, is unambiguously locative and thus atelic. We assume that the relevant structure is the one in (21) below, where the PP_{PATH} is a VP-adjunct, and the structure is unergative:

(21)



O Yanis periplanjotan / periplanithike sto parko
the Yanis wandered.$_{\text{IMP.3S}}$ / wandered.$_{\text{PERF.3S}}$ *s*-the park

Turning to the ambiguous manner-of-motion verbs, the locative and the non-locative readings should in principle correspond to the structures in (21) and (20) above, respectively. In order to establish the complement *vs* adjunct difference in each case, we can subject the perfective and imperfective verb forms of these verbs to the usual aspectual PP test (Dowty 1979) and change the position of the PP_{PATH} to be adjacent or non-adjacent to the motion verb (Zubizarreta & Oh 2007):

(22) a. O Yanis etrekse sto parko se mia ora.
the Yanis ran.$_{\text{PERF.3S}}$ *s*-the park in an hour
b. ??O Yanis etrekse se mia ora sto parko.
the Yanis ran.$_{\text{PERF.3S}}$ in an hour *s*-the park
"Yanis ran to/*in the park in an hour."

(23) a. O Yanis etrekse sto parko ja mia ora.
the Yanis ran.$_{\text{PERF.3S}}$ *s*-the park for an hour
b. O Yanis etrekse ja mia ora sto parko.
the Yanis ran.$_{\text{PERF.3S}}$ for an hour *s*-the park
"Yanis ran in/*to the park for an hour."

The pairs in (22) and (23) involve the verb *trexo* (= run) in the perfective form. Both sentences in (23) are grammatical: the locative reading induced by the temporal PP

allows the path PP *sto parko* to appear in sentence-final position, thus suggesting that this PP is also an adjunct. In the pair in (22), however, the non-locative and, in particular, the telic reading is the only one compatible with the temporal PP *se mia ora* (=in an hour). The reduced acceptability of (22b) in which the temporal adjunct PP intervenes between the verb and the PP *sto parko* supports the complement analysis of the PP_{PATH}.

Consider the same examples with the verb in the imperfective form:

(24) a. O Yanis etrehe sto parko se mia ora.
the Yanis ran.$_{IMP.3S}$ *s*-the park in an hour
b. ??O Yanis etrehe se mia ora sto parko.
the Yanis ran.$_{IMP.3S}$ in an hour *s*-the park
"Yanis ran to the park / *in the park in an hour."

(25) a. O Yanis etrehe sto parko ja mia ora.
the Yanis ran.$_{IMP.3S}$ *s*-the park for an hour
b. O Yanis etrehe ja mia ora sto parko.
the Yanis ran.$_{IMP.3S}$ for an hour *s*-the park
"Yanis ran in the park / *to the park for an hour."

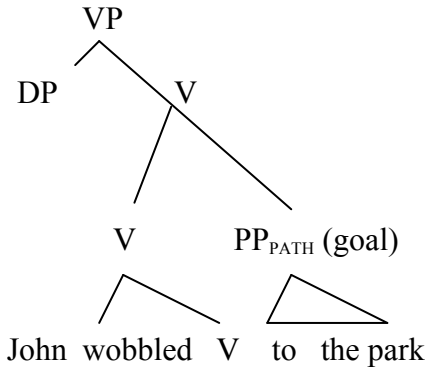
Although the acceptability of the sentences in pairs (24) and (25) is parallel to the ones in (22)-(23), (24a) is acceptable only if the imperfective aspect is read as [+iterative] (Iatridou 2000). In other words, the translation of (24a) cannot be '**Yanis was running to the park in an hour*' but only '*Yanis used to run to the park in an hour*'. In this respect, the event is construed as a series of telic events (see section 2.1 above). This constraint in the interpretation of (24) is forced by the temporal PP which only allows a telic reading of the motion event and neither of the atelic ones (directional or locative)[14]. Thus, the [+iterative] rather than the [-iterative] (durative) reading of imperfective aspect is the only one available for deriving the series of telic events. Finally, the reading of (25a) is either locative or directional whereas in (25b) the directional reading is unavailable given that the aspectual PP intervenes between the verb and its complement *sto parko.*

It thus seems that the class of ambiguous manner-of-motion verbs in Greek can be associated with either a locative reading in which the PP_{PATH} is an adjunct or the non-locative reading in which the PP_{PATH} is a complement (directional or telic). According to Zubizarreta & Oh (2007), the fact that Germanic languages, but not French or Spanish, allow the directional (or telic) reading with manner-of-motion verbs whereby the PP_{PATH} is a complement, is associated with the parametrically defined property of languages to allow compound formation in the syntax of the V-V type. Zubizarreta & Oh argue that the compounding in this case involves two Vs the first of which is specified for 'manner' and the second for 'directed motion'. It is the latter, which is phonologically null, that selects the PP_{PATH} as a complement and thus it is represented

[14] The PPs *in an hour* and *for an hour* lead to the interpretation of the situation type of the verb as accomplishment and activity respectively (Dowty 1979; Verkuyl 1972). In turn, whether the accomplishment reading is also telic depends on the specificity of the complement. Given that in the activity reading the manner-of-motion verbs discussed here lack a complement, whereas in the accomplishment reading the PP is a complement with a *specific* DP object, we assume that the distinction between activity and accomplishment in (22)-(25) is co-extensive with atelic vs. telic. Accordingly, the directional interpretation is excluded from the examples modified by *in an hour* regardless of the aspectual morphology of the verb.

as a complement of the whole V-V compound. The corresponding structure is presented in (26) below:

(26)



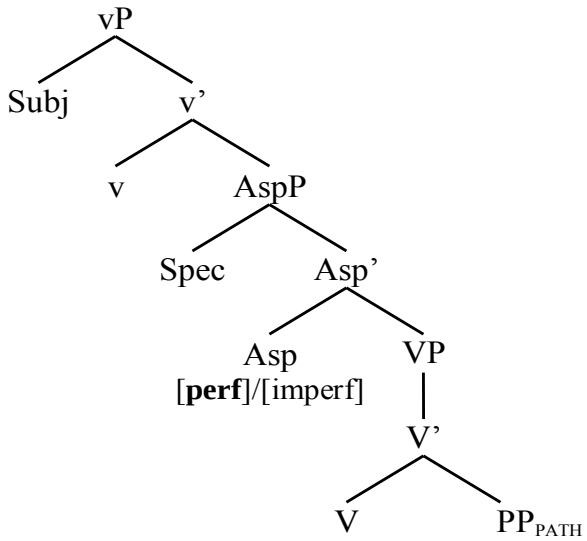
Recall from the previous section that the Greek class of manner-of-motion verbs which lack a 'distance' complement (e.g. *xorevo* 'dance') are unambiguously locative and thus cannot participate in (24a). In this respect, Greek patterns with French and Spanish and not with Germanic languages. In French and Spanish, however, the class of manner-of-motion verbs which are ambiguous in Greek, is unambiguous. Directed motion can be expressed in these languages periphrastically, i.e. with a gerund or with an unambiguously specified preposition. The problem then is, if V-V compounding in (26) is a syntactic option in Greek why is it restricted to a subclass of manner-of-motion verbs only and is not generalized to the other class exemplified in (9) (e.g. *dance, stumble, gallop* etc)?

