

Case morphology and word order in L2 Turkish: Evidence from Greek learners

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Abstract

The optional use of morphology attested in second language learners has been attributed either to a representational deficit or to a ‘surface’ problem with respect to the realization of inflectional affixes. In this paper we contribute to this issue by providing empirical data from Greek learners of Turkish. Three experiments have been conducted, a cloze task, a sentence picture matching task and on-line grammaticality judgment task, in order to investigate case morphology and its interaction with word order constraints. The findings showed variable use of case morphology, also observed in previous studies in L2 Turkish, but also better performance on verbal inflections as well as some sensitivity to word order restrictions. We interpret these findings as providing support to accounts which attribute the variable use of morphology to a mapping problem between abstract syntactic features and their surface realization.

I Introduction

One of the most robust observations in the field of first-language (L1) acquisition is that verbal and nominal inflection is omitted frequently in the early child grammar. Inconsistent use of inflection has also been observed in the grammars of second-language (L2) learners. This variability or optionality in the use of inflection in the L1 and L2 grammars has provoked an ongoing debate in the two fields regarding the status of functional categories and features associated with the missing inflectional elements. According to a number of researchers, variability in the use of inflection implies that the associated functional categories are impaired or missing from the learners' grammars (Radford, 1990; Clahsen, Penke & Parodi, 1993/1994; Vainikka & Young-Scholten, 1994; 1996, among others). Other researchers, though, argue that functional categories are present in both the L1 and L2 grammars and the optionality in the use of inflection is due to problems associated with surface morphology (Wexler, 1994; Lardiere, 1998a; 1998b; Prévost & White, 2000, among others).

In this paper we contribute to this debate by investigating the acquisition of case suffixation and its interaction with word order constraints in the grammar of Greek students learning Turkish as a foreign language. Our results replicated previous findings in that L2 learners of Turkish exhibit some internalized knowledge of the features associated with the case morphemes and the interaction of word order constraints and case morphology, even though they show optionality in the use of case suffixes.

The paper is organized as follows: Section 2 presents an overview of L2 theories on the variability of inflection and the availability of functional categories in L2 grammars. The structure of Turkish and Greek with specific reference to case morphology and (non)specific objects is discussed in section 3. Section 4 offers a

summary of studies on the acquisition of case in Turkish as an L2. Section 5 presents the methodology of the study, followed by a presentation of the results on case suffixation and its interaction with word order constraints in section 6. The implications of this study for L2 theories are discussed in the final section.

II Theoretical perspectives on L2 acquisition

The availability and status of functional categories related to verbal and nominal inflection has been debated among researchers of L1 and L2 acquisition. In both cases, the debate has focused on whether functional categories are present at the onset of the acquisition process or whether they develop later. The basis for this debate lies on the variability or optionality that both L1 and L2 learners exhibit in the use of verbal (e.g. tense, agreement) and nominal (e.g. case, gender) morphology as well as in the use of functional elements like auxiliaries, complementizers and determiners.

As far as L1, there are two contrasting views on morphological variability/optionality. According to the *Weak Continuity* view (Radford, 1990; Clahsen, Penke & Parodi, 1993/1994), the absence of overt morphology in the L1 data indicates the absence of associated functional categories. According to the second view, namely *Strong Continuity*, advocated by Wexler (1994) and Hoekstra & Hyams (1996), the variability observed in the L1 data is due to the underspecification of abstract categories in the L1 grammar and does not indicate absence of functional projections.

Both views have been extended to L2 acquisition in order to provide an explanation for the variability/optionality observed in the L2 grammars. Thus, according to a number of researchers, functional categories are initially absent in the grammars of L2 learners and develop in succession during the acquisition process due to positive evidence from the morphological paradigm of the input language. For

example, based on the lack of verb raising, auxiliaries and modals, complementizers and wh-movement as well as on the impoverished agreement paradigm in their Korean and Turkish L2 speakers of German, Vainikka & Young-Scholten (1994; 1996) argue that only lexical categories are present at the earliest stage of L2 acquisition and the subsequent acquisition of functional projections is input-driven resulting in an early underspecified functional projection (FP), which is gradually replaced by a fully specified IP/AgrP, which is in turn followed by a CP level. Within this Weak Continuity approach, the morphological variability observed in L2 grammars reflects an underlying impairment in functional projections or feature strength. For example, Meisel (1997) claims that the abstract features are impaired in L2 grammars, while for Eubank the features associated with functional categories are unspecified (Eubank, 1993/1994; 1996; Eubank et al., 1997).

More recent theories in L2 acquisition, such as the ‘Failed Functional Features’ Hypothesis (Hawkins & Chan 1997; Hawkins & Hattori 2006) and the ‘Interpretability’ Hypothesis (Tsimplici, 2003; Tsimplici & Dimitrakopoulou, 2007), assume a representational deficit in L2 grammars with respect to uninterpretable features which are not grammaticalized in the L1. On the other hand, interpretable features are not predicted to be vulnerable in the interlanguage (Tsimplici & Mastropavlou, 2008).

These so-called ‘Impaired Representation’ accounts (see Prévost & White, 2000) contrast with the ‘Missing Surface Inflection Hypothesis’ (Prévost & White, 2000; Lardiere, 1998a; 1998b; Haznedar & Schwartz, 1997; Gavruseva & Lardiere, 1996; Haznedar, 1997; Haznedar & Schwartz, 1997; Haznedar, 2006; Grondin & White, 1996; White, 1998; Lakshmanan, 1993/1994), according to which morphological variability in the L2 grammar does not indicate an impairment in the

underlying representations of L2 learners but a problem in the realization of surface morphology, that is a mapping problem between syntactic projections/features and morphological forms. Based on the presence of the Determiner Phrase, Inflectional Phrase and Complementizer Phrase as well as on Case in adult and child L2 grammars such Strong Continuity approaches have argued that functional projections are present from the earliest stages of L2 acquisition. For example, Lardiere (1998a; 1998b) shows that despite the deficient use of the 3rd person singular and the past tense suffixes in adult L2 English, there is evidence for agreement and tense at an abstract level based on evidence from the suppliance of nominative subjects and adverb placement. Gavrusseva & Lardiere (1996) present evidence from child L2 English for the early emergence of CP-related material (inversion in yes/no questions and wh-questions) and for nominative pronominal subjects despite the variability of inflection associated with the IP projection (see also Haznedar & Schwartz 1997 for similar evidence from child L2 English). On similar grounds, Grondin & White (1996) present evidence that Det, Infl and probably Comp are present in child L2 French based on the consistent use of determiners and pronominal possessives, overt case assignment in DPs, placement of negation, adverbs, quantifiers as well as subject and object clitics. Prévost & White (2000) also argue that interlanguage grammars do not suffer from a syntactic deficit but rather from a mapping problem between syntactic features and their morphological realization. They show that adult learners of French and German, despite their optional use of finite verb forms, manifest internal knowledge of “finiteness”, as they do not use finite forms in non-finite contexts and their inflected forms are correctly marked for agreement. In a similar vein, White (2003) reports on production data from a Turkish learner of English, which demonstrate high level of accuracy in the verbal domain and relatively lower level in

the use of definite and indefinite articles. Moreover, based on the fact that the syntactic properties associated with the verbal (i.e. argument drop, Case, verb placement) and the nominal (i.e. +/- definiteness) domains are not impaired, White argues that the optionality attested in the L2 data is due to problems with morphology realization rather than with underlying syntactic representations.

