The syntax/morphology interface: Agree Relations in L1 Slavic / L2 Greek

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1 Introduction

A considerable number of L2 studies within the generative framework have been concerned with morphological agreement and the relationship between syntax and morphophonology. The aim has been to provide a principled explanation of the variation attested even at advanced stages of acquisition in terms of morphological production. According to representational deficit accounts (Hawkins & Chan 1997, Tsimpli 2003a, Tsimpli & Mastropavlou to appear), inconsistent use of target forms, which qualitatively differentiates the L2 learner from the native speaker, is taken to be evidence of an underlying deficit in syntactic representations. Important in these accounts is the learnability status of uninterpretable (formal) features. Specifically, formal features which are not instantiated (i.e. lexicalised) in the native language (or vice-versa) are predicted to cause problems in L2.

The alternative view, the Missing Surface Inflection Hypothesis (Haznedar & Schwartz 1997, Lardiere 1998, 2005, Prévost & White 2000), allows for the possibility of parameter resetting, i.e. the ability of acquiring formal (uninterpretable) features,

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2 We would like to thank Eleni Agathopoulou for detailed comments on the paper. All errors remain, of course, ours.
even when these are absent in L1. It also maintains that syntax and morphology in second language acquisition (L2A) do not develop in a parallel fashion (see also Smith & Tsimidi 1995 for arguments that the two develop independently in L2A and that the mapping between them is not a straightforward process). This dissociation is reflected in the inconsistent production of functional free or bound morphemes, which, as proponents of this theory argue, is caused by the inability to access the target morphological form and not by the underlying syntactic representation. Finally, it has been suggested that variation at the syntax/morphology interface is the result of a conflict between the grammar and the parser, which is responsible for mapping syntactic objects onto phonetic realisations and on which processing constraints and memory limitations apply (Juffs 1998, Felser et al. 2003, a.o.). This relates to the lack of automaticity that characterises L2 learners, one aspect of which is the slower rate at which the target language is processed (Segalowitz 2003).

In cases when functional features are lexicalised in both L1 and L2, syntactic deficit accounts cannot offer a satisfying explanation of L2 variability. In particular, when the same uninterpretable feature is activated in both languages (L1 and L2), the difference lies in the way it is morphologically realised, a property of the PF-interface. The task of the learner is to match the specific form with the feature or the feature-bundle spelled-out. Lardiere (2005) links (mis)suppliance of the target phonological form with the “morphological competence” of the learner, conditioned by phonological, morphological and semantic factors as well as knowledge of which features are expressed in which form and in which domains.

In this paper we examine the production of morphological agreement by L1 Slavic / L2 Greek speakers and analyse the data in terms of (i) the different agreement domains (TP and DP), (ii) the locality of the antecedent and (iii) the type of features involved, aiming at identifying the conditions that affect production. Furthermore, by looking at the developmental pattern, we aim to establish a correlation between length of stay and L2 development. The paper is organised as follows: Section 2 presents agreement phenomena in Greek and Slavic. Section 3 reviews previous studies into agreement phenomena. Sections 4 and 5 present the research hypotheses and the results of the study, while the paper concludes with the discussion of the results in light of the theories presented.

2 Agreement morphology in the languages of the study

As an operation of narrow syntax, AGREE expresses a relation between sets of features (e.g. phi-features which are uninterpretable on T/v -the probe- but interpretable on N- the goal) observing minimality (Chomsky 2001) and is universally available, while there are cross-linguistic differences in terms of spell-out properties of agreement features. Morphological agreement, a post-syntactic (PF), language specific process applies on syntactic objects (Sigurdsson 2006) and is attested in various domains according to the repertoire of the language: it may be the PF realisation of an AGREE relation between a verb and its subject or a verb with the subject and a predicative adjective but also of a dependency, which may be strictly local (such as agreement spreading within a DP) or one that has referential properties (between a pronoun and its antecedent). In Greek morphological agreement is found in all the aforementioned domains: in the verbal (TP) domain between T and the subject DP, in the nominal (DP) domain among all the elements in the DP, namely determiners, adjectives and the head.
noun, and in long-distance dependencies between the DP-antecedent and an object/possessive clitic.

In each agreement relation different features may be involved. In Greek, a grammatical gender language with a tripartite distinction, case (NOM/ACC/GEN), gender (MASC/FEM/NEU) and number features are morphologically realised on nouns, adjectives and determiners, with the addition of person distinctions (1st, 2nd, 3rd) on clitics. On the other hand, subject agreement involves person and number features only.