This problem is addressed by Zubizarreta & Oh (2007) with respect to Italian, a language that seems to be closest to Greek with respect to the classification of manner-of-motion verbs. Folli (2001) suggests that Italian has three classes of manner-of-motion verbs, similar to the ones presented in (9), (10) and (12) in the previous section. The crucial difference between Greek and Italian, however, is that within the ambiguous class, Italian disambiguates between locative and non-locative readings through auxiliary use (*essere* for the unaccusative *vs avere* for the unergative structure), whereas Greek does not *disambiguate* the two readings in the grammar through morphological aspect (and choice of preposition), but instead renders one of the two readings a strongly preferred choice at the syntax-discourse interface.

Zubizarreta & Oh (2007) suggest that Italian uses the position of these motion verbs which, in this structure, are semi-functional to compose a structure such as the one in (26). We would like to suggest that Greek uses the functional projection of Aspect to distinguish between the complement *vs* adjunct choice for the PP$_{PATH}$. In the empirical study of Tsimpli & Papadopoulou (2006), it is found that optionally transitive verbs in the perfective show a significantly stronger preference for the realization of an overt object than in the imperfective. In present terms, this finding is translated as perfective aspect requiring a complement PP$_{PATH}$ more than imperfective aspect. In other words, the non-locative (i.e. the directional or telic) reading should be clearly preferred over the locative with perfective verbs.

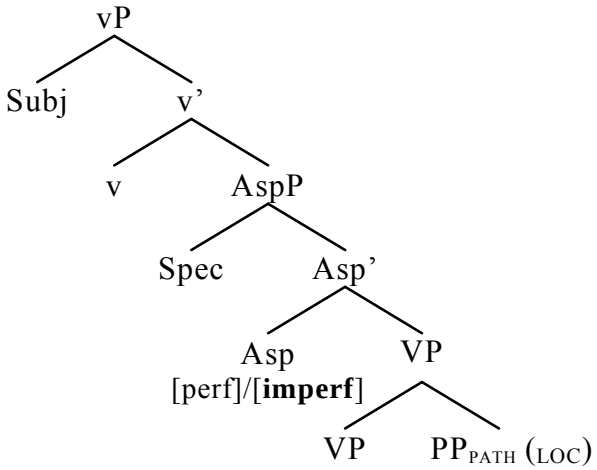
In line with Zubizarreta & Oh's analysis regarding the compositional nature of 'manner' and 'directed motion' features in the V-V compounding structure in (26), we suggest that aspect in Greek manner-of-motion structures hosts the directed motion feature, as in the following representation:

(27)



In case the perfective form is used, the complement PP is consistent with a directional or telic reading but not with the locative reading in which the directed motion feature is missing. The latter has a VP-adjunct status as in the structure below:

(28)



In (27), if aspect is imperfective the only possible reading is the directional and not the telic. This is due to the fact that imperfective aspect denotes an unbounded event and as such it cannot derive a telic interpretation[15]. If aspect is perfective, the telic reading is also available. The representation is identical to the directional reading and the difference involves a syntax-discourse enrichment whereby the goal PP is also understood as the reached endpoint of the motion event.

In (28), the PP is locative and the interpretation is always atelic. We claim that native speakers of Greek associate the structure in (27) with perfective aspect on the basis of the independently attested property of perfective to favour a complement. On the other hand, we expect that the structure in (28) is strongly associated with the imperfective aspect and a locative interpretation.

[15] Recall from the discussion above that the only possibility for a telic reading with imperfective is if imperfective is [+iterative].

3. Previous studies

The acquisition of motion verbs in the second language has been studied by Inagaki (2001), Matsunaga (2006), Montrul (2001) and Navarro & Nicoladis (2005). Their aim was to test whether the argument structure of the L1 constrains motion expressions in the second language. An additional aim of the studies by Inagaki and Montrul was to investigate whether positive evidence facilitates the acquisition of motion verbs.

Inagaki (2001) tested the argument structure of manner-of-motion verbs in the interlanguage of intermediate Japanese learners of English and advanced English learners of Japanese. Notice that Japanese, contrary to English, does not allow goal PP complements to appear with manner of motion verbs (cf. 29b). Instead they use a periphrastic structure (cf. 29c), which includes apart from the main directed motion verb a gerund expressing the manner (examples taken from Inagaki 2001: 155):

(29) a. He ran into the house.
b. *John-ga gakkoo-ni aruita.
John-nom school-at walked
c. John-ga gakkoo-ni aruite itta.
John-nom school-at walking went

In a written grammaticality judgment task with pictures, Inagaki found that the Japanese learners of English accepted sentences such as (29a), which suggests that they were able to recognize the grammaticality of manner-of-motion verbs with goal PPs, due to the availability of positive evidence in the input (Inagaki 2001: 164). However, L1 effects were also obtained, since the learners accepted constructions which are possible in their L1 and which received low judgments by the native speakers of English. On the other hand, the English learners of Japanese exhibited difficulties in identifying the ungrammaticality of sentences such as (29b), due to the lack of positive evidence.

Matsunaga (2006) also tested manner-of-motion verbs with goal PPs in L2 English by German and Japanese speakers. German is similar to English in that it allows goal PPs with manner-of-motion verbs:

(30) Er rannte ins Haus.
he ran in.$_{ACC}$ house
"He ran into the house."

In a sentence-combining task, she replicated Inagaki's finding that advanced Japanese learners of English did produce sentences such as (29a) and actually to the same extent as German speakers. L1 influence from Japanese was observed in less proficient learners of English.

Montrul (2001) investigated the (un)availability of transitivity alternations with manner-of-motion verbs in L2 English and Spanish. More specifically, in English unergative manner of motion verbs (31a) undergo a transitivity alternation when the PP denoting the endpoint is present (31b), whereas this construction is not possible in Spanish (31c) and Turkish (31d):

(31) a. The soldiers marched.

b. The captain marched the soldiers to the tents.
c. *El capitán marchó a los soldados hasta el campamento.
e. *Asker-ler heyke-l-e yürü-dü.

In a picture judgment and a grammaticality judgment task, she found L1 effects in the acquisition of the argument structure for manner-of-motion verbs. Namely, (i) Spanish and Turkish learners of English were reluctant to accept sentences such as (31b) and (ii) English learners of Spanish were more likely to accept sentences such as (31c) than Turkish learners of Spanish. The fact that positive evidence in the input did not facilitate Spanish and Turkish learners of English is attributed by Montrul to the fact that constructions such as (31b) are not very productive in English.

Navarro & Nicoladis (2005) investigated the expressions of motion events used by native speakers and advanced English speaking learners of Spanish through a production task, in which the participants described two silent video excerpts[16]. Spanish differs from English in that directed motion is expressed with path verbs – and not manner-of-motion verbs – combined with PP goals. The findings indicated that the learners, as the native speakers, produced more path than manner-of-motion verbs to denote directed motion events, even though this difference was not overwhelming. In addition, the L2 learners were less likely to produce bare path verbs than the native speakers. Navarro & Nicoladis (2005: 106) conclude that the L2 learners of their study show a clear trend towards the complete acquisition of constructions denoting directed motion, even though their first language is typologically different from Spanish in the encoding of path and they have not received explicit instruction on this phenomenon.

To summarize the main findings from the previous studies presented here show that, although L1 effects are evident, L2 learners can acquire motion structures even when they are differently encoded in their native language.

4 The empirical study

The aim of the empirical study was to investigate the role of the aspectual verb form (perfective *vs* imperfective) on one hand and the preposition type (simple *vs* complex) on the other in the comprehension and production of potentially ambiguous manner-of-motion verbs. The study compares the proposed role of aspect and prepositions in native and L2 Greek. With respect to the role of aspect at the syntax-semantics interface, the study aims to address the question of whether L2 learners, similarly with native speakers, use the perfective/imperfective distinction to differentiate between complement and adjunct PPs. Furthermore, the role of aspectual distinctions at the syntax-discourse interface involves the interpretative difference between telic and atelic readings of motion events.

