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**Gender agreement in Heritage Language Acquisition:
Evidence from Modern Greek ***

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1. Introduction

Morphology has been found to cause persistent difficulties not only to second language (L2) learners but also to heritage speakers, or early bilinguals who grew up speaking –apart from the community language– an ethnic minority language (‘home language’), in which they have not achieved full proficiency. Different accounts of morphological variability in Second Language Acquisition (SLA) have been proposed in the past, but since the early 2000 some of these accounts have been tested with data from heritage speakers. These studies show that heritage speakers tend to make the same types of errors in the domain of morphology as L2 learners, despite the fact that the former do better in production tasks than the latter (Montrul, in press).

Against this background, the present paper examines morphological variability in the speech of ten heritage speakers of Modern Greek and tests one of the theories that have been proposed for L2 learners: the Morphological Underspecification Hypothesis (McCarthy 2007, 2008). The basic tenets of this hypothesis are that a) variability is not an epiphenomenon observed just in production but also extends to other domains (comprehension and judgments), and b) variability, across the board, is qualitatively similar. The present study extends this hypothesis to investigate gender agreement errors in Greek as a heritage language.

2. Background

2.1 SLA theories of morphological variability and heritage speakers

Inflectional morphology is an area of grammar that causes many difficulties to L2 learners even at very advanced levels of proficiency. But what do these difficulties imply for their interlanguage grammars? Various theories have attempted to interpret morphological variability and trace its source. Some of these theories (e.g. Clahsen, 1988; Meisel, 1991; Hawkins & Chan, 1997) support what has broadly been called the ‘Representational Deficit View’. According to this view, L2 learners make mor-

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phological errors because of their permanent inability to represent L2 features that are not instantiated in their first language (L1). Specifically, some researchers (e.g. Hawkins, 1998; Hawkins & Franceschina, 2004) argue that it is uninterpretable features like agreement that cannot be acquired in L2 grammars while interpretable features like gender, for example, are acquirable. This view traces the problem in maturational constraints. The L2 learners no longer have access to Universal Grammar (UG) past the critical period.

Other theories, such as the Missing Surface Inflection Hypothesis (MSIH) (Prévost & White, 2000) subscribe to the Full Access view of Universal Grammar according to which it is possible for L2 learners to overcome problems with morphology because there is no representational impairment. Morphological variability is a problem restricted to production stemming from communication pressure. In other words, performance underestimates competence (Montrul, 2004).

Various methods have been proposed to investigate the depth of the problem. Some researchers argue that if the morphological problems are not limited to production but extend to other domains (comprehension and judgments), then the problem lies in L2 learners' underlying competence (a representational problem). If not, then perhaps it is superficial (a problem of online access). Another diagnostic is the patterns of errors. If L2 learners cannot represent abstract morphological features, then they are likely to make random rather than systematic errors.

This type of morphological variability in L2 acquisition has been investigated in the area of gender agreement (Fernandez, 1999; Franceschina, 2005; Hawkins & Franceschina, 2004; McCarthy, 2007; for L2 Spanish; Carroll, 1989; Dewaele & Veronique, 2001, for L2 French, Sabourin, Stowe & de Haan, 2006, for L2 Dutch), although the literature is inconclusive regarding task effects (the first diagnostic). Reporting on a study on pronouns and clitics in L2 Spanish, Franceschina (2002), who supports the Representational Deficit View, found that errors extend to both production and comprehension, but she does not report on the type of errors. White et al. (2004), in their study on gender and number in L2 Spanish, found –unexpectedly for the MSIH– that learners made more errors in comprehension than production. Nevertheless, in both tasks they found systematic error patterns in the gender that the learn-

ers used as the default¹ (masculine), overextending it to inappropriate contexts (feminine). In another study on determiners in L2 Spanish, White (2007) found that one of the experimental groups did worse in a judgment task than in a production task. Overall, the evidence for gender morphology seems inconclusive regarding task effects, but a relatively more consistent finding is the use of systematic defaults, although some studies (e.g., Hawkins, 1998) report that the choice of defaults may vary depending on the subject.

A proposal that capitalizes on the systematicity of defaults is McCarthy (2007), who proposed the Morphological Underspecification Hypothesis (MUSH). McCarthy claims that what accounts for morphological variability lies in the way *morphological features* (masculine, feminine, singular, etc.) are represented in L2 grammars. The basic hypothesis put forward by McCarthy is that the morphological errors that L2 learners make as they build their interlanguage grammar are systematic in the sense that learners tend to substitute specified forms for underspecified forms.

MUSH states that

“L2 errors are instances of underspecification, not feature clash.”

Before providing examples of this kind of error, I clarify some important notions to MUSH, starting with underspecification. Underspecification refers to a certain organization of abstract morphological features like [feminine], [masculine], [singular], etc. Unlike other approaches, MUSH, following theoretical approaches in morphology like Distributed Morphology, assumes that abstract morphological features show a certain organization and are characterized by underspecification, i.e. the elimination of unnecessary or redundant information from a representation. This means that the underspecified feature bears less structure. For example, [feminine] bears the feature of feminine, but masculine is underspecified, and in that sense, it is not specified for gender, as in (1).

- | | |
|-------------------------|--------------------|
| (1) a. <i>masculine</i> | b. <i>feminine</i> |
| GENDER | GENDER |
| | |
| | feminine |

¹ The notion of *default* refers to a gender form that L2 learners adopt and systematically overextend to contexts where the form is incongruent.

Underspecified features correspond to *unmarked* features, and the marked or unmarked status of a feature is established through markedness criteria such as indeterminateness and neutralization, among others (McCarthy, 2007: 34-35). In Spanish these two criteria suggest that masculine is the unmarked gender. For example, the plural of *hermano* ‘brother’, *hermanos*, can include both male and female siblings, and in this respect, it is underspecified. Here, a note is in order. Following Distributed Morphology, McCarthy specifically argues that, because nouns carry inherent gender properties and there is high degree of syncretism, affixes or endings do not introduce features but rather realize them. For McCarthy, it is the abstract features that “matter in determining the outcomes of L2 variability, and not the morpho-phonological forms”. Let’s see a concrete example of what constitutes an error of underspecification from the nominal domain.

- | | | |
|-----|-------------|--------------|
| (2) | *el | noche |
| | the-MASC-SG | night-FEM-SG |

In (2) the syntax supplies the feature [feminine] in *noche* but, instead of inserting *la* (the feminine determiner), *el* was inserted in a feminine context. If *el* is underspecified for gender and bears less structure, then this is an error of underspecification.

On the other hand, an error like (3) differs in that it constitutes an error of feature clash.

- | | | |
|-----|------------|--------------|
| (3) | *la | libro |
| | the-FEM-SG | book-MASC-SG |

In (3), if the syntax supplies the feature [masculine], the insertion of a feminine form, which is fully specified for the feature [feminine], results in feature clash.

If L2 errors are errors of underspecification and L2 learners use an underspecified form that becomes the default, then McCarthy expects that the same type of error would surface both in production and comprehension (as well as judgments). She claims that, because the representations are represented asymmetrically, then no task effect would be expected. In other words, the variability may surface across the board,

since “underspecified morphemes should act as defaults across both domains” (McCarthy, 2007: 66).

McCarthy notes that we need to examine whether errors across the board are qualitatively similar, which is a question that has been mostly ignored in the literature (although see White et al. (2004) which reports on the type of errors across production and comprehension). In regard to task effects, another important point is that, although MUSH is often considered a theory that supports a representational deficit view, this is not the case. McCarthy argues (2007: 67) that “there are representational issues behind default morphology” but “these issues are not to be confused with representational deficits: the underspecification of features is a property of native grammars and so cannot be considered a deficit.” (2007: 67, footnote 33)².

In her study on determiners, adjectives and clitics, McCarthy (2007) confirmed her hypotheses by showing that L2 Spanish learners made the same amount of errors in both production and comprehension, and most importantly errors of underspecification were found across the board, where learners overextended masculine forms to feminine contexts.

In sum, McCarthy has called attention to the unidirectionality of patterns of errors found in L2 learners’ performance. Crucially, these patterns of errors are not limited to production but extend also to other domains.

Recently, SLA theories like the ones discussed above (not including MUSH) have also been tested with data from early bilinguals who grew up speaking, apart from the community language (the dominant language), an ethnic minority language restricted to communication at home. It is often the case that these heritage speakers do not acquire full competence in their home language (see e.g., Håkansson, 1995; Polinsky, 2008; Montrul 2006; Montrul et al. 2008). Montrul (2006: 340) notes that “[d]epending on the particular family circumstances, as adults, these bilinguals may be less fluent in the family language than in the community language, either because they have acquired the family language incompletely (incomplete acquisition), or be-

² Although note: if underspecification is a property of native grammars, then what differentiates the errors that a native speaker makes from the errors of an L2-learner? McCarthy does not clarify this point.

cause they may have lost aspects of it at some point in late childhood or early adolescence (L1 attrition before the critical period).”