The Slavic L1s of our subjects are also languages that have a grammatical three-gender system. In Russian, in particular, masculine and feminine nouns amount to 87% of the total number of nouns, while loans and new words are of neuter gender (Comrie et al. 1996, Corbett 1991). All of the above features also take part in agreement relations, albeit differently in some cases. For instance, the subject agreement suffix in the Russian Past system agrees with the subject in gender as well. Furthermore, the possessive form, which is not a clitic pronoun but an XP in a specifier position (Rappaport 1998), agrees with the host noun in all relevant features (except for gender when in plural) and only in person with the antecedent. In contrast, Greek possessive clitics agree only with the possessor. Examples of the agreement relations relevant for our study are in (1-5). Examples (a) are Greek and examples (b) are Russian.

(1a) To koritsi pezi / epekse
    the-NOM.NEU.SG girl-NOM.NEU.SG play-PRE.3S / play-PAST.3S
(1b) Djevuska igraket / igrala
    girl-NOM.FEM.SG play-PRE.3S / play-PAST.3S.FEM
(2a) Aftos o omorfos kipos
    this-NOM.MASC.SG the-NOM.MASC.SG beautiful-NOM.MASC.SG garden-NOM.MASC.SG
(2b) eta sad ziljonich
    this-NOM.MASC.SG garden-NOM.MASC.SG beautiful-NOM.MASC.SG
(3a) I Maria ine efxaristimeni
    the-NOM.FEM.SG Maria-NOM.FEM.SG be-PRES.3S pleased-NOM.FEM.SG
(3b) Marija velikaja
    Marija-NOM.FEM.SG pleased-NOM.FEM.SG
(4a) Ton ida (ton | Petro)
    cl-ACC.MASC.3S see-PAST.1S (the-ACC.MASC.SG Petro-ACC.MASC.SG)
(4b) jia jivo vitzel (*Piotra)
    pron-NOM.1S pron-ACC.MASC.SG see-PAST.1S.MASC (Piotra-ACC.MASC.SG)

Locality is also a key factor in differentiating dependencies. Thus, nominal concord apart, all other dependencies may involve an antecedent that is extra-clausal or and discourse salient.

It should be noted at this point that Russian lacks definite determiners and allows object drop. Kowaluk (2001) argues that object deletion in Slavic languages is related to the absence of a D system and its effect on the spell-out constraints on formal features found in English, Romance languages and Greek.
(5a) Thelis to vivlio su?
    want-PRES.2S the-ACC.NEU.SG book-ACC.NEU.SG cl GEN.2S

(5b) ti hotsis tsibju knigu?
    you-NOM.2S want-PRES.2S poss-ACC.FEM.2S book-ACC.FEM.SG

3. Previous studies on agreement phenomena

There is a fair amount of studies into different types of agreement concord in various languages. In particular, studies into the acquisition of agreement in languages with rich morphology report degrees of variability in the suppliance of the target morphological form. In the case of subject–verb agreement in L2 French and German, Prévost & White (2000) found morphological variability in the production of finite and non-finite forms but low frequencies of agreement mismatches in cases were finite forms were actually supplied. Similarly, longitudinal data from an advanced Anglophone learner of L2 French in Herschensohn’s study (to appear) contain almost target-like morphological inflection. Instances of agreement mismatch (use of 3S instead of 3P) are argued to stem from problems mapping abstract features onto the PF form and are not taken to indicate underlying deficits in knowing the properties of the French TP (e.g. target adverb placement, negation and question formation). Both studies account for instances of non-target performance in terms of learning the overt morphology in line with the Missing Surface Inflection Hypothesis (Haznedar & Schwartz 1997, Lardiere 1998, 2000), which postulates, following the Full Transfer/Full Access theory of Schwartz & Sprouse (1994, 1996), learnability of abstract syntactic features since these are available by UG.