4.1 Predictions

With respect to the native speakers of Greek, the prediction is that they will provide more PP_{GOAL} readings (directional and telic) with perfective than with imperfective aspect, since they use aspectual distinctions to differentiate between argument structures. This prediction is based on previous empirical evidence

[16] For similar studies in L1 acquisition see (Berman & Slobin 1994; Oh 2003; Özçalişkan & Slobin 1999; Slobin 1996; Hickmann & Hendriks 2006).

presented in Papadopoulou (1996) and on our earlier study (Tsimpli & Papadopoulou 2006), which shows a close link between perfectivity and transitivity. At the syntax-discourse level, we expect native speakers to show a preference for the telic over the directional/atelic reading due to the pragmatic link between perfectivity and telicity.

With respect to L2 grammars[17], the Interpretability Hypothesis predicts that the interpretable status of Aspect will help L2 learners of Greek master the morphological aspectual distinctions and integrate grammatical and lexical information to derive the "native" choices of (a) argument structure for perfective and imperfective verbs respectively and (b) telic/atelic interpretations. These predictions run counter the Sorace (2006) and Belletti et al. (2006) claims that interpretable features, relevant at the syntax-discourse interface, are problematic for L2 learners even at advanced stages of L2 acquisition. We therefore expect L2 learners to share structural representations with NSs in so far as the complement/adjunct distinction interacts with the aspectual forms (see (27) & (28) in section 2.2).

Regarding the difference between simple and complex prepositions we predict, in line with Papadopoulou (1996), that complex rather than simple prepositions will enhance the PP-adjunct readings in both the native and the L2-learner data.

Finally, we do not expect direct L1 transfer since the L1s of the participants do not exhibit the ambiguity attested in Greek structures with manner-of-motion verbs. However, we do expect L2 learners to prefer unambiguous structures using unambiguously locative or directed-motion verbs for two reasons: the first is due to the lack of ambiguity in the corresponding L1 structures and the second is the increased processing load associated with ambiguous structures overall and more so when using a non-native language.

4.2 Participants

Two groups of subjects participated in the study: monolingual native speakers and second language learners of Greek. There were ten (six females, four males) L2 learners of Greek who participated in both the comprehension and the production task. At the time of testing they were all attending Greek lessons at the Aristotle University of Thessaloniki and were at the intermediate level. Their level of proficiency in Greek was determined by a non-standardized placement test used in the School for Modern Greek, Aristotle University of Thessaloniki. In terms of their educational background, four of them had a university degree and six of them were still studying at the University when tested. They came from two different language backgrounds: Slavic (four native speakers of Russian and one of Macedonian) and Germanic (three native speakers of German and two of English). When tested, all participants had been attending courses on Greek for at least seven months and at most twenty months. With respect to the time they had been living in Greece, all had spent from seven to eighteen months in the country. Information about the profile of the L2 learners is also provided in Table 2:

Table 2. Profile of the second language learners of Greek

Profile	Mean scores (SD)

[17] Recall from the Introduction section that the FFFH does not make any explicit predictions for the acquisition of interpretable features other than the logically implied hypothesis that interpretable features should be unproblematic in L2 development.

Mean Age	22 (6.24)
Stay in Greece (months)	11 (3.98)
Time of instruction in the Greek language (months)	9.10 (4.12)

Since the main experiments investigated the role of aspect in the interpretation of motion events, we wanted to ensure that the L2 participants were aware of (a) the morphological aspectual distinction in the Greek verbal system and (b) the semantic features associated with perfective and imperfective aspect. For this reason, L2 learners initially completed a cloze task adopted by (Agathopoulou & Papadopoulou 2007). In the cloze task the participants had to fill in the gaps with the appropriate aspectual verb form based on an adverbial included in the sentence, which unambiguously rendered the event bounded or unbounded (see (32) and (33)). The cloze task consisted of thirty sentences, all referring to the past. In sixteen of the sentences the gap had to be completed with the perfective past and in fourteen with the imperfective past. All the verbs were in active voice and were given at the end of each sentence in the 3rd person present of the indicative mood:

(32) Otan itan nea, ……..…..…..….. tria foremata ti vdhomada. (ravi)
when was young,……..three dresses the week (sew.$_{3s}$)
"When she was young, ……..three dresses per week."

(33) Persi i Mary …..…..…..….. mono mia hristujeniaktiki karta. (ghrafi)
last-year the Mary……..only one Christmas card (write.$_{3s}$)
"Last year Mary …….only one Christmas card."

In (32) the target form is *erave* (=was sewing/ used to sew) which is past, imperfective and in (33) it is *eghrapse* (=wrote) which is past, perfective.

The following table presents the mean accuracy scores per each aspectual verb form:

Table 3. Pilot task: Mean accuracy scores

Aspect	**Mean scores (SD)**
Perfective	14.20/16 (1.69)
Imperfective	12.70/14 (1.57)
Total	26.90/30 (3.00)

As shown in Table 3, all L2 learners performed very well. The mean percentages of accuracy for both aspectual forms was 90%, which suggests that the L2 learners who participated in the study were able to associate the perfective and the imperfective aspect with the appropriate morphological and semantic features[18].

The main experiments have also been conducted with native speakers of Greek for control purposes. The comprehension task was run with ten monolingual native speakers of Greek (females: 6; mean age: 22.1 years, SD: 1.66). A different group of ten native speakers of Greek participated in the production task (females: 5, mean age: 24.90 years, SD: 3.81).

[18] An anonymous reviewer points out that a pilot task should have been used to test our L2 learners' knowledge of simple and complex prepositions in Greek. We admit that methodologically this is a flaw in our study. However, simple and complex prepositions of the type tested in the comprehension task and expected to be used in the production task are frequent in Greek and part of the syllabus of the elementary Greek courses.

4.3 Method

Sentence-picture matching (SPM) task

Materials

The SPM task consisted of forty-six items which involved forty-six quartets of pictures related to forty-six sentences[19]. Among the forty-six items there were four practice, fourteen filler and twenty-eight critical items. The critical sentences always denoted a motion event expressed by a manner of motion verb and a PP. Seven motion verbs have been used, namely *treho* (= to run), *peto* (= to fly), *perpato* (= to walk), *pidho* (= to jump), *sernome* (= to crawl), *kolibo* (= to swim) and *odhigho* (= to drive). Each verb has been incorporated in two different motion events: in one the PP was introduced by the simple preposition *se* and in the other by a complex preposition (*mesa se* = into*, pano se* = onto). In each motion event the verb appeared in its two aspectual forms (perfective *vs* imperfective). Therefore, each verb appeared in four conditions as shown below:

Perfective – simple preposition

(34) To alogho etrekse sto tsirko.
the horse ran.$_{\text{PERF.3S}}$ *s*-the circus
"The horse ran in(to) the circus."

Imperfective – simple preposition

(35) To alogho etrehe sto tsirko.
the horse ran.$_{\text{IMP.3S}}$ *s*-the circus
"The horse was running in(to) the circus."

Perfective – complex preposition

(36) To alogho etrekse mesa sto tsirko.
the horse ran.$_{\text{PERF.3S}}$ inside *s*-the circus
"The horse ran in(to) the circus."

Imperfective – complex preposition

(37) To alogo etrehe mesa sto tsirko.
the horse ran.$_{\text{IMP.3S}}$ inside *s*-the circus
"The horse was running in(to) the circus."