Various studies have shown advantages for –even low proficiency– heritage speakers over L2 learners (Au et al., 2002 in the domain of phonology or Montrul, 2006 in the domain of unaccusativity and the morphosyntax of the Null Subject Parameter). Nevertheless, other researchers have observed striking similarities between L2 learners and heritage speakers such as cross-linguistic influence (transfer from the dominant language) and non-targetlike ultimate attainment, although they have also identified morphology as one of the areas of grammar that presents problems for both populations.

Studies on the ability of heritage speakers to produce correct morphology (Håkansson, 1995; Au et al., 2002; Montrul et al., 2008; Montrul, in press) have shown that heritage speakers –usually from low to intermediate level– may be similar to L2 learners in some respects. For example, both populations make the same types of errors (using the same defaults): “when errors occur, both L2 learners and heritage speakers overextend the default masculine form to the more specified feminine form” (Montrul et al., 2008: 535). On the other hand, while L2 learners usually do worse in production tasks, the reverse pattern has been observed with heritage speakers, who do better in production than in written recognition tasks due to lack of literacy skills in the heritage language (Montrul et al., 2008). This finding is contrary to SLA theories like MSIH that predict better performance in production, as discussed above.

Another important similarity between heritage speakers and L2 learners is that both these populations receive variable input during acquisition. Factors that contribute to the heterogeneity of early bilinguals are age of onset of bilingualism, the status of the ethnic minority language in the community, its use at home, and schooling in the heritage language. Thus, for every heritage speaker the linguistic outcome might be very different.

These similarities have important theoretical implications for fields like psycholinguistics and second language acquisition. If early bilinguals cannot achieve, as adults, target-like levels in the heritage language, then generative notions such as “the ‘stability’ of linguistic competence acquired *before* a critical period” (Montrul, 2006: 340, emphasis in the original) cannot go unchallenged. Montrul (2006, 2008) has called attention to factors such as the role of input (both in quantitative and qualitative

terms) and age of onset of bilingualism among others as determining the outcome of ultimate attainment in heritage speakers.

In sum, the similarities observed between L2 learners and heritage speakers make the comparison of these populations theoretically compelling and the results of this comparison may inform theories of both bilingualism and second language acquisition.

Before turning to the current study on Greek heritage learners, I present previous findings for L2 Greek. Studies on Greek gender morphology in L2 learners are few. Varlokosta (to appear) investigates gender assignment with novel nouns in L2 learners, namely how L2 learners classify nouns mainly on the basis of morphology, but since assignment errors are not examined in the present study, it will not be discussed. It suffice to say that morphology, specifically the information carried by the noun suffix, plays important role in assigning gender in absence of semantic information.

Tsimpli (2003) reports on a study of six L2 Greek learners' naturalistic production. She examined morphological agreement in definite and indefinite determiners and adjectives and found that participants made more agreement errors with adjectives than determiners. Most importantly, in regard to defaults, participants overextended the neuter with definite determiners but not adjectives (she does not report what the other overextended form was). Because of the nature of the data (naturalistic production), Tsimpli cannot report on task effects. One problem with Tsimpli's study is that we cannot know whether the errors with the determiners and adjectives she examined are actually agreement or assignment errors: All the examples she gives could also be considered assignment errors if the subjects have misclassified the nouns. To tease apart this distinction, the present study employs a Gender Monitoring Task.

Hypotheses and predictions

Against the previous background, the present study reports on the ability of ten Greek heritage speakers to produce correct morphology in two different tasks (production and recognition). I hypothesize that the heritage speakers will behave like L2 learners and, according to MUSH, will perform similarly in both tasks. Furthermore, I predict they will make the same type of errors in both tasks. This goes contra to both Full Access Accounts, since it is expected that they will perform worse in the production task, and to the Representational Deficit View, since it is expected that they will do worse

in both tasks and furthermore no systematic patterns of errors will be observed. It is interesting to see nevertheless whether the patterns that have been observed with adult early bilinguals in other studies (advantages in production and similar error patterns as L2 learners) will have some bearing in this study. Thus, the hypotheses put forward in the present study are the following:

HYPOTHESES

H1. There will be no difference between the two tasks with regard to the performance of heritage speakers. The production problems will also extend to other domains (written recognition).

H2. The same patterns of errors will be observed both in terms of a) the gender affected and b) the insertion of default forms across **both** tasks. In regard to the form of the default, the neuter will be preferred.

2.2 Linguistic background: Gender distinctions in Greek

Gender constitutes an abstract grammatical feature of a noun. In some languages like Greek it is grammaticalized while in others such as Turkish it is not. When grammaticalized, it is also subject to agreement rules between the elements that constitute the DP.

Greek has a three gender system (masculine, feminine and neuter), and nouns (but also determiners, adjectives, pronouns and numerals) are marked with suffixes that denote gender. The gender of nouns denoting humans corresponds, in general, to their sex (for example, *andras* ‘man’ is masculine, *gineka* ‘woman’ is feminine), but in many nouns there is no such one-to-one correspondence (e.g. *koritsi* ‘girl’ is neuter, *agori* ‘boy’ is again neuter). Furthermore, the gender of nouns denoting inanimate entities can vary (e.g. *porta* ‘door’ is feminine, *trapezi* ‘table’ is neuter, *polemos* ‘war’ is masculine).

Greek is a morphologically rich language that has a set of suffixes marking for gender, but at the same time these suffixes mark for case and number (portmanteau morphemes). For example, masculine nouns usually end in *-os*, *-is*, *-as*, feminines in *-a* and *-i*, and neuters in *-o*, *-i* or *-ma* (Holton, Mackridge & Philippaki-Warbuton, 1997). However, there are also feminines and neuters that end in *-os* (see 4 below) or, as we have already seen, the suffix *-i* can mark for both feminine and neuter.

(4) o kipos

the _{MASC-SING-NOM}	garden _{MASC-SING-NOM}
i	proodos
the _{FEM-SING-NOM}	progress _{FEM-SING-NOM}
to	dasos
the _{NEUT-SING-NOM}	forest _{NEUT-SING-NOM}

This asymmetry has led some researchers (e.g., Ralli, 2002) to argue that, since there is *no* one-to-one relationship between suffixes and genders, gender must be an intrinsic property of the noun stem and *not* of the suffixes. This property is stored in the noun entry in the lexicon.

In Table 1, we see some of the most common noun classes in Greek.

Table 1. Most common Greek noun classes.

<i>Masculine</i>	<i>Feminine</i>	<i>Neuter</i>
-os ader f os ‘brother’	-a thalasa ‘sea’	-o vuno ‘mountain’
-is xoreft is ‘dancer’	-i kori ‘daughter’	-i agori ‘boy’
-as pater a s ‘father’		-ma mathi a ‘lesson’

Greek nouns are also divided into two major categories: prototypical and non-prototypical³. Anastasiadi-Symeonidou and Cheila-Markopoulou (2003) use morphological and semantic criteria to categorize Greek nouns, drawing upon evidence for this classification from language change, language acquisition and loan words. The morphological criteria refer to the presence of suffixes representing an inflection class⁴, and the semantic criteria refer to the distinction [\pm anim]. For example, prototypical masculines are those that end in *-s*, and their object of reference is [$+$ anim] (e.g. *daskalos* ‘teacher’), while non-prototypical masculines are those that end *-s*, but their object of reference is [$-$ anim] (e.g. *uranos* ‘sky’).

The other genders are somewhat more complicated: Prototypical feminines are those that a) end in *-a*, *-i*, *-u* and are [$+$ anim] (e.g. *mama* ‘mum’, *kori* ‘daughter’, *alepu* ‘fox’) or b) end in *-a* and *-i* and denote abstract entities (e.g. *omorfia* ‘beauty’,

³ The term ‘prototypical’ is equivalent to the term ‘canonical’ used in other studies.

⁴ An inflection class is a purely morphological feature that defines the declension paradigm of a word.

alagi ‘change’). Non-prototypical feminines include nouns that end in *-s* and may be [-anim] (e.g. *odos* ‘street’) or [+anim] nouns denoting profession (*ipurgos* ‘minister’), among others. Anastasiadi-Symeonidou and Cheila-Markopoulou (2003: 28) state that non-prototypical feminine nouns belong to the educated register⁵.

Prototypical neuters include [-anim] nouns ending in *-o*, *-i* and *-a* (e.g. *vuno* ‘mountain’, *trapezi* ‘table’, *mathima* ‘lesson’) but belong to different inflection classes than feminines that end in *-i* and *-a*. There are also some prototypical neuters of “intermediate degree” (Anastasiadi-Symeonidou & Cheila-Markopoulou, 2003) that are [+anim] and include the youngsters of humans or animals (*pedi* ‘child’, *gati* ‘kitten’), among others. Non-prototypical neuters are those that are a) [-anim] nouns that end in *-n* (e.g. *proion* ‘product’, *simban* ‘universe’) or *-s* (*dasos* ‘forest’, *kreas* ‘meat’) and b) [+anim], ending in *-o* and *-i* that denote animals (e.g. *provato* ‘sheep’, *arni* ‘lamb’). According to Anastasiadi-Symeonidou and Cheila-Markopoulou (2003), category a) represents closed noun classes characterized by relatively low frequency which belong to the educated register.

