

Article

Agreement Asymmetries with Adjectives in Heritage Greek

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Abstract: Research on different populations of heritage speakers (HSs) has demonstrated that these speakers (i) frequently produce fewer adjectives, and (ii) produce more errors in nominal concord than in subject–verb agreement. The first point, (i), has been attributed in the literature to the optionality of adjectives and to the fact that adjectives characterize the literary language and HSs lack familiarity with this register. The second point, (ii), is viewed by other researchers as supporting theories that treat nominal concord as being different from subject–verb agreement. In this paper, we contribute data on production of adjectives and agreement asymmetries with adjectives from heritage Greek. We show that these cannot be viewed as supporting claims with respect to (i) but conclude that nominal concord and subject–verb agreement involve different mechanisms. We furthermore explore ways to account for a slight contrast we observe between prenominal and postnominal agreement.

Keywords: heritage speakers; nominal concord; subject–verb agreement; Greek; syntax; register



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1. Introduction

Research on different populations of heritage speakers (HSs) has demonstrated that such speakers show poor performance on adjectives, meaning that they produce fewer adjectives than monolingual speakers, as their input to this word class is infrequent compared with verbs and nouns (Polinsky 2005); moreover, HSs seem to produce more errors in nominal concord than in patterns of subject–verb (S/V) agreement; see, e.g., Benmamoun et al. (2013), Bolonyai (2007), Montrul et al. (2012), Polinsky (2006), Albirini et al. (2011, 2013), Fenyvesi (2000), De Groot (2005) and Fuchs (2019), among many others. Polinsky (2005) argued that the former contrast is due to the optionality of adjectives and to the fact that they characterize the literary language. As HSs lack familiarity with this particular register, they are expected to show this selective bias. With respect to the latter, Benmamoun et al. (2013, p. 145) suggest that the centrality of verbs may outweigh the simplicity of adjectives. Fuchs (2019, p. 185), following Norris (2014), argues that this agreement contrast ‘supports theories which treat nominal concord and verbal agreement as inherently different processes’.

In this contribution, we aim to investigate how HSs and monolingual speakers of Greek behave regarding the category of adjectives and we present data from heritage Greek agreement asymmetries that cast doubts on Polinsky’s claims with respect to the former contrast but support Fuchs’s conclusion with respect to the latter. We collected data from two age groups of HSs of Greek in the US and Germany and monolingual controls via a narration task of a video presenting a fictional accident, and these data show such asymmetries. Moreover, we explore whether there is a contrast between prenominal and postnominal adjectival agreement, which has been discussed controversially in the literature; cf. Bartning (2002), and Kupisch et al. (2013) for L2 French and Håkansson and Arntzen (2021) for L2 Norwegian, among others. Håkansson and Arntzen (2021), for instance, pointed out that more mismatches are produced in prenominal than in postnominal agreement. By contrast, Irizarri van Suchtelen (2016) for Spanish HSs, and Alemán Bañón et al. (2012)

and Foote (2010) for L2 Spanish claim that prenominal attributive adjectives are easier to process and thus the speakers produce fewer mismatches compared with adjectives used predicatively in the postnominal position. In the same vein, Kupisch et al. (2013) point out that predicative agreement might be more vulnerable. Finally, as the adjective is a word class that depends on register, we investigate to what extent monolingual and HSs of Greek differ in terms of adjective productions by adding this factor.

HSs are usually defined as speakers of a minority language residing in a country with a majority language acquiring 2L1 in a naturalistic setting (Polinsky 2018). They can acquire those languages either simultaneously or sequentially depending on their age of onset to bilingualism (Montrul and Polinsky 2019). Although HSs may differentiate their repertoires from monolingually raised speakers, they belong to the nativeness continuum (Wiese et al. 2022; Rothman et al. 2022). Many researchers have stated that the speakers' proficiency in those two languages differ, as it depends on different metalinguistic factors such as the quality and the quantity of past and current input, the formal education received mainly in the heritage language and the age of onset (Unsworth et al. 2014; Flores et al. 2017; Meir and Armon-Lotem 2017; Daskalaki et al. 2019; Dosi and Papadopoulou 2019; Kupisch 2019, among others). As we will see, the patterns observed in the domain of agreement relate to three debates in the syntactic literature: (1) whether nominal concord and S/V agreement are subject to different mechanisms or not, (2) whether pre-/postnominal agreement should be treated differently from each other or not and (3) whether the syntax of attributive adjectives differs from that of predicative adjectives or not. For instance, it has been proposed that while attributive adjectives are specifiers of functional projections within the DP (Cinque 1994), postnominal ones are predicates within reduced relative clauses (Kayne 1994; Demonte 1999, and others) and hence targeted by different agreement mechanisms; see, e.g., Baier (2015). While our data do not provide sufficient evidence to directly contribute to all of these, we want to highlight here the role heritage languages may play in informing linguistic theory and pave the way for further research.

This paper is structured as follows: In Section 2, we present the relevant theoretical and empirical background. In Section 3, we turn to our research questions and hypotheses. In Section 4, we present our methodology and results. In Section 5, we offer a discussion of our results, and in Section 6 we conclude.

2. Theoretical Background

In this section, we provide an overview on the structure of noun phrases (adjective placement, nominal concord) in each of the three languages we are interested in, namely Greek, English and German. By providing this theoretical section, we present analyses of the possible syntactic processes involved in the phenomenon under investigation, leading us to formulate our hypotheses and guiding the interpretation of our findings.

2.1. Noun Phrases in Greek, English and German

We begin with an overview of the structure of noun phrases in Greek, English and German, Greek being the heritage language of our speakers, while English and German are the two majority languages; see Alexiadou et al. (2007) for further discussion. In all three languages, adjectives precede nouns, and the canonical word order is as in (1). Greek has three genders and eight nominal inflection classes (Ralli 2000). Determiners and adjectives agree with the noun in case, number and gender both in attributive and predicative positions, as seen in (2) and (3). Adjectives may appear in the postnominal position in indefinite noun phrases, as seen in (4), agreeing in case, number and gender. Example (4) is analyzed as a case of predication (Stavrou 1996):

(1)	Article—Adjective1- Adjective2- ... Noun				
(2)	O	megalos	kokinos	pinakas	(Greek)
	the.MASC.NOM	big.MASC.NOM	red.MASC.NOM	board.MASC.NOM	
	‘The big red board’				
(3)	O	pinakas	ine	kokinos	(Greek)
	the.MASC.NOM	board.MASC.NOM	is	red.MASC.NOM	
	‘The board is red’				
(4)	Enas	pinakas	kokinos		(Greek)
	a.MASC.NOM	board.MASC.NOM	red.MASC.NOM		
	‘A red board’				

Table 1 illustrates the Greek nominal inflection classes based on [Ralli \(2000\)](#). Every noun in the language belongs to one of these eight classes, meaning that depending on the class it belongs to it appears with the set of inflectional endings included in Table 1.

