THE EFFECT OF UPDATING ON THE PRODUCTION OF ASPECT IN GREEK-AMERICAN HERITAGE BILINGUAL SPEAKERS

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ABSTRACT

The aim of the present study is to investigate the impact of executive functions (i.e. updating) on the production of aspect by Greek-American heritage speakers. Previous studies on grammatical aspect have found that heritage speakers prefer to use more often the perfective aspect over the imperfective one (Montrul, 2002; Polinsky, 2007; Dosi, 2017). Moreover, they suggest that the habitual feature is more problematic than the continuous feature (Montrul, 2002; Dosi, Papadopoulou & Tsimpli, 2016a; Dosi, 2017). To date, very limited studies have tested the influence of cognitive abilities on linguistic abilities in heritage speakers (Dosi et al., 2016b; Andreou et al., to appear); similarly, very few studies have examined the role of updating on the acquisition of aspect (Dosi, 2016; Dosi, 2017). The present study examines the impact of updating in the production of grammatical aspect in Greek-American heritage speakers, who live in the States. The findings have shown that heritage speakers scored really low, almost at chance level. Moreover, confirming previous studies imperfective aspect was found to be particularly problematic. Interestingly, only habitual feature correlates with the performance on updating task, indicating that this feature of imperfective aspect is more demanding, since it is interpreted as a series of completed events and the speaker should remember to use imperfective aspect instead of the perfective aspect.

Keywords: Heritage bilingual speakers, updating, grammatical aspect, habituality.

INTRODUCTION

Heritage speakers belong to a broader bilingual group with great range and variety within it; greater than any other bilingual group (Montrul, 2009). They differ apart from their input and their language proficiency in their literacy practices and profiles (Rothman, 2007). For these reasons it is more difficult to outline their acquisition. Morphology is a demanding linguistic area for heritage speakers and it is often subjected to attrition (Montrul, 2008); notwithstanding this attrition is not chaotic but is driven by simplification processes. Previous studies suggest that the aspects of grammar which lie in interfaces are more susceptible to attrition (*Interfaces Hypothesis*; Tsimpli & Sorace, 2006). Therefore, grammatical aspect has been found to be quite challenging in heritage speakers' grammars. Aspectual distinctions between perfective and imperfective seem to be demanding for heritage speakers; with perfective aspect being more prevalent compared to imperfective aspect (Montrul, 2002; Polinsky, 2007). Furthermore, studies on (non-) heritage bilinguals have found that habituality is more problematic than continuity or progressivity (Dosi et al., 2016a; Dosi, 2017; Montrul, 2002).

In terms of the cognitive abilities of the bilingual speakers, previous studies point out that bilinguals exhibit a 'cognitive advantage' compared to monolinguals (Bialystok, 2001; Carlson & Meltzoff, 2008, Costa et al., 2009; Bialystok, 2011). More recent studies suggest that the role of educational setting and biliteracy (literacy in both languages) boost the cognitive

abilities of bilinguals and not bilingualism itself (Dosi et al., 2016b; Dosi & Papadopoulou, 2019; Andreou et al., to appear). Previous studies have also found that bilingual speakers rely on their cognitive skills in order to either comprehend or produce grammatical aspect.

To date, studies in Greek heritage speakers are quite limited (Tsimpli et al., 2004; Zombolou & Alexiadou, 2012; Dosi et al., 2016b; Dosi, 2017; Andreou et al., to appear). Additionally, the acquisition of the Greek aspectual system by heritage speakers and the impact of cognitive abilities on the acquisition of aspect are underinvestigated. The present study aims to address these gaps by investigating aspectual differences in Greek-American heritage speakers taking into account the role of updating.