Summarizing, Anastasiadi-Symeonidou & Cheila-Markopoulou (2003: 47) state that in Greek, there is a core system represented by prototypical inflection classes. In this respect, *-s* is a marker of masculines, *-a* and *-i* are markers of feminines and *-o*, *-i* and *-a* are markers of [-anim] neuters.

Table 2 below summarizes the prototypical and non-prototypical nouns for each gender.

Table 2. Prototypical and Non-Prototypical Greek noun classes (Anastasiadi-Symeonidou & Cheila-Markopoulou, 2003).

	Prototypical		Non-Prototypical	
	+animate	-animate	+animate	-animate
Masculine	-s		-s	
	<i>daskalos</i> ‘teacher’ <i>pateras</i> ‘father’ <i>xoreftis</i> ‘dancer’	—	—	<i>dromos</i> ‘road/street’ <i>anaptiras</i> ‘lighter’ <i>kathreftis</i> ‘mirror’
Feminine	-a, -i, -u	-a, -i	-s	

⁵ Evidence from language change shows that some of the feminines ending in *-os* can a) become masculine and be incorporated into prototypical masculines, b) drop the *-s* and remain feminine, or c) drop the *-s* and become prototypical neuters.

	<i>mama</i> ‘mum’ <i>kori</i> ‘daughter’ <i>alepu</i> ‘fox’	<i>omorfia</i> ‘beauty’ <i>kalosini</i> ‘kindness’	<i>ipurgos</i> ‘minis- ter’	<i>odos</i> ‘street’	
Neuter	-o, -i, -a		-o, -i	-n	-s
	<i>vasilopulo</i> ‘prince’ <i>agori</i> ‘boy’ <i>gati</i> ‘kitten’	<i>vuno</i> ‘mountain’ <i>stafili</i> ‘grape’ <i>kima</i> ‘wave’	<i>provato</i> ‘sheep’ <i>arni</i> ‘lamb’	<i>proion</i> ‘product’	<i>dasos</i> ‘forest’

It has to be noted that although both feminine and neuter nouns are classified into prototypical vs. non-prototypical according to both semantic and morphological criteria, *the (non)prototypicality of masculine nouns lies only on semantic grounds*.

Anastasiadi-Symeonidou & Cheila-Markopoulou (2003) make the important point that the neuter gender maintains a special status as far as the [-anim] nouns are concerned, which are numerically far more common than the [+anim] nouns. They consider neuter as the unmarked gender, because it is:

- a) the most frequent in [-anim] nouns
- b) the marker of metalinguistic use as in (5):

(5) to ‘apo’ ine prothesi
 the_{NEUT} ‘from’ is preposition
 from *is a preposition*

c) the gender that L2 learners use the most when building their interlanguage grammar (here they draw on Tsimpli’s 2003 study discussed in the previous section).

According to Mirambel (1959/78), in a random sample of 600 nouns, 240 are neuter, 195 feminine and 149 masculine. Tsimpli (2003) argues that:

If we suppose that the majority of nouns are neuter, then we can conclude that this is the unmarked form of gender for Greek at a psycholinguistic level. On the other hand, the masculine is considered unmarked in relation to the feminine given that the former can be used generically while the latter cannot. Therefore, a distinction could be made between [+animate] and [-animate], and the neuter could be considered the unmarked form in [-animate] nouns in terms of frequency, and the masculine as the unmarked form for [+animate] in terms of its generic use [*my translation*].

Mastropavlou (2006: 218), summarizing the findings of different studies, states: “In Greek, neuter has been characterized as the *unmarked* gender and has been claimed to bear the default function, a claim that stems from the fact that it is the easiest to acquire by children going through early stages of acquisition (Stephany, 1995) and the most overgeneralized gender in the speech of [...] language impaired subjects (Iosif, 2004)”. In sum, the literature points to the fact that there good reasons to consider neuter as the default in Greek.

In regard to the agreement of other elements (articles, adjectives, demonstratives, and participles, among others) with the nouns inside the DP, they have to agree in gender (and also in case and number). In the present study, agreement in two domains is examined: definite determiners and adjectives in the singular nominative. Definite determiners are presented in Table 3.

Table 3. Definite determiners in Greek (singular nominative)

Masculine	Feminine	Neuter
<i>o</i>	<i>i</i>	<i>to</i>

Adjectives belong to various inflection classes, but here I present only the prototypical –according to Anastasiadi-Symeonidou & Cheila-Markopoulou, 2003– inflectional system:

Table 4. Core inflectional system in Greek adjectives (singular nominative)

Masculine	Feminine	Neuter
-os <i>neos</i> ‘new/young’ <i>omorfos</i> ‘beautiful’	-a or -i <i>nea</i> <i>omorfi</i>	-o <i>neo</i> <i>omorfo</i>

Cheila-Markopoulou (2003) argued that morphological agreement of all elements with the noun is obligatory inside the DP (see 6 below), but sometimes outside the DP it is possible for adjectives to agree with semantic features of the nouns (as in 7):

- (6) a. to erotevmeno koritsi
the_N enamored_N girl_N

- b. *to erotevmeni koritsi
 the_N enamored_F girl_N

- (7) a. to koritsi ine atherapefta erotevmeno/erotevmeni
 the_N girl_N is incurably enamored_N / enamored_F

Nevertheless, this free alternation (enamored_N / enamored_F) is restricted to cases where the noun bears the features [+anim] [+human].

As can be shown in (6) above, the canonical position of the adjective in Greek is prenominal, unlike that in Romance languages. A construction like (8) is ungrammatical:

- (8) *to milo kokino
 the apple red

It has been claimed (Alexiadou and Stavrou, 1997) that, although Greek has rich morphology, there is no noun movement. Following a Distributed Morphology approach, Alexiadou and Stavrou (1997) propose that Noun movement is not necessary in Greek since, as Ralli (2002) has shown, the noun stem has already acquired the gender feature in the lexicon and therefore shows up under the terminal node N' (see Figure 1). Through a process called *Merger*, the Case and Number affix, a result of *Fusion*, is joined with the noun stem under structural adjacency. Agreement with adjectives and determiners, which are unspecified for the ϕ -features (number, gender), is achieved by inserting an Agr node at Adj' and D' respectively. The sum of the features of the Noun (gender) and the fused node F (case, number) is copied on the Agr nodes.

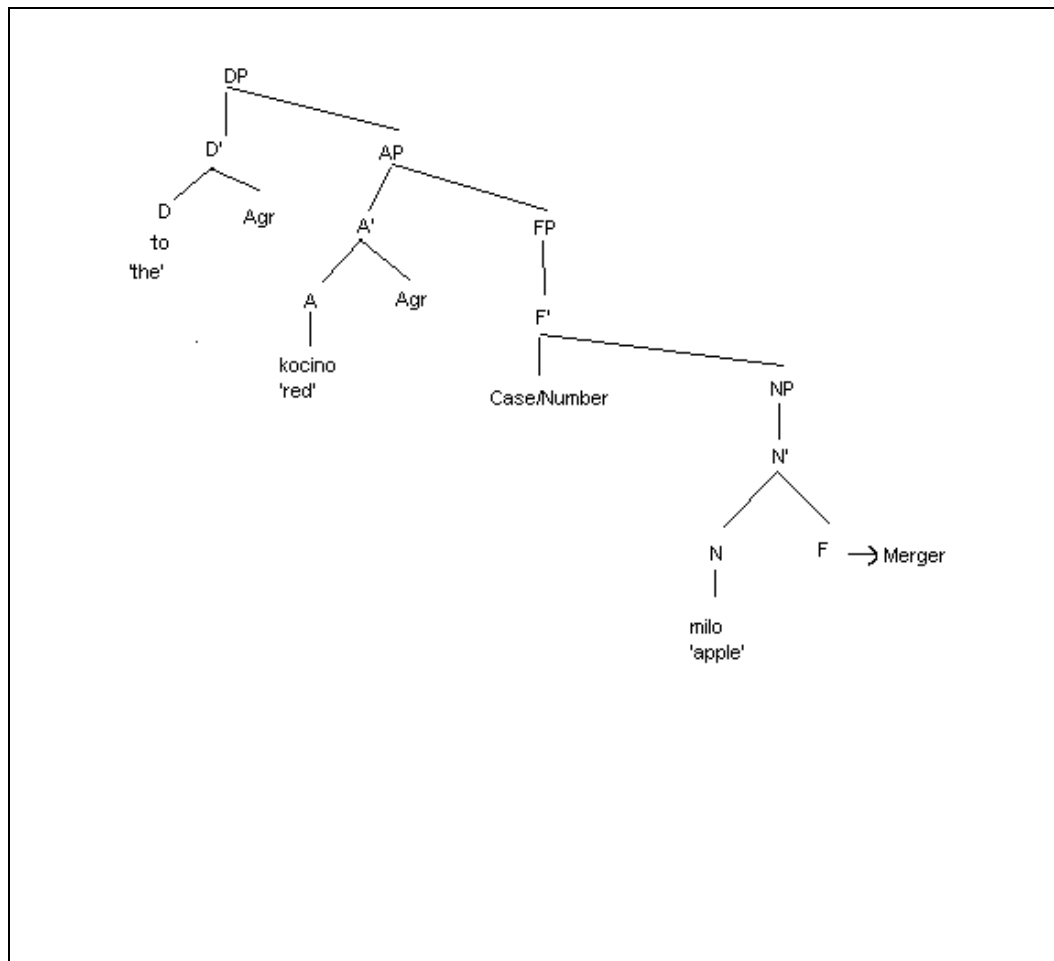


Figure 1. The Greek DP.