Table 1. Greek nominal inflection classes.

	I _{M/F}	II _M	III _F	IV _F	V _N	VI _N	VII _N	VIII _N
Nom _{sg}	os	s	Ø	Ø	o	Ø	os	Ø
Acc _{sg}	o	Ø	Ø	Ø	o	Ø	os	Ø
Gen _{sg}	u	Ø	s	s	u	u	us	os
Voc _{sg}	e	Ø	Ø	Ø	o	Ø	os	Ø
Nom _{pl}	i	es	es	is	a	a	i	a
Acc _{pl}	us	es	es	is	a	a	i	a
Gen _{pl}	on	on	on	on	on	on	on	on
Voc _{pl}	i	es	es	is	a	a	i	a

Greek adjectives basically follow the inflectional nominal classes 1, 3 and 5 (though there are two additional classes for adjectives). There is no agreement in inflection class.

As is well known, there is no nominal concord in English, and nouns lack gender and nominal class information. Only certain adjectives may appear in the postnominal position in the absence of a copula, e.g., *those responsible*, and are typically analyzed as predicative. German, like Greek, has three genders and a number of inflection classes ([Alexiadou and Müller 2008](#) and references therein). Adjectives agree with nouns in the prenominal position, whereby there is a large amount of syncretism (adjective inflection is regulated by the definite and indefinite paradigm), but there is no agreement in the predicative position. Adjectives never appear in the postnominal position in the absence of a copula.

2.2. The Syntax of Adjectives and Nominal Concord

The syntax of adjectives has been controversially discussed in the literature; see, e.g., [Alexiadou et al. \(2007\)](#) for an overview. Because of this, for the purposes of this paper, we make the following assumptions. Building on [Cinque \(1994\)](#), [Kayne \(1994\)](#), [Demonte \(1999\)](#), [Alexiadou and Wilder \(1998\)](#) and [Alexiadou \(2001\)](#) among others, we take attributive adjectives to be generated as specifiers of designated functional heads within the extended projection of the noun phrases. By contrast, predicative adjectives are introduced as predicates within relative clauses; see (5) and (6):

(5) [DP [FP1 Adjectives [FP2 Adjective [NP]]]]

(6) [D [CP DP [Adjective]]

In line with [Norris \(2014, 2017\)](#), we treat agreement within the nominal domain as different from subject–verb agreement. The latter is subject to *Agree*, as defined in [Chomsky \(2000\)](#). The operation *Agree* incorporates next to interpretability the concept of valuation. Uninterpretable features enter the derivation unvalued. *Agree* provides values to unvalued features. This is illustrated in (7)–(9):

(7) Agree ([Chomsky 2000, 2001](#))

(i) An unvalued feature F (a *probe*) on a head H scans its c-command domain for another instance of F (a *goal*) with which to agree.

(ii) If the goal has a value, its value is assigned as the value of the probe.

(8) Valuation/Interpretability Biconditional ([Chomsky 2001](#), p. 5) A feature F is uninterpretable if F is unvalued.

(9) Deletion of uninterpretable features

Once an uninterpretable feature is valued, it can and must be deleted.

By contrast, nominal concord is the result of a distinct mechanism. As Norris points out, the exact implementation of nominal concord on this view depends on a particular analysis of adjectives. Assuming that adjectives are specifiers of functional projections, [Giusti \(2008\)](#) argues that concord is the relation between a head and a specifier and never involves movement. As [Giusti \(2008\)](#) signals, the functional heads hosting adjectives are, at least in part, copies of the φ -features (and, possibly, case features) of the N(P) that is modified by these adjectives. [Norris \(2014\)](#) argues that the heads that must show concord trigger insertion of a dissociated Agr node adjoined to the heads themselves. According to [Norris \(2014\)](#), these Agr0 nodes are specified for the features that are relevant for concord in the given language. Then, a rule of Feature Copying copies feature values from the closest source to the Agr0 node, where proximity is determined by domination rather than c-command; see (10) and (11), from [Norris \(2014, p. 126\)](#):

(10) Agr node Insertion schema $X \rightarrow [X \text{ Agr}]$

After Agr0 nodes are inserted, the values are copied onto the Agr0 nodes via a rule of Feature Copying, as shown below:

(11) Feature Copying

Any particular Agr nodes are copied onto the features of the closest c-commanding K(ase).

As these definitions show, copying is a more complex mechanism, as one has to keep track of the number of features copied, which may differ across languages. In Greek, both number and gender features need to be copied as well as case.

2.3. Adjectives in Heritage Grammars

Adjectives have been discussed in the literature on HSs from two perspectives. One is that of category bias, i.e., whether HSs discriminate between adjectives, nouns and verbs. The second focus concerns agreement and relates to the theoretical assumptions introduced in 2.2: do HSs preserve agreement patterns within the noun phrase, if the heritage language has such agreement? In the context of HSs, Polinsky (2005) investigated Russian HSs vs. uninterrupted learners of Russian and showed that the former perform poorly on adjectives due to the optionality of adjectives. Furthermore, Polinsky noted varied distribution across registers and styles: adjectives characterize literary language, and HSs lack familiarity with this register.

Turning now to agreement, several authors have shown that HSs produce more errors in the nominal domain than in the verbal domain (Benmamoun et al. 2013; Bolonyai 2007; Montrul et al. 2012; Polinsky 2006; Albirini et al. 2011, 2013; Fenyvesi 2000; De Groot 2005; Fuchs 2019). In addition, there seems to exist a pre- vs. postnominal contrast, whereby contrasting views have been reported in the literature. It has been suggested that postnominal agreement is acquired late due to distance, in the sense of Corbett's (1979) *agreement hierarchy*, as seen in (12) (Kupisch et al. 2013). According to Kupisch et al. (2013), the linear distance between a noun and a postnominal modifier is longer, thus increasing the working memory load and making predicative agreement more difficult than attributive agreement:

- (12) attributive > predicative > relative pronoun > personal pronoun

Several studies have shown that learners who produce predicative agreement also produce attributive agreement; however, the opposite is not found to be the case (Glahn et al. 2001, for L2 Scandinavian languages; Bonilla 2014, for L2 Spanish). In other works, accuracy rates were higher for predicative than attributive positions (see, e.g., Bartning 2002; Dewaele and Véronique 2001). Håkansson and Arntzen (2021) focused on the influence of L1 on L2 production of Norwegian gender and number agreement in attributive and predicative contexts. They show that attributive agreement is a prerequisite for predicative agreement and clear developmental stages can be identified. See also Irizarri van Suchtelen (2016), Alemán Bañón et al. (2012) and Foote (2010) for similar asymmetries in heritage and L2 Spanish. To a smaller extent, Håkansson and Arntzen's participants also showed an implicational order between number and gender (number was first and gender was later; see also Fuchs et al. 2015 for arguments that in monolingual Spanish number and gender agreement are targeted independently, while they are bundled in heritage Spanish; Scontras et al. 2018). As no L1 influence was identified, their results refute a language interference hypothesis.

