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Master's thesis

Heritage language phonotactics

Word-medial cluster syllabification in Albanian heritage speakers in Greece

Submitted by

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To my grandparents, Panayiotis Iliopoulos and Kaiti Iliopoulou,

My first and forever teachers

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Abstract

This thesis studies the *metalinguistic phonotactic knowledge* in Albanian *heritage speakers* whose *dominant language* is Greek, aiming to investigate whether *phonotactics* in a *heritage language* can be *incompletely acquired* and/or *attrited*. To this end, a group of 6 Albanian *heritage speakers* who were raised in Greece and a control group of 2 Albanian immigrants who moved to Greece in adulthood participated in a *three-consonant word-internal cluster syllabification* task, syllabifying 66 nonce-words that contained clusters allowed by Albanian phonotactics, but disallowed by the phonotactics of Modern Greek. The great between-subjects and within-subjects *variability* in the results of both groups suggests *incomplete acquisition* of *heritage phonotactics* by *heritage speakers*, as well as some degree of *attrition* in the first-generation Albanian immigrants. I argue that this *variability* is attributed to the use of *Multiple Parallel Grammars* (Kiparsky, 1993**;** Anttila, 2002a, 2002b**;** Anttila and Cho, 1998**;** Revithiadou and Tzakosta 2004a, 2004b**;** Tzakosta, 2004, among others), which is indicative of *incomplete acquisition* and *non-native ultimate attainment* in the *phonotactic knowledge* of *heritage speakers*, while the use of *Multiple Parallel Grammars* by first generation immigrants can suggest *first language attrition* of phonotactics.

1. Introduction

Language acquisition and *bilingualism* have long been of interest in *linguistic* studies. *Heritage language acquisition*, i.e. *bilingual acquisition* in a context where the one language has a *minority status*, has been a growing research field. *Heritage speakers*, as *minority language speakers*, are widely studied by *sociolinguistics*, while *education studies* have also shown an interest on migrant populations and *minority languages* research, since findings on different *linguistic* needs are important for pedagogical practices. In the last decades, there has been a growing interest for *heritage linguistics* in the fields of *theoretical linguistics* and *psycholinguistics*, since theoretical and empirical findings on the *acquisition* of a variety of language pairs, that are studied in *heritage language acquisition*, can shed light on *language development* as well as on *universal* and *language-specific* aspects of language (Montrul, 2016).

Despite the growing interest *linguistics* have shown in *heritage language* research, *heritage phonology* remains understudied. Findings in *heritage phonology* indicate impaired *segmental* and *suprasegmental perception* and *production* and some *interference* from (and sometimes to) the *heritage speaker's dominant language*. However, very little research has been done to investigate the nature of *heritage phonotactic acquisition*. To my knowledge, there has been only one study on *phonotactics* so far, carried out by Shelton *et al.* (2017), who found *significant interference* of the *dominant language* (English) on heritage Spanish *diphthong syllabification*.

This thesis aims to provide data that will contribute to the elucidation of the nature of *heritage phonotactic acquisition*, adding to the findings of this vastly understudied field. To this end, the present study examined the *syllabification* of *word-medial three-consonant clusters*, an issue with no previous findings that I am aware of. The goal was to test for *dominant language interference* in the *syllabification patterns* of *heritage speakers* but, also, to provide some primitive understanding of the nature of *phonotactic acquisition* in a context of *insufficient input*, such as the context of *heritage language acquisition*, finding evidence that support or refute the claim that *heritage languages* are *incompletely acquired* (e.g Montrul, 2008, 2016). The *subjects* tested were *bilinguals*, *heritage speakers* of Standard Albanian, who were born in Greece or moved to Greece during childhood, thus Standard Modern Greek became their *dominant language*. A *control group* of two Albanian immigrants, who immigrated to Greece at the age of 19 and speak Greek as a *second language*, was also tested in order to compare findings.

The present thesis has the following outline:

In chapter 2, I present the definition and description of *heritage speakers*, *imbalanced bilingualism* and *incomplete acquisition*. After that, I present a comprehensive overview of all *linguistic* research on *heritage phonetics* and *phonology* that has been conducted so far. Finally, I provide some information on the status of Albanian as a *heritage language* in Greece today.

In chapter 3, *syllable structure* and *phonotactics* of Standard Albanian and Standard Modern Greek are presented.

In chapter 4, I present the experimental design and procedure, as well as the participants' background, the *stimuli* used in the experiment and the limitations which arose.

In chapter 5, I discuss the experimental findings in detail, first grouped by *cluster type* and then grouped by participant, and present a detailed description and some generalizations within the theoretical framework of *Optimality Theory* (Prince and Smolensky, 1993; McCarthy and Prince, 1993a, 1993b), followed by discussion and a possible explanation of the findings, following the *Multiple Parallel Grammars* model (Kiparsky, 1993**;** Anttila, 2002a, 2002b**;** Anttila and Cho, 1998**;** Revithiadou and Tzakosta 2004a, 2004b**;** Tzakosta, 2004, among others).

Chapter 6 is the conclusion of this thesis, with a general discussion on *heritage language acquisition*, the findings of this study and implications for future research.

Finally, there is a comprehensive list of the works cited in this thesis, followed by three Appendices with comprehensive tables of Standard Albanian and Standard Modern Greek *consonants* (*phonemes* and *allophones*) (Appendix I), the *experimental stimuli* (Appendix II) and the *experimental data* of the present study (Appendix III).

2. *Heritage speakers* and their *grammars*

Infants are capable of *acquiring* as many languages as they hear in their environment and, typically, the *ultimate attainment* of first language *acquisition* is the adult *native speaker proficiency* level (Montrul, 2016). Growing up exposed to two or more languages is called *bilingual first language acquisition* (De Houwer, 2009; Meisel 1994, 2001), while *acquisition* of one or more additional languages that starts later in time than the *acquisition* of *first language(s)* is called *second language acquisition* (Ellis, 1989). *Heritage language*[1] *acquisition* is *early bilingual acquisition* that takes place in an environment where the one language is a culturally or ethnolinguistically *minority language* while the other language is a *majority language*, spoken by the larger part in a predominantly *monolingual* community (Kondo-Brown, 2006; Silva-Corvalán, 1994; Montrul, 2008, 2016; Polinsky, 2008, 2011, 2018, among others).

2.1 Who is a *heritage speaker*

According to Polinsky (2018:9; italics mine), "A *heritage language speaker* (for short, *heritage speaker*) is a *simultaneous* or *sequential* (successive) *bilingual* whose weaker language corresponds to the *minority language* of their society and whose stronger language is the *dominant language* of that society".

A *minority language* may be the *native language* of immigrant families (or of just one of the parents in *bicultural* families), or the language of communities who speak an *indigenous*, *national* or *regional* language in a place where a different *majority language* is spoken[2] (Montrul, 2016). The *minority language* status is ascribed to "lower social, cultural and political status related to factors surrounding immigration or colonialization" (*ibid*:14) and not necessarily to demographics. In any case, a language can have the status of a *majority* or a *minority language*, depending on the given social context. For example, Spanish is a widely spoken language, which is a *majority language* in Spain as well as in various Southern American countries. At the same time, Spanish is a *minority language* in the United States, spoken by immigrant families and *heritage speakers* (Montrul, 2016).

Migration naturally leads to *bilingualism* and *language contact*. Migrant families who are *speakers* of a *minority language* are *subject* to *language shift*, especially when they move to a predominantly *monolingual* country (Holmes, 1992). Getting a good command of the *majority language* is crucial for successful *assimilation*, as "immigrants who look and sound 'different' are often regarded as threatening by majority group members" (*ibid*:56). This means that adult immigrants who have to use the *majority language* at work and want to be integrated in society become *bilinguals*. In predominantly *monolingual* societies this can result in their abandoning their *native language* and using the host country's *majority language* even with *interlocutors* of the same origin or at home (Holmes, 1992). This is especially true for languages that have a low sociopolitical status (Montrul, 2016). Child immigrants, who have immigrated with their family at a young age, as well as children born to migrant families in the host country, may communicate in the *minority language* at the domain of home and family, before they start school. However, when they start to interact with peers and teachers at the domain of school, they will have to use the *majority language* of the country they live in, and this will become their *dominant language* outside home (*ibid*). Additionally, children often re*fuse* to interact in their *mother tongue*, as they feel it alienates them from their peers (*ibid*). As a

[1] Other terms used to describe *heritage language*s are: *international, community, immigrant, ethnic, indigenous, minority, ancestral, third, non-official* (Montrul, 2016:13-14).

[2] *Returnees* and *international adoptees* are also considered to be *heritage speakers* (Montrul, 2016).

result, even when immigrant parents do not cease to use their *native language* at home, the *majority language* "infiltrates the home through the children" (Holmes, 1992:56).

Apart from the social factors mentioned above, when the immigrant community does not take measures to ensure *language maintenance*, *language shift* is unavoidable in future generations, as the *dominant language* is used in every institutional domain (Holmes, 1992). Especially in cases where the immigrant group is isolated, in the sense that the immigrants cannot find many *interlocutors* to use their *native language* with, *language maintenance* is difficult to be achieved (*ibid*). This *language shift* can happen over only two generations, as the migrants' children are *bilingual* and their grandchildren tend to be *monolingual* in the *majority language* (*ibid*).

Due to the different frequency of use of the two *first languages*, the *heritage language* which, especially in adolescence, is contained in the domain of family (Oh and Fuligni, 2010) is *acquired incompletely* or *attrited* and *heritage speakers* do not often reach the level of *competence* and *fluency* of a *native speaker* who lives in a community where the *heritage language* is a *majority language* (cf. 2.2). At the same time, the *majority language*, spoken in all public settings, tends to become the *dominant language* of such *bilinguals* and is *processed* with ease, compared to the weaker language (Montrul, 2016). However, *heritage speakers* may decide to learn or *reacquire* and further develop their *family language* in order to empower their resume, but also because they may feel that this is their *native language* and their *cultural heritage* (*ibid*). These *speakers* affirm that "they have lost parts of it [the *heritage language*] as they were growing up" (*ibid*:4).