3. THE STUDY

3.1 Methodology

In order to examine gender agreement in the grammar of the heritage speakers, three tasks were administered: a) an Oral Elicited Production Task (OEP), b) a Written Gender Recognition Task (WGR) and c) a Written Gender Monitoring Task. All tasks were untimed and were administered in this sequence.

Each task included 60 target items. For all tasks the same nouns were used in order to control for syllable number and stress position. These nouns were drawn from both prototypical and non-prototypical classes of masculine, feminine and neuter nouns. Certain compromises were made in order to meet the testing criteria (e.g. not to have too many items and to have balanced test categories for each gender). Specifically, each task included:

- a) 20 masculine nouns: 10 prototypical (5 ending in **-os** and 5 ending in **-as**, all [+anim]) and 10 non-prototypical (5 ending in **-os** and 5 ending in **-as**, all [-anim]).
- b) 20 feminine nouns: 10 prototypical (5 ending in **-a** and 5 ending in **-i**, all [+anim]) and 10 non-prototypical (10 ending in **-os**, all [-anim]).
- c) 20 neuter nouns: 10 prototypical (5 [-anim] ending in **-o** and 5 [-anim] ending in **-i**) and 10 non-prototypical (5 [-anim] ending in **-n** and 5 [-anim] ending in **-os**).

The non-prototypicality of masculine nouns lies on semantic grounds ([-anim]), the non-prototypicality of feminines lies on both semantic and morphological grounds and the non-prototypicality of the neuters lies on morphological grounds only.

Below I repeat the table of the prototypical nouns of Greek, marking the categories and endings tested in this study in red boxes.

Table 5. The categories that were tested (in boxes).

	Prototypical		Non-Prototypical		
	+animate	-animate	+animate	-animate	
Masculine	-s			-s	
	daskalos ‘teacher’ pateras ‘father’ xoreftis ‘dancer’	—	—	dromos ‘road/street’ anaptiras ‘lighter’ kathreftis ‘mirror’	
Feminine	-a, -i, -u	-a, -i		-s	
	mama ‘mum’ kori ‘daughter’ alepu ‘fox’	omorfia ‘beauty’ kalosini ‘kindness’	ipurgos ‘minister’	odos ‘street’	
Neuter	-o, -i, -a		-o, -i	-n	-s
	vasilopulo ‘prince’ agori ‘boy’ gati ‘kitten’	vuno ‘mountain’ stafilī ‘grape’ kima ‘wave’	provato ‘sheep’ arni ‘lamb’	proion ‘product’	dasos ‘forest’

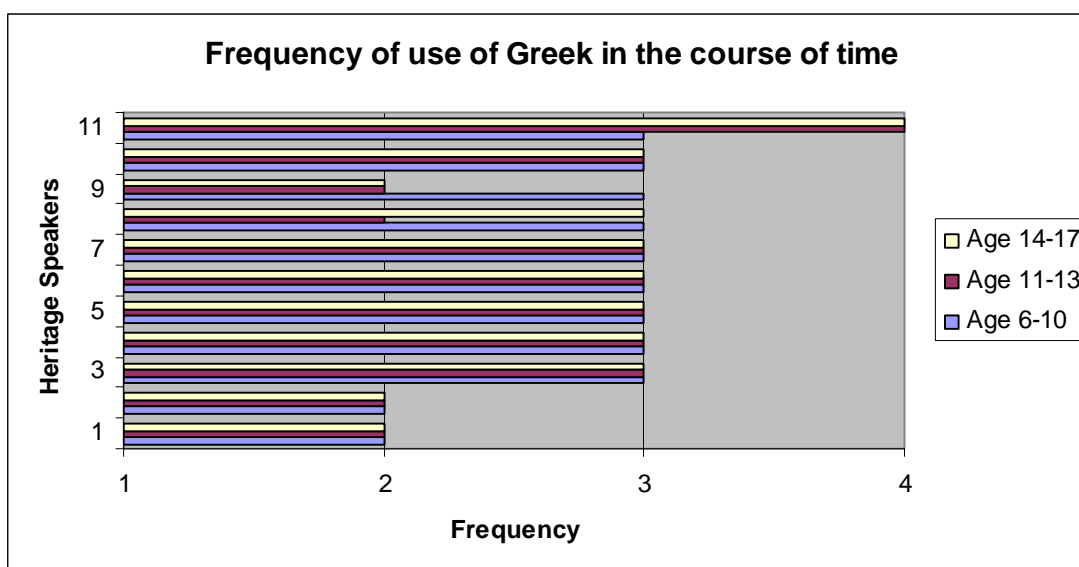
3.2 The participants

In the present study two groups of speakers were tested: 11 heritage speakers and 11 native speakers of Greek. All of them completed the three basic tasks described above.

The native speakers were all born and raised in Greece. Most of them are graduate students and the rest, university professors with a mean length of residence in the US of 5.5 years. The mean age of this group is 30.6 (range 23-43). All were tested in the US, at the university where the study was conducted.

The group of the heritage speakers consists mostly of college students. Apart from the three basic tasks of the study, they completed a written Greek proficiency test and a linguistic background questionnaire.

The linguistic background questionnaire consisted of 22 questions aimed at revealing important facts about participants' bilingual profiles. The mean age of this group was 23.7 (range 18-36). All were born in the US to Greek parents. For 72% of the group, both parents were Greek, for 28%, only one parent was Greek with the other being American. Almost all participants (10 out of 11) stated that they started speaking both Greek and English before the age of 5. Only one speaker stated that she started speaking English at the age of 5-6, after she acquired Greek (Code Number 10 in Figure 2). In regard to their stated frequency of use of Greek between the ages of 6 and 10 (see Figure 2), a majority (81%) used Greek often and the rest (19%) only seldom between 6 and 10 years old. Between 11 and 13, one used Greek always, approximately half (54%) used Greek often, and the rest only seldom. Between 14 and 17, approximately half (54%) used Greek often, and the rest only seldom. Between 14 and 17, one of the speakers used Greek always, more than half (63%) stated that they used Greek often, and the rest seldom.



*Figure 2. Stated frequency of use in heritage speakers
(on the Y-axis: 1 = never, 2 = seldom, 3 = often, 4 = always)*

Most of the heritage speakers also attended Greek Sunday school from 6 to 17 years old. Between the ages of 6 and 10, most of them (81%) attended Greek Sunday school for at least 2 hours per week. Between 11 and 13, the percentage of attendance is lower (54%) and between 14 and 17 even lower (36%). Four of 11 speakers are currently enrolled in Modern Greek language classes (half of them are in their third semester, Code Number 8 and 11, and the rest in their first semester, Code Number 1 and 2 in Figure 2).

The heritage speakers were also asked to provide a self-assessment of their proficiency in Greek on a scale of 5 with defined content for each number on the scale. Approximately half (54%) rated their ability in Greek at 3 (“understand and speak but with some difficulty”) and the rest above 3 (26% at 4 and 20% at 5). Lastly, more than half (63%) consider Greek to be a second language, while the rest (27%) classify it as their first language.

Before the completion of the questionnaire, heritage speakers completed a written proficiency test. This test was created as an L2 placement test by the academic and teaching staff of the Hellenic American Union (HAU) and, to the best of my knowledge, has not been used in previous studies. The test is divided in four sections each representing a proficiency level (Intermediate I, II, III and Advanced) and consists of 60 multiple-choice items in total. The tests were coded in the following way: In each section there were 15 multiple choice questions. If the participants made more than three errors in a certain section, they would qualify for a lower proficiency level. For example, if a participant made more than three errors in the first section (Intermediate I), s/he would be classified as a low proficiency speaker. Following the instructions provided by HAU, no overall scores were calculated.

According to the criteria set in the placement test, one heritage speaker is low-proficiency (Elementary Level, Code Number 2), three heritage speakers are low-to-intermediate (Intermediate I Level), five speakers are Intermediate II Level, one speaker Intermediate III Level and one speaker is Advanced.