The aim of the present study is to investigate case suffixation and its interaction with word order in Greek learners of Turkish. More specifically, we conducted three experiments, a cloze-task, a sentence-picture matching task and an on-line grammaticality judgment task, in order to examine whether adult Greek learners of Turkish correctly supply case suffixes and show sensitivity to word order constraints.

III Case and (non)specific objects in Turkish and Greek

Both Greek and Turkish employ morphological case in order to mark certain grammatical functions and categories. Greek distinguishes three cases: nominative is the case for the subject, accusative prototypically marks the object and genitive mainly marks oblique arguments and adnominal functions, such as the possessive, the noun complement, etc. (Holton, Mackridge & Philippaki-Warbuton, 1997):

(1) o janis kimate
the-NOM John-NOM sleep-3SG
'John is sleeping'

(2) o filakas xtipise to jani
the-NOM guard-NOM hit-PAST.3SG the-ACC John-ACC
'The guard hit John'

- (3) a. i maria eđose tu jani ena fili
the-NOM Maria-NOM give-PAST.3SG the-GEN John-GEN a-ACC kiss-ACC
‘Maria gave a kiss to John’
- b. o fakos tu filaka
the-NOM torch-NOM the-GEN guard-GEN
‘The guard’s torch’

On the other hand, Turkish morphology distinguishes six cases, namely nominative, accusative, genitive, dative, ablative and locative. Their main functions are the following (Kornfilt, 1997; Göksel & Kerslake, 2005):

- (4) nominative: subject
Hasan-∅ uyan-dı
Hasan-NOM wake up-PAST
‘Hasan has woken up’
- (5) accusative: object
Ali Hasan-ı gör-dü
Ali Hasan-ACC see-PAST
‘Ali saw Hasan’
- (6) genitive: possession
Hasan-ın kitab-ı
Hasan-GEN book-3SG
‘Hasan’s book’

(7) dative: indirect object, direction

Ali kitab-ı Hasan-a ver-di

Ali book-ACC Hasan-DAT give-PAST

‘Ali gave the book to Hasan’

(8) ablative: origin, source

Hasan Ankara-dan gel-di

Hasan Ankara-ABL come-PAST

‘Hasan came from Ankara’

(9) locative: location

kitap masa-da

book table-LOC

‘The book is on the table’

It turns out that the functions of nominative, genitive and accusative coincide to a large extent in both languages. On the contrary, Greek expresses the functions of Turkish dative, ablative and locative by means of prepositional phrases. Greek examples (10-12) correspond to the Turkish (7-9):

(10) o ali eðose sto xasan to vivlio

the-NOM Ali-NOM give-PAST.3SG to-the-ACC Hasan-ACC the-ACC book-ACC

‘Ali gave the book to Hasan’

(11) o xasan irðe apo tin agira

the-NOM Hasan-NOM come-PAST.3SG from the-ACC Ankara-ACC

‘Hasan came from Ankara’

- (12) to vivlio ine sto trapezi
 the-NOM book-NOM is on-the-ACC table-ACC
 ‘The book is on the table’

The morphological marking of cases is more transparent in Turkish since it is an agglutinative language. Thus, the category of case is marked with distinct specialized suffixes that appear at the end of the nominal element. Case allomorphy is always phonologically determined, since the vowel of these suffixes is subject to rules of vowel-harmony, whereas the presence of an initial consonant or its voicing value depends on the featural composition of the final phoneme of the preceding root (Lewis, 2000; Göksel & Kerslake, 2005). The formatives for each case and the phonological shapes they take are presented in (13):

- (13) a. nominative
 -∅
- b. accusative
 -(y)I → -(y)i, -(y)u, -(y)ı, -(y)ü
- c. genitive
 -(n)In → -(n)in, -(n)un, -(n)ın, -(n)ün
- d. dative
 -(y)A → -(y)a, -(y)e,
- e. ablative
 -DAn → -dan, -den, -tan, -ten
- f. locative
 -DA → -da, -de, -ta, -te

On the other hand, Greek is a synthetic language with a great degree of fusion in the marking of grammatical categories. Case is fused with number and there is extensive lexically determined allomorphy depending on the inflectional class the relevant noun belongs to (Ralli, 2000). Thus, for the same case, there are different formatives for the singular and the plural as well as for the different inflectional classes.

In this paper we focus on cases that mark the grammatical notions of subject and object of main clauses. In Turkish, subjects are in nominative case, which is marked with the default null formative, whereas direct objects are normally marked with the accusative suffix *-(y)I* (see examples above). However, there is a complication about the accusative marking of objects in the sense that Turkish is a *Differential Object Marking* (DOM) language. In DOM languages, an object may or may not be case marked depending on its semantic and/or pragmatic features (Comrie, 1979; 1989; Silverstein, 1981; Bossong, 1985; Croft, 1988; Lyons, 1999; Aissen, 2003, among others); Turkish exhibits DOM with respect to specificity (Enç, 1991; Kornfilt, 1997; Lyons, 1999; Aissen, 2003; von Heusinger & Kornfilt, 2005, among others). Thus, specific objects are marked by the accusative marker *-(y)I*, whereas non-specific objects carry no overt case morphology:

- (14) a. Ali bir kitab-ı al-dı
Ali a book-ACC buy-PAST
'A book is such that Ali bought it'
- b. Zeynep adam-ı gör-dü
Zeynep man-ACC see-PAST
'Zeynep saw the man'

- (15) a. Ali bir kitap al-di
Ali a book buy-PAST
'Ali bought some book or other'
- b. Bilet sat-ıyor-lar
ticket sell-PRES-PL
'They are selling tickets'

It should be noticed that DOM does not apply in constructions where the object receives lexical dative or ablative case. In these situations the object always appears in the relevant case no matter if it is specific or non-specific:

- (16) Ahmet at-a bin-er
Ahmet horse-DAT ride-HABIT
'Ahmet rides the horse' or 'Ahmet is a horse-rider'

On the other hand, in Greek there is no interaction between case and specificity or definiteness, in the sense that there is no case alternation with respect to specificity. In fact, Greek does not mark specificity. Definiteness is marked by means of the definite article, whereas indefiniteness is marked by the indefinite article or by the absence of article (Holton et al., 1997). Crucially, there is no way to distinguish between indefinite specific and indefinite non specific noun phrases, since both are marked by the indefinite article:

- (17) o janis eyrapse ena piima
 the-NOM John-NOM write-PAST.3SG a-ACC poem-ACC
 ‘John wrote some poem’ or ‘John wrote a certain poem’

Finally, case and definiteness also affect the word order in Turkish. Turkish is a head final language so that a head always follows its complements. Thus, objects precede verbs, NP-complements precede their nominal heads, adpositions always appear as postpositions, etc. Given this typology, the basic word order for Turkish is SOV (see examples 5, 7, 16, etc.) (Erguvanlı, 1984). However, the order between S and O is largely determined by the referential properties of these two elements and subsequently by their case marking. Thus, non referential and indefinite NPs tend to appear adjacent to the verb form, whereas definite NPs tend to appear in sentence initial position. Thus, in a situation where both S and O are definite or indefinite their relative order will be SO. The same order occurs when S is definite and O is indefinite. However, when O is definite and S indefinite, the order is reversed, i.e. OS.