Turning to agreement within the DP domain, Franceschina (2001) argued for impairment in the narrow syntax, reflected in agreement mismatch. Her argument, following the FFFH of Hawkins & Chan (1997), was based on the significant differences in the production of gender concord found between learners of a [−] gender and a [+] gender language, despite target-like performance by both groups in a comprehension task. On the other hand, evidence for knowledge of abstract syntactic properties in terms of appropriate adjective placement despite agreement mismatches within the DP was found in Bruhn de Garavito (2003), Bruhn de Garavito & White (2000), Gess & Herschensohn (2001) and White et al. (2004). In all these studies there was target performance on word order, while agreement mismatches involving gender and number were made even by populations in whose L1 gender is lexicalised (e.g. French L1/ Spanish L2). A further characteristic of agreement mismatches within the DP reported in the study of Bruhn de Garavito and White (2000) for L2 Spanish is the increased rate of errors on the adjective in Adj+N combinations in comparison to determiners (D+N). Tsimpli’s study on L2 Greek (2003b) reports similar findings, while there were also significant differences between the definite and the indefinite article, the former inducing more mismatches.

Agreement mismatches within native populations have also been the focus of a considerable number of processing studies. Bock & Miller (1991) and Viggliocco & Nicol (1998) report errors in subject-verb agreement in English in case of number

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5 Note that in Tsimpli’s study the average rate of errors within an indefinite (adjective) DP increased due to the dramatically high inaccurate performance of 2 out of the 6 subjects. Individual variation, however, is a characteristic property of adult L2A.
mismatch between the head DP and an embedded DP in the same domain (e.g. in a prepositional phrase as the N ‘parco’ in example (6)). Similar number errors were reported by Hartsuiker et al. (2003) for L1 Dutch and German. As regards agreement between a subject DP and a predicative adjective, Viggliocco & Franck (2001) report significant mismatches in the production of gender and number agreement when there was a noun embedded in the DP, differing in gender or number from the head noun, as example (6) shows.

(6) *La ragazza nel parco è rosso
the-FEM girl-FEM in the-MASC park-MASC is red-MASC
(example taken from Viggliocco & Franck 2001:371)

These findings suggest that i) proximity may interfere with morphological production in both native and non-native speakers and ii) distance between two agreeing elements may increase the processing load and the occurrence of agreement errors.

Turning to the features that seem to cause more problems, gender has been reported as the most problematic in all of the above studies. Assuming that gender lacks semantic content, contrary to person and number, its problematic status in L2 acquisition is to be expected. Although grammatical gender sometimes coincides with natural gender (for instance in the case of humans\textsuperscript{6}), it is an inherent classificatory feature of nouns (Carroll 1989, Corbett 1991), which arbitrarily classifies them into two (in the case of Romance languages) or three classes (in Greek and Slavic). It has been assumed that gender has a special status in the repertoire of features, in that it is an intrinsic feature on nouns but it is uninterpretable due to its dissociation from natural gender (Tsimpli 2004, cf. Franceschina 2001). As such, it is assumed to be problematic in L2 acquisition with respect to assigning the appropriate gender features on nouns and with respect to gender concord. Morphophonological (noun endings) and syntactic cues (gender marking on agreeing determiners, adjectives and pronouns) are exploited in L1 acquisition in assigning nouns to a specific gender class. If adult L2 morphology develops independently from narrow syntax, the relevant cues may not be appropriately used by the L2 learner. A study into Italian L2 (Oliphant 1998) reports decreased sensitivity to morphological cues especially in the absence of complementary syntactic cues, and resort to semantic cues and other strategies, such as analogy-based phonological properties or salience of ending. In addition, Sabourin et al. (2006) report transfer effects when both the native and target language have grammatical gender systems (Dutch L1/ German L2).

In all, findings seem to suggest that morphological agreement is subject to and conditioned by the domain in which it is realised, the locality of the agreement relation and the features involved. Although previous L2 studies have focused on L1 effects of parametric choices on agreement processes as well as the types of features which appear to be most problematic, none has investigated agreement in non-local dependencies (involving pronominal elements). Furthermore, processing studies that investigate the effect of intervening material on agreement, thus raising the locality issue, use data from on-line judgment tasks or manipulated production. Therefore, it might be informative to explore learner behaviour in all types of dependencies (local vs. non-local, verbal vs. non-verbal).

\textsuperscript{6} This is not always the case, though. In Greek, words referring to children, such as to agori ‘the child’, to koritsi ‘the girl’, to pedi ‘the child’ are of neuter gender.
nominal) in off-line production in order to see whether difficulties arise in the absence of time constraints.