Before presenting the results, it should be noted that two heritage speakers were excluded from the general presentation as these outliers are not representative of the sample. The first (Code Number 2 in Figure 2) is of very low proficiency, had poor knowledge of vocabulary (he knew only 45% of the target test items at the time as measured by the Gender Monitoring Task), and 20% of his production/recognition

had to be excluded. Nevertheless, a detailed analysis of his data is provided in the end of this paper (see Appendix). The other outlier (Code Number 10) is a sequential bilingual (she learned English after 5) and did not demonstrate any variability.

3.3 Method in analyzing variability and establishing knowledge of gender (Written Gender Monitoring Task)

In principle, two types of errors are possible in L2 learners: a) errors of assignment, and b) errors of agreement. The first type of error (errors of assignment) is not exactly an error from the perspective of the learner. The learner has incorrectly (i.e. under the native grammar view) encoded the gender of a noun. The learner thinks that a feminine noun (e.g. *proodos* ‘progress’) is masculine. These errors are not examined in this study, although they were coded for different properties, as they do not have to do with the mechanism of agreement proper, but with vocabulary learning.

The second type of error (agreement errors) point to the fact that, although the learner knows the gender of the noun, s/he incorrectly produces errors that affect the agreeing elements (determiners or adjectives or both). The learner knows that a noun is feminine but s/he produces, for instance, a masculine or a neuter determiner.

McCarthy (2007: 112) makes the point that “many –if not most– of the previous studies of the acquisition of gender agreement in Spanish have not attempted to distinguish between these two types of errors”, although she admits that White et al. (2004) have recognized the problem and tried to cope with it by introducing a vocabulary test in which learners provided the meaning and the gender of the target items.

In this study, a similar task (Written Gender Monitoring Task) was used in order to establish knowledge of gender and word meaning. The subjects were asked to provide the gender and the meaning of each noun that was targeted. Specifically, they were asked to circle the correct gender and to provide the meaning in English as in (9):

(9)		Meaning
Masculine / Feminine / Neuter	δάσκαλος	_____
Masculine / Feminine / Neuter	daskalos	_____
Masculine / Feminine / Neuter	teacher	_____

This was done in an effort to control for the knowledge of gender and word meaning, although this is not unproblematic, as the heritage speakers were asked to give the morphological gender of each noun, but it is speculated that in a few cases this was not the case and perhaps they were driven by semantic criteria in their choices.

As can be seen in Tables 6 and 7, the heritage speakers know the meaning and gender of prototypical items, but the opposite holds true for the non-prototypical items (except for the non-prototypical masculines). In Table 6, we can see the percentage of correct identification of word meaning. In Table 7, we can see the percentage of correct identification of gender of target items. The low percentages of accuracy in non-prototypical items, with the exception of non-prototypical masculines, is not surprising as the non-prototypical feminines and neuters belong to relatively closed classes of nouns.

Table 6. Knowledge of meaning of target-items by gender and prototypicality (%). The percentages represent accuracy in heritage speakers' data.

(n = 9)	Masculine		Feminine		Neuter	
	% (SD)	% (SD)	% (SD)	% (SD)	% (SD)	% (SD)
	Prot (n=10)	Non-Prot (n=10)	Prot (n=10)	Non-Prot (n=10)	Prot (n=10)	Non-Prot (n=10)
	98 (4.4)	97 (5)	99 (3.3)	46 (27)	99 (3.3)	46 (22.9)

Table 7. Knowledge of gender of target items by gender and prototypicality (%). The percentages represent accuracy in the heritage speakers' data.

(n = 9)	Masculine		Feminine		Neuter	
	% (SD)	% (SD)	% (SD)	% (SD)	% (SD)	% (SD)
	Prot (n=10)	Non-Prot (n=10)	Prot (n=10)	Non-Prot (n=10)	Prot (n=10)	Non-Prot (n=10)
	96.7 (10)	100 (0)	94.4 (8.8)	23.3 (35.7)	100 (0)	63.3 (19.4)

As the results show, the heritage speakers by and large do not know the non-prototypical feminine and neuter items. Based on this finding, only the results for the prototypical items are analyzed in the Oral Elicited Production Task and the Written Gender Recognition Task. If the heritage speakers do not know the meaning (especially in a language where the gender is determined lexically), we cannot conclude anything about their ability to produce gender agreement by taking into account items that they do not know.

Nevertheless, it is interesting to note that, in cases of incorrect assignment, the categories affected the most are the non-prototypical feminines and neuters. As Table below shows, the heritage speakers assigned mostly masculine gender to non-prototypical feminines and neuters. This is not surprising if the suffixes of these categories are taken into consideration: All of the non-prototypical feminines and half of the non-prototypical neuters that were tested end in *-s*, a typical marker of masculine.

Table. Assignment errors by gender and prototypicality. The figures represent the percentage of incorrect assignment.

	Masculine			
	Prot		Non-Prot	
Assignment Errors % (SD)	1.1 (3.3)		0 (0)	
Assigned Gender	Fem	Neut	Fem	Neut
% (SD)	0	1.1 (3.3)	0 (0)	0 (0)
	Feminine			
	Prot		Non-Prot	
Assignment Errors % (SD)	5.6 (8.8)		68.9 (39.8)	
Assigned Gender	Masc	Neut	Masc	Neut
% (SD)	0 (0)	5.6 (8.8)	65.6 (40.7)	2.2 (4.4)
	Neuter			
	Prot		Non-Prot	
Assignment Errors % (SD)	0 (0)		31.1 (23.7)	
Assigned Gender	Masc	Fem	Masc	Fem
% (SD)	0 (0)	0 (0)	30.0 (22.9)	1.1 (3.3)

3.4 Task 1: Oral Elicited Production (OEP)

3.4.1 Task and Materials

The Oral Elicited Production Task contained 120 items in total, 60 test items and 60 fillers. For the target items, participants had to construct a simple phrase using a definite determiner, an adjective and a noun. The task included 10 prototypical and 10 non-prototypical masculine nouns, 10 prototypical and 10 non-prototypical feminine nouns and 10 prototypical and 10 non-prototypical neuter nouns (see also section 3.1 above). The filler items consisted of verbs.

3.4.2 Procedure

The task was untimed and administered using Power Point. For each item, the participant was shown one picture. Each picture was accompanied by a recorded word that corresponded to the object depicted in the picture (or the action for the fillers). Participants saw the picture, heard the sound and were asked to describe it constructing a phrase.

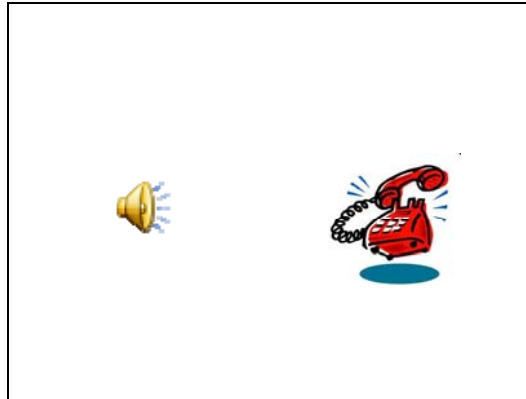


Figure 4: Example of picture used for Task 1

For filler items, they were asked to provide a pronoun and the correct form of the verb. For target items, they were asked to provide a definite article and an adjective, such as:

- (11) to kokino tilefono
the red phone

3.4.3 Results

As mentioned above, only results for the prototypical items are reported for this task. The data were coded in the following way: Invariant adjectives like *ble* ‘blue’ were excluded from the analysis as they do not indicate agreement. Also, if participants did not provide any gender or provided the wrong gender in the Gender Monitoring Task, these cases were excluded from the present analysis. Only agreement errors were taken into account like (12).

- (12) *to mavro agelada
the_N black_N cow_F

In this example, the heritage speaker has correctly assigned feminine gender to the noun *agelada* ‘cow’ but the agreement of both the determiner and adjective are not correct (neuter was chosen instead of feminine: *i mavri agelada*). These were coded as agreement errors. Although in language acquisition literature a mismatch between the determiner and the adjective has been taken to be an agreement error proper (since “the gender of the determiner is often used as evidence for lexical assignment of gender” (Montrul et al., 2008: 510), the Gender Monitoring Task in the present study was used as a baseline for establishing gender knowledge.

Due to the nature of the task, the number of DP phrases that each subject produced slightly differs, thus both percentages of errors and raw numbers are presented.

In this task, the variables that are examined are a) gender (masculine vs. feminine vs. neuter), and b) overextension of default forms to inappropriate contexts.

Table 7. Variability in Oral Elicited Production Task by gender (percentages and raw numbers represent errors).