- (18) a. both S and O are definite → SOV
 arı çocuğ-u sok-tu
 bee child-ACC sting-PAST
 ‘The bee stung the child’
- b. both S and O are indefinite → SOV
 bir arı bir çocuk sok-tu
 a bee a child sting-PAST
 ‘A bee stung a child’

c. S is definite and O is indefinite → SOV

arı bir çocuk sok-tu

bee a child sting-PAST

‘The bee stung a child’

d. S is indefinite and O is definite → OSV

çocuğ-u bir arı sok-tu

child-ACC a bee sting-PAST

‘The child was stung by a bee’

IV Previous studies on the acquisition of case in Turkish as an L2

The acquisition of case by L2 learners of Turkish has been examined recently by Gürel (2000) and Haznedar (2006). The aim of both studies was to investigate whether the difficulties L2 learners of Turkish exhibit with respect to case morphology are due to the realization of case morphemes or alternatively whether they reflect a more global syntactic deficit.

Gürel (2000) conducted two experiments with twenty-one English speaking learners of Turkish, who have been divided into three proficiency groups (7 participants in each group), and a group of fifteen native speakers (NSs) of Turkish. The first experiment was a grammaticality judgment task and the second one was a production task that involved picture description. The results showed that the L2 learners had an overall lower performance than the NSs and that there were developmental patterns, namely the intermediate and advanced learners performed significantly higher than the beginners. Moreover, the learners produced omissions rather than substitutions of case morphemes and showed sensitivity to the word order constraints of Turkish. In particular, Gürel tested sentences with (non)specific

(non)adjacent objects and found that L2 subjects did not accept the ungrammatical non-specific non-adjacent items at a high rate. These findings indicate knowledge of word order restrictions in the L2 grammar. Thus, Gürel argues for a deficit at the syntax-morphology interface rather than the syntactic module per se.

Haznedar (2006) draws similar conclusions based on spontaneous production data (6 recordings) collected from an English speaking learner of Turkish during the subject's 5-month stay at Boğaziçi University. The findings showed that the learner was able to correctly use verbal suffixes. More specifically, he was more than 90% correct in his production of tense marking. He also showed evidence for use of all S-V agreement morphemes and he marked subjects correctly for nominative. In contrast, the L2 learner exhibited very low performance in case marking (accusative, dative, locative and ablative). However, he seemed to be aware of word order restrictions in Turkish, since he was consistent in the correct case marking of scrambled objects. On the basis of these findings, Haznedar concludes that the learner has difficulties only with the surface realization of Case.

In what follows we present our study with adult Greek learners of Turkish in an attempt to contribute to the on-going debate regarding the source of optionality in L2 grammars. Taking into account the grammatical properties of Greek and Turkish, as well as the theories of second language acquisition presented in section II, we make the following predictions:

(a) Theories postulating a Weak Continuity approach to second language acquisition (Eubank, 1993/1994; 1996; Vainikka & Young-Scholten, 1994; 1996; Meisel, 1997; Eubank et al., 1997), predict that the functional features are impaired and, therefore, the L2 learners are expected to show optionality in the use of case morphology and no sensitivity to word order constraints.

(b) The ‘Failed Functional Features’ and the ‘Interpretability’ hypotheses, on the other hand, predict sensitivity to the word order constraints in L2 Turkish, because the relevant feature, i.e. specificity, even though not grammaticalized in Greek, is interpretable.

(c) Finally, the ‘Missing Surface Inflection’ hypothesis predicts variability in the use of case morphology but also sensitivity to the interaction between case suffixation and word order restrictions, since the underlying representations are assumed to be intact.

V Method

1 Participants

All the non-native speakers of Turkish who participated in this study were monolingual native speakers of Greek. Moreover, they all learnt Turkish as a foreign language at the Department of Mediterranean Studies of the University of the Aegean through instruction and none of them had spent more than six months in a Turkish-speaking environment when tested. The L2 learners have been divided into three proficiency levels based on whether at the time of testing they were attending the first, second or third level of studies on the Turkish language at the University. More specifically, the beginners (first level) have attended Turkish lessons for two years, the low intermediates (second level) for three years and the high intermediates (third level) for four years. The courses on Turkish in each proficiency level last for twenty-four weeks, six hours per week.

The cloze task has been conducted with 35 beginner, 37 low intermediate and 39 high intermediate learners of Turkish. In the sentence-picture matching task, there were forty-eight Greek learners of Turkish: 9, 20 and 19 subjects in the first, second and third proficiency level respectively. The on-line grammaticality judgment task

has been carried out with fifty-six learners (14 beginners, 14 low intermediates and 28 high intermediates). All three tasks have also been administered to sixteen native speakers of Turkish (13 females & 3 males; mean age: 29.75 years).

2 Cloze-task

The cloze-task consisted of a text created by two native speakers of Turkish and contained 51 gaps. All the gaps involved nominal and verbal morphemes denoting case, number, tense and person. In this paper, we will only present the findings concerning the morphological marking of definite and indefinite direct objects. The accusative case morpheme was required for all definite direct objects of the task (4 gaps), whereas the indefinite objects should be left unsuffixed (2 gaps).

3 Sentence picture matching (SPM) task

a Materials

The SPM task contained 36 items. In this paper we will concentrate on the set of the 24 sentences which examined the interaction of word order and case morphology. More specifically, the critical sentences the subjects heard belonged to three conditions:

(a) SOV – definite object marked for accusative case

(19) Erkek kadını kucaklıyor.

man woman-ACC embrace-PRES

“The man is embracing the woman.”

(b) OSV – definite object marked for accusative case

(20) Kadını erkek kucaklıyor.

woman-ACC man embrace-PRES

“The woman is embraced by (some) men.”

(c) SOV – indefinite object unmarked for case

(21) Bir erkek bir kız öpüyor.

a boy a girl kiss-PRES

“A boy kisses a girl.”

b Procedure

The experimentation took place in a quiet room, where the participants were individually tested by one of the researchers. The participants were given a booklet that contained 36 quartets of pictures. In each quartet one picture was the target one, another picture depicted the same action with reversed thematic roles, i.e. for (19) and (20) a woman holding a man. The other two pictures in each quartet described a different action (i.e. for (19) and (20) the action of greeting) performed by the same protagonists, in one of which the thematic roles were as in the target picture (a man greeting a woman) whereas in the other one the thematic roles were reversed (a woman greeting a man). The participants looked carefully at each quarter and at the same time they listened to a Turkish sentence. They were instructed to indicate the picture that best illustrated the sentence they heard. All 36 sentences were spoken by a female native speaker of Turkish and were tape-recorded.

4 On-line grammaticality judgment (GJ) task

a Materials

The on-line GJ task consisted of 48 sentences, 24 of which were grammatical and 24 ungrammatical. There were 24 experimental items equally distributed across four conditions, as shown below (see Appendix I for the entire list of the experimental sentences):

(a) SOV – definite object marked for accusative case

(22) Çocuk gazete-ler-i oku-du.

child newspaper-PL-ACC read-PAST

“The child read the newspapers.”

(b) OSV – definite object marked for accusative case

(23) Gazete-ler-i çocuk oku-du.

newspaper-PL-ACC child read-PAST

“The newspapers were read by some/the child.”

(c) SOV – indefinite object unmarked for case

(24) Çocuk gazete oku-du.

child newspaper read-PAST

“The child read some newspapers.”

(d) *OSV - indefinite object unmarked for case

(25) *Gazete çocuk oku-du.

newspaper child read-PAST

“Some newspapers were read by some/the child.”

There were 6 items per condition, which resulted in 18 grammatical and 6 ungrammatical experimental sentences.