Several studies report agreement asymmetries between articles and adjectives. For instance, Chini (1995) argues that agreement on articles appears before agreement on adjectives, while Bartning (2002) shows that the reverse order holds in L2 French. Fuchs (2019) reports asymmetries between determiner and adjectival agreement in two distinct HS groups, namely Polish and Spanish, obtained via eye-tracking methodology, whereby the latter group was more error-prone. Her results support the existence of a *tight link* between Spanish determiners and nouns discussed in earlier literature; see Grüter et al. (2012) and Montrul et al. (2014). Fuchs (2019) argues that this relates to how nominal

concord is established: determiners being functional elements agree via the process of *Agree*, while adjectives being modifiers are subject to concord.

3. Research Questions and Hypotheses

This study focuses on HSs' performance on Greek adjectives, exploring two aspects: (1) HSs' production of adjectives (over nouns and verbs) compared with Greek monolinguals, and (2) HSs' agreement mismatches in the nominal (article–adjective–noun) vs. verbal (subject–verb) domains as well as in prenominal vs. postnominal positions. The novelty of our work lies in that we investigate both (1) and (2) in the context of Greek being a heritage language in contact with two different majority languages, namely German (similar to Greek in terms of prenominal agreement, but with no agreement in the postnominal position) and US English (complete lack of agreement).

Our research questions (RQs) are provided below together with corresponding hypotheses and predictions:

RQ1: Do HSs show different patterns from monolinguals in adjective production in Greek? What is the role of register (formal vs. informal)?

Hypothesis 1: In view of Polinsky's results on heritage Russian, we expect that HSs' performance diverges from monolinguals' performance in terms of the number of adjectives produced. As our methodology takes into consideration register and modality variation, we explore whether HSs exhibit register levelling; being exposed mainly to informal everyday conversations (Dressler 1991; Chevalier 2004), register may influence their overall production of adjectives. However, we do not expect register to influence adjectival agreement, as noun–adjective agreement in Greek is not subject to register-dependent variation. In other words, there is no alternation between the presence and absence of agreement that is triggered by register. Rather, noun–adjective agreement is categorical, and we thus do not expect any difference between the two registers and modes. Although the literature has shown that Greek HSs show effects of register levelling in different domains, e.g., they generalize informal determiners and periphrastic constructions with light verbs across registers (Alexiadou et al. 2022; Alexiadou and Rizou 2022), these phenomena allow alternations between two variants. This is not the case with adjectival agreement.

Prediction 1: Due to the optionality of adjectives in HSs' repertoire (Polinsky 2005), they are expected to produce fewer adjectives in Greek overall than their monolingual peers. In addition, no group is expected to produce different agreement patterns modulated by register and mode variation. For all groups, more adjectives are expected to be produced in the formal than in the informal register.

RQ2: Do HSs show differences in the number of agreement mismatches produced in the nominal vs. verbal domains? Moreover, do HSs show differences in agreement mismatches involving adjectives and determiners?

Hypothesis 2: Greek is a highly inflectional language, and several studies have shown that Greek HSs exhibit vulnerability in this domain (Paspali 2019; Alexiadou et al. 2021). If nominal concord and verbal agreement indeed appear to be different processes (Benmamoun et al. 2013; Norris 2014), we expect an asymmetry in the number of mismatches produced by HSs in these two domains. In view of the previous literature, we also expect fewer agreement mismatches with determiners.

Prediction 2: HSs are predicted to produce fewer mismatches in verbal vs. nominal agreement, since the latter is considered more complex in that one has to track the relevant phi-features.

RQ3: What is the effect of the majority language (German vs. US English) and age (adults vs. adolescents) on agreement mismatches in HSs' adjectives?

Hypothesis 3: If language interference plays a role, we expect differences between the two HS groups. Moreover, if attrition is at play, we expect differences between the two age groups regardless of majority language.

Prediction 3: Since English lacks agreement, HSs in the US are predicted to be overall more error-prone in adjective agreement compared with HSs in Germany. Within each HS

group, adolescents are expected to perform better than adults due to more formal exposure to Greek as part of their current education.

Finally, we also look at both pre- and postnominal instances, and given previous findings on the difference between those two positions (Kupisch et al. 2013; Håkansson and Arntzen 2021), we add the following research question, which, however, is secondary for this paper:

RQ4: Are there differences between pre- and postnominal adjectival agreement in HSs? Do the two HS groups diverge in their performance?

Hypothesis 4: We expect differences between pre- and postnominal agreement in both HS groups.

Prediction 4: Following Kupisch et al. (2013) hierarchy, postnominal agreement is predicted to be harder and thus to trigger more errors than prenominal agreement in both HS groups. If language interference from the majority is present, we also expect HSs in the US to produce a high number of prenominal mismatches compared with HSs in Germany.

4. Production Study in Heritage and Monolingual Speakers

A production study was conducted to elicit data from three groups of participants, namely monolingually raised Greek speakers, and HSs in Germany and HSs in the US having Greek as their heritage language. More specifically, a narration task taps into the explicit and implicit knowledge of both populations and provides us with a variety of phenomena, unlike controlled experiments (Montrul 2011). As we discuss in Section 4.1, in our study we added the parameter of register variation; our participants had the opportunity to easily adapt in different communication settings given the proper circumstances.