Research shows that *heritage speakers* are *proficient* in the *minority language* to different extents. There can be different degrees of *fluency*, ranging from full *fluency* to little or no *productive ability*. Also, there are differences regarding the extent of *proficiency* in *formal registers*, as well as in the degrees of *literacy* (Montrul, 2016). Montrul (2016) suggests that "the vast majority of *heritage speakers* […] lies in-between these two extremes" (*ibid*:17; italics mine) of *proficiency*. These differences across *speakers* of *heritage language*s correlate to the age at which the *majority language* is *acquired* or *learnt*, to the extent and *frequency of use* of the *heritage language* in the family and in broader settings, and to the extent of instruction and *literacy* (*ibid*:18).

To conclude, a *heritage language* is a *minority language* due to sociopolitical factors, hence its infrequency of use. The home languages of migrant families are usually *minority language*s, since migrants move to a region where their home language has a minority status and they are forced into *language shift* towards the *majority language*. Furthermore, migrant children, or children born to migrant families grow up in an environment where the vast majority of *input* is in the *majority language*, using the *minority language* only in the setting of family. Such *speakers* are defined as *heritage speakers* and they rarely have an *ultimate native-like attainment* in the *heritage language*.

2.2 Imbalanced *bilingualism* and *incomplete acquisition*

The idealized *representation* of a *bilingual* person is that of an individual who has *acquired* two languages in infancy and, as an adult, has a balanced *proficiency* in both languages (Montrul, 2008, 2016). Even though it is possible for the two (or more) languages to be fully *acquired* with a *native-like* command, this is a very rare outcome (Grosjean 1989, 1998). Typically, *bilingual linguistic knowledge* and *language use* are *imbalanced* (Montrul, 2008) as the two languages have to be equally used in various domains. While the amount of *use* of the *minority language* in limited, given that the language is only used in the family setting, there is abundant *input* in the *majority language*, which is the pre*dominant language* to which the *bilingual* is exposed, in a variety of *contexts*, including school and media in both oral and written *modality*. In addition to that, many *heritage language speakers*

have a low degree of motivation, being aware that the *heritage language* is used only in their home setting, while the *majority language* is spoken in nearly any other context (Montrul, 2008) and make *language choices* that reflect their perceived value of the *heritage language* (*ibid*). Additionally, the wider *quality* and *quantity* of *input* in the *dominant* language, alongside the *input* impediment in the *heritage language* and enhanced *proficiency* in the *majority language*, can guide *language preference*, which leads to *language choices* that favor the use of the *majority language* (Meisel, 2007), hence its *dominance*. In such cases, the *dominant language* is the one that is more *native*-like (Meisel, 2001).

An important factor in heritage language maintenance, fluency and proficiency is the age of onset of bilingualism (Jia and Aaronson, 2003). *Bilingualism* can be either *simultaneous* or *sequential*. *Simultaneous bilingual acquisition*, or *bilingual/multiple first language acquisition* (see Meisel, 2004; de Houwer, 1995), occurs when infants are exposed to the *input* of two (or more) languages in their environment before the age of 3 (Montrul, 2008, 2016). This is usually the case with children of immigrants (second generation immigrants), children living in *bilingual* (or *multilingual*) communities (e.g. Montreal, Catalonia, Switzerland) and children raised in a setting where each parent has a different *native language* and speaks solely their language to the child (*one-parent/one-language strategy*), even in cases when the *input* of the different language comes from a caregiver (Montrul, 2008). In this case, children get less *input* in their *home language* than *sequential bilingual* children because in *simultaneous bilingual* children the quantity of *input* and the time of use are shared by their two *first languages* (Montrul, 2008).

L2 acquisition in children who grow up *immersed* in the *L2 environment* after the age of 4, when the foundations of the *basic grammar* of the *first language* are already established, tends to have a *native-like ultimate attainment*, although this could lead to *L1 attrition* (*subtractive bilingualism*) (Lambert, 1977). Even though this is technically a case of *L2 acquisition*, it takes place within the *critical period*[3] (Lenneberg, 1967), thus being *subject* to *Universal Grammar* (Bley-Vroman, 1989). In the typical case, children of migrant families who *acquire* a *heritage language* are *subsequent bilinguals*, who receive plenty of exposure in their *heritage language* in infancy, but the *quantity* of this *input* is reduced to a large extent when *heritage speakers* start formal schooling, when societal and peer influences build up an advantage for the *majority language.* (O'Grady *et al.*, 2011). As the *input* in their *L2*, which is the *majority language*, increases in frequency and variety of *contexts*, the use of *L1* progressively decreases and becomes domain specific. Thus, *development* of their *L1* stops and their ability in the *heritage language* diminishes or *stabilizes* at a *stage* where it is not fully *developed* (Jia and Paradis, 2014). This results in *incomplete acquisition* (Montrul 2008, 2016) or *L1 attrition* (Cook, 2003; de Bot, 2004; Jessner, 2003; Köpke *et al.*, 2007; Polinsky, 2006, 2011; Montrul, 2008, 2010, 2011, 2012; Bylund, 2009 among others) as "*input* is relevant not only for language *acquisition*, but also for *language maintenance*" (O'Grady *et al.*, 2011: 29, italics mine), so adult *heritage speakers* tend to lose elements of their *L1* "as a consequence of disuse" (O'Grady *et al.*, 2011: 35) when they use the *heritage language* occasionally and/or in restricted contexts. Additionally, studies comparing children and adult *heritage speakers* (O'Grady *et al*., 2011; Polinsky, 2011) have indicated that there seems to be *attrition* over the course of a lifespan, since their *data* imply more evident *language regression* in adults.

The outcome of *heritage language acquisition* depends on the *input* the child receives in the *minority language* during the *critical period* (Montrul, 2008, 2016; O'Grady *et al.*, 2011) as well as on

[3] The *critical period* ends at about the age of puberty (12-13 years old), when *cerebral lateralization* is established (Lenneberg, 1967: 62, 65).

social factors. Both *simultaneous* and *sequential bilinguals* are prone to an *unbalanced language development. Sequential bilinguals*, who had enough exposure in their *L1* before the commencement of *L2 acquisition* tend to grow up to be more *proficient* in the *heritage language* than *simultaneous bilinguals* (Allen, 2007; Allen *et al.,* 2006; Montrul 2002, 2008, 2016, among others)[4]. Children who immigrate with their parents tend to maintain a degree of *proficiency* in their *L1*, and different *pattern*s of *attrition* or *incomplete acquisition* are observed (Montrul, 2008, 2016; Polinsky, 2006), depending on the *quality* and *quantity* of *input* in the *L1* that they receive in the community to which they move in. Nevertheless, they might grow up to be *receptive bilinguals* or *overhearers*[5] (Au *et al.*, 2002).

There are also some studies (Ellis, 2006; Yip and Matthews, 2007) claiming that the language *pattern*s attested in *heritage speakers* are the outcome of *dominant language interference* or *transfer*. According to Grosjean (2001), both languages are activated at the same time in *bilingualism*. Nevertheless, only one of the languages is used at a given time, while the other one is inhibited. Building on that, Meisel (2007) suggests that *dominant language interference* can be ascribed to the unsuccessful inhibition of the *dominant language,* which results in the grammars of both languages being used at the same time.

The *Incompleteness Hypothesis*, proposed by Schachter (1990) (building on Bley-Vroman, 1989) and further argued for by Sorace (1993), describes the *nonnative-like attainment* attested in *L2 acquisition* and the *incompleteness* of *L2 grammars*, ascribing that to *maturational effects*. However, Montrul (2008) argues that, although *incomplete acquisition* is typical to late *bilingualism*, it is also possible in early *bilingual grammar*s which are *acquired* before the end of the *critical period*. What is more, some of the *structural patterns* observed in *heritage language*s are also observed in *L2 learners* of the same languages (Schlyter, 1993; Montrul, 2016), while the *dominant language* exhibits *patterns* found in normal *L1 development* (Schlyter, 1993). This is typical in *heritage language acquisition*. As Montrul (2008, 2016) suggests, because of its particular context, *heritage language acquisition* follows *developmental paths* similar to those observed in both *monolingual L1* and *child L2 acquisition*, concluding that *heritage grammars* resemble *grammars* in early *stages* of *language development*.

Research suggests that *heritage speakers* have *acquired* the core aspects of the *heritage language grammar* and *vocabulary*. However, it is observed that *heritage speakers* show a "tendency toward *simplification*, *reduction* and *reanalysis*" (Montrul, 2016:86) and the less *fluent* a *heritage speaker* is the more *nonnative patterns* emerge in *vocabulary*, *inflectional morphology, syntax, semantics, discourse* and *pragmatics* (see Montrul, 2016: §3 for a detailed discussion on the *grammar* of *heritage speakers* and a detailed literature overview).

Several studies indicate that many of the *pattern*s observed are due to *indirect* (Otheguy and Zentella, 2012; Silva-Corvalán, 1994) or *direct* (Albirini and Benmammoun 2014; Montrul and Ionin, 2010) *transfer* from the *majority language*, since *language contact* can lead to *simplification* of a language (DeGraff, 1999; McWhorter, 2007; Meisel 2011; Silva-Corvalán, 1994; Thomason and

[4] Cf. Kupisch *et al.* (2017) for a discussion of the contradicting view. Kupisch *et al.* (2017) argue that type of *bilingualism* (*subsequent* or *sequential*) does not create a disadvantage and that insufficient *input* does not always lead to *incomplete acquisition* or *attrition* (at least for definiteness effects in the syntax-semantics-discourse interface).

[5] i.e. *heritage speakers* with a *passive knowledge* of the language, who grew up hearing it but not communicating or being addressed in it. They only retain some *receptive language skills*, usually in *oral language.*

Kaufman, 2001). On the other hand, there are studies suggesting that *language contact* can also lead to *complexification*, rather than *simplification* in *grammar* (McWhorter, 2007; Keel, 2015; Shin, 2014). However, the *pattern*s of *simplification*, *reduction* and *reanalysis* attested in *heritage grammars* are also found in *monolingual first language acquisition*, suggesting that the *heritage speakers*' divergence from the *native adult grammar* is due to *incomplete acquisition* or *first language attrition* (Montrul, 2016). Evidence for *language attrition* indicates that the *structure*s of *L1* are yet to be stable at the age of 4 and they can be *lost* or incompletely *acquired* (*ibid*), hence *language acquisition* has not been completed by that age and there is a need for a large amount of *input*, in various contexts and for many years to follow, in order for the language to *develop* and *stabilize* (*ibid*).