In addition to the test items, there were 24 distractors, 6 of which were grammatical and 18 ungrammatical. The filler sentences were of the same length as the experimental ones, namely they contained 3 words. The grammatical distractors contained predication constructions, negative sentences as well as sentences consisting of a subject, a PP and a verb. The ungrammatical distractors involved S-V agreement mismatches and incorrect morphological marking for cases other than accusative.

b Procedure

The experiment was designed through the e-prime paradigm. The subjects read the sentences on a computer screen. Each word automatically appeared in the middle of the screen and remained there for 2 seconds. At the end of each sentence a question mark appeared “?” and at this point the subjects had to judge the grammaticality of the sentence they had read in 4 seconds. If no response was given after 4 seconds, the experiment continued with the presentation of the following sentence. Before the main experimental session, there was a familiarization phase consisting of 10 trials.

VI Results

1 Cloze-task

First, we present the accuracy on the verbal suffixes per proficiency group. The NSs were 100% accurate in all their responses:

-----Insert Table 1 here-----

The following table illustrates the percentages of correct productions for the cases tested per each proficiency level.

-----Insert Table 2 here-----

The data shown in Table 2 indicate a clear developmental pattern. More specifically, in all conditions, apart from the indefinite object one, the low intermediate students performed better than the beginners and the high intermediate students produced more correct responses than the low intermediate learners.

In the other cases, all L2 groups differed significantly from each other (beginners vs low: $\chi^2 = 35.240$, $p < 0.001$; beginners vs high intermediates: $\chi^2 = 177.611$, $p < 0.001$; low vs high intermediates: $\chi^2 = 57.985$, $p < 0.001$).

In the definite object condition, the beginners performed significantly worse than the low ($\chi^2 = 11.647$, $p < 0.01$) and high intermediate ($\chi^2 = 26.337$, $p < 0.001$) learners, whereas the difference between the low and high intermediates was not significant ($p > 0.05$).

When the direct object was indefinite and thus the noun was morphologically unmarked, there were no statistically significant differences among the three groups ($p > 0.05$). Notice that in this condition the beginners seem to perform better – even though not significantly – than the intermediate groups. However, this is probably a misleading result because in this case correct performance coincides with omission and, hence, we cannot be sure whether the production of a null morpheme really reflects knowledge of the constraints related to indefinite objects in Turkish.

Moreover, we counted the omission and substitution errors produced by each proficiency group only for the definite-object condition:

-----Insert Graph 1 here-----

Graph 1 illustrates that the omission errors are more frequent than the substitution errors in all proficiency groups and the statistical analyses showed that these differences are statistically significant (beginners: $\chi^2 = 12.333$, $p < 0.001$; low intermediates; $\chi^2 = 23.511$, $p < 0.001$; high intermediates: $\chi^2 = 21.278$, $p < 0.001$).

We have also conducted a more detailed error analysis in order to see which case suffixes have been mistakenly used instead of the correct ones in the definite and indefinite object conditions. All responses that did not involve case suffixes have been excluded from this analysis. Table 3 presents the erroneous case suffixes produced for the definite object condition:

-----Insert Table 3 here-----

As shown in Table 3, the suffix that is most often erroneously supplied by all L2 groups is the one marked for dative.

Table 4 presents the analysis of substitution errors for the indefinite object condition:

-----Insert Table 4 here-----

The data show that the beginners erroneously use accusative, dative and locative suffixes to the same degree, whereas both intermediate groups over-apply the accusative suffix more often than other case suffixes.

2 Sentence-picture matching task

First, we present the overall accuracy scores per proficiency group:

-----Insert Table 5 here-----

The overall scores show developmental patterns in that the high ($\chi^2 = 42.449$, $p < 0.001$) and low ($\chi^2 = 13.530$, $p < 0.001$) intermediate groups perform significantly better than the beginners, and the beginners significantly worse than the low intermediates ($\chi^2 = 14.009$, $p < 0.001$).

The following table illustrates the frequency of correct responses for the experimental items. The NSs were 100% accurate in all target sentences:

-----Insert Table 6 here-----

The high intermediate group's performance was significantly better than that of the beginners in both the $SO_{ACC}V$ ($\chi^2 = 5.368$, $p < 0.03$) and the $SO_{ABS}V$ ($\chi^2 = 12.600$, $p < 0.001$) conditions, whereas the low intermediates differed from the beginners only in the $SO_{ABS}V$ condition ($\chi^2 = 6.191$, $p < 0.02$). No significant differences among the three groups were observed in the $O_{ACC}SV$ condition. Notice, however, that most of the developmental differences in the $SO_{ACC}V$ and $SO_{ABS}V$ sentences between the low or high intermediates on one hand and the beginners on the other are probably due to lexical and not grammatical errors. This is obvious in the following graph, which represents the accuracy in percentages per each group and condition when only grammatical – in this case word order errors – are counted. The only difference that remains statistically significant is the one between the beginners and the high intermediates in the $SO_{ABS}V$ ($\chi^2 = 8.036$, $p < 0.01$).

----- Insert Graph 2 here -----

3 On-line grammaticality judgment task

a Accuracy for filler items

Table 7 shows the accuracy scores for the grammatical and ungrammatical filler sentences for L2 learners and NSs:

----- Insert Table 7 here -----

An ANOVA with Grammaticality (grammatical *vs* ungrammatical sentences) as the within-subjects factor and Group (native speakers *vs* beginners *vs* low *vs* high intermediates) as the between-subjects factor revealed a significant main effect of Grammaticality ($F(1,68) = 20.392, p < 0.001, \eta^2=0.231$) due to the fact that overall the grammatical sentences have been judged significantly more accurately than the ungrammatical ones and a significant Group effect ($F(3,68) = 23.275, p < 0.001, \eta^2=0.507$). Planned post-hoc comparisons showed that the Group effect is due to the fact that (a) the native speakers performed significantly better than all L2 groups ($p < 0.001$) and (b) the beginners performed significantly worse than the high intermediate group ($p < 0.03$). One-way ANOVAs performed on each proficiency level showed that the grammatical sentences were judged significantly better than the ungrammatical ones only by the low ($F(1, 26) = 6.782, p < 0.02$) and high ($F(1,55) = 19.383, p < 0.001$) intermediate groups.

b Accuracy for experimental items

----- Insert Table 8 here -----

A repeated-measures ANOVA with Word Order (canonical vs non-canonical sentences) and Case (accusative vs absolute) as the within-subjects factors and Group (native speakers vs beginners vs low vs high intermediates) as the between-subjects variable has been performed. The Group effect was significant ($F(3,68) = 23.659, p < 0.001, \eta^2=0.511$; $F(3,92)= 23.305, p < 0.001, \eta^2=0.432$) and planned post-hoc comparisons with the Bonferroni test showed that this is due to the significant comparisons between the native speakers and all L2 groups ($p < 0.001$ in the subject- and the item-analyses), whereas there were no significant differences among the L2 groups ($p = 1.000$ in the subject- and the item-analyses). Moreover, the main effects of Case ($F(1,68) = 18.036, p < 0.001, \eta^2=0.210$; $F(1,92) = 20.310, p < 0.001, \eta^2=0.181$) and Order ($F(1,68) = 46.533, p < 0.001, \eta^2=0.406$; $F(1,92) = 39.610, p < 0.001, \eta^2=0.301$) as well as the interactions between Order x Group ($F(3,68) = 48.295, p < 0.001, \eta^2=0.268$; $F(3,92) = 7.292, p < 0.001, \eta^2=0.192$) and Case x Order x Group ($F(3,68) = 3.852, p < 0.02, \eta^2=0.145$; $F(3,92) = 3.370, p < 0.03, \eta^2=0.099$) were significant. To further explore the source of these interactions a two-way repeated measures ANOVA with case and word order as the within-subjects factors has been performed on the data from each participant group. In this and all further analyses, the L2 data from the three groups have been collapsed together, since the planned comparisons did not reveal any significant differences among the L2 groups.