4.1. Materials and Design of the Production Study

The study followed the ‘language situation’ setting proposed by Wiese (2017) which enables researchers to elicit naturalistic and comparable data in two levels of formality and in two modalities (data sets 2×2). The narration task was to retell in two modalities (oral and written) the events presented in a short video (00:42”) of a fictional car accident to different people indicating the two levels of formality. Beginning with the register variation, one level was the informal register in which participants had to narrate the story to a close friend; the other level was the formal, in which participants had to give a testimony in the form of a witness report to the police. Concerning the elicitation of data in two modalities, the spoken informal retelling what has happened was left as a voice message on WhatsApp and the formal one was left as a voice mail on the answering machine of the police department. The written one in the informal register was a text message in WhatsApp to the same close friend, narrating the events, and the formal written one was typed as a testimony on a police laptop, imagining that the participant witnessed the accident. HSs took part in two sessions, one in their majority language (German or US English) and one in their heritage language (Greek), while monolingual participants took part only in a session involving the language they grew up with (Greek). Every participant took part separately from the others and a group session was not allowed. Furthermore, the whole process was recorded for transparency reasons. In order to not bias the process, we created 16 balanced elicitation orders, starting each time with a different communication setting, which can be seen in Table A1. The elicitation orders were created so that participants would not begin with the same communication setting and thus influence their performance on different phenomena; i.e., in our case, adjectives are characteristic of the formal setting.

Particular emphasis was given to the set-up of the study in order to create two distinct communication situations. We simulated a formal and an informal setting, and different elicitors conducted the study in each. The former setting took place in an office with a formally dressed elicitor using standardized language with honorifics and inviting the participant to sit opposite to him/her keeping a proper distance between each other. The simulation of the latter setting took place in a different office where the elicitor and the participant were sitting close to each other and having a warm-up chat about different

topics for 20 min. The informal elicitor was casually dressed and very talkative, and did not use any honorifics. The elicitor of the formal register arranged the appointments for the session via e-mail while the elicitor of the informal register always reminded the participant of the appointment in a friendly way with a text message. The video was identical for the heritage and the majority elicitation sessions, and it was shown to every participant twice in each session, once by the elicitor of the formal setting and once by the elicitor of the informal setting. The exact same procedure was followed by trained elicitors in each language elicitation session where participants were asked to perform the same task. Besides the different elicitation orders mentioned before, the sessions in the majority/heritage language took part three to five days apart in order to avoid any interference effects.

4.2. Participants

This study was conducted in two groups of Greek HSs. One was recruited in the US (NY and Chicago) and one in Germany (Berlin); the monolingual control group was recruited in Greece (Athens). Within every group, we recruited two age groups of speakers, namely adolescents and adults. Table 2 presents the metalinguistic data that were collected in the form of a questionnaire at the end of the elicitation task.

Table 2. Metalinguistic data across groups and age groups.

		HSs in Germany		HSs in the US		Monolinguals	
		adults	adolescents	adults	adolescents	adults	adolescents
N		27 (17 females)	21 (7 females)	31 (18 females)	32 (16 females)	32 (16 females)	32 (16 females)
Chronological age ¹		Mean 28;5 SD 4.108	Mean 16;3 SD 1.717	Mean 29;9 SD 3.224	Mean 16;2 SD 1.408	Mean 27;6 SD 3.003	Mean 15;3 SD 1.755
Age of onset		Mean 2;3 SD 2.404	Mean 1;3 SD 1.720	Mean 1;7 SD 2.715	Mean 1;0 SD 1.692	-	-
Current use of Greek		Mean 1.0 SD 0.455	Mean 1.2 SD 0.476	Mean 0.8 SD 0.344	Mean 0.7 SD 0.347	-	-
Current use of the ML		Mean 0.7 SD 0.343	Mean 1.0 SD 1.082	Mean 1.1 SD 0.339	Mean 1.1 SD 0.353	-	-
Literacy practices in Greek		Mean 1.0 SD 0.455	Mean 1.2 SD 0.476	Mean 0.8 SD 0.344	Mean 0.7 SD 0.347	Mean 1.6 SD 0.494	Mean 1.4 SD 0.422
Literacy practices in the ML		Mean 1.5 SD 0.533	Mean 1.5 SD 0.396	Mean 1.8 SD 0.383	Mean 1.8 SD 0.342	-	-
Parents' generation ²	Both 1st	18 prt	6 prt	20 prt	10 prt	-	-
	One 1st	-	-	1 prt	2 prt	-	-
	One 1st, one 2nd	2 prt	1 prt	8 prt	10 prt	-	-
	One 1st, one foreign	7 prt	9 prt	-	2 prt	-	-
	Both 2nd	-	1 prt	2 prt	6 prt	-	-
	One 2nd	-	-	-	1 prt	-	-
	One 2nd, one foreign	-	2 prt	-	1 prt	-	-
Years of education in Greek		Mean 6;0 SD 4.301	Mean 8;5 SD 2.673	Mean 7;7 SD 4.266	Mean 10;4 SD 1.319	-	-
Hours of education in Greek		Mean 5352 SD 4979.337	Mean 6884 SD 4262.286	Mean 1664 SD 977.682	Mean 2671 SD 355.319	-	-

The first variables which appear in Table 2 are the number of speakers in every group/age group, their gender and their mean chronological age at the time of testing. The mean age of onset to bilingualism is presented next in the table, and it was measured only for HSs. The next two variables presented in Table 2 are the current use of the majority and the heritage language. The mean of the current use of the majority language (either US English or German) was calculated only for HSs, while the mean of the current use of Greek was calculated for all participants across the groups. Each of these variables was measured in two scales from 1 to 3 (from a few times per month to every day), with one counting how often the participants speak Greek to different members of their family and friends, and the other how often each of these people speaks Greek to them. The ratings were averaged by language (heritage, majority) and transformed into a score for each language.

The input received from media (TV, radio, blogs, newspapers in Greek/majority language) was calculated on a three-point scale (0 to 2) measuring the frequency (from never to often) and is listed under the term literacy practices, in the sense that this kind of input could also be educational. One important variable included in the metalinguistic data is the generation to which our participants' parents belong. Thus, we can have a clear picture of their baseline. Finally, the years and the hours of formal education received in Greek are presented in the last rows. The asymmetries observed between years and hours of education in the two groups can be explained by the different curricula followed in Europe and in the US. In bilingual schools in Europe, Greek or other subjects in Greek are taught every day for several hours, while in equivalent schools in the US, Greek is taught only for an hour per day.

The median of the self-ratings is presented in Table A5 and is based on four questions on reading, writing, comprehending and speaking both in Greek and in the majority language on a scale from 1 to 5 (very easy to very difficult). Furthermore, the median based on the frequency of visits to the country of heritage was also calculated for both HS groups, with the scale ranging from none (0) to several visits per month (3). These variables are presented separately in Table A5 as the data are ordinal. Our goal was to exhibit the profiles of the two different HS groups regarding their trips to the metropolitan area where Greek is spoken and their acquaintance with its linguistic landscape.