The research reported in this paper takes account of all the above conditions except for L1 effects. Specifically, the analysed spoken data come from speakers of grammatical gender languages with similar patterns of phi-feature agreement as Greek. Thus, the L1-L2 similarities in the relevant properties allow us to exclude the factor of learnability problems posed by uninterpretable features.

4. Research questions

We assume that L2A is UG-based and as such the operation Agree is expected to be available in second language acquisition. Thus, learners should show evidence of agreement in various types of dependencies where this is required. Assuming further (i) that morphological agreement is the PF (post-syntactic) realisation of syntactic outputs and as such it is subject to constraints extraneous to properties of the narrow syntax, and (ii) that in adult L2A the mapping between morphology and syntax is problematic due to the independent development of each component, we predict variation in the L2 output, subject to locality constraints and the types of features/feature bundles to be spelled-out, which may inhibit retrieval of the target form. In light of the above and the findings of previous studies, the research addresses the following specific questions:

a. Is variation affected by the domain in which agreement is required? (e.g. DP or TP?)

b. Is locality a crucial factor in variation? More specifically, does distance from the head noun (within the DP) or the controller, i.e. the antecedent, (in long-distance dependencies) affect morphological agreement?

c. Is there an interaction between agreement mismatches and the type of features involved?

d. Is there effect of exposure to L2 on the production of morphological agreement?

5. The study

The data were collected in the period between 2002 and 2004 and come from oral interviews with 39 adult Slavic (Russian and Serbian) speakers of Greek, all immigrants and learning Greek in a naturalistic setting. To investigate effects of L2 exposure on development, we divided the participants into three groups according to their length of stay in Greece (see Table 1).

<table>
<thead>
<tr>
<th>Group</th>
<th>Length of stay</th>
<th>Age at time of test</th>
<th>MLU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1(n=13)</td>
<td>2.7 (SD: .70)</td>
<td>37 (SD: 10.1)</td>
<td>4.25 (SD: 1.18)</td>
</tr>
<tr>
<td>Group 2 (n=13)</td>
<td>6.9 (SD: .96)</td>
<td>39.5 (SD: 9.36)</td>
<td>5.43 (SD: 1.71)</td>
</tr>
<tr>
<td>Group 3 (n=13)</td>
<td>13.6 (SD: 5.20)</td>
<td>46 (SD: 9.35)</td>
<td>5.97 (SD: 1.71)</td>
</tr>
</tbody>
</table>

The interviews consisted of four parts: i) natural conversation and biographical details relevant to the subject’s exposure to the L2, ii) story-telling through the description of eight sets of pictures, iii) two instruction-giving tasks and iv) general discussion on every-day life topics. The story-telling and the instruction-giving tasks
created contexts for the production of definite DPs, 3rd person clitics and subject-verb agreement while the first part of the interview mostly generated 1st and 2nd person clitics and subject-verb agreement.

5.1. Results

According to the research questions presented in Section 4, we examined instances of agreement mismatches in terms of i) the domain in which agreement operations apply (i.e. agreement spreading in DP, subject-verb agreement (+/- predicative adjective), agreement between a clitic and its antecedent), ii) locality (i.e. distance within the DP, distance of the antecedent from the clitic/subject affix) and iii) the features involved (i.e. gender, number, person, case). Results are presented in percentages (proportion of inaccurate responses over total responses) while non-parametric tests were used for the statistical analysis.

A. Agreement mismatches according to types of dependencies: Table 2 presents percentages of inaccurate performance in the different domains examined.

<table>
<thead>
<tr>
<th>Agreement domains</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject-Verb</td>
<td>4.5</td>
<td>3</td>
<td>2.1</td>
</tr>
<tr>
<td>Within DP</td>
<td>19.3</td>
<td>14.5</td>
<td>11.1</td>
</tr>
<tr>
<td>Subject-pred. adjective</td>
<td>19</td>
<td>25.6</td>
<td>23.1</td>
</tr>
<tr>
<td>Acc. clitic - DP antecedent</td>
<td>26</td>
<td>25.3</td>
<td>19.3</td>
</tr>
<tr>
<td>Poss. clitic -DP antecedent</td>
<td>58.3</td>
<td>35.9</td>
<td>33.3</td>
</tr>
</tbody>
</table>

As can be seen from the table, the incidence of agreement errors in the TP domain is extremely low, replicating results from other studies (Herschensohn to appear). Furthermore, a developmental pattern is found since there are significant differences across groups (Groups 1, 2: $\chi^2 = 8.50$, p< .01; Groups 2, 3: $\chi^2 = 4.61$, p<.05).