In each quartet the pictures illustrated four different events:

(i) in one the moving entity (i.e. *the horse*) was in a circus and was running within it (atelic – locative event),

(ii) in the second one the moving entity was directed towards a circus (atelic – directional event) as indicated by an arrow showing the path and direction of motion,

[19] The pictures used in the SPM task and the short videos in the production task were prepared for the purposes of a different collaborative project (IKYDA '04) between University of Hamburg and Aristotle University of Thessaloniki. We are grateful to our colleagues in the German and the Greek research groups (Monika Rothweiler, Annette Fox, Solveig Kroffke, Nadine Stahl, Maria Mastropavlou, Kalliopi Katsika and Agapi Mylonaki) for letting us use these materials for the present study. The pictures of the SPM task were modified to clearly show the difference between the directional and the telic readings. An example of the picture quartets is provided in the Appendix.

(iii) in the third one the moving entity ran and arrived at the circus (telic event) as indicated by an arrow showing the endpoint of the motion event,
(iv) in the fourth one the same entity (i.e. *the horse*) was performing an activity not involving a motion event (distractor).

The filler sentences always matched pictures such as (iv) and were included in the task for control purposes.

Procedure
The participants were given a booklet that consisted of forty-six quartets of pictures. They were instructed to look at each quartet of pictures and at the same time the experimenter read aloud one sentence. The participants' task was to match the sentence they heard with one of the four pictures they saw. All the participants were tested individually in a quiet room. The forty-six sentences and quartets of pictures were divided into two sessions, so that each participant never saw the same set of pictures more than twice and never heard the same sentence more than once in the same session. Moreover, the same sets of pictures that appeared in the two different sessions or within the same session always included the four pictures in different order. The items were pseudo-randomized and there was a one-week interval between the two sessions.

Production task
Materials
The production task consisted of twenty-six short videos: two practice, eight filler and sixteen critical videos. The critical videos involved eight motion events presented in two different conditions: in one condition one entity was performing a motion event (i.e. walking) in a certain location (atelic video), whereas in the other condition the same entity was shown to perform the same motion activity and to arrive at a certain endpoint (telic video). For instance, a video showing a woman who was walking in a kitchen represented the atelic condition. On the other hand, a video depicting a woman walking and arriving at the kitchen represented the telic condition. The eight motion activities employed in this task were supposed to be illustrated by manner of motion verbs such as *to walk* (twice), *to run*, *to fly* (twice), *to crawl*, *to drive* and *to jump*. The filler videos described various kinds of non-motion actions.

Procedure
The participants were instructed that they would watch a short video and then they would be asked to describe what they saw. The videos were presented on a computer screen. After the participants saw each video, the experimenter asked the question "What did the … do?". The participants provided their response, which was recorded on the computer through the Windows Media Player. All participants were tested individually in a quiet room.

4.4 Results

Sentence-picture matching (SPM) task

The NSs of Greek always matched the filler sentences with the distractor pictures and the L2 learners did so 98.60% of the time. In addition, the native speakers' data revealed two incorrect matches of critical sentences with distractor pictures and one

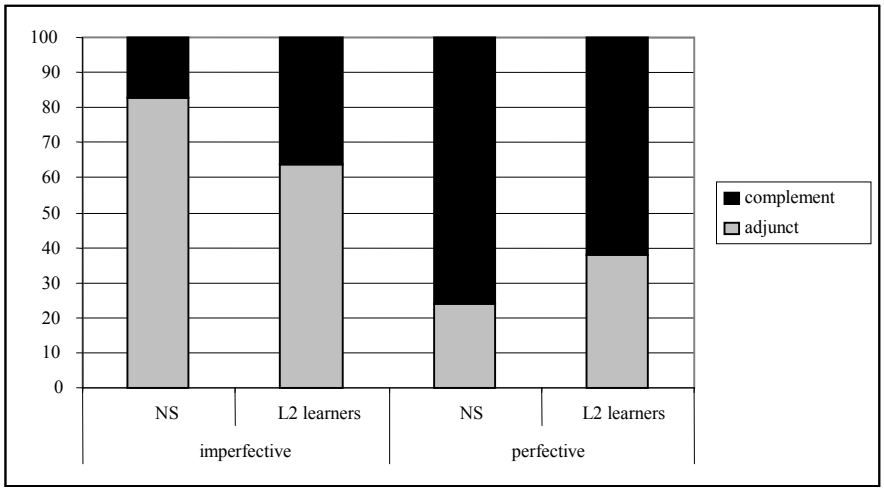
"no response", whereas in the L2 data there were five incorrect matches of a critical sentence with a distractor picture. The incorrect responses to the critical sentences have been eliminated from any further analyses. This resulted in the elimination of 1% of the native speakers' data and 1.80% of the L2 data.

We will begin by the presentation of the participants' interpretation of the sentences they heard depending on the aspectual form of the verb and irrespectively of the preposition that introduced the path or the goal of motion.

First, the participants' responses, i.e. the picture they chose among the four alternates, were coded depending on whether they denoted path (PP adjunct) or goal (PP complement).

The two groups' PP complement and PP adjunct readings for the two aspectual verb forms are presented in Graph 1:

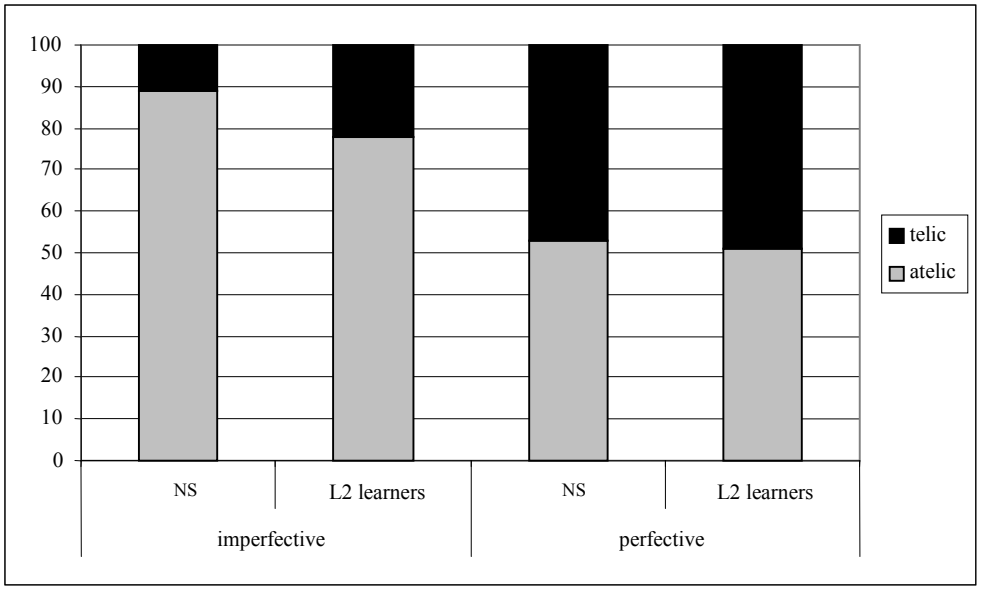
Graph 1. Mean percentages of (non)locative readings for each aspectual form



As shown in Graph 1, both the NSs and the L2 learners of Greek relied on the aspectual form of the verb to interpret the sentences. Namely, when the predicate they heard included an imperfective verb, they interpreted it as denoting a locative event (PP adjunct), whereas, when the verb in the spoken sentence was in the perfective aspect, the motion event was understood as being non-locative (PP complement). These observations have been confirmed statistically. There were significantly more PP_{PATH} readings with imperfective than with perfective manner of motion verbs (L1-Greek: χ^2= 96.353, p<0.001; L2-Greek: χ^2= 18.339, p<0.001). In addition, there were significantly more PP_{PATH} than PP_{GOAL} interpretations with imperfective aspect (L1-Greek: χ^2= 58.696, p<0.001, L2-Greek: χ^2= 9.993, p<0.01), whereas the reverse effect was obtained for the perfective aspect (L1-Greek: χ^2= 38.338, p<0.001, L2-Greek: χ^2= 8.377, p<0.01). Note, however, that the performance of the L2 learners is significantly different from that of the NSs in both the imperfective (χ^2= 12.759, p<0.001) and the perfective (χ^2= 6.327, p<0.02) aspect.