Although the descriptive statistics presented in Table 2 appear to be quite similar across groups and age groups, we ran several non-parametric Mann–Whitney tests and we did find some significant differences between the communities. Comparing the two adolescent HS groups, we find that there is a significant difference regarding the self-ratings in the heritage language ($U = 133.500$, $Z = -3.139$, $p = 0.001$), the years of education in the heritage language ($U = 171.500$, $Z = -2.629$, $p < 0.05$) and the literacy practices ($U = 148.000$, $Z = -2.884$, $p < 0.05$). Moreover, significant differences are reported in both age groups recruited in the US and in Germany concerning the current use of the heritage language [adolescents: ($U = 122.500$, $Z = -3.352$, $p = 0.001$), adults: ($U = 280.000$, $Z = -1.983$, $p < 0.05$)], hours of instruction in the heritage language [adolescents: ($U = 128.000$, $Z = -3.445$, $p < 0.001$), adults: ($U = 291.000$, $Z = -1.996$, $p < 0.05$)] and the visits to the heritage country as well [adolescents: ($U = 143.000$, $Z = -3.505$, $p = 0.001$), adults: ($U = 193.500$, $Z = -4.343$, $p < 0.001$)]. Finally, there was also one more significant difference with respect to the chronological age of adult HSs in the US and adult monolingual controls at the time of testing ($U = 294.000$, $Z = -2.795$, $p < 0.05$).

Further non-parametric Mann–Whitney tests were performed within groups. Adult and adolescent HSs in the US differ significantly regarding the self-ratings reported (for the heritage language $U = 1,242,153.00$, $Z = -17.971$, $p < 0.001$) while no difference was detected regarding the visits to the heritage country ($p = 0.316$). In addition to this, the two age groups significantly differ in terms of their current use of the HL ($U = 1,487,897.000$, $Z = -10.828$, $p < 0.001$), their hours of bilingual education ($U = 837,169.500$, $Z = -29.823$, $p < 0.001$) and regarding their literacy practices in Greek ($U = 849,997.000$, $Z = -29.675$, $p < 0.001$). Within the German group, the self-ratings in the heritage language as well as the visits to the heritage country seem to be significantly different between adults and adolescents (for the heritage language $U = 1,027,165.500$, $Z = -12.328$, $p < 0.001$; for the visits to the country of heritage $U = 1,249,101.000$, $Z = -4.971$, $p < 0.001$). Further significant differences were detected in the current use of Greek ($U = 921,626.500$, $Z = -11.364$, $p < 0.001$), in the literacy practices in the HL ($U = 1,272,782.500$, $Z = -3.474$, $p < 0.001$) and in the hours of education in Greek ($U = 1,146,618.500$, $Z = -9.697$, $p < 0.001$).

4.3. Results

Our results are presented in descriptive tables with raw frequencies and percentages. The data can be found online in the open access RUEG Corpus (Wiese et al. 2021).

4.3.1. Adjective Production in HSs

In our data, we counted how many adjectives (in tokens and types/lemmas), verbs and nouns were produced by HSs in Germany, HSs in the US and monolingual speakers of Greek. Table 3 shows the raw numbers and percentages for all these categories per speaker group.

Table 3. Raw numbers (and percentages) of adjective, verb and noun tokens produced by HSs vs. monolinguals.

	HSs in Germany	HSs in the US	Monolinguals
Adjectives	445 (1.9%)	414 (1.8%)	627 (2.1%)
Verbs	3594 (15.7%)	3445 (15.3%)	4961 (16.1%)
Nouns	3849 (16.8%)	3353 (14.9%)	5454 (17.7%)
Other	15,036 (65.6%)	15,365 (68%)	19,735 (64.1%)
Total	22,924 (100%)	22,577 (100%)	30,777 (100%)

Across groups, fewer adjectives (tokens) were produced compared with nouns and verbs. HSs indicate a lower number of token productions than monolinguals, with the US group producing slightly fewer adjectives than the German group. This means that the proportion of adjectives produced by every group is almost identical and the heritage groups' patterns are like those of the monolingual group. Moreover, the same pattern is found in the production of adjective types/lemmas (42 in Germany vs. 37 in the US vs. 88 in monolinguals).

Interestingly, we also observe an asymmetry between the two registers (formal vs. informal), whereby more adjective tokens were produced in the formal register across groups: $N_{\text{formal}} = 277$, $N_{\text{informal}} = 168$ in HSs in Germany; $N_{\text{formal}} = 239$, $N_{\text{informal}} = 175$ in HSs in the US; and $N_{\text{formal}} = 410$, $N_{\text{informal}} = 217$ in monolinguals. A table with the total number of tokens is included in Appendix A.

4.3.2. Agreement Mismatches in HSs

Table 4 presents raw numbers and percentages of correct and incorrect agreement instances in the verbal (subject–verb) and nominal (article–adjective–noun) domains for the two HS groups and monolinguals.

For verbal agreement (S/V), HSs in Germany seem to be almost error-free across age groups, while HSs in the US overall indicate a higher number of mismatches. In the latter group, adolescents appear more error-prone than adults. It is important to note that the S/V mismatches here concern person and number agreement as seen in (13), which was produced by an adolescent HS in Germany.

In nominal agreement, both HS groups seemed to produce more mismatches than in verbal agreement. Again, HSs in the US show more errors in total than HSs in Germany, and within the US group adolescents show more errors than adults. However, this is not the case for the HS group in Germany, where the mismatches were produced by adults only.

Table 4. Raw numbers (and percentages) of agreement patterns in the verbal (S/V) and nominal domains across groups and age groups.

Agreement Patterns	HSs in Germany		HSs in the US		Monolinguals	
	adults	adolescents	adults	adolescents	adults	adolescents
Total S/V	1212 (100%)	864 (100%)	1228 (100%)	1250 (100%)	1440 (100%)	1226 (100%)
Correct S/V	1212 (100%)	863 (99.8%)	1210 (98.5%)	1220 (97.6%)	1439 (99.9%)	1222 (99.6%)
Mismatches S/V	-	1 (0.2%)	18 (1.5%)	30 (2.4%)	1 (0.1%)	4 (0.4%)
Total nominal	264 (100%)	182 (100%)	257 (100%)	157 (100%)	321 (100%)	306 (100%)
Correct nominal	259 (98.1%)	182 (100%)	252 (98%)	129 (82.2%)	320 (99.7%)	306 (100%)
Mismatches nominal	5 (1.9%)	-	5 (2%)	28 (17.8)	1 (0.3%)	-

(13) den egine sovara atihimata (Greek)
not happen.3SG serious.NEUT.PL. accident.NEUT.PL
'serious accidents didn't happen'

Looking deeper into nominal agreement patterns, we distinguish between pre- and postnominal instances (Table 5). HSs in the US produced more mismatches postnominally than prenominally across age groups, and adolescents were again more prone to errors than adults. For the HSs in Germany we observe the opposite pattern, namely that there are only prenominal mismatches and, as we mentioned before, all by adults. As we show later (examples 14–19 in Discussion), the pre- and postnominal mismatches found in the data concern case, number and gender mismatches.