LITERATURE REVIEW
Heritage speakers
Heritage bilingual speakers are at first exposed to the home language (first language, L1), which is usually the minority language of the community. When they attend school they are exposed to the majority language (i.e. the language of the community) and the majority language gradually becomes the dominant language (Montrul, 2010). As a result the language dominance changes; thus the proficiency level of the majority language meliorates and the proficiency level of the minority language degrades. At this point we should mention that there is a great range within the group and the speakers may have many different profiles (Rothman, 2007; Montrul, 2010), that affect their language knowledge and may lead to language attrition. Heritage language can be also affected by the input that they receive (Rothman, 2007; Sorace, 2004). Literacy practices, and more specifically literacy in the minority language, is a crucial factor in heritage language acquisition (Rothman, 2007). Other studies (Andreou et al., to appear), have manifested that if the minority language is supported the majority language can also be positively affected and can counterbalance the limited oral use of the heritage language at home. In terms of heritage speakers' language attrition, it is argued that the aspects of grammar that lie in the interfaces, such as grammatical aspect, are more demanding and thus more vulnerable to attrition (*Interfaces Hypothesis*; Tsimpli & Sorace, 2006); by contrast, core syntactic phenomena are more insusceptible to attrition (Montrul, 2009).

Aspectual systems in Greek and in English and acquisition of aspect
The grammatical aspect illustrates the perspective of the speaker, whether they observe the event as completed or as ongoing. It is mainly divided into perfective and imperfective aspect. In both English and Greek the perfective aspect denotes completed events. In English the morpheme *–ed* designates perfectivity (Comrie, 1976; Smith, 1991). In Greek, the perfective aspect is expressed through morpho-phonological changes in the verb stem (Holton, Mackridge & Philippaki-Warburton, 1997). The two languages mark very differently the imperfective aspect; English marks different the habitual (*-ed* or *used to/would*) and progressive features (*-ing*). On the other hand Greek can assign – without any morphological differentiation – either a habitual or a continuous interpretation (Mozer, 1993). Lexical cues, i.e. adjuncts, lead to a different interpretation (for more details see Dosi et al., 2016a; Dosi, 2017). In English, the progressive aspect is marked by the suffix *–ing*; while Greek marks for continuity but not for progressivity. Marking for habituality differs even more; in English habitual events are marked either by the suffix *–ed* or by a modal or a periphrastic expression (*used to/would*); while in Greek, the habitual feature is marked similarly to continuous feature; however the difference between the two features is denoted lexically.

Grammatical aspect lies in interfaces (i.e. morpho-semantics and morpho-syntax interfaces) and therefore more vulnerable to attrition, according to the *Interfaces Hypothesis* (Tsimpli &

Sorace, 2006). In the acquisition of aspect in (non-) heritage bilingual speakers there seems to be an asymmetry between the two features. Thus the speakers prefer to use more the perfective aspect over the imperfective aspect. In a series of studies of Montrul (2002, 2009) on Spanish-American heritage speakers, they scored higher in the perfective aspect compared to the imperfective aspect. However the asymmetry between the two features is not always in favor of perfective. In the study of Dosi & Papadopoulou (2019) testing Greek-German bilinguals, it was observed that in the production task, the imperfective aspect was more prevalent than the perfective. By contrast, the results of the comprehension task showed that the perfective aspect was more preferable than the imperfective. The findings were attributed to be the result or either what is known as the task effect or the fewer morpho-phonological changes that are required in the form of imperfective aspect. Similar findings were shown in a study of Nicoladis & Paradis (2012), albeit for tense marking. Other studies found that there is an asymmetry between the two interpretations of imperfective; hence habitual was found to be more demanding compared to continuous for Greek-X bilinguals or second language learners of Greek (Dosi, 2016; Dosi et al., 2016; Dosi & Papadopoulou, 2019; Papadopoulou, 2005).

Cognitive abilities and grammatical aspect

Previous studies have shown that bilingual speakers show a 'cognitive advantage' compared to monolingual speakers (Bialystok, 2001; Carlson & Meltzoff, 2008, Costa et al., 2009; Bialystok, 2011). More recent studies dispute this general 'cognitive advantage' indicating more specific factors that affect this asset; hence they draw attention to the role of educational setting and biliteracy (literacy in both languages). These factors, rather than bilingualism itself, seem to enhance the cognitive abilities of bilinguals (Dosi et al., 2016b; Dosi & Papadopoulou, 2019; Andreou et al., to appear). Latest studies show that bilingual speakers rely on their cognitive skills in order to understand and use grammatical aspect (Dosi, 2016, 2017); however it also depends on the task methodology used.