The data have also been analyzed with respect to telicity. More specifically, the pictures that illustrated locative and directional events were coded as atelic and the ones that depicted an entity moving and reaching an endpoint as telic. Graph 2 displays the percentages of telic and atelic responses for the two aspectual verb forms and the two groups:

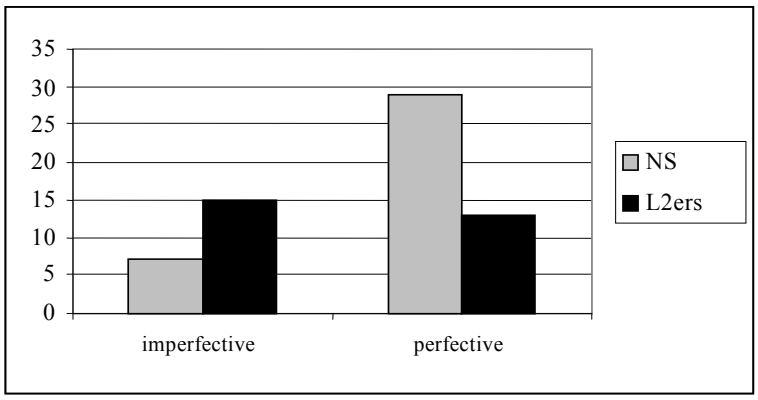
Graph 2. Mean percentages of (a)telic readings for each aspectual form



The data shown in Graph 2 are similar to those of Graph 1 in that the aspectual form of the verb affected the readings the participants imposed on the sentences. This means that there were more atelic interpretations with imperfective than with perfective verb forms (L1-Greek: χ^2= 44.863, p<0.001; L2-Greek: χ^2= 22.466, p<0.001). In addition, there were significantly more atelic than telic readings with imperfective aspect (L1-Greek: χ^2= 84.522, p<0.001; L2-Greek: χ^2= 43.277, p<0.001). On the other hand, the difference between telic and atelic interpretations in the perfective aspect was not significant for either group (L1-Greek: χ^2= 0.353, p=0.553; L2-Greek: χ^2= 0.029, p=0.865). Moreover, even though no significant differences were found between the native and the non-native speakers in the perfective aspect (χ^2= 0.291, p=0.589), in the imperfective the L2 learners did differ significantly from the native speakers (χ^2= 6.109, p<0.02).

A further analysis has been performed with respect to the directional readings of the sentences. Graph 3 illustrates the percentages of directional responses with imperfective and perfective verbs:

Graph 3. Directional interpretations per aspectual form and participant group



As Graph 3 shows, the NSs' directional responses are affected by the aspectual form of the verb; namely, significantly more directional responses have been obtained

with perfective than with imperfective verb forms (χ^2= 23.556, p<0.001). On the other hand, no such effect was found in the L2 data (χ^2= 0.106, p=0.745).

We also counted the adjunct and complement interpretations with respect to both the aspectual form of the verb and the preposition type (simple *vs* complex):

Table 4. Mean percentages per aspectual verb form and preposition type

Groups	Imperfective				Perfective			
	Simple		Complex		Simple		Complex	
	Adjunct	Compl.	Adjunct	Compl.	Adjunct	Compl.	Adjunct	Compl.
NS	68	32	97	3	19	81	29	71
L2 learners	51	49	76	24	23	77	52	48

Table 4 illustrates that the NSs' interpretations depended on the aspectual form of the verb but not on the type of preposition. This means that for both preposition types the NSs show (a) an unambiguous preference for the PP_{PATH} reading in the imperfective (simple P: χ^2= 8.471, p<0.01, complex P: χ^2= 62.229, p<0.001) and (b) a preference for the PP_{GOAL} interpretation in the perfective (simple P: χ^2= 27.657, p<0.001, complex P: χ^2= 12.188, p<0.001). However, we have to note that the PP_{PATH} reading with imperfective significantly increases (χ^2= 20.888, p<0.001) when the preposition is complex (68% with simple *vs* 97% with complex Ps), which supports previous findings on manner-of-motion verbs (Papadopoulou 1996).

On the other hand, the data from the L2 learners indicate that their interpretations were affected by the choice of the preposition. More specifically, they show a preference for the adjunct reading with the imperfective, only when the preposition is complex (χ^2= 18.514, p<0.001). By contrast, in the perfective aspect they exhibit a preference for PP-complement only with simple prepositions (χ^2= 19.841, p<0.001).

To summarize the results from the comprehension task, we found that both participant groups relied on the morphological aspect of the verb to comprehend motion events. More specifically, they both associated perfective aspect with PP_{GOAL} readings and imperfective aspect with PP_{PATH} readings. In addition, both groups had similar behaviour with respect to the encoding of (a)telicity: imperfective aspect is clearly linked with atelicity, whereas perfective manner-of-motion verbs were not necessarily interpreted as telic. Nevertheless, there is a quantitative difference between the two groups since these tendencies are stronger in the NSs than the L2 learners. Furthermore, the learners' preference for PP_{PATH} and PP_{GOAL} readings needs to be reinforced by the distinction between simple and complex prepositions. Native speakers' preference for adjunct *vs* complement is associated with the choice of preposition (simple *vs* complex) only in the imperfective. Finally, even though for both groups the directional reading is not the most preferred one with either imperfective or perfective aspect, only in the NSs' data the directional interpretations are affected by the aspectual form of the verb.

Production task

We eliminated any responses that were irrelevant to the purpose of the task, namely responses that did not involve motion events. This resulted in the elimination of 4% (6 out of 160 responses) of the native speakers' data and 16% (25 out of 160 responses) of the L2 data. The L2 learners produced significantly more irrelevant responses than the NSs in both the atelic (χ^2=5.959, p<0.02) and the telic (χ^2=6.944, p<0.01) videos. In all subsequent analyses only relevant responses have been counted.

First, we present the target and non-target responses per video condition and participant group (see Graph 4). Any utterances that unambiguously denoted telic motion events in the atelic video condition and atelic motion events in the telic video condition were considered as non-target. For example, the predicate in sentence (38) describes an unambiguously telic event, since the verb *beno* (enter) incorporates the PATH and the PP *stin kuzina* is necessarily a complement. Such a response is non-target, when the video describes an atelic motion event, and target, when the video illustrates a telic motion event.

(38) I jineka bike stin kuzina.
the woman entered.$_{\text{PERF.3S}}$ *s*-the kitchen
"The woman entered the kitchen."

In addition, sentence (39) denotes an atelic locative motion event, because the manner-of-motion verb is in the imperfective aspect. Such an utterance was considered as non-target for the telic videos and as target for the atelic videos.