Table 5. Raw numbers (and percentages) of agreement patterns in the nominal domain across groups and age groups.

Agreement Patterns	HSs in Germany		HSs in the US		Monolinguals	
	adults	adolescents	adults	adolescents	adults	adolescents
Total prenominal	255 (100%)	175 (100%)	240 (100%)	154 (100%)	294 (100%)	285 (100%)
Correct prenominal	250 (98.1%)	175 (100%)	237 (98.7%)	127 (82.5%)	293 (99.6%)	285 (100%)
Mismatches in prenominal	5 (1.9%)	-	3 (1.3%)	27 (17.5%)	1 (0.3%)	-
Total postnominal	9 (100%)	7 (100%)	17 (100%)	3 (100%)	27 (100%)	21 (100%)
Correct postnominal	9 (100%)	7 (100%)	15 (88.2%)	2 (66.6%)	27 (100%)	21 (100%)
Mismatches in postnominal	-	-	2 (11.8%)	1 (33.3%)	-	-

We further explored the distribution of pre- and postnominal mismatches in the different communication settings depending on the elicitation order, with mixed results

(Table A6). Most of the participants adopted an avoidance strategy of the mismatched agreement structure in their narrations. Some participants repeated the mismatched agreement structure in the second narration and then avoided using the same structure. There were other participants who produced a mismatch in their first narration and then produced the correct form in the following narrations. Finally, there were also speakers who produced correct agreement patterns in the first three narrations while in the last one they produced a mismatch. This is the reverse pattern from speakers who improved as the task went on, and this could be explained by the cognitive load associated with the task. We can thus speculate that this inconsistency points to a processing effect.

We also checked for differences between determiner and adjectival agreement in both the prenominal and postnominal positions. As can be seen in Tables 6 and 7, HSs in the US again showed more mismatches in the prenominal position; the numbers of mismatches in the adolescent group, however, do not suggest a clear pattern with respect to an article vs. adjective preference, as on several occasions they got both agreement patterns wrong. Monolinguals and HSs in Germany are not included in Table 6 as they did not exhibit any ungrammatical patterns. Similarly, monolinguals are also not included in Table 7.

Table 6. Distribution of postnominal errors across groups.

Mismatches in Postnominal	HSs in the US	
	adults	adolescents
Article correct—adjective wrong	2	1
Article wrong—adjective correct	-	-
Both wrong	-	-

Table 7. Distribution of prenominal errors across groups.

Mismatches in Prenominal	HSs in Germany		HSs in the US	
	adults	adolescents	adults	adolescents
Article correct—adjective wrong	2	-	2	8
Article wrong—adjective correct	3	-	-	6
Both wrong	-	-	1	13

Finally, we looked at the distribution of mismatches with respect to the level of formality and modality in the prenominal and postnominal positions. Tables A3 and A4 do not lead us to conclude a formality/modality sensitivity of mismatches, as expected, since the presence vs. absence of agreement is not conditioned by register and/or modality. For the sake of completeness, we include the tables with the instances of adjectives found in the different communication settings.

5. Discussion

With respect to our RQ1, we cannot confirm that Greek HSs produce fewer adjectives than monolinguals, supporting Polinsky's findings on the optionality of adjectives. Contrary to previous literature, this result was not expected, thus our first prediction was not confirmed. Furthermore, we did not expect register to influence adjectival agreement, as noun–adjective agreement in Greek is not subject to register/modality variation, and this was confirmed by the fact that monolingual speakers were error-free. The errors observed with HSs are not register/modality dependent, as they appear across contexts and modalities, and thus must receive a different explanation.

Delving into RQ2, the verbal vs. nominal agreement mismatches found are also in line with previous literature on heritage languages. Greek HSs, especially in the US, produced more mismatches in the nominal domain, while they also produced mismatches

in the verbal domain. The results on determiner vs. adjectival agreement, however, are inconclusive, as the HSs in the US in particular got both wrong.

With respect to the question in RQ2 of why nominal concord is more prone to mismatches than S/V agreement, one possible answer is offered by Fuchs (2019, p. 185), and we adopt it here. Following Norris (2014) and Fuchs (2019), we take nominal concord and verbal agreement to be inherently different processes: prenominal adjectives can only receive features via copying, while S/V agreement involves *Agree*. This can be seen in our definition of *Agree* and *Feature Copying*, repeated below:

- (14) *Agree* (Chomsky 2000, 2001)
- (i) An unvalued feature F (a *probe*) on a head H scans its c-command domain for another instance of F (a *goal*) with which to agree.
 - (ii) If the goal has a value, its value is assigned as the value of the probe.

Feature Copying copies feature values from the closest source to the Agr0 node, where the closest is determined by domination rather than c-command; see (13) and (14), from Norris (2014, p. 126):

- (15) Agr node Insertion schema
- $$X \rightarrow [X \text{ Agr}]$$

After Agr0 nodes are inserted, the values are copied onto the Agr0 nodes via a rule of *Feature Copying*, as in (22):

- (16) *Feature Copying*
- The features of the closest c-commanding K0 to any particular Agr node are copied onto it.

Feature copying is thus a complex operation and, in addition, it needs to keep track of the number of features that must be copied. While one could attribute this to a performance error, an alternative would be to relate this to the operation Scontras et al. (2018) label *representational economy*. According to these authors, HSs restructure their grammar showing a preference for structures with fewer features as a way to ease working memory load; such structures are preferred over fully articulated ones. Prior to restructuring, a certain variability of features is observed.

Turning to RQ3, we start from the age group differences and our prediction that adolescent participants would show fewer mismatches compared with the adult group which undergoes attrition. Although the number of mismatches in our data do not allow us to make strong claims here about attrition, it seems that our prediction points to this direction for HSs in Germany as they pattern as predicted, while this is not the case for HSs in the US. The reasons why adult HSs in the US seem to perform slightly more accurately than adolescents given the few incorrect agreement patterns between the age groups in comparison have been discussed in a related context in Alexiadou et al. (2021). It was argued that the adults in the US have more implicit input than the relevant younger group, which explains their distinct behavior. This is also corroborated in Table 2 and the non-parametric Mann–Whitney tests, which report that adults have higher self-ratings and higher mean scores in current input and literacy practices compared with the younger group recruited in the US. As predicted, our results show that the US group is overall more error-prone than the Germany group, presumably due to influence from English which, unlike German, completely lacks agreement. Interestingly, within these two groups we observe different patterns between adults and adolescents. Our prediction about adolescents performing better remains inconclusive as the numerical difference in the Germany group on the one hand points to a minor tendency, but on the other does not

comprise a solid claim, while in the US group adolescents appeared to produce more mismatches than adults. On this basis, we cannot make claims about the presence or absence of attrition here.