The findings on the *incomplete acquisition* of *heritage language*s challenge the assumption that child language *acquisition* results in *native competence* in adulthood (Chomsky, 1981; Crain and Thornton, 1998) as well as the assumption of solidity of the *structure* of the *native language*, assumptions that take the ideal *monolingual native speaker* for granted (Montrul, 2016).

Concluding, typical *bilingualism* is *unbalanced*. In the case of *heritage speakers*, the *weaker language* is their *home* (*minority*) *language*, while the *majority language* of their community is their *dominant language*. Regardless of whether *heritage speakers* are *simultaneous* or *sequential bilinguals*, they tend to display *nonnative patterns* in their *grammars*, since insufficient *input* in the *heritage language* and narrow contexts of use result in *incomplete acquisition* or *attrition*.

2.3 *Heritage speakers' phonology* and *phonetics*

Linguistic research in the field of *heritage language*s has shown that there are signs of *attrition* or *incomplete acquisition* in the domains of *syntax, inflectional morphology, semantics, pragmatics, discourse* and *vocabulary*. *Heritage speakers* display *nonnative patterns* in these domains and they display different degrees of *fluency*[6]. However, *phonetics* and *phonology* seem to be the least affected *linguistic* domains in *heritage grammars*.

Heritage speakers seem to have *native-like phonological skills*, when compared to *L2 learners* matched for *morphosyntactic skills*. Even *heritage speakers* with minimum *proficiency* in the *heritage language* who have no *productive skills* (*overhearers*) seem to have strong *receptive aural* skills. On the other hand, when *heritage speakers* are compared to *native speaker* groups or to the *baseline*[7], they seem to be significantly less *proficient*.

2.3.1 Production

Studies in *production* have indicated some divergence from *native phonology/phonetics*. Most researchers studying *segmental production* in *heritage speakers* conclude that there is some *interference* from the *dominant language*.

Godson (2003, 2004) reports signs of *incomplete acquisition* in ten Western Armenians who immigrated to the US before the age of 8. Godson's *subjects* exhibited affected *production* in 3 of the five Western Armenian *vowels*: the two *front vowels* /i/ and /ɛ/ and the *central vowel* /a/, which were influenced by English, as the *acoustical* and statistical analysis showed. Comparing the results of these

[6] Cf. Montrul (2016) and Polinsky (2018) for comprehensive literature overviews and an extended discussion.

[7] In the study of *heritage language acquisition*, first generation immigrants are the *baseline* and serve as *input* source for the *heritage speakers*. *Attrition* is possible in the *baseline*, which means that the *input heritage speakers* receive from the *baseline* is not the same as the *input* they would receive in the homeland (Polinsky, 2018).

speakers to those of Western Armenian immigrants, who immigrated to the US after the age of 8, as well as to *data* from *monolingual* Western Armenian *speakers*, Godson showed that the three *vowels* in the group of *subjects* who immigrated before the age of 8 were more influenced by English than the *outputs* of the group who immigrated after the age of 8. Keeping in mind that the *target* words in the experiment were expected to be *acquired* by the age of 5 in *monolingual* children growing up in a Western Armenian setting, Godson concludes that the *grammar* of the adult *heritage speakers* she investigated is *incomplete* and probably influenced by *L2*, in the *phonetics* domain. Additionally, Godson's findings suggest that the age of immigration, at which *L1* gets demoted to a *minority language* status, plays key role to the degree of *attrition* or *incomplete acquisition*. Bullock and Gerfen (2004) and Louden and Page (2005) had findings similar to those of Godson (2003, 2004). Bullock and Gerfen (2004) investigated *heritage speakers* of French in Frenchville, Pennsylvania and found convergence to the English *vowel system*, while Louden and Page (2005) studied *vowel production* in German *heritage speakers* in Pennsylvania and found evidence for both convergence to and divergence from English. What is more, Mayr *et al.* (2015) presented evidence for convergence of some (but not all) Welsh *vowel*s towards English. Similarly, Saadah (2011) investigated *production* of Palestinian Arabic *vowel*s in 12 *heritage speakers* of Palestinian Arabic raised in the US, 12 *L2 learner*s of Arabic with English as their *L1*, and 6 *native* Palestinian Arabic *speakers* who immigrated to the US after the age of 20. Saadah examined the acoustic values for the Palestinian Arabic *vowel*s /i, u, a, iː, uː, aː/ in their *plain* and *pharyngealized forms*. *Heritage speakers* in the study exhibited both *native* and *nonnative* performance, as their *values* were in proximity to those of the *native speakers* for the *high front vowel*s, yet they performed closer to the *L2* group for /uː/, falling in between the two comparison groups for the rest of the *vowel*s /u, a, aː/.

Spanish *heritage speakers* also exhibited *production* differences from *native speakers* in the studies of Rao (2013, 2014, 2015), who looked into *spirantization* in Spanish *intervocalic voiced stops* (/b, d, g/ turn into [β, ð, ɣ]). Rao's *data* suggest that there is individual *variability* in *heritage speakers*, as the *allophonic production* of more *proficient heritage speakers* in his experiment was more *native-like* than the production of *heritage speakers* of low *proficiency*. Moreover, the *production* of /b/ was not as *native-like* as the production of /d/ and /g/. Similarly, Henriksen (2015) and Amengual (2016) studied the *production* of *trill* versus *tap* in Spanish, both concluding that, while the *heritage speakers* have *acquired* the *trill/tap distinction*, there are *articulatory* differences from *monolingual speakers*.

Tse (2016a, 2016b, 2017a, 2017b) showed that, while *heritage speakers* of Cantonese in Toronto produce the same *phonemic inventory* as the *baseline*, there is some divergence in *vowel*s. *Heritage speakers* analyze *vowel distinctions* using the *contrast* between *tense* and *lax vowel*s, a *contrast* that is part of English *phonology*, which advocates for *language shift* in the domain of *phonological representations* (Polinsky, 2018). Moreover, Ronquest (2013) and Alvord and Rogers (2014) found that *heritage speakers* of Spanish in the US produce more *centralized* and *shorter unstressed vowel*s (compared to *vowel*s in *stressed position*), indicating *interference* from English, since *vowel reduction* is typical in it. However, Chang *et al.* (2011) conducted 3 *production* experiments, investigating the *production* of *language-internal phonemic contrasts* in 15 Mandarin *heritage speakers* in the US, comparing them to a group of 6 *native speakers* of Mandarin who immigrated to the US from Taiwan and mainland China after the age of 14. Chang and his colleagues investigated the *production* of *back vowel*s /o, u, y/, the *production* of *aspirated* versus *unaspirated plosives*, and the *production* of *retroflex fricative* /ʂ/ and *alveo-palatal fricative* /ɕ/, asking participants to read the *target phonemes* inside words. Unlike the other studies mentioned above, all three experiments concluded that the

heritage speakers who participated in the study had not lost any of the *language internal contrasts* of Mandarin but, also, they were able to discern *crosslinguistic contrasts* between Mandarin and English.

In addition to that, there are also studies that have implied that *bilingual production* is bidirectionally affected, and that this also applies to the case of *heritage speakers*. In the study of Baker and Trofimovich (2005), the *production* of 6 English and 5 Korean *vowel*s by Korean *heritage speakers dominant* in English was *acoustically* distinct from the *production* of the same *vowel*s by English and Korean *monolingual*s. Guion (2003) presented similar results, studying the *production* of *vowel*s in Quechua-Spanish *bilinguals*, *dominant* in Spanish.

Barlow *et al.* (2013) and Barlow (2014) offer additional supporting evidence for convergence of the two *grammars* in areas where the two languages are quite the same. Their study of Spanish-English *bilinguals* who were *dominant* in English shows that, in *onset* position, the *bilinguals* produced a /l/ *variant* divergent from, though close to the *target* in both English and Spanish. On the contrary, when in *rhyme position* the *target-like allophone*[8] was produced.

Intriguingly, there is also evidence that *language shift* is driven by both the effects of *language contact* (or *transfer* from the *dominant language*) and *universal principles*, available in the *Universal Grammar*. Applebaum and Gordon (2013) suggest that the *shift* of *labialized ejectives* towards *voiceless unaspirated* and *voiced stops* and the *simplification* of the *heritage phonemic inventory*, as signified by the fading of *contrast* between *postalveolar* /ʃ, ʒ/ and *alveopalatal* /ɕ, ɕ', ʑ/ *coronal fricatives* in Turkish Circassian in diaspora are due to the *universal tendency* for *ease of articulation*.

Polinsky (2018) concludes that *bilinguals* use a strategy she calls "the good enough strategy", where

> "speakers bring their knowledge of contrasts in one language to the other only when such contrasts are useful, while minimizing less contrastive distinctions and arriving at some kind of compromise in those instances where contrast is not important" (Polinsky, 2018:141).

Indeed, research shows that *heritage speakers* tend to spotlight *phonological* differences between their two languages, for example, *heritage speakers* of Polish in Canada (Łyskawa *et al*., 2016) show a higher rate of *final obstruent devoicing* than *monolingual* Polish, *monolingual* English and first-generation Polish immigrants. *Final obstruent devoicing* is characteristic of Slavic languages (including Polish) and the emphasis put on it by *heritage speakers* could be indicative of a tendency[9] to *overproduce* differences between the *dominant* and the *heritage language* in *heritage grammars* (Polinsky, 2018).

However, when those differences are not considered crucial, either because they are not informative enough or because they come from a *scalar*, as opposed to a *categorical binary representation* they are not brought into play (Polinsky, 2018). *Heritage* Russian *speakers dominant* in Hebrew produced Russian words using the *vowel reduction pattern* of standard Russian (Asherov *et al.*, 2016). Nevertheless, when the *heritage speakers* produced Russian *nonce-words*, they used the *binary distinction phonological rule* applied in the Hebrew *vowel reduction pattern*. This could suggest that they have not *acquired* the Russian *phonological rule* for *vowel reduction*, and they have stored the Russian words as *learnt lexical items*, actively *applying* only the Hebrew *rule* (Polinsky, 2018). It

[8] the *velarized allophone* /ɫ/ in American English, which is different from the Spanish *lateral approximant*
[9] cf. also Kupisch *et al.*, 2014a for evidence for overapplying gemination in *heritage* Italian.

remains unknown, though, if Asherov and colleagues' *subjects* showed signs of *interference* from Russian in their Hebrew *production* (*ibid*).