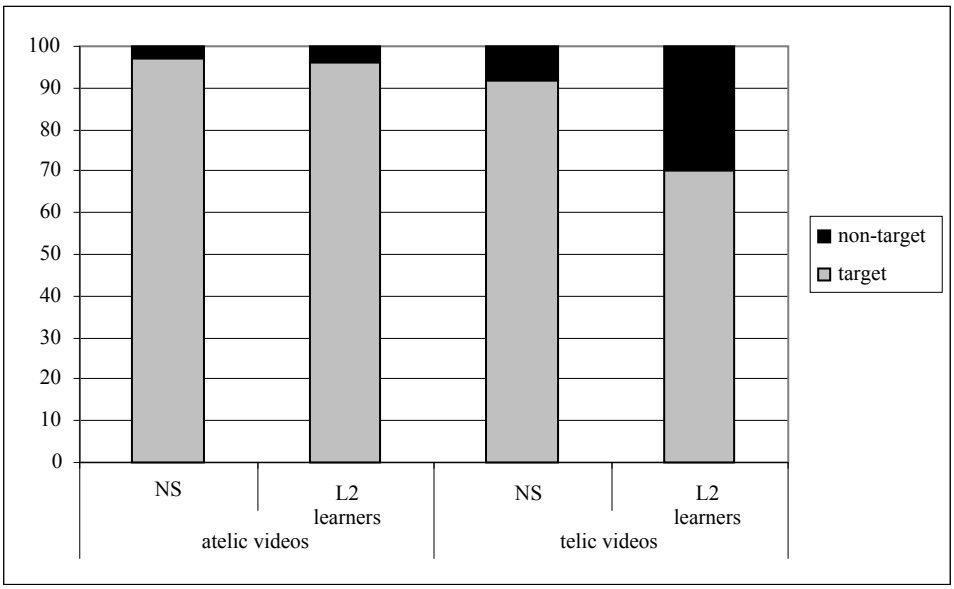
(39) To aeroplanaki petuse se mia ethusa.
the airplane flew.$_{\text{IMP.3S}}$ in a room
"The airplane was flying in a room."

Consider, finally, sentence (40):

(40) I petaludha petakse mesa sto vazo.
the butterfly flew.$_{\text{PERF.3S}}$ in *s*-the vase
"The butterfly was flying in the vase."

As already discussed in section 2.1, the predicate in (40) is ambiguous with respect to the denotation of (a)telic motion events. In other words, as far as the grammatical representation is concerned, there are two possible structures. In one the PP denotes the GOAL and is the complement of the verb, whereas in the other the PP denotes the PATH and is an adjunct. Therefore, such utterances have been counted as target responses in both the telic and the atelic video conditions.

Graph 4. (Non)Target responses per condition and participant group (%)



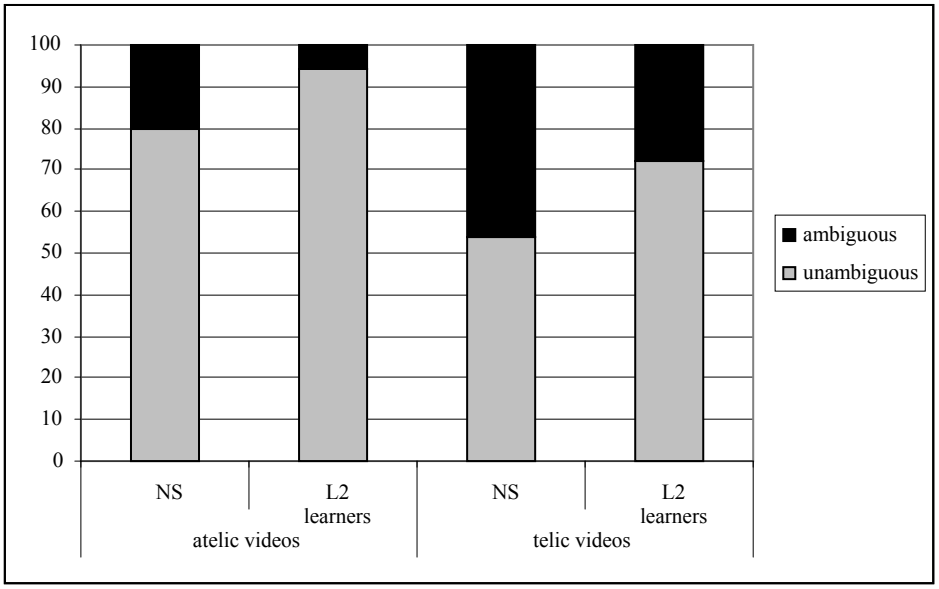
As is obvious from Graph 4, the NSs' and the L2 learners' performance in the atelic video condition was very good and there were no statistically significant differences between the two groups (χ^2=0.357, p=0.550). In the telic video condition, however, the L2 learners performed significantly worse than the NSs (χ^2=11.782, p<0.01).

The following graph presents the percentages of ambiguous (cf. (40)) and unambiguous target responses in each video condition. Notice that unambiguous target responses in the telic condition were utterances including a perfective motion verb that inherently denotes PATH, i.e. *go, enter* (cf. (38)). In the atelic videos, utterances containing imperfective manner-of-motion verbs (cf. (39)) and responses in which lexical means are used to express location (cf. (41) and (42)) were counted as unambiguous:

(41) Enas antras ekane voltes stin apothiki.
a man did.$_{3S}$ rounds *s*-the loft
"A man was walking back and forth in the utility room."

(42) To koritsi horopidhise mesa stis laspes.
the girl bounced.$_{PERF.3S}$ in *s*-the mud
"The girl was bouncing in the mud."

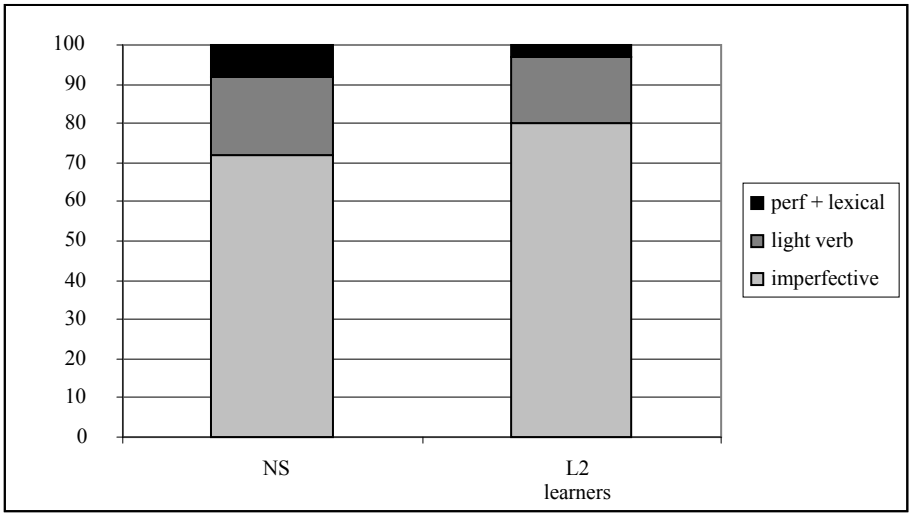
Graph 5. (Un)Ambiguous responses per condition and participant group (%)



Both participant groups produced significantly more ambiguous responses in the telic than in the atelic videos (NSs: χ^2=11.588, p<0.01; L2 learners: χ^2=9.470, p<0.01), which indicates that the use of perfective manner-of-motion verbs with PPs is preferred when describing a telic rather than an atelic motion event. Furthermore, in the atelic videos both groups produced more unambiguous than ambiguous responses (NSs: χ^2=27.000, p<0.001; L2 learners: χ^2=47.032, p<0.001), which is consistent with the previous finding. In the telic videos, however, this effect was significant only for the L2 learners (χ^2=8.696, p<0.01), which suggests that the construction [manner-of-motion V_{PERF} + PP] is not productively used by the L2 learners in this condition; rather, the L2 speakers prefer to use inherently directional verbs to express telic motion events. Nonetheless, the L2 learners used this construction less frequently than the NSs in both the atelic (χ^2=5.216, p<0.03) and the telic (χ^2=3.883, p<0.05) videos.