In comparison with the rate of mismatches in the TP domain, the rate of agreement errors within the DP domain is considerably higher in group 1 while it decreases by 8% in Group 3, revealing a significant effect of exposure to L2 on performance. (Groups 1, 2: $\chi^2 = 10.52$, p< .01; Groups 2, 3: $\chi^2 = 37.56$, p<.01). As for agreement between a DP and a predicative adjective, subjects in Group 1 produce the same rate of agreement mismatches as in the DP dependency, while the other two groups show an increased rate of mismatches, which, surprisingly, exceeds the percentage of mismatches produced by group 1, with the least exposure to Greek.

Turning to non-local dependencies involving clitics and their antecedents, there is a considerably higher rate of agreement errors in the possessive clitic-DP antecedent dependency. This could be due to the fact that possessive clitics are embedded within a DP, hence morphophonologically influenced by the features of the head noun. In fact, in 60% of errors in Group 2 and over 90% in Group 3, the possessive clitic agrees in gender or/and number with the host DP instead of the antecedent. For instance, the possessive clitic in example 7 should be the feminine form *tis* – agreeing with the possessor – but is instead masculine as is the gender of the host noun.
Still, there is a developmental pattern as the performance of groups 2 and 3 is significantly better than that of group 1 (Groups 1, 2: \( \chi^2 = 6.24, p< .01 \), Groups 1, 3: \( \chi^2 = 6.44, p< .01 \)). The problems caused by this type of dependency are also shown clearly in Figure 1 below.

Figure 1. Agreement errors in the domains examined

Note, at this point, that the rate of mismatches might be higher if more determiners and object clitics were produced. Preliminary results (Dimitrakopoulou et al. 2004) from the production of D elements (determiners and clitics) taken from the same data revealed a high omission rate of these elements (see Table 3).

Table 3: Omission of D elements in L1 Slavic / L2 Greek (from Dimitrakopoulou et al.’s study)

<table>
<thead>
<tr>
<th></th>
<th>Definite article</th>
<th>3rd person clitics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=10/1-4 years)</td>
<td>38.9%</td>
<td>51%</td>
</tr>
<tr>
<td>Group 2 (n=10/10+ years)</td>
<td>13.4%</td>
<td>26.4%</td>
</tr>
</tbody>
</table>

B. Effect of locality on performance: In order to test possible effects of locality on the production of inaccurate forms, we examined incorrect performance according to the distance between the agreeing members of each dependency. The number of incorrect tokens as well as percentages of non-target performance are presented in Tables 4 - 9). With regard to the DP domain, agreement mismatches were broken down according to the distance between the determiner and the head (see Table 4). We further compared these to errors on the head noun.
Generally, errors were mostly related to determiners and were not affected by distance (i.e. the number of elements in the DP) in the way we expected. In fact, it seems as if accurate feature copying on the elements within the DP is facilitated when there is more than one member in the dependency, since most occurrences of feature mismatch involved one element (determiner or adjective) and the head noun. Chi-square tests on the distribution of errors according to distance from the head noun reveal significantly improved performance in determiner-adjective-noun combinations across groups (Group 1: $\chi^2_{(1,215)} = 106.96, p < .01$; Group 2: $\chi^2_{(1,273)} = 112.15, p < .01$; Group 3: $\chi^2_{(1,196)} = 125.12, p < .01$). Turning to errors on the head noun, these are significantly fewer, showing that inaccuracy in the case of determiners and adjectives may not have resulted from incorrect specification of the noun.

Our results concerning the difference between determiners and adjectives contrast those reported in the studies of Bruhn de Garavito & White (2000) and Tsimpli (2003b), as in our study errors on the determiner are significantly more than on the adjective across groups (Group 1: $\chi^2_{(1,183)} = 3.67, p = .055$; Group 2: $\chi^2_{(1,197)} = 6.54, p < .05$; Group 3: $\chi^2_{(1,76)} = 53.15, p < .01$). It should be pointed out, though, that in Bruhn de Garavito & White’s study mismatches on predicative adjectives were calculated together with those on attributive adjectives.