Heritage speakers seem to be more conservative in their *heritage language* than *native speakers* living in the country where said language has a *majority* status or, even, more conservative than first-generation immigrants. The studies of Thepboriruk (2015) for *heritage* Thai in Los Angeles and Kang and Nagy (2012, 2016) for Seoul Korean in Toronto, have shown that the *innovation* and ongoing *language change* observed in homeland are absent from *heritage grammars*. Thepboriruk (2015: 155-158) concludes that Thai teens model their mothers', rather than their peers' speech, as the speech of elders is considered to be more authentic and serves as a hallmark of their Thainess. Cultural motivation is also present in *Kiezdeutsch*[10] (or *hood German*) (Jannedy and Weirich, 2014; Jannedy *et al.*, 2015) where "the raising and fronting of /ɔɪ/, a velar realization of /l/, tensing of final <-er>, dental release of /t/, and most saliently, the realization of the palatal fricative /ç/ as [ɕ] or [ʃ]" (Jannedy *et al.*, 2015:1), which are present in both *production* and *perception*, are adopted even by German *monolingual* youths, as a sign of community identity and belonging.

Phonetic/phonological conservatism is also apparent in the *dominant language* of *heritage speakers*, irrespective of their *home language*. Polinsky (2018: 142-144) discusses an unpublished study of hers, where she found that *heritage speakers* of various languages who were *dominant* in English "produced significantly fewer unreleased stops than their age-matched counterparts" (Polinsky, 2018:143). The *production*s were assessed by 4 *native* English listeners. The variety of home languages of those *heritage speakers* excludes the possibility that this divergence is a result of *transfer* from the *home language*. Polinsky (2018:144) suggests that *heritage speakers* feel the need to express themselves in more clarity than the usual *speaker*, because they have frequent interactions with *nonnative speakers* of English in their home setting and their communication is more successful when *word boundaries* are clear, with no *contractions* or *omissions*. Thus, this divergence could be explained as a result of their *bilingual* experience (Polinsky, 2018:144).

Research shows that, in the domains of *stress* and *prosody*, *heritage speakers* do not tend to have a *native-like ultimate attainment*. Nevertheless, they still perform better than *L2 learners* of their *home language*. *Acquisition* of *suprasegmental features* is considered to occur earlier than *acquisition* of *segmental features* (cf. Peña *et al.*, 2012 for a general discussion and Hua and Dodd, 2000; Hua, 2002 for discussions on Mandarin *phonological acquisition*). Chang and Yao (2016) compared the tonal *production* of *native* Mandarin *speakers*, *heritage speakers* of Mandarin and late *L2 learners*, in an *acoustic study*, concluding that *heritage speakers* produce *suprasegmental contrasts* that are divergent from the *contrasts* produced by the *native speakers* and the *L2 learner*s, falling closer to either group at times. Similarly, Yang (2015) concludes that, unlike *native* Mandarin *speakers*, *heritage speakers* do not depend on *pitch contour* to produce *tonal patterns*, while they also use a smaller *pitch range*.

Investigating *prosody* and *pitch contours*, Colantoni *et al*. (2016) found that *heritage speakers* of Mexican Spanish did not diverge significantly from long-term immigrants from Mexico. However, they spotted some more differences in their reading task, than in their semi-spontaneous speech task, a fact indicative of some effect due to formal educational background. Harris and Gries (2011), who studied Spanish *heritage speakers* in the US, report some *variation* in *vowel-length* consistent with a

[10] A youth *dialect* in urban areas of Germany, which are mainly populated by families of Turkish or Arabic descent and German *speakers* of the same, low socioeconomic background.

stress-timed language (like English), as contrasted with a *syllable-timed language* (like Spanish), suggesting that there is *interference* of English on the *rhythm* of *heritage* Spanish.

Chen *et al.* (2014) studied *prosody* in *focus environments*, in *heritage speakers* of Quanzhou Southern Min who were *dominant* in Mandarin. Chen *et al.* (2014) found that the *heritage speaker* group they studied produced *focus* consistent with their *heritage language* in Quanzhou Southern Min (with no *post-focus compression*), as well as *post-focus compression* consistent with their *dominant* language, when speaking it. Their findings suggest no *transfer* from either the *subjects*' *heritage* or their *dominant language*. Similarly, Pan (2007) found minimal *transfer* from the *dominant language* in the same language pair. These findings suggest that, when it comes to *focus*, even in cases where there is some *interference* from the *dominant* language, this *interference* is limited, at least for Quanzhou Southern Min *heritage speakers dominant* in Mandarin. On the contrary, Van Rijswijk *et al.* (2017) found some *interference* from *heritage* Turkish to the *dominant language* (Dutch), when they investigated the *prosody of focus*, but they do not conclude whether this is an actual case of *transfer* or just a cultural difference. However, Fenyvesi (2005) found that *heritage speakers* of Hungarian, *dominant* in English use *prosodic patterns* which are consistent with English, in their *heritage* Hungarian *production*. Altogether, findings in the *prosody of focus* are by far not conclusive, but they could be indicative of a "prosodic motivation for '*heritage* accent'" (Polinsky, 2018: 152).

When *native speakers* listen to the *oral production* of *heritage speakers*, they tend to conclude that their *production* is *nonnative*, even in cases where they judge excerpts with no *pauses* and no *morpho-syntactic errors*.

Polinsky (2018: 118-121) discusses an unpublished study she conducted using the matched-guise technique (Lambert *et al.*, 1960), where 15 Russian *native speakers* in Moscow listened to seven-second narratives of 7 *heritage speakers*, 11 *native speakers* living in the homeland, 5 highly *fluent L2 learner*s of Russian (with English as their *L1*) and 8 Russian first-generation immigrants who had lived in the US for at least 10 years. The raters had to decide if the person on the recording was born in Russia and if they currently live in Russia and answer "yes", "no" or "I don't know". Polinsky used excerpts with no hesitations, long breaks or *morpho-syntactic errors* that could reveal the *subjects*' *nativeship*. Examination of the *data* revealed that the recordings coming from *heritage speakers* were deemed produced by *speakers* living abroad in 83.5% of the cases and produced by *speakers* who were born abroad in 62.3% of the cases. Interestingly, in 85.7% of the cases of immigrants living in the US for at least 10 years, the ratings were accurate, thus offering supporting evidence for *attrition*. Polinsky (2018) suggests that the *heritage speakers* and the immigrants in her study were recognized as such because of their divergent *intonation* and not because of *segmental* differences. She also thinks that it is possible that the *heritage speakers*' divergent *prosody* is due to the divergent *prosody* they heard from the first-generation immigrants (*baseline*) who served as *input* source during *heritage* Russian *acquisition*.

Kupisch *et al.* (2014a) had *native speakers* of German, French and Italian judge the *pronunciation* (in naturalistic speech samples) of *simultaneous bilingual heritage speakers* raised in Germany, France and Italy (German-French and German-Italian) of *L2 learner*s, and of *monolingual native speakers* of the respective languages. They found that speech samples of the *majority language* were judged to be *native*, while speech samples containing the *heritage language* were judged to be *nonnative*. Still, the *heritage speakers*' groups performed better than the *L2 learners'* groups, and the raters showed uncertainty when judging *heritage language* speech samples. Also, Kupisch and colleagues found correlation between perceived *native accent* and length of residence in the country where the

heritage language has a *majority language* status, during childhood, as the more years a *subject* spent in the homeland, the less they are perceived to be *nonnative*.

In her dissertation, Bae (2015), states that her *subjects*' *prosody* was *native-like*. However, the subjects' production was sometimes perceived as having a Korean-American accent, which she attributes to the *input* they received as children growing up in Korean immigrant families in the US. Moreover, raters in the study of Au *et al.* (2008) were highly consistent, perceiving the *cohorts* of adult *heritage re-learners* of Spanish, *L2 learners* and *childhood overhearers* as *nonnative*. Again, the *L2 learners* were perceived as less *native-like* than the other three groups. In the study of Knightly *et al.* (2003), Spanish *overhearers* performed better than Spanish *L2 learners* in producing Spanish *phonemes* and narratives. However, Oh *et al.* (2003, 2010) and Au and Oh (2009) who included Korean *overhearers* in their studies, reached a different conclusion as their *data* indicated that only *heritage speakers* who had actually used the language had an advantage over *L2 learner*s in *production*. Polinsky (2018) claims that this can be due to the fact that Spanish *overhearers* were studied in Southern California, where they grew up as a part of a Latino community, having increased opportunities for language exposure, unlike Korean *overhearers*.

Yeni-Komshian *et al.* (2000) had *native* Korean *speakers* evaluate the presence of *foreign accent* in recorded *production*s of Korean *native speakers* and Korean *heritage speakers dominant* in English, in a *sentence repetition task*. Results indicated that "participants who arrived in the US before the age of 12 years produced the Korean sentences with an "American" foreign accent" (Flege, 2007:364), while Koreans who immigrated to the US after age 12 also demonstrated some signs of *attrition*, as their perceived *accent* diverged from the *monolingual native* one.

Finally, there is also some evidence for loss of *morphophonological rules* (Vago, 1991). Vago (1991) found evidence for *attrition* in a *case study* of a 36-year-old Hungarian *heritage speaker*, whose family immigrated to Israel when she was at the age of 5;10. Vargo's *subject* exhibited signs of *attrition* (which Montrul (2016) interprets as *incomplete acquisition*), *oversimplifying* and *overapplying glide epenthesis* between the *stem* and the *possessive suffix* in Hungarian *nouns*, failing to apply *phonological rules* in the expected order and exhibiting *rule loss* in the case of 3 *phonological rules* (*vowel epenthesis* or *metathesis* in /h/+*liquid sequences*, *t-palatalization* and *assimilation*).

2.3.2 Perception

In perception, it seems that *bilingualism* offers an advantage in *perceiving* both *cross-language* and *language-internal vowel contrasts*.