The L2 group manifested significant Word Order ($F(1,55) = 74.094, p < 0.001, \eta^2=0.574$; $F(1,71) = 50.435, p < 0.001, \eta^2=0.415$) and Case effects ($F(1,55) = 20.755, p < 0.001, \eta^2=0.274$; $F(1,71) = 15.495, p < 0.001, \eta^2=0.179$) as well as a significant interaction between Case and Word Order ($F(1,55) = 5.426, p < 0.03, \eta^2=0.090$; $F(1,71) = 5.517, p < 0.03, \eta^2=0.072$). These effects are due to:

- (a) more accurate judgments for sentences with canonical than with non-canonical word order (accusative ($t_1(55) = 5.195, p < 0.001; t_2(71) = 3.144, p < 0.01$); absolute: ($t_1(55) = 6.287, p < 0.001; t_2(71) = 6.917, p < 0.001$))
- (b) more accurate judgments for sentences involving the absolute than the accusative case (SOV: $t_1(55) = 2.064, p < 0.05$; OSV: $t_1(55) = 4.516, p < 0.05; t_2(71) = 4.419, p < 0.001$).

On the other hand, the data from the control group showed a significant main effect of Case only in the item analysis ($F_2(1,23) = 5.690, p < 0.03, \eta^2=0.198$) and a significant interaction between Case and Word Order ($F_1(1,15) = 6.728, p < 0.03, \eta^2=0.310; F_2(1,23) = 5.938, p < 0.03, \eta^2=0.205$), due to the lower accuracy scores of the SOV-sentences in the absolute case as compared to the OSV-sentences in the absolute ($t_1(15) = 2.452, p < 0.03$) and the SOV-sentences in the accusative case ($t_1(15) = 4.008, p < 0.01; t_2(23) = 2.976, p < 0.01$). Notice that the rather low accuracy score of the NSs on the $SO_{ABS}V$ sentences (73%) is due to the data from three participants who performed at chance level on this condition for reasons that are unknown to us, since an individual subject analysis did not reveal any consistent problems with specific items.

c RT data

We turn now to the RT data. Table 9 presents the RTs for the correct trials:

----- **Insert Table 9 here** -----

The data in Table 9 show that in the sentences involving the accusative case, both the NSs and the L2 learners were slower in the items with non-canonical than with canonical word order. However, in the absolute case the NSs' behaviour was different

from the L2 learners'. Specifically, the ungrammatical condition, i.e. $O_{ABS}SV$, was the slowest and, hence, the most difficult condition in the L2 data, whereas this was not the case for the native speakers. These observations have been confirmed by statistical analyses.

In the repeated-measures ANOVA with Case and Word Order as the within-subjects factors and Group as the between-subjects factor, the Group effect was significant only in the item-analysis ($F(2,71) = 3.190, p < 0.03, \eta^2=0.119$). Moreover, the Bonferroni post-hoc comparisons showed a significant difference between the low and the high intermediate groups which was significant only in the item analysis ($p < 0.03$). On the contrary, the main effects of Case ($F(1,63) = 5.289, p < 0.03, \eta^2=0.077$; $F(1,71) = 5.288, p < 0.03, \eta^2=0.069$) and Word Order ($F(1,63) = 6.848, p < 0.02, \eta^2=0.098$; $F(1,71) = 7.020, p < 0.02, \eta^2=0.090$) as well as the three-way interaction among Case, Word Order and Group ($F(3,63) = 3.951, p < 0.02, \eta^2=0.158$; $F(3,71) = 4.515, p < 0.0, \eta^2=0.160$) were significant. To further explore the three-way interaction, two-way ANOVAs have been performed for each group data set. As for the accuracy data, the RTs from the three L2 groups have been collapsed together as no significant differences were revealed.

The NS data revealed a significant interaction between Case and Word Order ($F(1,15) = 6.102, p < 0.03, \eta^2=0.289$; $F(1,23) = 11.410, p < 0.01, \eta^2=0.332$). Paired-samples t-tests showed that this interaction is due to the faster RTs for (a) the SOV than the OSV sentences in the accusative case condition ($t(23) = 3.780, p < 0.01$) and (b) the OSV sentences in the absolute than the accusative case ($t(23) = 2.504, p < 0.03$).

In the L2 data, the two-way ANOVA with case and order as the within-subjects factors revealed that the main effects of Case ($F(1,50) = 7.896, p < 0.01, \eta^2=0.136$;

$F2(1,50) = 6.366, p < 0.02, \eta^2=0.113$) and Word Order ($F1(1,50) = 9.338, p < 0.01, \eta^2=0.157; F2(1,50) = 5.344, p < 0.03, \eta^2=0.097$) as well as the interaction between Case and Word Order ($F1(1,50) = 10.415, p < 0.01, \eta^2=0.172; F2(1,50) = 8.373, p < 0.01, \eta^2=0.143$) were significant. These results are due to the fact that the OSV condition in the absolute case was judged significantly slower than the SOV condition in the same case ($t1(51) = 4.017, p<0.001; t2(56) = 3.405, p<0.01$) and the OSV sentences in the accusative case ($t1(50) = 3.540, p < 0.01; t2(56) = 3.670, p<0.01$).

Furthermore, we did an additional analysis on the items involving the absolute case. More specifically, we counted the RTs for the trials that have been erroneously judged as grammatical in the ungrammatical condition $O_{ABS}SV$. Graph 3 displays the mean RTs for all three L2 groups for the $O_{ABS}SV$ trials judged as grammatical and ungrammatical:

----- **Insert Graph 3 here** -----

Graph 3 shows a different pattern for the $O_{ABS}SV$ trials judged as grammatical and ungrammatical: the RTs for the former are shorter than for the latter ($t1(50) = 5.383, p < 0.001; t2(55) = 3.819, p < 0.001$).

VII Discussion

Before we proceed to the interpretation of our findings we will first summarize the main findings from the three tests we employed. The cloze task showed developmental effects in the production of all case suffixes. With respect to the production of the correct accusative morphemes in the definite object condition, the two intermediate groups performed significantly better than the beginners. In this condition, omission errors significantly outnumbered substitution errors in all

proficiency levels and the dative suffixes have been overused more frequently than the other case suffixes. As far as the indefinite object condition is concerned, the beginners appeared to perform better than the intermediate groups, even though the differences did not reach significance. We think that this finding is an artefact, since in the case of indefinite objects correct performance means production of a null morpheme. Notice that the analysis of the substitution errors in the indefinite object condition provides evidence that the intermediate groups are actually at a higher developmental stage compared to the beginners. This is because the intermediate groups overgeneralize the accusative suffix more often than the other case suffixes, which is not found in the data from the beginners.

The SPM task, on the other hand, showed an overall better performance on sentences with canonical word order than on sentences with non-canonical word order. This was evident in all proficiency groups and any differences among them were due to lexical difficulties.