Finally, recall our secondary RQ4: Are there differences between pre- and postnominal adjectival agreement in HSs? Do the two HS groups diverge in their performance? Although an in-depth analysis of pre- and postnominal agreement patterns is not possible due to the extremely small amount of data for the latter, we still find some interesting patterns worth noting here. In the US group, both adults and adolescents seemed to produce more mismatches postnominally than prenominally, confirming Kupisch et al.'s (2013) hypothesis. Unexpectedly, adult HSs in Germany produced errors only prenominally, while their postnominal agreement seemed to be intact (cf. Kupisch et al. 2013). So, we find differences between pre- and postnominal agreement in both groups, but in different directions.

Although postnominal appears to be more vulnerable than prenominal in the US group, we find mismatches in both domains, which could indicate interference from English. However, no interference from the majority language seems to take place in the German group. Since German lacks postnominal agreement, if language interference were at play, we would expect this domain to be more vulnerable, and prenominal to be less error-prone. We asked ourselves whether their agreement system undergoes a reorganization even in their majority language. We thus examined their German narrations in order to detect any emerging patterns in the prenominal domain that could possibly signal to a vulnerability, but we found none.³ We may therefore conclude that there is no interference from German. The fact that German has gender agreement allows these HSs to master agreement overall much better than HSs in the US, so their error rates in the few postnominal cases are zero across age groups. In addition to that, we can rely on the metadata, which show us that HSs in Germany had and still have a greater exposure to Greek, with the most important source of this being the formal education they have received.

We now turn to a more qualitative analysis of the errors in the two HS groups. HSs in Germany produce the following types of prenominal mismatches: they either make use of semantic agreement (17), create a novel agreement pattern (18) or make use of a dialectal form (19). In (17), the adjective agrees with the diminutive noun (neuter), while the indefinite determiner is masculine. According to Anagnostopoulou (2017), in Greek the basic distinction determining default gender is between human and non-human nouns: masculine is the default for humans and neuter for non-human nouns. Speakers treat non-human animates as belonging to either category, and (17) seems to support that. Case (18) shows that HSs create a novel form, which agrees with the head noun by adding inflectional information on an uninflected form. Finally, it is not clear that (19) is a mismatch, as it could be acceptable in several Greek dialects, and is listed in dictionaries as an alternative form.⁴

Regarding HSs in the US, they produce the following types of mismatches: Case (19) is a gender error on the definite determiner, while agreement on the adjective is intact. Case (20) shows a gender error on the prenominal adjective, while (21) shows such an error on the postnominal adjective. Here, HSs seem to default to neuter, irrespectively of the human vs. non-human character of the noun. As for (23), it looks like a postnominal case mismatch; however, it is not clear whether it could also be an elliptical form of *galaziu hromatos*, 'of blue color'.

(17)	*Enas _{HS} / Ena _{monolingual}	mikro	skilaki	(Greek)
	One.MASC / one.NEUT	small.NEUT	doggy.NEUT	
		'A small dog'		

- (18) O *pisos_{HS}/ piso_{monolingual} odigos den prolave na patisi freno (Greek)
 The.MASC behind.MASC/ behind.ADV (no inflection) driver.MASC didn't manage to press
 brake
 'The driver who was behind didn't brake on time.'
- (19) To trakarisma sti *deksi_{HS}/ deksia_{monolingual} plevra tu dromu (Greek)
 The accident on the.FEM right.NEUT/ right.FEM side.FEM of the street
 'The accident on the right side of the street.'
- (20) *to_{HS}/ o_{monolingual} *proto_{HS}/ protos_{monolingual} anthropos (Greek)
 the.NEUT.NOM/ the.MASC.NOM first.NEUT.NOM /first.MASC.NOM man.MASC.NOM
 'The first man'
- (21) eginē *olokliri_{HS}/ olokliro_{monolingual} zimja (Greek)
 happened whole.NEUT/whole.FEM damage.FEM
 'A whole lot of damage was done.'
- (22) aftos apo piso itane *pjo mikro_{HS}/ mikros_{monolingual} (Greek)
 this.MASC.NOM from back was more
 small.NEUT/small.MASC.NOM
 ''
- (23) ke ena aftokinito *galazju_{HS}/ galazjo_{monolingual} pige (Greek)
 and a.NEUT.NOM car.NEUT.NOM light blue.NEUT.GEN/ light blue.NEUT.NOM went
 'And a light blue car went'

It is worth pointing out that the differences observed between the HS groups in the two countries may be due to the different characteristics of the groups themselves, as mentioned in Section 4.2. HSs in Germany seem to be more dominant in their heritage language compared with HSs in the US, as the statistical tests reveal. We could not find a significant correlation between the variables presented in Table 2 and their mismatches in the production task, as the few non-canonical data points found did not allow us to perform any statistical test. In overview, as previous literature has shown, the higher the engagement with the heritage language is, the better performance these speakers exhibit (Flores et al. 2017; Andreou et al. 2020; Giancaspro 2020). The metalinguistic data collected for all the groups in the form of a questionnaire attest to this.

6. Conclusions

Overall, our study explored differences in the production of adjectives and adjectival agreement between HSs and monolingual controls. Our specific research questions (RQs) were as follows:

RQ1: Do HSs show different patterns from monolinguals in adjective production in Greek? What is the role of register (formal vs. informal)?

RQ2: Do HSs show differences in the number of agreement mismatches produced in the nominal vs. verbal domains? Moreover, do HSs show differences in agreement mismatches involving adjectives and determiners?

RQ3: What is the effect of the majority language (German vs. US English) and age (adults vs. adolescents) on agreement mismatches in HSs' adjectives?

A secondary RQ4 was as follows: Are there differences between pre- and postnominal adjectival agreement in HSs? Do the two HS groups diverge in their performance?