Regarding *segmental perception*, research has shown that being exposed to the *phonetic contrasts* of a language early on in life offers an advantage for discriminating those *contrasts* in adulthood (cf. Werker and Tees, 1984; Tees and Werker, 1984, Werker, 1989). The studies of Werker (1989) and Tees and Werker (1984) have shown that English-speaking *overhearers* of Hindi retained their ability to discriminate between Hindi *dental* and *retroflex contrasts* which do not have a *phonemic status* in English.

In the studies of Au *et al.* (2002) and Oh *et al.* (2003), it was shown that *perception* and *VOT measurements* of *heritage speakers* of Spanish and Korean differed significantly from both the *L2 learners'* groups (*subjects* who were first exposed to the language after childhood) and the *native speakers*' groups, performing more *native-like* than the *L2 learners*, but less *native-like* than the *native speakers*. Kim (2012) also found differences in *production*-but not in *perception*, comparing the

perception and *production* of Spanish *stops* /p, t, k, b, d, g/ in 7 Spanish *heritage speakers* born in the US and in Spanish *native speakers*.

Similarly, Lukyanchenko and Gor (2011) and Gor (2014) explored the *perception* of the *hard* versus *soft* (*non-palatalized* versus *palatalized*) *stop* /t, t'/ and /p, p'/ *language internal contrasts* in Russian *heritage speakers* living in the US, finding no difference in group results between highly *proficient heritage speakers* and *native speakers*, in discrimination tasks including the target *stops* in *word-final* and *non-final positions*. However, *low-proficiency heritage speakers* did not have a *native-like perception* in any of the *conditions*, but all *heritage speakers* outperformed *L2 learners* in *nonword* discrimination.

Chang (2016) studied *heritage* Korean *speakers* who were *dominant* in English, comparing them to English and Korean *monolingual* groups. Investigating the *bilingual advantage* of *heritage speakers*, Chang (2016) found that *heritage speakers* had a *native-like perception* of Korean *contrasts* in *voiceless stops* and a better-than-*native perception* of English *voiceless stops* (which, unlike Korean *voiceless stop*s, are not *obligatorily unreleased*) in *nonce-words*. In the same study, in an English word *perception* task, Korean *heritage speakers* performed better than English *native speakers*, suggesting that there might, indeed, be a *bilingual advantage* in *perception*. Lee-Ellis (2012), who also studied the *perception* of English *stops* in Korean *heritage speakers*, *dominant* in English, observed the same advantage, finding no *transfer* from the *heritage* to the *dominant language*.

Gor (2014) investigated how low and high *proficiency heritage speakers* of Russian perform in conditions of high and low *babble noise*, comparing those two groups to a group of *L2 learners* of Russian. Gor used high and low predictability *contexts* and found that high *proficiency heritage speakers* performed the same as *native controls*, outmatching highly *proficient L2 learners*. In contrast, lower *proficiency heritage speakers* did not seem to have an advantage over *L2 learners*, suggesting that higher *proficiency* helps take advantage of *contextual cues* in order to discern speech under *babble noise* conditions.

Kim (2015) tested *perception* of *lexical stress* in 11 *heritage speakers* of Spanish, of Mexican descent, in the US (*sequential bilinguals*, exposed to English after the age of 5), comparing them to a group of 47 *L2 learners* of Spanish, who were *native speakers* of English, as well as to a *control group* of 25 *native speakers* of Spanish, living in Mexico. The *subjects* participated in a minimal pairs discrimination task. The words in the task were *disyllabic* Spanish words, differing only in the *position of lexical stress* and presented in auditory form. Again, the *heritage speaker* group was more sensitive to *acoustic cues* than the *L2 learners*, performing better than the *L2 learners*, but still worse than the *native speaker control group*.

Yang (2015)[11], had *L2 learners* of Mandarin and Mandarin *heritage speakers* participate in a *tone* identification task, where they had to discern and differentiate 4 Mandarin *tones* contained in sentences, and correspond these sentences to interpretations. While the *heritage speaker* group significantly outperformed that of *L2 learners*, *heritage speakers* "perceived a narrower pitch range than [*native speakers*]" (Yang, 2015:109). The *heritage speakers*' *perception* diverged from *native perception*, indicating *transfer* from *dominant* English. However, the assumption that divergent *tonal patterns* in *heritage speakers* are due to *transfer* from a (*non-tonal*) *dominant language* should be further confirmed by relevant studies (Polinsky, 2018).

[11] Yang (2015) studied both *production* and *perception* in *heritage speakers* of Mandarin (cf. 2.3.1).

Finally, Laleko and Polinsky (2016, 2017) investigated the differences in duration of the *contrastive/anaphoric topic marker -nun* in Korean[12] as well as the placement of *boundary tone*, in Korean *native speakers*, *heritage speakers* of Korean and Korean *L2 learners*. Once again, *heritage speakers* perform worse than *native speakers* and their performance falls close to that of *L2 learners* in *anaphoric topics* comprehension, while they have a better comprehension of *contrastive topics*, which are more *prosodically salient*. All in all, *heritage speakers* seem to be sensitive only to "stronger, more salient prosodic cues" (Polinsky, 2018: 161), and Polinsky (2018) suggests that "[t]he prosodic defaults in *heritage speakers* may be more general than the defaults established by *native speakers*" (Polinsky, 2018: 162), a suggestion calling for further testing.

Despite growing research in *heritage phonetics* and *phonology*, *syllable* and *phonotactics* in *heritage grammars* remain vastly understudied. To the best of my knowledge, there is only one relevant study, carried out by Shelton *et al.* (2017). Shelton and colleagues had 29 *heritage speakers* of Spanish, who were *dominant* in English and 29 Spanish *monolingual*s participate in a pen-and-paper Spanish word *syllabification* task, testing the *syllabification* of Spanish *diphthongs*. The researchers found significant *interference* of English *phonotactics* in the *heritage language*, in all four categories they studied.

The studies overviewed in the last two sections suggest that *phonetics* and *phonology* are *subject* to "different developmental schedules for *acquisition* and loss" (Montrul, 2016:85), as they seem to be affected in more subtle ways than the other domains. The research conducted so far indicates that *heritage speakers* have separate *mental representations* for their two languages, as expected in *bilingualism*. Even so, they tend to accentuate the differences in the two *systems* and de-emphasize their congruities. Regarding *perception*, *heritage speakers* seem to have an advantage over *monolingual*s in *segmental perception* and, despite some difficulties in the *perception* of *tone*, *heritage speakers* tend to outperform *L2 learners* and have close to *native* or *native-like* performance. Still, there is evidence for *dominant language interference* in *segmental* and *suprasegmental production*, as well as in *phonotactics*, and a *nonnative accent* impression, reported by *native speakers* who judge *heritage language production*.

2.4 Albanian as a *heritage language* in Greece

Albania remained a completely isolated state during the Enver Hoxha regime and, after the fall of communism in the early 1990s, there was a *migration flow* from Albania, which resulted in 1/5 of its population moving abroad (Carletto *et al.*, 2006:768; Manos *et al.*, 2017:29). Due to the country's adjacency to Greece, 52.7% (Mattheoudakis *et al.*, 2017:2) of immigrants in Greece where of Albanian origin (Manos *et al.* 2017:31), a percentage that translates into 480,804 individuals in the 2011 census (Manos *et al.* 2017:29). This means that Albanians are the largest immigrant group in Greece today and, at the same time, they form a 5% population proportion (Gogonas, 2009). A large population of Albanian immigrants has lived in Greece for the last three decades, leading to a large number of second and third generation immigrants of Albanian origin. The child immigrants of the early 1990s, as well as children born to Albanian parents in Greece during that period are, today, adults who have grown up in a *bilingual* setting, speaking Albanian at home and Greek at school and almost any other

[12] Differences in *duration* and *placement* of *boundary tone* guide the *interpretation* of the -nun *topic marker* as *contrastive* or *anaphoric*. (see Laleko and Polinsky (2016, 2017), Polinsky (2018), Jun (1996:101) and Lee (2007) for discussions on the -nun topic marker in Korean and the prosodic properties linked to its interpretations.

setting, thus being *dominant* in Greek, as Greek is the language of public life, while Albanian is the language of private (i.e. family) life (Gkaintartzi, 2012: 385, 388).

Despite this ethnolinguistic group's population in Greece, the Albanian language has failed to remain alive both as a *minority language* and as a *heritage language*. This is due to low institutional support, the educational policies in Greece, the immigrant group's low status and exclusion and the group's high degree of integration and assimilation.

In contrast to the considerable demographical presence of people of Albanian origin, Albanian associations are few, with very low participation (Gogonas, 2009). For example, only 18% of Albanians living in Thessaloniki participated in such associations in 2006 (Hatziprokopiou, 2006). The primary goal of Albanian associations is identity preservation and protection from racism and prejudice (Gogonas, 2009), while they present an opportunity for the second generation to socialize in an Albanian environment, getting in touch with their homeland's language and culture. Nevertheless, such associations do not provide mother tongue classes, with the associations based in Thessaloniki and Volos being the only exceptions (Gogonas, 2009), failing thus to fill in the gap created by the Greek Ministry of Education. These complementary schools are not subsidized or officially recognized by the Greek state (Maligkoudi, 2009). Their students are mainly second-generation immigrants, born and/or raised in Greece who have little or no competence in the *heritage language* (Manos *et al.*, 2017).

The educational policy in Greece does not seem to support *minority* and *heritage language*s, as the main provision made for immigrant students is teaching Greek as a *second language* in *Reception* or *Support classes* (Gogonas, 2009; Dimakos and Tasiopoulou, 2003; Mitakidou *et al*., 2007) in order to assimilate them successfully. In addition to that, the effort to establish 26 *intercultural schools* did not pay off, as there was no successful integration of foreign students both linguistically and culturally (Mitakidou *et al.*, 2007), while there was no awareness-raising amongst the non-immigrant background student population, since *intercultural schools* isolated and otherized their students (Damanakis, 1997). A 1999 ministry decision (Φ1/22/Γ1/720-14/9/99) included the initiation of *heritage language* and culture classes (Gaintartzi *et al.*, 2014:3), a measure hardly enacted (Kiliari, 2005), for which the state blames the insufficient interest of immigrant parents on *mother tongue* classes (Mitakidou *et al*., 2007; Gaintartzi *et al.*, 2016; Androulakis *et al.*, 2016).