In considering predicative adjectives (see Table 5 below), we found that overt subjects (example (8a)) induced significantly more agreement errors on the adjective than null subjects (example (8b)). The effect of an overt subject on the production of agreement mismatches holds for all groups, as chi-square tests revealed (Group 1: $\chi^2_{(1,27)} = 5.14, p < .05$; Group 2: $\chi^2_{(1,43)} = 11.00, p < .01$; Group 3: $\chi^2_{(1,23)} = 4.16, p < .05$). It may be the case that a pro subject improves predicate agreement due to the reduced number of agreeing elements that need to be spelled-out.

(8a) *Ta pragmata diko mou ine (D., 3 ys)  
the-NEU.PL mine-NEU.SG poss-1P are

(8b) *Theli afto to pragma ala nomizo den itan toso nostima (R., 8 ys)  
want-3S this-NEU.SG the-NEU.SG thing-NEU.SG but think-1S not was so tasty-NEU.*PL

Turning to the rest of the dependencies (subject-verb and object/possessive clitic -DP antecedent), we examined the distribution of agreement errors in three contexts: a) when the antecedent was in the same clause (0-D), b) when the antecedent was one-
clause distant (1-D) and c) when the antecedent was further away (LD). Examples of mismatches on object clitics occurring in each condition are given in (9)-(11).

(9) *I koritsi ithele [na to pari xartatos apo ton agor]. (0-D) (R., 6 ys) the girl wanted na.SUBJ cl.*NEU.SG take-3S kite-MASC.SG from the boy

(10) *Kleftis bike sto taksi [ke astinomos den to prolaive. (1-D) (Z., 10 ys) thief-MASC.SG got-3S into the taxi and policeman not cl.*NEU.3S catch up

(11) *De m’ aresi [otan ta skupidia petane] [opu borun], [den tus niazi], [den to petane sto skupidokivot]. (LD) (Z., 10 ys) not cl-1S like-3S when the*NEU.PL rubbish*NEU.PL throw-3P where can-3P not care-3P not cl-NEU.*SG throw into the trashcan.

Table 6 presents errors in the TP domain. Here, zero distance (0-D) means that the clause had an overt subject. As can be seen, most agreement mismatches occur in null-subject contexts. A comparison between dependencies involving an overt subject (0-D) and a null subject (1-D, LD) revealed a significant effect of the presence of the subject on accuracy for group 1 ($\chi^2_{(1,62)} = 7.86, p < .01$) and group 3 ($\chi^2_{(1,106)} = 7.86, p < .01$) while a similar pattern emerged in group 2, as well. A further comparison within the null-subject context between the (1-D) and the (LD) condition showed that longer distance between the subject and the verb induces more agreement errors for group 1 ($\chi^2_{(1,68)} = 11.53$, $p < .01$) and group 2 ($\chi^2_{(1,53)} = 111.08$, $p < .01$). The fact that this rate of mismatches decreases in group 3 shows the effect of L2 exposure on performance.

Table 6. Distribution of subject/verb agreement mismatches in overt vs. null subject contexts

<table>
<thead>
<tr>
<th></th>
<th>Overt subject (0-D)</th>
<th>Null subject</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>39/107 (36.5%)</td>
<td>20/68 (29.4%)</td>
</tr>
<tr>
<td>Group 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>35/87 (40.2%)</td>
<td>14/52 (26.9%)</td>
</tr>
<tr>
<td>Group 3</td>
<td>18/63 (28.6%)</td>
<td>20/45 (44.4%)</td>
</tr>
</tbody>
</table>

Turning to object clitic dependencies (see Table 7), zero-distance mismatches involved clitic doubling and clitic left dislocation constructions. The comparison between dependencies in which the antecedent was in the same clause (ex. (9)) and ones with the antecedent outside the clause containing the clitic (ex. (10) and (11)) shows that agreement mismatches are significantly fewer when the antecedent is in the same clause as the clitic (Group 1: $\chi^2_{(1,38)} = 16.02$, $p < .01$; Group 2: $\chi^2_{(1,39)} = 19.60$, $p < .01$; Group 3: $\chi^2_{(1,46)} = 20.45$, $p < .01$). In the case of the antecedent being clause-external, distance does not seem to play a significant role since mismatches were evenly distributed in the (1-D) and (LD) condition among groups 1 and 2. As for group 3, more mismatches were produced in the (1-D) condition.
Table 7. Distribution of agreement mismatches between the object clitic and DP antecedent