Since the studies on the impact of updating and grammatical aspect are very limited, especially in terms of heritage speakers, the present study aims to address this gap and investigate the role of updating in the production of aspect in Greek-American heritage speakers.

METHODOLOGY
Participants

In the present study participated twenty-five children from 10 to 12 years old. They were divided into two groups; (a) Greek-American heritage speakers (henceforth HS; N=10), who attended a Greek-American school in the US; thus, they received support in both Greek and English (10 hrs/w and 25 hrs/w, respectively); and (b) Greek monolinguals (henceforth; ML, N=15) who formed the control group. The heritage participants were assessed through a child questionnaire (Mattheoudakis, Chatzidaki & Maligkoudi, 2014). The question categories were four: (a) home language history, (b) current language use, (c) early literacy practices and (d) current literacy. *Home language* history pertains to exposure to each language from birth up to the age of six (age of schooling). *Current language* use pertains to the language preferences for daily activities (i.e. memorizing phone numbers, calculating, telling the time or watching TV) and oral interaction with family members and friends. *Early literacy practices* pertain to activities such as shared-book reading in preschool age. Finally, *current literacy* refers to language classes in their L1 and/or L2, language choice for writing/reading (texting, emailing, visiting websites, video-gaming, (comic-) books/magazines).

In terms of the *home language* and *current language use* the HS group did and does not use Greek (14.7% and 12.4%, respectively) or both languages (17.9% and 14.4%, respectively)

quite often; while they prefer to use American more often on a daily basis (67.4% and 73.2%, respectively); the finding is plausible if we consider that they live in the States. Similar findings were detected in the *early* and *current literacy practices*, where they used more American (74.7% and 59.6%, respectively) than Greek (10.2% and 18.8%, respectively) or both languages (15.1% and 21.6%, respectively). The findings are also expected, since these participants attend a school, where the main medium of instruction is in English.

Material
Screening tasks
All participants undertook two screening tasks: (a) an expressive vocabulary task in Greek (Vogindroukas, Protopapas & Sideridis, 2009); the HS group undertook the same task in English (Renfrew, 1995); and (b) a task testing fluid intelligence (Raven, Raven & Court, 1998). The results (see Table 1) exhibited differences between the groups [$t(24)= 11.775$, $p<.001$]; ML group outperformed HS group. Within group comparisons manifested that HS group performed better in the English vocabulary task compared to the Greek one [$t(10)=-18.296$, $p<.001$]. In the non-verbal fluid intelligence task no differences were attested between the groups [$t(24)= 1.163$, $p=.256$].

Table 1. Participants' performance on the screening tasks.

| Group	Vocabulary task in Greek (%) (SD)	Vocabulary task in English (%) (SD)	Non-verbal intelligence task (%) (SD)
HS	28.4 (8.9)	81.6 (7.5)	89.2 (1.2)
ML	88.8 (5.2)	-	88.4 (2.3)

Linguistic task
Apart from the screening tasks all participants undertook an elicitation task (see Dosi, 2016), where the participant had to fill the gaps with the given verb. The aim of the task was the production of grammatical aspect in past events. The experimental conditions were three; habitual and continuous features of imperfective aspect and perfective aspect. In total, the target items were 30, i.e. 10 per condition. In both tasks only one answer was acceptable with respect to the context. The procedure was the following: the researcher read the sentences and the participant had to produce the aspectual form of a verb in brackets. For instance, in the example *On Saturday the whole morning Kate …… an essay* (write) the participant was expected to answer was writing namely to produce the imperfective past verb form. Both tasks were provided orally in order to avoid any effects of literacy.

Cognitive task
Finally, an updating task was administered; it was based on the N-back digit task (introduced by Kirchner, 1958), was adapted to a two back digit version. N-back tasks are assumed to measure updating, i.e. standard "executive" working memory (Kane et al., 2007). The task was designed in E-prime II (Psychology Software Tools, Inc., Pittsburgh, PA, USA). The procedure was the following: the participant is shown a sequence of digits (2, 5, 7, 8), each presented one by one for 500 ms, followed by a blank 2,500 ms inter-stimulus interval. The participants were instructed to press the "J" on the keyboard if the current digit displayed was identical to the one introduced two steps back or refrain from pressing any key if the digit presented was not identical (for a more detailed presentation of the task, see Dosi et al. 2016b).