Finally, the on-line GJ task indicated that the result pattern of the L2 learners differed from that of the NSs but there were no significant differences among the three proficiency groups. First, the NSs were more accurate than the L2 learners. In addition, the L2 learners exhibited difficulties in correctly judging (a) the grammatical sentences with non-canonical word order and (b) the ungrammatical $O_{ABS}SV$ sentences, which was not the case for the NSs. The only condition that seemed to have caused some problems to the NSs is the $SO_{ABS}V$ condition (see section 6.3 for further discussion). The RT data also demonstrated significant differences between the NSs and the L2 learners, in that the ungrammatical $O_{ABS}SV$ condition was the slowest in the L2 but not in the NSs' data. Moreover, sentences with non-canonical word order resulted in processing load which was evident in both the NSs and the L2 learners,

even though this effect did not result in any significant differences in the L2 learners' results.

Our data from the cloze-task reveals a difference in performance between the verbal and the nominal suffixes in all proficiency levels, with better performance for the verbal morphemes. In particular, the intermediate groups exhibited rather high accuracy as far as S-V agreement (73% for the low and 95% for the high intermediates) and Tense (76% for the low and 92% for the high intermediates) are concerned. This result contrasts with the low accuracy in the production of Case (accusative: 21% for the beginners, 39% for the low intermediates and 49% for the high intermediates; other cases: 28% for the beginners, 41% for the low intermediates and 58% for the high intermediates). Our findings are consistent with Haznedar's (2006) study where there is an asymmetry in the use of verbal and case morphology. Moreover, our results replicate the optionality observed by Gürel (2000) in the production of case suffixes.

In parallel with other studies (Gürel 2000; Prévost & White, 2000) we also found more omissions than substitutions in the production task, which, despite the variable use of case morphology, shows that L2 learners prefer to avoid the production of erroneous suffixes. As noted in previous studies (Borer & Rohrbacher 1997; Gürel 2000), this is an indication of some internal knowledge of case features since learners avoid a possible feature clash in cases where they are not sure about the appropriate form.

In the SPM task our learners exhibited low performance in the $O_{ACC}SV$ sentences as compared to the $SO_{ACC/ABS}V$ sentences. A possible explanation for this finding is interference from the L1. Greek is a free word order language that allows six alternative word order patterns: SVO, SOV, VSO, VOS, OSV and OVS (Holton et al.

1997; Clairis & Babiniotis 2005). While SVO and VSO are the unmarked word orders, the other orders are less frequent and are chosen under specific discourse constraints. Keller & Alexopoulou (2001) investigated experimentally the information structure of Greek and according to their data the SOV and OSV orders are the least preferred in both subject and object focus cases. Similar findings are reported by Lascaratou & Georgiafentis (2006: 18-19), who present the frequency of word orders in Greek based on data from written corpora. Therefore, given that these two orders are more marked, it is expected that a Greek learner of Turkish would encounter difficulties in sentences that involve such word order patterns. However, we attested a significant difference in performance between SOV and OSV sentences, which might be attributed to a general processing strategy, according to which L2 learners prefer to interpret the first NP as the subject of the sentence, as observed in a number of processing studies (for ambiguous sentences see Frazier, 1987; Mecklinger et al., 1995; Schriefers et al., 1995; Bader & Meng, 1999 among others).

The problems the L2 learners have with scrambled sentences are also evident in the on-line data. Low accuracy was observed in OSV sentences that were either grammatical, when the object was marked for accusative, or ungrammatical, when the object was morphologically unmarked. Nonetheless, the accuracy rate for the $O_{ABS}SV$ condition was lower, which shows that the L2 learners of our study accept scrambled sentences with unaffixed objects and, thus, do not seem to be aware of the interaction between case morphology and word order constraints, as was the case in previous studies (cf. Gürel, 2000; Haznedar, 2006). A difference between our study and previous studies, which may have contributed to the discrepancies in the findings, is that the grammaticality judgment we used was more demanding, as it was an on-line task with specific time limits. However, we think that the conclusion that there is no

interaction between case morphology and word order is not entirely true because of the RT data. The fact that the $O_{\text{ABS}}\text{SV}$ condition was significantly slower than the $O_{\text{ACC}}\text{SV}$ condition shows that learners treat the two conditions differently, which possibly indicates some sensitivity to the interplay of case and word order.

VIII Conclusion

The findings from the present study suggest that L2 grammatical representations are not impaired, because (a) verbal grammatical morphemes are productively used, (b) L2 learners prefer to omit than substitute grammatical morphemes as first language learners do and (c) their RT data show evidence that L2 learners are aware of word order restrictions on case marking. Based on these findings, we think that the L2 acquisition accounts which postulate missing or underspecified features (Eubank, 1993/1994; 1996; Vainikka & Young-Scholten, 1994; 1996; Meisel, 1997; Eubank et al., 1997) are not supported by our findings. On the other hand, the ‘Failed Functional Features’ hypothesis and the ‘Interpretability’ hypothesis are partly supported by our data, as the L2 learners manifested sensitivity to word order constraints. Furthermore, these observations are in favour of the ‘Missing Surface Inflection’ hypothesis which assumes a mapping problem between morphological elements and syntactic features.

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References

- Aissen, J. 2003: Differential object marking: iconicity vs. economy. *Natural Language and Linguistic Theory* 21, 435-483.
- Bader, M. and Meng, M. 1999: Subject-object ambiguities in German embedded clauses: an across-the-board comparison. *Journal of Psycholinguistic research* 28, 121-143.
- Bossong, G. 1985: *Empirische Universalienforschung. Differentielle Objektmarkierung in den neuiranischen Sprachen*. Tübingen: Gunter Narr Verlag.
- Clahsen, H., Penke, M. and Parodi, T. 1993/1994: Functional categories in early child German. *Language Acquisition* 3, 395-429.
- Clairis, C. and Babinotis, G. (in collaboration with Mozer, A., Bakakou-Orfanou, A. and Skopeteas, S.) 2005: *Γραμματική της νέας ελληνικής. Δομολειτουργική – Επικοινωνιακή* [Grammar of Modern Greek. [Structural/Functional - Communicative]]. Athens: Ellinika Grammata.
- Comrie, B. 1979: Definite and animate direct objects: A natural class. *Linguistica Silesiana* 3, 13-21.
- Comrie, B. 1989: *Language Universals and Linguistic Typology*. Oxford: Blackwell.
- Croft, W. 1988: Agreement vs. case marking and direct objects. In Barlow M. and Ferguson, C., editors, *Agreement in Natural Language: Approaches, Theories, Descriptions*, Stanford, CSLI, 159-179.
- Enç, M. 1991: The semantics of specificity. *Linguistic Inquiry* 22, 1-25.
- Erguvanlı, E.E. 1984: *The Function of Word-Order in Turkish Grammar*. Los Angeles: University of California Press.