		Masculine	Feminine	Neuter
<i>Native Speakers</i>	<i>% of errors (SD), Range</i>	0 (0), 0	0 (0), 0	0 (0), 0
	<i>Raw numbers</i>	0	0	0
<i>Heritage Speakers</i>	<i>% of errors (SD), Range</i>	2.5 (5.0), 0-12.5	4.7 (7.5), 0-20	2.8 (4.4), 0-10
	<i>Raw numbers</i>	4/171	8/171	5/178

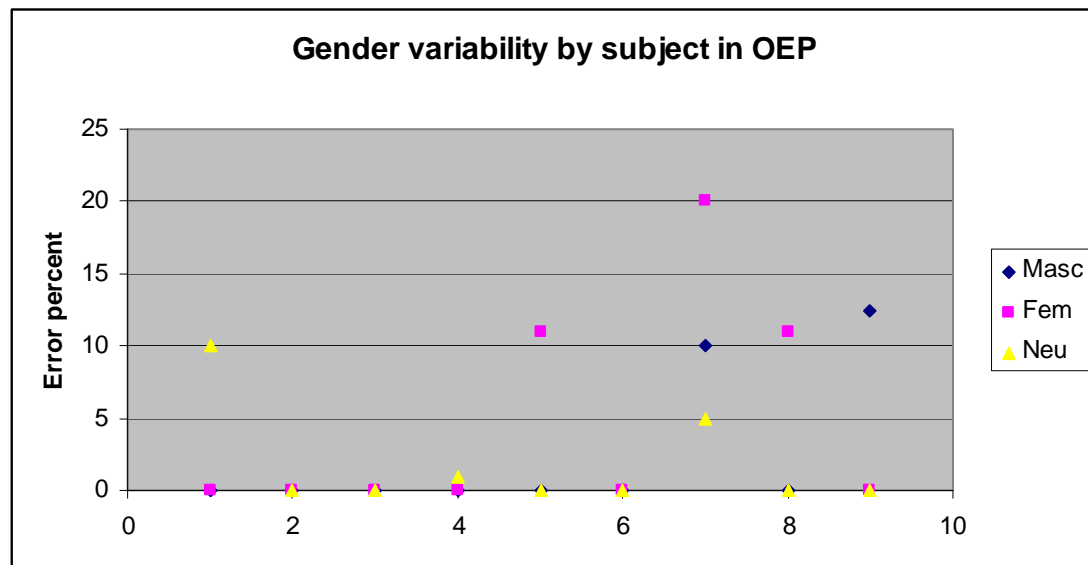


Figure 5. Variability in gender by subject in the Oral Elicited Production Task.

In regard to how each gender was affected in this task, native speakers did not make any errors. In heritage speakers' production, the number of errors is small: The masculine and the neuter are almost equally affected and feminine seems to be the most affected (see Table 7 but cf. Figure 5 showing variability by subject). Below some typical examples of the type of errors that were encountered are presented:

(14) *to mavro araxni
 the_N black_N spider_F

(15) *i megali kuti
 the_F big_F box_N

(16) *to aspro krokodilos
 the_N white_N crocodile_M

It has to be noted with respect to the errors in masculines that the heritage speakers made errors mostly in [-human] nouns (examples 14 and 16). Masculine [+human] nouns were not affected as much. Here I cannot exclude transfer from the dominant language, English, where [-human] nouns are treated as neuters.

It has to be noted that in most of the cases, *no mismatch* between the gender of the determiner and that of the adjective was observed. Of all the errors, there was only one case where there was a mismatch between the determiner and the adjective:

*to	megali	kuti
the _N	big _F	box _N

This goes contrary to the findings of other studies on gender agreement, such as Tsimpli (2003) for L2 Greek and Montrul et al. (2008) for L2 and Heritage Spanish, that have found a considerably higher percentage of errors with adjectives as compared to the determiners.

A prediction of MUSH is that the gender that is underspecified is expected to be the least affected in L2 interlanguage. Numerically at least, masculine seems to be the least affected in this task.

One of my hypotheses (**H2**) concerns whether heritage speakers use defaults and overextend forms to contexts that are not appropriate. For example, the heritage speaker knows that a noun is feminine but inserts a neuter determiner and adjective as in (14) above.

It is essential for my hypotheses to see if there is a systematic pattern in the way heritage speakers introduce forms into inappropriate contexts. If they significantly overextend more neuter determiners and adjectives in feminine and masculine contexts than feminine or masculine modifiers in the respective inappropriate contexts, then there would be good reason to say that the default is the neuter and surfaces across contexts. Of course, if this is the case, then it is predicted that the underspecified gender will also be the least affected in terms of errors.

Table 8. Overextension of erroneous forms in the Oral Elicited Production Task.

		Masculine Forms	Feminine Forms	Neuter Forms
Native Speakers	<i>Raw numbers</i>	0	0	0
	<i>% (SD), Range</i>	0	0	0
Heritage Speakers	<i>Raw numbers</i>	0/17	5/17	12/17
	<i>% (SD), Range</i>	0 (0), 0	24 (43), 0-100	43 (51), 0-100

Overall, in the Oral Elicited Production Task heritage speakers seem to introduce more neuter than feminine forms in inappropriate contexts (Table 8). Table 9 shows

the contexts to which the heritage speakers overextend different forms. It is worth noting that in feminine and neuter contexts no masculine forms are inserted.

Table 9. Contexts to which erroneous forms are overextended in OEP (%).

	% (SD), Range
	Masculine Context
Insertion of Fem form	0
Insertion of Neu form	9.22 (18.79), 0-50
	Feminine Context
Insertion of Masc form	0
Insertion of Neu form	18.89 (34.8), 0-100
	Neuter Context
Insertion of Masc form	0
Insertion of Fem form	16.67 (25), 0-50

3.5 Task 2: Written Gender Recognition (WGR)

3.5.1 Task and Materials

The Written Gender Recognition task was written and included 120 items, 60 fillers and 60 target items (nouns), embedded in the context of sentences. The same nouns were used in this task as in Task 1 in order to control for stress position and syllable number. This task was untimed as well.

3.5.2 Procedure

Participants were given 120 sentences and asked to circle the correct form of the verb (for the filler items) and the correct form of the article and adjective for the noun (for the target items). The adjectives used in this task were selected to represent the prototypical classes of Greek adjectives (see Section 2.3, Table 3). All items were embedded in the context of a sentence as in (20) below:

- (20) (O / H / To) (νέος / νέα / νέο) δάσκαλος διδάσκει μαθηματικά.
 (O / I / To) (neos / nea / neo) daskalos didaski mathimatika.
 (The_M / The_F / The_N) (new_M / new_F / new_N) teacher_M teaches mathematics.

The new teacher teaches mathematics.

The order of the items in each parenthesis was manually randomized for each sentence so that participants were presented with different ordered sets in each sentence:

- (21) (To / O / I) (palia / palio / palios) tilefono dulevi akoma.
 (The_N / The_M / The_F) (old_F / new_N / new_M) telephone_N works still.
The old telephone still works.

A note about Greek spelling is in order. Prototypical feminines that end in **-i** (like *kori* ‘daughter’) and prototypical neuters that end in **-i** (like *kuti* ‘child’) have the same phonological shape in terms of their endings, but Greek spelling disambiguates that. The noun *kori* (κόρη) is spelled differently from the noun *pedi* (παιδί). This might have skewed the results to a certain extent, although as we will see below, the spelling did not prevent some speakers from making errors with feminine nouns by inserting neuter determiners and adjectives (see example 23 below).

3.5.3 Results

As in the previous task, only prototypical items were analyzed. The variables that were examined were a) gender (masculine vs. feminine vs. neuter), and b) overextension of default forms to inappropriate contexts.

Table 10. Variability in the Written Gender Recognition by gender (the percentages and the raw numbers represent errors).

		Masculine	Feminine	Neuter
<i>Native Speakers</i>	% (SD), Range	0 (0), 0	0 (0), 0	0 (0), 0
	Raw numbers	0	0	0
<i>Heritage Speakers</i>	% (SD), Range	0 (0), 0	4.4 (7.3), 0-10	1.2 (3.5), 0-10.5
	Raw numbers	0/176	8/178	2/178

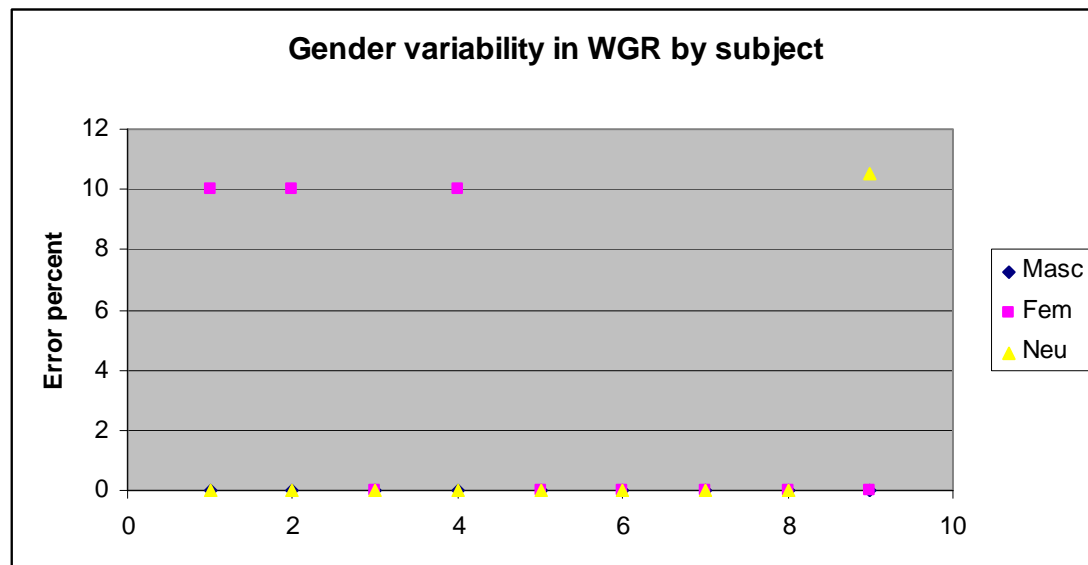


Figure 7. Gender variability by heritage speaker in WGR.