An additional analysis has been performed for the unambiguous target responses in the atelic video condition, in order to find out which is the preferred construction for the description of an atelic, locative event. Graph 6 presents the frequency of responses with (a) imperfective manner-of-motion verbs (cf. (39)), (b) light verbs with nouns showing atelic locative events (cf. (41)) and (c) inherently locative verbs marked for perfective (cf. (42)):

Graph 6. Analysis of unambiguously target responses in the atelic video condition (%)



As is obvious from the data in Graph 6, both the NSs and the L2 learners preferred to use a manner-of-motion verb marked for imperfective aspect to denote location (NSs: χ^2=11.267, p<0.001; L2: χ^2=20.763, p<0.001). Moreover, there are no statistically significant differences between the two groups in the use of imperfective manner-of-motion verbs to express atelic motion events (χ^2=1.032, p=0.310). Notice also that 26% of the imperfective verbs used by the NSs were unambiguously locative, whereas the L2 learners never used such verbs in their responses. This effect is probably due to more constrained lexical repertoire of the L2 learners as compared to the NSs.

Finally, in this task as in the comprehension experiment the L2 learners distinguished between telic and atelic motion events through the use of PPs as shown in Table 5:

Table 5. Frequency of PP use per condition and participant group

Group	**Atelic**			**Telic**	
	Simple	**Complex**	**No PP**	**Simple**	**Complex**
NS	20/75 (27%)	45/75 (60%)	10/75 (13%)	31/72 (43%)	41/72 (57%)
L2 learners	29/63 (46%)	12/63 (19%)	22/63 (35%)	29/42 (69%)	13/42 (31%)

In the telic videos, the L2 learners used more simple than complex prepositions (χ^2=12.190, p<0.001), which is not the case for the NSs (χ^2=2.778, p=0.096). Recall that L2 learners show the same pattern in the comprehension task. A difference between the two tasks is that PP omission is an option that L2 learners in particular employ in the description of atelic motion events. This option is based on the adjunct status of the PP in this condition. In the atelic video condition, the L2 learners omit PPs more often that the NSs (χ^2=8.958, p<0.01).

To sum up the main results from the production task, we found that the L2 learners behaved in a native-like way when describing atelic motion events, since they consistently used manner-of-motion verbs marked for imperfective aspect. On the other hand, their performance diverged from that of the NSs' when expressing a telic motion event. In this condition the learners produced significantly more errors than the NSs, i.e. they used more imperfective forms to describe a telic motion event, on one hand and on the other they did not seem to productively use perfective manner-of-motion verbs together with goal PP complements. Instead they relied on the use of inherently directed motion verbs which in their perfective form are necessarily telic in

Greek as in other languages too (cf. fn. 6). Finally, preposition choice seems to strengthen the expression of telic *vs* atelic motion events.

4.5 Discussion

The aim of this study was to investigate whether native and non-native speakers of Greek make use of grammatical aspect at interface levels, and, in particular, at the syntax-semantics interface where argument realization interacts with aspectual properties and at the syntax-discourse interface where the interpretation of the predicate as telic or atelic is involved. Since Aspect is an interpretable feature, the study also aims to test the IH with respect to the claim that interpretable features should not be problematic for L2 acquisition. The interaction of manner-of-motion verbs with Aspect provides relevant evidence for the role of interpretability at these two interfaces.

Our predictions with respect to the performance of the Greek native speakers have been confirmed. The distinction between perfective and imperfective aspect affected (a) the complement *vs* adjunct choice in the representation of the PP and (b) the telic *vs* atelic interpretations of manner-of-motion verbs. It should be noted that (b) is a result relevant to both the comprehension and the production tasks. The findings from the NSs provide further support for the independently attested transitivity preference associated with the perfective form of Greek verbs (Tsimpli & Papadopoulou 2006), as perfective manner-of-motion verbs are preferably construed with PP complements. Moreover, the NSs' data from this study also support the pragmatic link between perfectivity and telicity suggested in previous research (Chila-Markopoulou and Mozer 2001; Giannakidou 2003; Tsimpli and Papadopoulou 2006). With respect to the interaction of Aspect and preposition choice (simple *vs* complex) in encoding the complement *vs* adjunct and the telic *vs* atelic readings, NSs show a tendency to use more complex than simple prepositions to describe atelic motion events. A similar tendency is found in the comprehension task, where the complex preposition significantly strengthens the adjunct reading.

With respect to the L2 learners, the control test we used showed that they have mastered the morphological properties of aspectual distinctions in Greek and use the corresponding forms accordingly. Specifically, they are aware of the [+/-bounded] distinction between perfective and imperfective forms as well as of the [+/-iterative] specification of the imperfective.

Turning to the results of our comprehension experiment, the L2 learners displayed a significant preference for adjunct readings with imperfective verbs and complement readings with perfective verbs. This means that they show sensitivity to the effects of aspect on the argument structure of manner-of-motion verbs in Greek, a syntax-semantics interface issue.

With respect to the syntax-discourse interface, the L2 data from both tasks show that imperfective verb forms are strongly associated with atelic readings and perfective forms with telic readings. In this respect, the L2 learners behave in a native-like way.

However, the L2 learners differed from the NSs in several respects. First, the L2 learners' preference for PP-adjunct readings with imperfective and for PP-complement readings with perfective aspect is modulated by the choice of complex *vs* simple prepositions. In particular, the adjunct interpretation with the imperfective aspect is significantly favored only when the preposition is complex and the complement reading with the perfective is favored only when the preposition is

simple. We could therefore conclude that the argument structure realization of manner-of-motion verbs is mainly determined by grammatical means in the NSs, while in the L2 learners it is also affected by lexical means that strengthen the preferred argument structure associated with each aspectual form. We, thus, suggest that the structural representations adopted by L2 learners involve an additional specification on the PP with respect to the simple *vs* complex prepositions. Note that the two types of prepositions differ in that the simple preposition heads a P with a DP complement, whereas the complex preposition involves two PPs a simple one embedded under a higher P (for further discussion on the structure of simple and complex PPs in Greek see Theophanopoulou-Kontou 1992; Terzi 2007). Our data show that both L2 learners and native speakers associate complex prepositions with locative readings. On the other hand, our data shows that only the L2 learners associate simple prepositions with non-locative readings, whereas NSs treat simple prepositions as equally compatible with locative and non-locative readings. We will come back to the L2 learners' strong preference for a one-to-one mapping between form and meaning at the end of the section.