Moreover, the Greek educational system seems to promote "ethnocentrism and conformity with monolingual forms" (Androulakis *et al.*, 2016:10) (see also Frangoudaki and Dragona, 1997; Katsikas and Politou, 1999). Language ideologies in the Greek school suggest that Greek be the only language of education (Gaintartzi *et al.*, 2014) and underpins the language hierarchies in the EU, seeing that English, French and German are the only three languages taught in public schools (Dendrinos and Mitsikopoulou, 2004) and are always taught as *second/foreign*. Teachers tend to advise immigrant parents to raise their children *monolingual*, in fear of the *heritage language* impeding school learning and confusing the students (Gaintartzi *et al.*, 2014). Gaintartzi *et al.* (2014) found that 48.2% of teachers in their sample think that "*heritage language*s hinder the learning of the school language" (Gaintartzi *et al.*, 2014:65), while 52.5% of them believe that *heritage language* classes should be a responsibility of the immigrant communities and not of the public school. Even if *mother tongue* classes were to be offered at the public school setting, most of the teachers (79.2%) Gaintartzi *et al.* (2014) interviewed suggested that they should be extracurricular.

On top of the invisibility of *heritage language*s at school, the stigmatization of the Albanian language in Greek society forces young Albanians to dissociate from their discredited *mother tongue* (Androulakis *et al.*, 2016; Gogonas, 2009, Michail, 2010) and perceive the Albanian *ethnolinguistic vitality* as very low (Gogonas, 2009). Besides, young second-generation Albanians communicate almost exclusively in Greek with their peers -including their siblings (Gogonas, 2009; Androulakis *et al.*, 2016), and grow up immersed in a Greek speaking environment, which leads to *language shift* (Gogonas, 2009; Chatzidaki, 2005; Chatzidaki and Xenikaki, 2012; Maligkoudi, 2010; Michail, 2010; Tsokalidou, 2005).

At the same time, the *heritage language* use is reduced to the home and family domain (Gogonas, 2007), especially with older relatives, although Albanian *heritage speakers* in Greece seem to prefer using their *dominant language* even at home (Chatzidaki and Xenikaki 2012). Their *linguistic competence* in Albanian is lower than their *competence* in Greek, predominantly regarding their *literacy skills* (Gogonas, 2010). However, Kiliari (2014) reports that primary and secondary school children of Albanian background wish to develop their skills in their *homeland language* in order to communicate with Albanian-speaking friends and family and because the *heritage language* has a symbolic value for them, as it is their main link to their Albanian roots. Also, some think that having skills in Albanian may be of use in the future (*ibid*). Archakis (2014) affirms that Albanian students want to integrate into the Greek culture and society in which they are growing up and, at the same time, they want to preserve their own cultural identity and pride.

Albanian parents wish for *heritage language maintenance*, in order to preserve and protect their ethnolinguistic identity and their family ties with kin in the homeland, but also for the possibility of future repatriation (Gkaintartzi *et al.*, 2016). Nevertheless, they do not seem to invest in it and support it systematically (Chatzidaki and Maligkoudi, 2013; Androulakis *et al.*, 2016). However, 88.3% of the Albanian parents Gkaintartzi *et al.* (2016) interviewed maintain that it is the Greek state school's responsibility to have mother tongue classes as part of the curriculum, a practice that would also increase the Albanian language social status. They mainly reinforce the use of Greek not only to avoid academic failure of their children due to confusing them (as many teachers suggest) (Mitakidou and Daniilidou, 2007; Gogonas, 2007; Skourtou, 2002; Androulakis *et al.*, 2016), but also because they consider Greek to be indispensable for their future social, academic and work life and success (Gkaintartzi, 2012; Androulakis *et al.*, 2016). Apart from that, during the first decades of Albanian immigrants' presence in Greece, Albanian parents wanted their children to integrate and feared that using Albanian was a reason for children to become marginalized and the target of racist attitudes (Manos *et al.*, 2017). Nowadays, the stigma seems to be fading and both parents and children recognize the benefits of being *bilingual* (*ibid*). Still, links to the homeland are fading more and more and children are not interested in Albanian music, literature and films or shows, which would enhance their involvement in Albanian language and culture (*ibid*).

All in all, *heritage speakers* of Albanian in Greece seem to be *dominant* in the *majority language*, having little or no skills in the *heritage language*. Language ideologies, insufficient language policies in education and little interest for mother tongue classes, alongside racism and stigmatization of the Albanian language and its *speakers* have led to a *language shift* towards Greek. However, Albanian *heritage speakers* are aware of their double identity and students of Albanian origin construct "multiple and complex identities" (Androulakis *et al.,* 2016:14).

2.5 Conclusion

To conclude this chapter, *heritage speakers* are successive or *simultaneous bilinguals* whose *home* or *heritage language* has the status of a *minority language* in their community. They are usually *dominant* in their community's *majority language* and can have different degrees of *proficiency* in the *heritage language*, ranging from limited or no *fluency* to full *native-like proficiency*. Research on *heritage grammars* suggests that there is evidence for *incomplete acquisition* or *attrition* in adult *heritage speakers*, laying the blame on the low quality and quantity of *input heritage speakers* receive in their *home language* as they grow up, especially after the age of 4-5, when they start formal schooling and, consequently start to interact with peers and nonfamily using the *majority language*.

Incomplete acquisition or *attrition* is evident in the domain of *morphosyntax*. However, *heritage phonetics* and *phonology* seem to be less affected, seeing that *heritage speakers*' *perception* in their *heritage language* is *near-native* or *native-like*, though divergent from *native perception*. *Heritage speakers* tend to outperform *L2 learner*s of the *heritage language* in *perception* tasks. Nonetheless, studies show divergent *production* in the *heritage language*. *Heritage speakers*' *segmental* and *suprasegmental production* are different from *native* and they tend to spotlight the distinctive *contrasts* in their two languages, while they play down unimportant *contrasts*, following a "good-enough strategy" (Polinsky, 2018). In addition, there is evidence for *interference* from the *dominant language* in *heritage segmental* and tonal *production* and in *heritage intonation* and *phonotactics*. Interestingly enough, the relevant literature indicates that *heritage speakers* tend to sound *nonnative* to *native speakers* of their *heritage language*.

Migrant children and children born to migrant families are typical examples of *heritage speakers*. In many cases, migrant families move to a community where their home language has a *minority* status and a low prestige. First generation immigrants are forced to become *bilingual* and use the community's *majority language* in all settings but home. Their children grow up in a *majority language*-speaking environment and become *dominant* in that language. The insufficient *input* they receive in their home language, together with peer pressure and lack of motivation for *heritage language* use, lead to language choices that favor the *majority language*, amplifying its dominance.

In Greece, Albanians form the largest and oldest immigrant group. Given that a great number of this *sociolinguistic* group arrived in the early 1990s, there are many second and third generation Albanians living in Greece today. Second generation Albanians fit the profile of *heritage speakers*. They are adults, who grew up in a Greek-speaking setting, using Albanian only with family members. Many Albanian families opted for the use of Greek, even at home, mainly to help their children integrate and succeed at school, but also because of the low prestige their language has in Greek society. Greek school language policies discourage use of *heritage language*s, favoring *monolingualism*. There is no state support for mother tongue classes, and teachers advise parents against using Albanian at home. At the same time, lack of motivation for *language maintenance* and lack of an Albanian community that would work to this end, result in *language shift*.

3. *Syllable* and *phonotactics*

3.1 The *syllable* in *phonology*

3.1.1 Syllable and *syllable structure*[13]

The *syllable* is a *phonological suprasegmental constituent*, a *prosodic unit* imperative for *word prosodic structure*. It was first described in linguistic literature by Whitney (1874) and Saussure (1959) (cf. Goldsmith, 2011) and, although it is not included in *generative phonological theory*[14] at first, it is now valued, as *phonological* research has reached a consensus that the *syllable* should be used in *phonological analysis*.

There is plenty of supporting evidence for *syllable* (cf. Blevins, 1995:206-209 for a detailed discussion). The *syllable* constitutes the domain of *phonological processes* (e.g. *epenthesis* and *deletion*) as well as the domain of *phonotactics*, therefore allowing for generalization. In addition, it is the domain of *morphophonological processes* (such as *reduplication* and *affixation*). Nonetheless, there is also *psycholinguistic* evidence for *syllable* being a unit. Preliterate children, as well as adult *native speakers* of *unwritten languages* divide words into *syllable*s when asked to break them into units. Interestingly, most *speakers* of a given language divide a given word into the same number of *syllable*s. Also, there are types of writing systems that are based on *syllable*s rather than *phonemes* (*syllabaries*), such as the writing systems of Cherokee and Japanese (cf. Walker and Sarbaugh, 1993; Cushman, 2011 among others, for the writing system of Cherokee, and Iwasaki, 2002; Tsujimura, 2013 among others, for the writing system of Japanese). Besides, the *syllable* is the unit on which language games are based. However, some scholars seem to be skeptical about the existence of *syllable*s, since *syllable structure* varies across languages and *syllabic* units are rather abstract, having no *phonetic* basis (Ladefoged and Maddieson, 1996).

Cross-linguistically, *syllable*s have an internal *structure* containing 2 basic *constituents* (Kurylowicz, 1948; Hockett, 1955): *onset* and *rhyme* (cf. (1)). The *onset* is *consonantal*, with one or more *consonant*s, depending on *language-specific phonotactics*, and optional in some languages, for example in Greek and Albanian. The *rhyme* is further divided into *nucleus* and *coda*. While the *nucleus* is the *cross-linguistically* obligatory *syllable sub-constituent* and the only *constituent* of a *syllable* where *stress* can be assigned, *coda*s can be optional, depending on the *syllable types* a language allows. *Coda*s contain one or more, depending on *phonotactics*, *consonant*s, whereas *nuclei* contain *vowel*s or in some languages, for example English, *liquids* or *nasal*s (*syllabic sonorants*)[15]. *Coda-less syllable*s are also called *open* (cf. (1a), while *syllable*s with a *coda* are called *closed* (cf. (1b)). *Open syllable*s of the form CV (*consonant-vowel*) are *universal* and *unmarked*, as they are found across languages and are the first to be *acquire*d by infants (Jakobson, 1941). On the contrary, *closed syllable*s of the type VC are *universally marked*. Languages that have VC *syllable*s in their *grammar* will also have every other *syllable* type, namely CV, CVC and V[16] (Clements and Kayser, 1983: 28-29).