RESULTS

The results were analyzed by means of *t-tests*. The findings suggest that ML group outperformed the HS group in total scores of the task (91% and 45.6%, respectively) and in all three conditions (total scores: $t(24)= 11.943$, $p<0.001$; habitual feature of imperfective aspect: $t(24)= 9.713$, $p<0.001$; continuous feature of imperfective aspect: $t(24)= 7.462$, $p<0.001$; and perfective aspect: $t(24)= 2.289$, $p=0.033$). The HS group performed significantly lower in both features of imperfective aspect (in the habitual feature: 39.2%; and in the continuous feature: 38.4%); while monolinguals scored at ceiling in both features of imperfective (98.9% and 93.3%, respectively). Within group comparisons have shown that in the HS group scores on perfective were higher compared to scores both on habitual and continuous features (for habitual: $t(9)= -8.098$, $p<0.001$; for continuous: $t(9)= -6.533$, $p<0.001$); while no differences were observed between the two features of imperfective aspect ($t(9)= 0.127$, $p=0.901$). On the other hand, the ML group performed in an opposite fashion; hence participants preferred to produce more often imperfective aspect over perfective one (habitual-perfective: $t(14)= 4.026$, $p<0.001$; continuous-perfective: $t(14)= 2.673$, $p=0.018$); while no differences were found between the two features of the imperfective aspect ($t(14)= 1.784$, $p=0.096$)

Figure 1. Performance on the production task
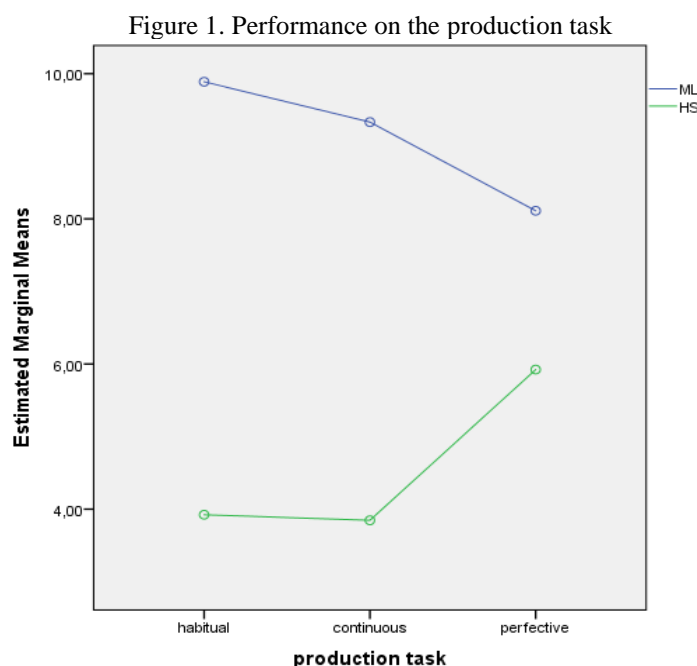
In the updating task, HS group scored higher than the ML group (52.3% and 44.2%, respectively; $t(24)= 5.118$, $p<0.001$; see Figure 2).