Secondly, the L2 learners differ from the NSs in that their directional readings were fewer and did not depend on aspect. Recall that direction is one of the two (the other being the telic reading) possible syntax-discourse interpretations when the PP is a complement. It might be the case that direction is only lexically – by the use of an unambiguously directional preposition – expressed in the L2 learners' interlanguage. Furthermore, this finding suggests that perfective manner-of-motion verbs with complement PPs are preferably understood by the L2 learners as telic and not as atelic, since perfectivity strengthened only the telic and not the directional responses. Notice that this crucially differs from the NSs' behavior, as the perfective aspect of the verb resulted in more directional and telic responses than imperfective aspect. We could thus argue that the L2 learners have a narrower range of possible interpretations at the syntax-discourse interface. They choose to associate (a)telicity with aspectual morphology: perfective manner-of-motion predicates are interpreted as telic and imperfective ones as atelic. This is the preferred option attested in NSs too who, however, also allow for directional readings with perfective to a smaller extent.

Furthermore, in the production task, the L2 learners produced more unambiguous than ambiguous responses in both the telic and the atelic conditions. In the telic videos, they preferred to use an inherently directed motion verb in the perfective than an ambiguous manner-of-motion verb which can also have a telic interpretation in its perfective form. Hence, the L2 learners used lexical cues, in this case the semantic features of the verb (Aktionsart), in addition to grammatical aspect, to encode telic events. In the atelic condition they produced fewer perfective manner-of-motion verbs with a PP_{PATH}, than the NSs. This implies that perfective aspect is not used to encode atelicity, which supports the claim, based on the data from the SPM task, that the learners interpret the two aspectual forms according to the telic/atelic distinction.

Finally, the L2 learners produced significantly more non-target responses than the NSs in the telic condition of the production task: 70% of the learners' non-target responses – the equivalent percentage in the NSs data is 33% – involved an imperfective verb showing overuse of the imperfective aspect. We think that this is not due to the incorrect mapping of the morphological and semantic features of aspect, since in the cloze task (cf. section 4.2) the L2 learners used the two aspectual forms accurately. Rather, the overuse of imperfective forms is probably related to the formation of the perfective aspect in on-line production which presents learners with

some difficulty, since the citation form of a verb is in the imperfective and the derivation of the perfective depends on a large set of mopho-phonological properties.

Taken together the findings from the comprehension and the production task indicate that the two participant groups effectively use Aspect to arrive at the preferred argument structure as well as the preferred telic/atelic interpretation of predicates with manner-of-motion verbs. In this respect, the interpretable feature of Aspect is unproblematic for L2 learners in the computational component and at the interfaces, which supports the predictions of IH for L2 acquisition. The two groups differ, however, in (a) the sensitivity they show to lexical cues such as the choice of preposition and the inherent semantics of the verb (Aktionsart), and (b) the avoidance of perfective manner-of-motion verbs, which are structurally ambiguous. With respect to (a), we suggest that L2 learners rely on lexical means, i.e. preposition type, to strengthen the intended meaning since the salience of lexicalized features is higher than that of grammatical morphology in L2 acquisition. With respect to (b), the preference for unambiguous constructions provides a more direct mapping between the syntax and the interfaces. In the phenomenon we study, the syntax-discourse interface restricts the grammatical options favoring the telic (rather than the directional) interpretation of the perfective. What these findings imply is that the L2 learners prefer to have a one-to-one correspondence between form (perfective *vs* imperfective, simple *vs* complex Ps) and meaning (telic *vs* atelic, non-locative *vs* locative). This is reminiscent of Rizzi's (2005) Categorial Uniformity principle, which is argued to apply at the syntax-semantics interface and defines the unmarked case of form-meaning mappings. It is plausible to assume that this principle also guides L2 grammars. In effect both differences distinguishing native from L2 speakers boil down to the L2 learners' tendency to avoid ambiguity with (lexical or grammatical) form-meaning associations. Whether this is an inherent property of developing L2 grammars or alternatively this is due to the lack of ambiguous structures in the L1 remains an open question.

If the Interpretability Hypothesis is correct, then Categorial Uniformity should apply even more strongly in L2 grammars since interpretable features alone will be responsible for regulating L1-L2 differences.

5 Concluding remarks

This study of ambiguous manner-of-motion verbs in Greek L2 attempts to address a question that FFFH and IH have not dealt with yet, namely whether interpretable features can be acquired in a target fashion by L2 learners and thus provide a radically distinct pattern of L2 acquisition compared to uninterpretable features.

The interpretable feature studied, Aspect, is a grammatical category with morphological expression of (im)perfectivity in Greek, but is also relevant to argument structure and the (a)telic interpretation of manner-of-motion verbs. Our findings support the predictions of IH, since the group of the L2 learners tested (a) has mastered the features associated with the perfective/imperfective distinction and (b) uses this distinction effectively at the syntax-semantics and the syntax-discourse interfaces. However, the aspectual distinctions employed by the non-native speakers of Greek are reinforced through the use of lexical information, an L2 property not attested in the NSs' data.

Overall, we conclude that interpretable features, in contrast to uninterpretable ones, are not vulnerable in L2 acquisition and any difficulties attested may be attributed to the ambiguities and the resulting underspecification of the form

(perfective/imperfective) with respect to the possible interpretations of (a)telicity at the syntax-discourse interface.

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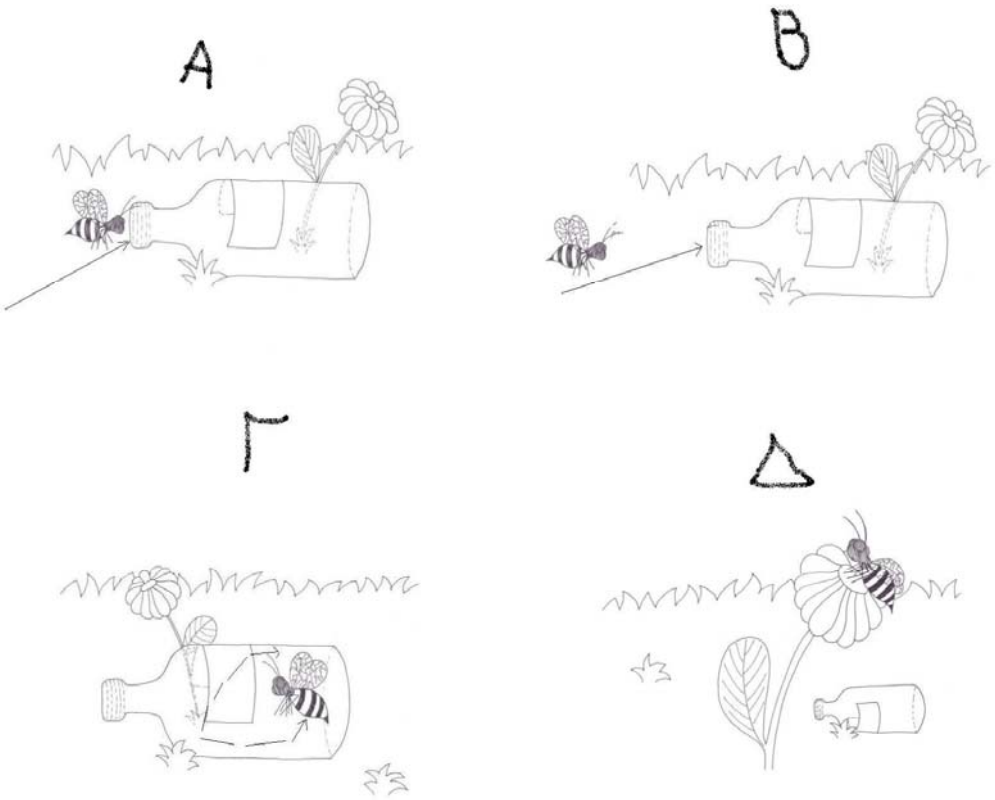
Appendix



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