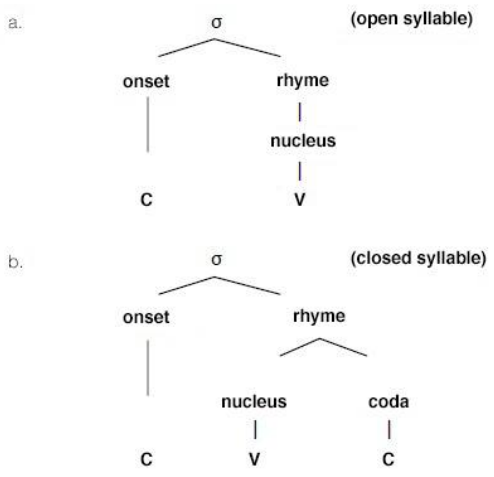
[13] This section is based on Nespor (1996, Chapter 7.1), Kager (1999, Chapter 3), Zec (2007), Lass (1984, Chapter 10.3), Blevins (1995) and Kappa (in press, Chapter 4)

[14] In Chomsky and Halle's classic work *The Sound Pattern of English* (*SPE*) (Chomsky and Halle, 1968), which was founding in *generative phonology*, there are not any *phonological units* described.

[15] For example, the final *syllable* of the word *syllable* /sɪ.lə.bl/ has a consonantal *nucleus*.

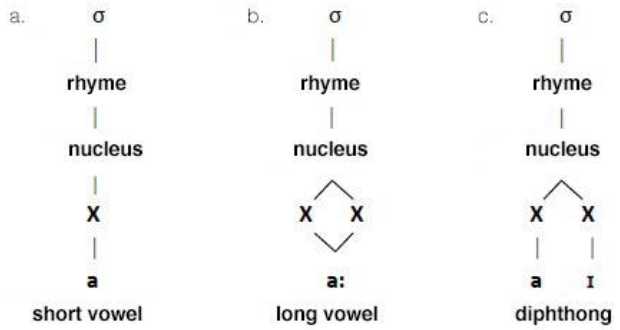
[16] In more detail, the *syllable* types found in natural languages are: V, CV, CVC, VC, CCV, CCVC, CVCC, VCC, CCVCC, and CVCC, where two Cs stand for *complex onset*s and/or *coda*s. The *syllable* types found in each language varies.

(1) Syllable types (open/closed)



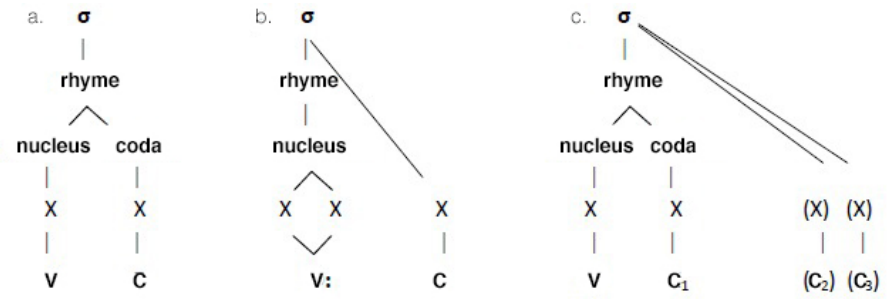
Onset and *Rhyme* can consist of up to two *timing units* (Goldsmith, 1976; Clements and Kayser, 1983). *Segments* typically occupy one *timing unit*, but *long vowel*s and *diphthongs* are associated with two *timing units* that are situated in a *branching nucleus* (cf. (2)). In this case, there is no place available for the *coda consonant* to occupy, therefore, it is *attached* directly to the *syllable* (or to the *phonological word*) *node* as *extrasyllabic* (*appendix*) (cf. (3b)). The same thing happens when *coda* consists of two or more *consonant*s (cf (3c)). *Complex codas* are *marked cross-linguistically* (Bybee, 2001). Languages tend to allow the presence of *clusters*[17] in *onset* position, rather than in *coda* and the restrictions for each *phonological system* tend to be stricter for *word-internal syllable*s (cf. (4a-b) for a representation of a *simple* and a *complex onset*). In the case of *onset clusters* that consist of three or more consonants, the two last *consonants* of the *cluster* are situated in a *branching onset*, occupying its two timing units. As there is no place in the *onset* for more than two *consonants* to be *attached*, the remaining *consonant(s)* can be directly *attached* to the *syllable node* as *extrasyllabic* (*appendix*) (cf. (4c) for a *three-consonant onset cluster* with an *appendix consonant*). If e*xtrasyllabic consonants* are not *attached* to a higher level of *prosodic structure* they will be *deleted* through *stray erasure* or *syllabified* in an extra *syllable* through *vowel epenthesis* (cf. Steriade, 1982; Clements and Keyser, 1983; Borowsky, 1986; Itô, 1986, among others, for discussions on the treatment of *extrasyllabic consonants*).

(2) Branching nuclei (Adapted from Kappa, 2013a)

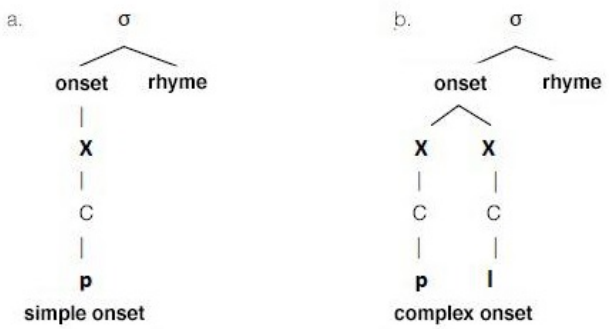


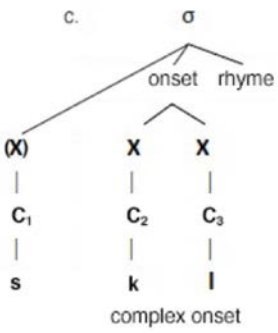
[17] When *sequential consonants* are part of the same *syllable* (*tautosyllabic*) they form *consonant clusters*. When they are not part of the same *syllable* (*heterosyllabic*) they form *consonant sequences* (Gussmann, 2002:94).

(3) *Consonant attached to coda position (a), consonant attached to syllable node due to branching nucleus (b), three-consonant coda cluster (c) (Adapted from Kappa, 2013a)*



(4) *Simple (a) and complex (b) onset, and complex onset with an appendix consonant (c) (a. and b. are adapted from Kappa, 2013a)*





3.1.2 Syllabification and Phonotactics

Sonority is a *universal constraint* that restricts *segments* in *onset* and *coda* position and their relative position inside the *syllabic constituent*. *Segments* are ordered in a *sonority scale*, originally proposed by Selkirk (1982) (cf. (5), adapted from Zec, 2007: 178).

(5)

Sonority scale

		Highest Sonority
Vowels	Low vowels	↑
	Mid vowels	
	High vowels	
Liquids	Rhotics	
	Laterals	
Nasals	Nasals	
Obstruents	Voiced fricatives	
	Voiced stops	
	Voiceless fricatives	
	Voiceless stops	**Lowest sonority**

Selkirk (1982) advocates for *sonority indices* of *segments* (cf. (6) adapted from Kappa (2013: 57)). The higher the *index*, the higher the *segment's sonority*, thus all *segments* with a ≥3 *sonority index* can occupy the *nucleus position*. Selkirk (1982) argues that *syllable well-formedness* is *subject* to the *Sonority Sequence Generalization*, according to which the *sonority* in a *syllable* must peak at the *nucleus*, increasing from *onset* to *nucleus* and decreasing from *nucleus* to *coda*. So, *well-formed consonant clusters* should contain *segments* of *increasing sonority* when in *onset* and *decreasing sonority* when in *coda* position.

(6)

***Universal Sonority Indices* (Selkirk, 1982)**[18]

Natural Class	***Sonority* index**
*vowel*s	6
glides	5
liquids	4
*nasal*s	3
fricatives/ affricates	2
stops	1

*Consonant*s found between *vowel*s have to be *parsed* into *syllables* and, according to the *Maximal Onset Principle* (Kahn, 1976:19) a *consonant* occupies the *onset* of the posterior *syllable* to satisfy *universal markedness constraints*, conforming to the CV *universally unmarked syllable* type. So, *onset*s

[18] In more detail, the sonority increases as follows:
/p,t.k/</b,d,g/</f,θ/</v, z, ð/</s/</m,n/</l/</r/</i,u/</e,o/</a/

[19] Or, according to others, following the *Minimal Onset* Sa*tisfaction principle* (Steriade, 1982; Roca, 1994; Roca and Johnson, 1999)

are formed by as much *consonant*s as *universal constraints* (*sonority*) and language-specific *constraints* for *syllable* formation (*phonotactics*) allow and only remaining *consonant*s are *syllabified* in the *coda* of the preceding *syllable*. In addition, a *coda* should be more *sonorous* than the following *onset*, as dictated by the *Syllable Contact Law* (Murray and Vennemann, 1983; Vennemann, 1988).

Finally, Steriade (1982: 91 et seq.) suggests different *sonority scales* for different languages and argues for the *Minimal Sonority Distance* principle, i.e. the minimal distance that *consonant* sequences in *onset* or *coda* position should have on the *sonority scale*, in order for the *cluster* to be *well-formed and tautosyllabic*[20]. This distance may vary across languages.

3.2 Standard Albanian *syllable* and *phonotactics*[21]

Standard Albanian (henceforth SA) have CV, V, CVC, VC *syllable*s. The language allows *clusters* of up to 4 *consonant*s in *onset position* and up to 3 *consonant*s in *word-final coda position*. So, the maximal *syllable pattern* of SA is $(C_1)(C_2)(C_3)(C_4)V(C_1)(C_2)(C_3)$. The *nucleus* position is occupied by short *vowel*s and *diphthongs* (both *falling* and *rising*). Open syllables are the most common syllable type in SA (Dodi (2004:133).