In this task, native speakers do not show any variability, thus the following discussion only includes heritage speakers' results. Although the number of errors is low, the heritage speakers' results showed that the masculine is not affected at all, and again feminine is the most affected. (Table 10 and see also the individual results in Figure 7). Some examples of the errors they made are the following

(22) *to mavro agelada
 the_N black_N cow_F

(23) *to megalo kori
 the_N old_N daughter_F

As in the Oral Elicited Production task, it should be stressed that no mismatch between the gender of the determiner and that of the adjective was observed.

In this task, heritage speakers inserted mostly neuter forms in inappropriate contexts and a smaller percentage of masculine forms. No feminine forms were overextended.

Table 11. Overextension of erroneous forms in WGR.

		Masculine Form	Feminine Form	Neuter Form
Native Sp	Raw numbers	0	0	0
	% (SD), Range	0	0	0

Heritage Sp	<i>Raw numbers (out of 10 errors)</i>	2	0	8
	<i>% (SD), Range</i>	11.1 (33.3), 0-100	0 (0), 0	33.3 (50), 0-100

Table 12 shows the inappropriate contexts to which the heritage speakers overextended various forms. This time, no feminine forms were introduced.

Table 12. Contexts to which erroneous forms are overextended in WGR (%).

	<i>% (SD), Range</i>
	Masculine Context
Insertion of Fem forms	0 (0), 0
Insertion of Neu forms	0 (0), 0
	Feminine Context
Insertion of Masc forms	0 (0), 0
Insertion of Neu forms	33.3 (50), 0-100
	Neuter Context
Insertion of Masc forms	2.78 (8.33), 0-25
Insertion of Fem forms	0

3.6 COMPARISON OF THE TWO TASKS

One of the most important debates in accounts of L2 morphological variability is whether errors found in production extend to other domains (comprehension, judgments) (**H1**). McCarty (2007) argues that, due to the nature of the human grammars characterized by underspecification, we may not expect differences across different task formats.

The results of a repeated measures ANOVA for task type and gender showed that the difference between the tasks is not significant, $F(1, 8) = .900$, $p = .371$. Also, there was no interaction between task type and gender. To a certain extent, this lends support to MUSH since the prediction is that no differences are expected across tasks, but at the same time, this statistical result has to be evaluated in terms of the observed error patterns to which I turn now.

In respect to **H2** regarding systematic error patterns, the ANOVA showed that the effect of gender approaches significance $F(2, 16) = 3.410$, $p = .061$ (Huynh-Feldt test). Nevertheless, Bonferroni pairwise comparisons did not show any significant differences between the genders. The heritage speakers did not make more errors in masculine than in feminine ($p = .203$) or than in neuter ($p = 1.000$). The difference

between the feminine and the neuter is not significant either ($p = .285$). Thus, the evidence is inconclusive as to the gender that is least affected, although the numerical trends point to the masculine as the least affected and to the feminine as the most affected.

As far as the insertion of defaults is concerned, overall the heritage speakers inserted more neuter forms than masculine and feminine forms in the respective contexts (Table 12). It is worth noting that in both tasks the percentage of neuter forms is higher than that of masculine or feminine.

Table 12. Comparison of OEP and WGR by gender in insertion of defaults.

	Masculine Forms		Feminine Forms		Neuter Forms	
	OEP	WGR	OEP	WGR	OEP	WGR
%	0.00	11.1	24	0	43	33.3

A repeated measures ANOVA for form insertion revealed that, first, there is not a significant effect of task type, $F(1, 8) = 1.000$, $p = .347$, but there is a significant effect of default form, $F(2, 16) = 7.500$, $p = .005$. Bonferroni pairwise comparisons showed that heritage speakers introduce significantly more neuter forms than masculine forms ($p = .012$) or feminine forms ($p = .044$) *in both tasks*. The difference between masculine and feminine form insertion is not significant ($p = 1.000$).

3.7 DISCUSSION

Although overall there seem to be some trends and patterns in heritage speakers' data (a larger scale study would be required to see these trends more clearly), it should be stressed first and foremost that even intermediate-proficiency heritage speakers perform well in gender agreement (the error rate is slightly less than 5% overall) which is contrary to previous findings from studies on both L2 learners (e.g. Franceschina, 2001; Bruhn de Garavito & White, 2003) and heritage speakers (e.g. Håkansson, 1995, Au et al., 2002; Montrul et al., 2008) that show a high percent of errors especially in low-proficiency but also in intermediate-advanced (L2 or heritage) speakers. I acknowledge that the measures that are used to classify L2-learners into proficiency levels are not necessarily appropriate for heritage speakers, as Valdes (1995) has argued in the past, but the use of a placement test for L2 Greek in the present study was

motivated by the fact that the heritage speakers already have some literacy skills in the heritage language.

It is evident that the heritage speakers of Greek in the present study do not make many errors when using determiners and adjectives with nouns they know (prototypical nouns). Some of them did not make any errors at all, as evidenced by the high degree of dispersion in our results. Despite the fact that two of the heritage speakers were removed from the general analysis –the first because he was of low-proficiency and the other because she learned English after she was 5 years old–, the heterogeneity of the group remained a reality. It has to be stressed that this intra-group variation is not uncommon in populations like heritage speakers as observed in other studies (e.g. Polinsky, 2008; Montrul 2006).

In respect to the Morphological Underspecification Hypothesis (MUSH) that predicts equal performance and the surfacing of unidirectional patterns of errors in different task formats, first the statistical results showed that there is no difference between the two tasks administered, a fact that lends support to MUSH. Nevertheless, the numerical trends show that the heritage speakers performed slightly better in the Written Gender Recognition Task than in the Oral Production Task. This is consistent with SLA theories such as the Missing Surface Inflection Hypothesis discussed above which predicts better performance of L2 learners in task formats other than production. I speculate that this numerical difference may be attributed to a number of factors: First, it is the nature of the Written Gender Recognition Task which differs from the oral task in terms of modality (written) and explicitness. Second, recall that the heritage speakers in this study have some literacy skills in the home language acquired from early on. Third, as mentioned previously, Greek spelling can disambiguate prototypical feminines from prototypical neuters in some cases. These factors might have contributed to making the task easier, thus accounting for the numerical difference.

MUSH also predicts systematic patterns of errors in terms of gender and the use of defaults across the board. The gender that is underspecified is predicted to be the least affected and to be used as a default. In terms of agreement, the default surfaces in determiners and adjectives as in McCarthy's study (2007) but also in other studies such as White et al. (2007) that showed that in L2 Spanish masculine is overextended to feminine contexts. Tsimpli's (2003) study on the acquisition of gender agreement in L2 Greek showed that the gender that surfaces as a default (only with determiners) is

the neuter. In the present study, the statistical results did not reveal any significant patterns regarding which gender is least affected, but the ANOVA showed significant results in regard to the introduction of defaults. Neuter is introduced the most in inappropriate contexts in both tasks. This lends some support first to MUSH and second to Tsimpli's study. It has to be noted that this is also in line with Varlokosta's (to appear) study that found that L2 learners predominantly assigned neuter gender to novel nouns ending in *-i*, which are ambiguous between feminine and neuter. This preference for neuter is perhaps related to the fact that it is the most frequent in terms of input (see above Section 2.2, p. 10).

In sum, my hypotheses are partly confirmed based on the statistical results. Hypothesis 1 is confirmed as there is no difference between the two tasks. Hypothesis 2 is partly confirmed, since the neuter surfaces as the form that the heritage speakers prefer to use and overextend to various contexts but was not found to be the gender that is the least affected.

In regard to studies of heritage speakers such as Montrul et al. (2008), the data seems to support the finding that heritage speakers use defaults like L2 learners do. Montrul et al. (2008) found that, like L2 learners, heritage speakers of Spanish produced a significantly higher percentage of masculine forms (with determiners and adjectives) than feminine forms in feminine contexts, in both comprehension and production. Håkansson (1995) makes similar claims about Swedish heritage speakers who tend to "overgeneralize the unmarked common gender morpheme (or zero morpheme)" and this result aligns with studies of L2 acquisition of Swedish.