We could not provide evidence that HSs produced fewer adjectives than monolinguals, and another convergence point is that all groups produced more adjectives in the formal register. We found differences in the production of mismatches between monolinguals and the US and Germany HS groups, whereby prenominal agreement was indeed more vulnerable than S/V agreement, while no clear picture emerges at least for Greek with respect to adjectival and determiner agreement. There is no real effect of the majority language; this is at least clearly the case for German. The pre- vs. postnominal contrast does not provide us with enough data to make any substantial claims. With respect to our core phenomenon, i.e., differences in productions in nominal vs. verbal agreement patterns, we capitalized on the idea that nominal concord is a process different from S/V agreement, suggesting that feature copying is more 'complex' than *Agree*. This issue awaits further research.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. In case of minors, their guardians, provided their written informed consent to participate in this study.

Data Availability Statement: Our corpus data are available at <https://zenodo.org/record/580887>.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Elicitation orders in production task.

	Order 1 (if/swsw)	Order 2 (if/wssw)	Order 3 (if/swws)	Order 4 (if/wsws)
informal	spoken	written	spoken	written
	written	spoken	written	spoken
formal	spoken	spoken	written	written
	written	written	spoken	spoken
	Order 5 (fi/swsw)	Order 6 (fi/wssw)	Order 7 (fi/swws)	Order 8 (fi/wsws)
formal	spoken	written	spoken	written
	written	spoken	written	spoken
informal	spoken	spoken	written	written
	written	written	spoken	spoken

Table A2. Number of tokens per setting and modality across groups.

Setting	Modality	HSs in Germany		HSs in the US		Monolinguals	
		adults	adolescents	adults	adolescents	adults	adolescents
Formal	Spoken	4210	2021	3744	3510	4722	4509
Formal	Written	3023	1391	2574	2414	4033	3822
Informal	Spoken	3470	1784	2942	3264	4120	4169
Informal	Written	2249	1106	1825	1887	2813	2589

Table A3. Distribution of prenominal mismatches across groups, age groups, formality levels and modalities.

Formality	Modality	HSs in Germany		HSs in the US		Monolinguals	
		adults	adolescents	adults	adolescents	adults	adolescents
Formal	Oral	2	-	-	8	-	-
Formal	Written	2	-	1	6	1	-
Informal	Oral	-	-	2	8	-	-
Informal	Written	1	-	-	5	-	-
Total number of mismatches per age group		5	-	3	27	1	-
Total number of mismatches per group		5		30		1	

Table A4. Distribution of postnominal mismatches across groups, age groups, formality levels and modalities.

Formality	Modality	HSs in Germany		HSs in the US		Monolinguals	
		adults	adolescents	adults	adolescents	adults	adolescents
Formal	Oral	-	-	2	-	-	-
Formal	Written	-	-	-	-	-	-
Informal	Oral	-	-	-	1	-	-
Informal	Written	-	-	-	-	-	-
Total number of mismatches per age group		-	-	2	1	-	-
Total number of mismatches per group		-		3		-	

Table A5. Median of metalinguistic variables per group and age group.

	HSs in Germany		HSs in the US		Monolinguals	
	adults	adolescents	adults	adolescents	adults	adolescents
Self-ratings in reading Greek	Median 4 min 3–max 5	Median 5 min 2–max 5	Median 4 min 1–max 5	Median 2 min 1–max 5	Median 5 min 4–max 5	Median 5 min 4–max 5
Self-ratings in comprehending Greek	Median 4 min 3–max 5	Median 5 min 3–max 5	Median 4 min 2–max 5	Median 4 min 3–max 5	Median 5 min 2–max 5	Median 5 min 3–max 5
Self-ratings in writing Greek	Median 3 min 1–max 5	Median 4 min 1–max 5	Median 4 min 1–max 5	Median 2 min 1–max 5	Median 5- min 3–max 5-	Median 5- min 4–max 5-
Self-ratings in speaking Greek	Median 4 min 2–max 5	Median 5 min 3–max 5	Median 4 min 1–max 5	Median 3 min 2–max 5	Median 5- min 4–max 5	Median 5- min 4–max 5
Self-ratings in reading the ML	Median 5 min 4–max 5	Median 5 min 3–max 5	Median 5 min 4–max 5	Median 5 min 4–max 5	- -	- -
Self-ratings in comprehending the ML	Median 5 min 4–max 5	Median 5 min 3–max 5	Median 5 min 5–max 5	Median 5 min 4–max 5		
Self-ratings in writing the ML	Median 5 min 3–max 5	Median 5 min 3–max 5	Median 5 min 5–max 5	Median 5 min 4–max 5		
Self-ratings in speaking the ML	Median 5 min 4–max 5	Median 5 min 3–max 5	Median 5 min 5–max 5	Median 5 min 4–max 5	- -	- -
Visits to the country of heritage	Median 2 min 1–max 2	Median 2 min 1–max 2	Median 1 min 1–max 2	Median 1 min 0–max 2		

Table A6. Examples of agreement-mismatched structures.

Participants	Narration	Elicitation Order	Example	Pre- or Postnominal	Before	After
USbi20FG	3rd	iw-is-fs-fw	aftos apo piso itane pio mikro	post	avoidance	avoidance
Glossing			thisM.SG from behind was more *small.Neut.SG			
USbi29MG	1st	is-iw-fw-fs	efige ena podosferiko bala	pre	-	iw: avoidancefw: correct productionfs: correct production
Glossing			gone *a.Neut.SG *football.Neut.SG *ball.Neut.SG			
USbi90MG	4th	is-iw-fw-fs	ap to ali meria tu dromu	pre	correct productions in all 3 narrations	-
Glossing			from *the.Neut.SG other.Fem.SG side.Fem.SG of the street			
USbi53FG	2nd	iw-is-fs-fw	itan ena mikri ikigenia	pre	iw: same mismatch	avoidance
Glossing			was *a.Neut.SG small.Fem.SG family.Fem.SG			
USbi65FG	1st	fw-fs-iw-is	to prot aftokinito stamiste	pre	-	correct productions
Glossing			the.Neut *first car.Neut.SG stopped			

Note: * indicates that this is ungrammatical.

Notes

- ¹ Chronological age at the time of testing and age of onset to bilingualism are given in the format of years;months.
- ² Two adolescent participants' data from the German group are missing due to technical problem.
- ³ The German agreement patterns can be found in OSF repository https://osf.io/4z3sm/?view_only=a9721f85066241058ed79678509e2ae0.
- ⁴ Lemma *deksios* 'right' available online: https://www.greek-language.gr/greekLang/modern_greek/tools/lexica/triantafyllides/search.html?lq=%CE%B4%CE%B5%CE%BE%CE%B9%CF%8C%CF%82 (accessed on 25 January 2023).

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