<table>
<thead>
<tr>
<th></th>
<th>Clause-internal antecedent (0-D)</th>
<th>Antecedent external to the clause</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-D</td>
<td>LD</td>
</tr>
<tr>
<td>Group 1</td>
<td>7/39 (17.9%)</td>
<td>14/32 (43.7%)</td>
</tr>
<tr>
<td>Group 2</td>
<td>6/40 (15%)</td>
<td>15/34 (44.1%)</td>
</tr>
<tr>
<td>Group 3</td>
<td>8/47 (17%)</td>
<td>24/39 (61.5%)</td>
</tr>
</tbody>
</table>

In the case of possessive clitics, the rate of agreement mismatches was much higher when the antecedent was clause external (see Table 8). Chi-square tests revealed a significant effect of locality in group 1 ($\chi^2(1,35)=20.83$, $p=0.000$) and close to significant in group 2 ($\chi^2(1,23)=3.52$, $p=0.061$) and group 3 ($\chi^2(1,15)=3.27$, $p=0.071$). As for the distribution of agreement errors within the clause external condition (i.e., between the (1-D) and the (LD) condition), results reveal similar patterns to those observed in the object clitic dependencies, namely, even distribution between the (1-D) and (LD) condition for groups 1 and 2 and higher rates in the (1-D) condition for group 3.

Table 8. Distribution of agreement mismatches between the possessive clitic and DP antecedent

<table>
<thead>
<tr>
<th></th>
<th>Clause-internal antecedent (0-D)</th>
<th>Antecedent external to the clause</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-D</td>
<td>L-D</td>
</tr>
<tr>
<td>Group 1</td>
<td>4/35 (11.4%)</td>
<td>14/31 (45.2%)</td>
</tr>
<tr>
<td>Group 2</td>
<td>7/23 (30.4%)</td>
<td>7/16 (43.8%)</td>
</tr>
<tr>
<td>Group 3</td>
<td>4/15 (26.7%)</td>
<td>7/11 (63.6%)</td>
</tr>
</tbody>
</table>

In all, it seems that long-distance dependencies are much more problematic than local dependencies. Effects of locality can also be seen in Figure 2, which presents the total number of agreement mismatches found in the three types of pronominal dependencies (i.e. subject-verb agreement, object clitics and possessive clitics).

Figure 2. Mismatches in local and long-distance pronominal dependencies

C. Effect of features on performance: Table 9 shows the total distribution of errors according to features, excluding subject-verb agreement since inaccurate performance in this domain is extremely low. Gender seems to cause the most learnability problems.
even for group 3 (with the longest exposure to Greek). On the other hand, person and case are the least problematic in production.

Table 9. Distribution of agreement errors according to features

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Person</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>57.4% (191)</td>
<td>30.6% (102)</td>
<td>8.7% (9)</td>
</tr>
<tr>
<td>Group 2</td>
<td>70.8% (252)</td>
<td>23.6% (84)</td>
<td>2.8% (10)</td>
</tr>
<tr>
<td>Group 3</td>
<td>73.9% (215)</td>
<td>21.3% (62)</td>
<td>1% (3)</td>
</tr>
</tbody>
</table>

Tables 10-13 present feature mismatches (number of incorrect tokens and percentages) in each type of dependency separately while some representative examples are given in (12)-(16).

Table 10. Feature mismatches within the DP

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>151 (66.8%)</td>
<td>9 (4%)</td>
</tr>
<tr>
<td>Group 2</td>
<td>184 (74%)</td>
<td>10 (6%)</td>
</tr>
<tr>
<td>Group 3</td>
<td>154 (75%)</td>
<td>10 (5%)</td>
</tr>
</tbody>
</table>

(12) ktipai me to podi to agori *ton koritsi (T., 8 ys.)
hit-3S with the foot the boy the-MASC.SG girl-FEM.SG

(13) me *to kosmimata efige o kleftis (Z., 11 ys.)
with the-NEU.*SG jewels-NEU.PL ran the thief

Table 11. Feature mismatches between the subject and a predicative adjective

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>12 (42.9%)</td>
<td>2 (7.1%)</td>
</tr>
<tr>
<td>Group 2</td>
<td>30 (68.2%)</td>
<td>-</td>
</tr>
<tr>
<td>Group 3</td>
<td>16 (66.7%)</td>
<td>1 (4.2%)</td>
</tr>
</tbody>
</table>