Montrul et al. (2008) found a task effect for heritage speakers, only the pattern observed was the opposite from the one found with L2 learners: the former performed with much higher accuracy in the oral production task than the L2 learners and with less accuracy in the written tasks. In Polinsky (2008), heritage speakers also did better in the oral semi-production task than in the aural judgment task. Although this study is about gender assignment and not gender agreement, it points to the difficulties of heritage speakers "to make a choice between two or more stimuli on a judgment task" (p. 62). These findings are not in line with the present study, where it was found that the heritage speakers performed similarly in both oral production and written recognition (and even numerically they did slightly better in the written recognition task).

As mentioned above, Polinsky (2008) studied gender assignment (noun categorization) in heritage speakers of Russian. It is interesting that in a language like Rus-

sian, that has many similarities to Greek as far as the case and gender system is concerned, case is inextricably tied to morphological gender. She demonstrates that low proficiency heritage speakers of Russian display a two-gender instead of a three-gender system because their knowledge of the case system has weakened as compared to the baseline. More specifically, the least affected genders are the masculine and the feminine, and the neuter is absent, although higher proficiency heritage speakers retain a three-gender system. This is also related to frequency considerations as neuter in Russian seems to be the least frequent. As we saw above, based on the results of the Gender Monitoring Task, the heritage speakers misclassified non-prototypical feminine and neuter nouns as masculine, and the explanation is that these non-prototypical classes have the same marking as masculines. Thus, in terms of assignment errors, masculine seems to be the least affected. This is in line with Varlokosta's (to appear) study that found that L2 learners assigned masculine values to novel nouns ending in *-os*. In gender agreement, we see roughly the same pattern: the least affected genders (at least numerically) are masculine and neuter but, as discussed above, in terms of input the neuter is the most frequent. If I can venture a generalization, feminine gender seems to be the most vulnerable in Heritage Greek. Of course, in order to better understand gender assignment and agreement in Heritage Greek, one has to look at heritage speakers' knowledge of the case system. In the present study, the target items were all presented in nominative case singular, and therefore I cannot make claims about the interaction of case and gender marking, but it is a factor that has to be taken into account in studies of L2 and Heritage Greek.

There is a last point that needs to be made in regard to the issue of the mismatch between adjectives and determiners. In both L2 and heritage language studies (for L2 see White et al., 2004; Bruhn de Garavito & White, 2002; and for heritage speakers and Montrul et al., 2008; for heritage speakers), accuracy on gender is generally lower with adjectives as compared to determiners, a fact related to the evidence that is – perhaps implicitly – used for distinguishing agreement errors from assignment errors. However, as Montrul et al. (2008: 510) point out, “a gender error with the determiner can also be related to agreement and not to assignment, although this is very hard to tease apart”. In the present study, in which a metalinguistic gender monitoring task was employed to determine knowledge of gender, the vast majority of agreement errors did not involve any mismatch between the gender of the determiner and that of the adjective. I speculate that some potential reasons for this result might be that a)

these errors are not in reality agreement errors (if the results of the written gender monitoring task are not reliable) or b) the match of determiner and adjective in gender has to do with the prenominal position of the adjective.

4. Conclusions and proposal for further study

The examination of agreement errors in the speech of nine heritage speakers of Modern Greek revealed the complexities of a language with rich morphology and a three gender system. First and foremost, the percentage of errors produced by intermediate proficiency heritage speakers of Greek was not high. This is not in line with other studies that have found a high percentage of gender agreement errors even in advanced proficiency heritage speakers. In addition, the difference between the two tasks that were administered was not found to be significant (although numerically the heritage speakers seemed to find the Production Task slightly more difficult than the Written Recognition Task). This is consistent with McCarthy's hypotheses which were tested in this study, but not with the patterns that heritage speakers show as studies on heritage speakers have demonstrated (e.g. Montrul, in press). The evidence seems inconclusive regarding which gender is the least affected but there is some evidence that the default that the Greek heritage speakers tend to use is the neuter. This is also consistent with MUSH.

I acknowledge that the present study has limitations. First, the small percentage of errors might be attributed to the task being too easy. The heritage speakers had to produce or recognize phrases only at the DP-internal level. A task that would require the elicitation of long dependencies (e.g. by testing predicative adjectives) might reveal other tendencies. Also, the three tasks administered differ both in domain (production vs. judgments) *and* modality (oral vs. written). The production task was oral while both the recognition task and the monitoring task were written. This might have obscured the role of each factor (domain and modality). In order to have a clearer picture of the heritage speakers' performance, it would be fruitful instead to further examine task effects with an aural comprehension task and a aural gender monitoring task that would minimize the explicitness of graphemic representations.

In this study, only task effects and patterns of errors were examined. Nevertheless, one of the significant diagnostics used for assessing theories of (L2 and heritage) language acquisition –and ultimately for drawing conclusions about ultimate attainment of uninterpretable features like gender agreement, the role of maturational constraints

and the role of early onset of acquisition– is the comparison of L2 speakers and heritage speakers. As a further step, it would be revealing to compare L2 learners and heritage speakers of Greek with different levels of proficiency.

A final diagnostic for addressing the problem of acquisition of gender agreement is the role of L1-background. It is hypothesized by some researchers that if an L2 learner has an L1 that does not instantiate gender features it is impossible for them to acquire gender agreement. Nevertheless, White et al. (2004) showed that ultimate attainment of gender agreement is possible even with L2 learners whose L1 does not have gender. In this respect, it would be very interesting to extend this area of investigation and compare heritage speakers with different L1-dominant backgrounds (for example, Greek-Americans with Greek-Germans).

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Appendix: Speaker 2’s performance

Speaker 2 (S2) is a low-proficiency heritage speaker. Nevertheless, since his knowledge of prototypical items is high both in terms of meaning and in terms of gender (see Tables 1 and 2), I decided to include an analysis of his data.

Table 1. Knowledge of meaning of target-items by gender and prototypicality (%). The percentages represent accuracy in S2’s data.

S2	Masculine		Feminine		Neuter	
	%	%	%	%	%	%
	Prot (n=10)	Non-Prot (n=10)	Prot (n=10)	Non-Prot (n=10)	Prot (n=10)	Non-Prot (n=10)
	90	40	80	20	90	10

Table 2. Knowledge of gender of target items by gender and prototypicality (%). The percentages represent accuracy in S2's data.

S2	Masculine		Feminine		Neuter	
	%	%	%	%	%	%
	Prot (n=10)	Non-Prot (n=10)	Prot (n=10)	Non-Prot (n=10)	Prot (n=10)	Non-Prot (n=10)
	100	90	90	0	100	10

Oral Elicited Production Task

In S2's performance we can see more clearly the trends observed in higher proficiency heritage speakers, especially in the production task. In OEP, S2 made more errors with the feminine and less with the masculine and the neuter. Actually, the neuter is the least affected (Table 3).

Some examples are the following:

- (1) to mikro aderfos
the-N little-N brother-M
- (2) to aspro melisa
the-N white-N honeybee-F

Table 3. S2's performance by gender in OEP (the raw numbers and percentages represent errors).

S2		Masculine	Feminine	Neuter
	<i>Raw numbers</i>	3/12	7/13	2/18
	<i>%</i>	25	53	11

In terms of default insertion, it is evident that S2 inserts more neuter than masculine or feminine forms in inappropriate contexts (Table 4).

Table 4. Insertion of erroneous forms in OEP by S2.

		Masculine Forms	Feminine Forms	Neuter Forms
S2	<i>Raw numbers (out of 12 forms)</i>	1	2	9
	<i>%</i>	8.5	16.5	75

In Table 5 we can see that neuter defaults are overextended mainly to feminine contexts and less to masculine contexts.

Table 5. Contexts in which erroneous forms were inserted.

	Raw Number (%)
(out of 12 forms)	Masculine Context
Insertion of Fem form	0
Insertion of Neu form	3 (25%)
	Feminine Context
Insertion of Masc form	1 (8.5%)
Insertion of Neu form	6 (50%)
	Neuter Context
Insertion of Masc form	0
Insertion of Fem form	2 (16.5%)

Written Gender Recognition Task

In the Written Gender Recognition Task, S2, perhaps surprisingly, does not show any variability. No errors were recorded.

Some remarks

S2's performance reflects, to a certain extent, the trends that we saw with the other subjects in terms of patterns of errors. Feminine seems to be the most affected, masculine is less and neuter is the least affected. It is clear though, that S2 uses neuter defaults much more than masculine and feminine ones. The major difference from the general analysis presented above is that his performance differs in the two tasks: In the Oral Production he makes 27% of agreement errors (12/43) while in the Written Gender Recognition Task he does not have any errors. This pattern is reminiscent of the performance of L2 learners and actually gives support to SLA theories such as the Missing Surface Inflection Hypothesis that predicts lower performance in production than in other task formats in low-proficiency learners. These results also go contra to the Failed Functional Features Hypothesis (e.g. Hawkins, 1998) that predicts equally low performance in production and other task formats. It goes also contrary to findings discussed above about heritage speakers being better in production than in other task formats, but it is in line with the finding that heritage speakers also use systematic defaults. In conclusion, S2's profile looks more like an L2-learner's.