Figure 2. Scores (%) on the updating task
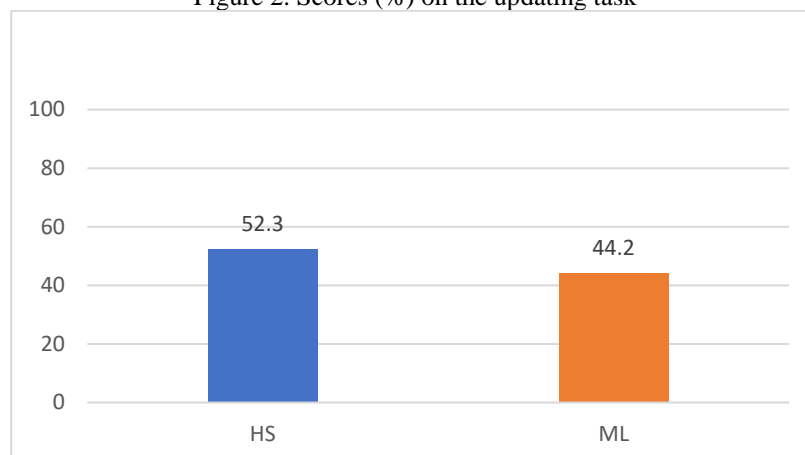
Interestingly, correlations between the performance on the linguistic task and the updating task were observed only in HS group, and only in the habitual feature (r=0.658, p=0.039).

DISCUSSION

The findings of the present study exhibit that heritage bilinguals scored almost at chance level, suggesting the attrition affect, which is often in heritage bilingual language acquisition, especially in demanding features, such as grammatical aspect (Tsimpli & Sorace, 2006; Dosi, 2017). In addition, the heritage group scored lower in both features of imperfective aspect; performance on perfective aspect was also rather low (in line with previous findings, Montrul, 2002; Polinsky, 2007). The control group performed in an opposite fashion; hence scores on imperfective aspect was lower than those on the perfective aspect. In the updating task, heritage bilinguals reached higher scores than monolinguals. Interestingly, correlations between the linguistic and the updating tasks were found only in the heritage group.

Explaining the results, we observe that in terms of the linguistic task (grammatical aspect), habitual feature was not found to be problematic compared to the continuous feature (in contrast to previous findings, Dosi, 2017; Dosi et al., 2016a). The finding can be subjected to the input that these speakers receive; however the issue remains open for further discussion. The higher scores on the perfective aspect suggest a possible attrition effect and a cross-linguistic transfer (Dosi, 2017; Dosi et al. 2016a), since in English habitual aspect is denoted by perfective aspect. The finding is expected if we consider that this bilingual group receive more input in English, in regard to the given questionnaires. By contrast, the performance of the control group is different; conceivably due to methodological issues, as Dosi (2016, 2017) suggests; hence participants prefer the less morphologically demanding feature. Nonetheless, the dissociation in the performance between the two groups, should be taken into account and further investigated by future studies.

In the updating task, a bilingual cognitive advantage is observed (similar to previous studies Bialystok, 2001; Carlson & Meltzoff, 2008, Costa et al., 2009; Bialystok, 2011); although the control group is matched in terms of the socioeconomic status with the heritage bilingual group. Since heritage bilinguals use both languages – albeit not equally – and they receive literacy in both language on a daily basis, it is expected to detect this cognitive advantage, according to previous studies (Dosi & Papadopoulou, 2019; Dosi, 2016; Dosi et al., 2016b; Andreou et al., to appear).

The correlation found, only in the heritage group, between the linguistic and cognitive tasks suggest that grammatical aspect, and especially demanding tasks, require to update the context in order to make the accurate aspectual choice (similar to Dosi, 2016, 2017; Dosi et al., 2016b; Dosi & Papadopoulou, 2019). According to previous studies, the habitual feature is interpreted as a series of completed events and the speaker should remember to use imperfective aspect instead of the perfective aspect. It is not surprising that a similar correlation was not detected in the monolingual group (similar to the findings of previous studies, Dosi, 2016), since monolingual speakers have acquired linguistic features and conceivably do not rely that much on their cognitive abilities.

CONCLUSIONS

Summarizing the findings of the present study heritage speakers scored really low in the production of aspect. Both features of imperfective aspect were more problematic compared to the use of perfective aspect. Although performance on habitual feature did not differ from the performance on continuous feature, in contrast to previous studies. Nonetheless habitual feature found to correlate with the performance on updating task, only for the heritage group, revealing that the habitual feature is more challenging, since it can be interpreted as a series of completed events and the speaker should remember to use imperfective aspect instead of the perfective aspect. All in all, the outcomes confirm that bilingual and monolingual acquisition are driven by different factors.

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