(14) ghefira *anikta ine (E., 11 ys.)
bridge-FEM.SG open-*NEU.*PL is

Table 12. Feature mismatches between the object clitic and DP-antecedent

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>23 (51.5%)</td>
<td>9 (20%)</td>
</tr>
<tr>
<td>Group 2</td>
<td>25 (62.5%)</td>
<td>9 (22.5%)</td>
</tr>
<tr>
<td>Group 3</td>
<td>37 (78.7%)</td>
<td>2 (4.3%)</td>
</tr>
</tbody>
</table>

(15) na *to mathi ligo ti rosiki glosa (K., 6 ys.)
a-subj cl-*NEU.3S learn-3S a bit the Russian language-FEM.SG
Table 13. Feature mismatches between the possessive clitic and DP-antecedent (possessor)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>5 (14.3%)</td>
<td>10 (28.6%)</td>
</tr>
<tr>
<td>Group 2</td>
<td>13 (56.5%)</td>
<td>9 (39.1%)</td>
</tr>
<tr>
<td>Group 3</td>
<td>8 (53.3%)</td>
<td>6 (40%)</td>
</tr>
</tbody>
</table>

(16) mana ke to pedi *tu kanun mathimata (Z., 10 ys.) mother-FEM.SG and the child-NEU.SG tu-NEU.SG do lessons

As can be seen, possessive clitics show a different pattern from object clitics with respect to the hierarchy of difficulty in feature-matching. Specifically, accusative clitics show gender problems whereas possessive clitics show high numbers of errors in number as well. Furthermore, half of the subjects in group 1 wrongly used 1st or 2nd person possessive clitics instead of 3rd person forms. This is probably because the subjects have not acquired the whole clitic paradigm yet so they resort to the forms that are retrieved more easily. On the other hand, the considerably increased inaccuracy attested in groups 2 and 3 may be caused by the proximity of the host head noun, the features of which might influence the choice of the possessive form. Recall from section 3 that agreement mismatches due to interference from a more local noun were reported in many psycholinguistic studies. However, inaccuracy might also be due to L1/L2 difference since possessive forms in Russian agree with the host noun (cf. section 2) in contrast to Greek possessive clitics.

6. General conclusions

Generally, the analysis of the data showed that subject-verb agreement is acquired very early in Greek L2 development, in line with other studies that show low percentages of agreement errors (cf. Bruhn de Garavito 2003, a.o.). A developmental pattern was attested in the nominal domain and in possessive clitic dependencies.

As for the issue of locality, our results suggest that it affects performance in that mismatches occurred mostly when the antecedent was outside the clause that included the agreeing element. In the case of possessive clitics, both locality and embedding (in the domain of a head noun with which they do not agree) seem to influence their morphophonology. The data thus point to a processing difficulty in L2A, which might cause failure to access the correct morphophonological form.

With respect to the role of features in the production of agreement errors, it was found that gender is largely responsible for the problems in the nominal domain. Although gender is part of the participants’ L1s, gender agreement seems to follow two strategies in L2 learners:

a. phonological agreement, namely, phonological harmony (e.g. (17)), amounting to 31% of mismatches, or analogy with frequent phonological combinations of D+N (e.g. (18)), amounting to 51.4%

(17) elinika glosa
greek-NEU.PL.language-FEM.SG

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7 1st and 2nd person possessive clitics in Greek are only specified for person and number.
Agree Relations in L2 Greek

(18) sto tsepî (frequent NEU ending)
    prep+the-**NEU.SG pocket-FEM.SG

b. default use of the (neuter) determiner (13%).

(19) to sighenis
    the-**NEU.SG relative,MASC.PL

Thus, inaccuracy in gender agreement may be due to the phonological bias stemming from the head noun, which in turn affects the retrieval of the target morphophonological form of the agreeing element.

In conclusion, we propose in line with the Missing Surface Inflection Hypothesis, that variability in the production of morphological agreement results from the interaction of non-syntactic variables which get in the way of associating the appropriate morphological form with the abstract feature (or bundle of features). The interaction between length of exposure to the target language and improvement in accuracy points to the conclusion, previously stated by Gess & Herschensohn (2001) and by Lardiere (2005), that surface morphology requires very extensive exposure to L2 and cannot always be taken to reflect a syntactic deficit.

References

Franceschina, F. (2001). Against an L2 morphological deficit as an explanation for the differences between native and non-native grammars. EUROSLA Yearbook 1: 143-158.