- Eubank, L. 1993/1994: On the transfer of parametric values in L2 development. *Language Acquisition* 3, 182-208.
- Eubank, L. 1996: Negation in early German-English interlanguage: more 'valueless' features in the L2 initial state. *Second Language Research* 12, 73-106.
- Eubank, L., Bischof, A., Huffstutler, J. Leek, P. and West, C. 1997: 'Tom eats slowly cooked eggs': Thematic verb raising in L2 knowledge. *Language Acquisition* 6, 171-199.
- Frazier, L. 1987: Syntactic processing: Evidence from Dutch. *Natural Language and Linguistic Theory* 5, 519-559.
- Gavrusseva, L. and Lardiere, D. 1996: The emergence of extended phrase structure in child L2 acquisition. In A. Stringfellow, Cahana-Amitay, D., Hughes, E. and Zukowski, A., editors, *Boston University Conference on Language Development (BUCLD) 20*, Somerville MA: Cascadilla Press, 225-236.
- Grondin, N. and White, L. 1996: Functional categories in child L2 acquisition of French. *Language Acquisition* 5, 1-34.
- Göksel, A. and Celia K. 2005: *Turkish: A Comprehensive Grammar*. London: Routledge.
- Gürel, A. 2000: Missing case inflection: Implications for second language acquisition. In Howell, C., Fish, S.A. and Keith-Lucas, T., editors, *Proceedings of the 24th Boston University Conference on Language Development 24*, Somerville, MA: Cascadilla Press, 379-390.
- Hawkins, R. and Chan, C. 1997: The partial availability of universal grammar in second language acquisition: the 'Failed Functional Features hypothesis'. *Second Language Research* 13, 187-226.

- Hawkins, R. and Hattori, H. 2006: Interpretation of English multiple wh-questions by Japanese speakers: a missing uninterpretable feature account. *Second Language Research* 22, 269-301.
- Haznedar, B. 1997: L2 acquisition by a Turkish-speaking child: evidence for L1 influence. In Hughes, E., Hughes, M. and Greenhill, A., editors, *Boston University Conference on Language Development (BUCLD) 21*, Somerville MA: Cascadilla Press, 245-256.
- Haznedar, B. 2006: Persistent problems with case morphology in L2 acquisition. In Conxita, L., editor, *Interfaces in Multilingualism: Acquisition and Representation*, Amsterdam: John Benjamins, 179-206.
- Haznedar, B. and Schwarts, B. 1997: Are there optional infinitives in child L2 acquisition?. In Hughes, E., Hughes, M. and Greenhill, A., editors, *Boston University Conference on Language Development (BUCLD) 21*, Somerville MA: Cascadilla Press, 257-268.
- von Heusinger, K. and Kornfilt, J. 2005: The case of direct object in Turkish: Semantics, syntax and morphology. *Turkic Languages* 9, 3-44.
- Hoekstra, T. and Hyams, N. 1996: The syntax and interpretation of dropped categories in child language: A unified account. In Camacho, J., Choueiri, L., and Watanaba, M, editors, *Proceedings of the West Coast Conference in Formal Linguistics 14*, Stanford, CA: CSLI Publications, 123-136.
- Holton, D., Mackridge, P. and Philippaki-Warbuton, I. 1997: *Greek: A Comprehensive Grammar of the Modern Language*. London: Routledge.
- Keller, F. and Alexopoulou, T. 2001: Phonology competes with Syntax: Experimental evidence for the interaction of word order and accent placement in the realization of information structure. *Cognition* 79, 301-372.

- Kornfilt, J. 1997: Turkish. London: Routledge.
- Lakshmanan, U. 1993/4: 'The boy for the cookie'-some evidence for the non-violation of the case filter in child second language acquisition. *Language Acquisition* 3, 51-97.
- Lardiere, D. 1998a: Case and tense in the 'fossilized' steady state. *Second Language Research* 14, 1-26.
- Lardiere, D. 1998b: Dissociating syntax from morphology in a divergent L2 end-state grammar. *Second Language Research* 14, 359-375.
- Lascaratou, C. and Georgiafentis, M. 2006: Βασικά χαρακτηριστικά της σειράς των προτασιακών όρων στην ελληνική και στην τουρκική [Main properties of word order in Greek and in Turkish]. In Moschonas, S., Editor, Η σύνταξη στη μάθηση και στη διδασκαλία της ελληνικής ως ξένης γλώσσας [The syntax in the learning and teaching of Greek as a foreign language], Athens: Patakis, 11-61.
- Lewis, G. 2000: Turkish Grammar. Oxford: Oxford University Press.
- Lyons, C. 1999: Definiteness. Cambridge: Cambridge University Press.
- Mecklinger, A., Schriefers, H., Steinhauer, K. and Friederici, A. 1995: Processing relative clause varying on syntactic and semantic dimensions: An analysis with event-related potentials. *Memory and Cognition* 23, 477-494.
- Meisel, J. 1997: The acquisition of syntax of negation in French and German: Contrasting first and second language development. *Second Language Research* 13, 227-263.
- Prévost, P. and White, L. 2000: Missing surface inflection or impairment in second language? Evidence from tense and agreement. *Second Language Research* 16, 103-133.

- Radford, A. 1990: *Syntactic Theory and the Acquisition of English Syntax*. Oxford: Blackwell.
- Ralli, A. 2000: A feature-based analysis of Greek nominal inflection. *Glossologia* 11-12, 201-228.
- Schriefers, H., Friederici, A. and Kuhn, A. 1995: The processing of locally ambiguous relative clauses in German. *Journal of Memory and Language* 34, 499-520.
- Silverstein, M. 1981. Case marking and the nature of language. *Australian Journal of Linguistics* 1, 227-244.
- Tsimpli, I.M. 2003: Clitics and determiners in L2 Greek. In Licerias, J., Zobl, H. and Goodluck, H., Editors, *Proceedings of the 6th Conference on Generative Approaches to Second Language Acquisition*, Somerville, MA: Cascadilla Proceedings Project, 331-339.
- Tsimpli, I.M and Dimitrakopoulou, M. 2007: The Interpretability Hypothesis: evidence from wh-interrogatives in second language acquisition. *Second Language Research* 23(2), 215-242.
- Tsimpli, I.M. and Mastropavlou, M. 2008: Feature interpretability in L2 acquisition and SLI: Greek clitics and determiners. In Licerias, J. Zobl, H. and Goodluck, H., Editors, *The Role of Formal Features in Second Language Acquisition*, London: Routledge, 142-183.
- Vainikka, A. and Young-Scholten, M. 1994: Direct access to X'-theory: evidence from Korean and Turkish adults learning German. In Hoekstra, T. and Schwartz, B., editors, *Language Acquisition Studies in Generative Grammar: Papers in Honor of Kenneth Wexler from the 1991 GLOW Workshop*, Philadelphia/Amsterdam: John Benjamins, 17-34.

- Vainikka, A. and Young-Scholten, M. 1996: Gradual development of L2 phrase structure. *Second Language Research* 12, 7-39.
- Wexler, K. 1994: Optional Infinitives, Head Movement and the Economy of Derivations. In Hornstein, N. and Lightfoot, D. editors, *Verb Movement*. Cambridge: Cambridge University Press, 305-350.
- White, L. 1998: Clitics in child L2 French. In Clahsen, H., editor, *Generative Perspectives on Language Acquisition: Empirical Findings, Theoretical Considerations, Crosslinguistic Comparisons*, Philadelphia/Amsterdam: John Benjamins, 335-368.
- White, L. 2003: Fossilization in steady state L2 grammars: Persistent problems with inflectional morphology. *Bilingualism: Language and Cognition* 6, 129-141.

Appendix

The four conditions used in the on-line grammaticality judgment task are presented in (1a)-(1d).

1. (a) Çocuk gazeteleri odudu.
boy newspapers-ACC read-PAST
(b) Gazeteleri çocuk odudu.
newspapers-ACC boy read-PAST
(c) Çocuk gazete odudu.
boy newspaper read-PAST
(d) *Gazete çocuk odudu.
Newspaper boy read-PAST
2. Kız mektubu yazdı.
girl letter-ACC wrote
3. Adam çantayı attı.
man bag-ACC threw-away
4. Öğrenci bilgisayarını aldı.
student computer-ACC bought
5. Hasta hastaneyi gördü.
patient nurse-ACC saw
6. Çocuk yemeği yedi.
boy food-ACC ate
7. Manav meyveleri sattı.
grocer fruit-PL-ACC sold
8. Baba televizyonu kapadı.
father television-ACC turned-off
9. Gazeteci arabayı aldı.

10. journalist car- ACC took
Kadın valizi hazırladı.
woman suitcase-ACC prepared
11. Anne kahvaltıyı hazırladı.
mother breakfast-ACC prepared
12. Öğretmen kitabı buldu.
teacher book-ACC found
13. Çocuk defteri açtı.
boy notebook-ACC opened
14. Kız kolyeyi verdi.
girl necklace-ACC gave
15. Büyükanne ceketi temizledi.
granmama cardinal-ACC cleaned
16. Çocuk pırzolayı yedi.
Boy steak-ACC ate
17. Müsteri salatayı istedi.
customer salad-ACC asked-for
18. Turist tavernayı arıyor.
Tourist tavern-ACC looks-for
19. Kedi topu buldu.
cat ball-ACC found
20. Adam birayı içti.
man beer-ACC drank
21. Çocuk otobüsü gördü.
boy bus-ACC saw
22. Öğrenci pencereyi açtı.
student window-ACC opened
23. Baba peçeteyi verdi.
father towell-ACC gave
24. Bakkal peyniri yedi.
grocer cheese-ACC ate

Table 1. Verbal suffixes: Correct scores per proficiency level

Verbal suffixes	Level I	Level II	Level III
S-V Agreement	42% (220/525)	73% (407/555)	95% (559/585)
Tense	49% (272/560)	76% (449/592)	92% (577/624)
<i>Total</i>	<i>45% (492/1085)</i>	<i>75% (856/1147)</i>	<i>94% (1136/1209)</i>

Table 2. Case suffixes: Correct scores per proficiency level

Cases	Level I	Level II	Level III
Definite object (accusative)	21% (29/140)	39% (58/148)	49% (77/156)
Indefinite object (unmarked)	76% (53/70)	64% (47/74)	62% (48/78)
Other cases	28% (253/910)	41% (393/962)	58% (588/1014)
<i>Total</i>	<i>30% (335/1120)</i>	<i>42% (498/1184)</i>	<i>57% (713/1248)</i>

Graph 1. Definite object: Omission and substitution errors per proficiency group (%)

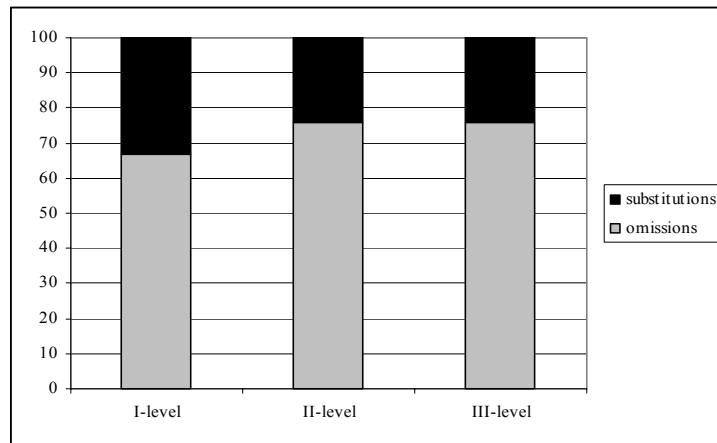


Table 3. Definite object: Erroneous case suffixation (%)

Proficiency levels	dative	locative	ablative	genitive
I	63% (20/32)	37% (12/32)	0	0
II	58% (7/12)	25% (3/12)	8.5% (1/12)	8.5% (1/12)
III	70% (7/10)	30% (3/10)	0	0

Table 4. Indefinite object: Error analysis (%)

Proficiency level	accusative	dative	locative	ablative	genitive
I	33.33% (4/12)	33.33% (4/12)	33.33% (4/12)	0	0
II	84% (10/12)	8% (1/12)	8% (1/12)	0	0
III	90% (19/21)	5% (1/21)	0	0	5% (1/21)

Table 5. SPM task: Overall accuracy scores

Proficiency Level	Correct Responses
Beginners	28% (103/378)
Low intermediate	38% (320/840)
High intermediate	47% (377/798)

Table 6. SPM task: Accuracy scores for the experimental items

Proficiency Level	SO_{ACC}V	O_{ACC}SV	SO_{ABS}V
Beginners	35% (17/48)	8% (4/50)	35% (32/92)
Low intermediate	48% (58/120)	12% (14/119)	50% (119/238)
High intermediate	55% (61/110)	19% (22/113)	57% (125/220)

Graph 2. SPM task: Accuracy scores per condition and proficiency group (%)

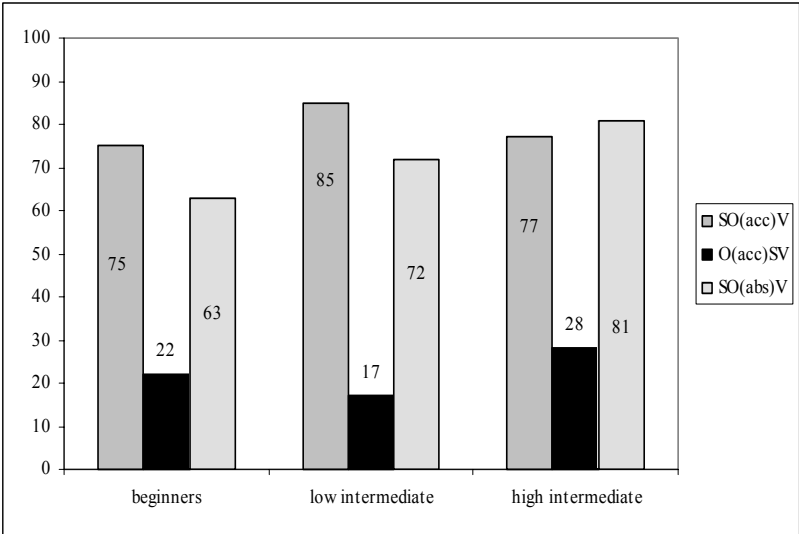


Table 7. GJ task: Accuracy scores for the filler items

Groups	Filler sentences	
	grammatical	ungrammatical
Beginners	54%	37%
Low intermediate	59%	43%
High intermediate	71%	49%
Native speakers	89%	87%

Table 8. GJ task: Accuracy scores for the experimental items (%)

Groups	Experimental sentences			
	(*)Object_{ABS}	Object_{ABS}	Object_{ACC}	Object_{ACC}
	OSV	SOV	OSV	SOV
Beginners	41%	62%	51%	67%
Low intermediate	42%	64%	56%	76%
High intermediate	31%	67%	61%	74%
Native speakers	86%	73%	83%	91%

Table 9. GJ task: RTs per condition and group

Groups	Experimental sentences			
	(*)Object_{ABS}	Object_{ABS}	Object_{ACC}	Object_{ACC}
	OSV	SOV	OSV	SOV
Beginners	1219	1003	862	1017
Low intermediate	992	798	819	851
High intermediate	1459	1021	1025	1034
Native speakers	975	1090	1164	897

Graph 3. Absolute conditions: RTs for trials judged as grammatical