*Simple coda*s in SA may contain any *consonant* in the SA *phonetic system* (cf. Appendix I). The *Sonority Scale* proposed by Dodi (2004) for SA, as cited in Xhaferaj (2018: 230) is the following:

*Voice*less *stops (1)* < *Voiceless fricatives* (2) <*Voiced stops* (3) < *Voiced fricatives* (4) < *Nasals* (5) < *Laterals* (6) < *Rhotics* (7) < *Glides* (8) < *High vowel*s (9) < *Mid vowel*s (10) < *Low vowel*s (11).

Cluster syllabification in SA is *subject* to *universal principles* (*sonority*, *Maximal Onset Principle*, *Syllable Contact Law*) and to language-specific *phonotactics*. Therefore, the word sapllak /sapɫak/ 'cup' is *syllabified* as /sa. pɫak/, because /pɫ/ is a *well-formed cluster*, *syllabified* in *onset position*, abiding by the *Maximal Onset Principle* (Kappa, 2013: 63), while the word qendra /cendra/ 'center' is *syllabified* as /cen.dra/ (Memushaj, 2010: 144) because the *cluster* /ndɾ/ is not *well-formed* and not *phonotactically legal* in SA, unlike the *well-formed* and *legal cluster* /dɾ/ (Kappa, 2013: 63). On the contrary, the *cluster* /ʃtɾ/ is *legal* in SA *phonotactics*, despite being *ill-formed* (/ʃ/ is more *sonorous* than /t/, thus there is *reversed sonority* inside the *cluster*). So, the word spastroj (/spaʃtroⁱ/) 'to purge' (Memushaj, 2010: 144) is *syllabified* as /spa.ʃtroⁱ/, following the language's *phonotactics* and the *Maximal Onset Principle* (Kappa, 2013: 63). In addition to that, the word aksion (/aksⁱon/) 'act' is *syllabified* as /ak.sⁱon/ (Memushaj, 2010: 145) due to SA *phonotactics*, in spite of the *Syllable Contact Law*.

SA *phonotactics* allow a great number of *consonant clusters*, both *word-internal* and *word-final* (Memushaj, 2010: 221-224). The following *cluster types* (7) are found *word-initially* in SA (adapted from Kappa (2013b: 69-70):

[20] When a *consonant sequence* of C_1 and C_2 does not form a *well-formed cluster*, C_1 and C_2 cannot form a *complex onset*, so C_1 will be *attached* to the *syllable node* as an *appendix* (cf. Kappa, in press:129-131). In this thesis, *reversed sonority* and *plateau sonority consonant sequences* will be referred to as *complex onsets* and *sequences* of one or more *consonants* at the *right syllable margin* will be referred to as *complex codas*, although only the first *consonant* of the *sequence* can be *syllabified* in *coda* position and the rest will have to be *attached* to the *syllable node* as *appendices* (cf. (3c), (4c) in this chapter).

[21] This section is based on Kappa (2013:59-63, 69-73) unless stated otherwise.

(7) *Word-initial two-consonant clusters*

	Cluster type	Examples
a.	[stop+liquid]	pl/bl, pɫ/bɫ, kl/gl, kɫ/gɫ, pɾ/bɾ, tɾ/dɾ, kɾ, gɾ *tl/*dl
b.	[stop+nasal]	tm *pn/*bn, *kn/*gn, *tn/*dn, *dm
c.	[stop+fricative[22]]	ps, ks[23], pj/bj, tj/dj (i.a.) *bz, *gz (i.a.)
d.	[stop+stop]	tk
e.	[fricative+liquid]	fl/vl, fɾ/vɾ, θɾ *xl/*ɣl, *xɾ/*ɣɾ, *ðl, *sl/*zl, *sɾ/*zɾ
f.	[fricative+nasal]	θn, sn, sm/zm *vm, *fn/*vn, *xn/*ɣn, *zn, *ɣm, *ðm
g.	[fricative+stop]	sp, st, sk, ʃt, ʃc, ʒb/ʒd, fc (i.a.)
h.	[fricative+fricative]	sf/zv, ʃθ, fʃ, sj, zj, fj/vj, θj/ðj
i.	[nasal+nasal]	-
j.	[nasal+liquid]	ml, mɫ, mɾ
k.	[nasal+homorganic stop]	nd, ɲg, ŋɟ, mb

There are also some *two-consonant clusters* which, though *well-formed* are *illegal* in SA *phonotactics* due to the *Obligatory Contour Principle* (henceforth OCP, Leben 1973, 1978) which prohibits two adjacent *segments* from having the same *feature specifications*. In SA, OCP forbids *homorganic consonant*s in *clusters*. *Two-consonant illegal clusters* in SA and their *place of articulation* are shown in (8) (adapted from Kappa (2013b: 70):

[22] "The manner in which *stress* falls upon the *vowels* in Albanian shows that it [the *glide*] should be treated as a *consonant* and distinguished from *diphthongs* formed by the combinations of [i] with other *vowels*. The varying *length* of *vowels* before the *semi-vowel* brings one to the same conclusion. Initially a *fricative member* of the *phoneme* is used. Examples: ju 'you' [ju], atje 'there' [a'tje], prroje 'streams' ['prro:je], aj 'he' [aj], shkruejne 'they write' [ʃkru: :jn]" Lowman (1932: 281; italics mine). This means that the *glide* is realized as *fricative*.

[23] Only in Greek loanwords.

(8) *Two-consonant illegal clusters in* SA *and their place of articulation*

illegal clusters	place of articulation
*tn, dn, tl, ðn, ðl, sl, sr, zl	[coronal]
*pm, fm	[labial]
*fn, θm	[+front]

Also, there are *two-consonant clusters* that are not present *word-initially* in the *phonological system* of SA due to *ill-formed*ness (*reversed sonority* or *sonority* plateau). They are shown in (9) (adapted from Kappa (2013b: 70):

(9) *Ill-formed two consonant clusters (word-initial)*

[fricative+stop] e.g. sp, st, sk	*reversed sonority*
[fricative+frivative] e.g. sf/zv, ʃθ	*sonority* plateau
[stop+stop] e.g. tk	*sonority* plateau
[nasal+homorganic stop] e.g. nd, ŋg, mb	*reversed sonority*

SA also allows *three-consonant clusters* in *word-initial* and *word-internal* positions. These *cluster types* and some examples for each type are shown in (10) (adapted from Kappa (2013b: 71):

(10) *Word-initial and word-internal three consonant clusters in* SA

	Cluster type	Examples
a.	[nasal+homorganic stop+liquid]	ndr, ŋgr, mbr, mbl
b.	[nasal+homorganic stop+fricative]	ndj, mbj
c.	[s+stop+liquid]	str/zbr, ʃtr, ʃpr, skl, ʒgr
d.	[s+fricative+liquid]	ʃfr, ʃfl, ʒvl
e.	[s+stop+fricative]	ʃpj, ʃtj
f.	[stop+fricative+stop]	-
g.	[stop+fricative+fricative]	kθj
h.	[fricative+fricative+fricative]	zvj

In the *cluster types* (10a-e) there is *reversed sonority* between the first two *consonant*s of the *cluster*, namely between the *nasal* and the *homorganic stop* (10a, b), as the *nasal* is more *sonorous*, and between the *sibilant* and the *stop* (10c, e) or the *fricative* (10d) where the *sibilant* is more *sonorous*. The *sonority* rises between the second and the third *consonant*s in those *clusters*, as *stops* are less *sonorous* than *liquids* (10a, c,) and fricatives (10b, e) and *fricatives* are less *sonorous* than *liquids* (10d). In (10f, g) there is *rising sonority* between the two first *consonants* and the *sonority falls* between the *fricative* and the *stop* (10f), but there is *plateau sonority* between the two *fricatives* (10g). There is, also, *plateau sonority* between the three *consonants* in (10h).

Finally, SA also allows *four-consonant clusters* in *word-initial* position. These *cluster types* and some examples for each type are shown in (11) (adapted from Kappa (2013b: 71):

(11) *Word-initial four-consonant clusters in* SA

	Cluster type	Examples
a.	[affricate+nasal+homorganic stop+liquid]	tʃndr, tʃmbr
b.	[fricative+nasal+homorganic stop+liquid]	zmbr, ʃndr

Clusters in (11) start with a *fricative* or *affricate consonant*, followed by a *prenasalized stop* and a *liquid* (Kappa, 2013b: 71).

Word-finally, SA *phonotactics* allow *two-consonant* and *three-consonant clusters* in *coda* position. The *two-consonant cluster* types and some examples for each type are shown in (12) (adapted from Kappa (2013b: 72):

(12) *Word-final two-consonant clusters in* SA *(coda position)*

	Cluster type	Examples
a.	[liquid+stop]	lp, lt, lk, lc, rp, rt, rk, rc, rb
b.	[liquid+fricative]	lf, ls, rf, rθ, rð
c.	[liquid+nasal]	lm, ɬm, rm, rn
d.	[nasal+stop]	mp, nt, ŋk, ŋc
e.	[nasal+fricative]	ns, nz, nθ, mf, mθ, mʃ
f.	[fricative+stop]	ht, fk, vg, ft, st, zg, ʃt
g.	[fricative+fricative]	fʃ
h.	[fricative+nasal]	zm
i.	[stop+fricative]	pθ, ps, kθ
j.	[stop+stop]	tk
k.	[stop+nasal]	tm

In *cluster* types (12a-f) the *sonority* falls, meaning that *clusters* (12a-f) are *well-formed*. On the contrary, *clusters* (12g-k) are *ill-formed*, as the *sonority* rises (12h, i, k) or there is a *sonority plateau* (12g, j).

The *three-consonant cluster* types and some examples for each type are shown in (13) (adapted from Kappa (2013b: 72-73):

(13) *Word-final three-consonant clusters in* SA *(coda position)*

	Cluster type	Examples
a.	[liquid+stop+fricative]	rgs
b.	[nasal+stop+fricative]	ŋks, ŋkθ, ŋgθ
c.	[nasal+stop+liquid]	mbɬ
d.	[liquid+stop+stop]	rkt
e.	[nasal+stop+stop]	ŋkt
f.	[stop+fricative+stop]	kst, pʃt

In *Clusters* (13a-e) the *sonority falls* from C_1 to C_2 ([liquid+stop] in (13a, d) and [nasal+stop] in (13b, c, e)), but *rises* from to C_3 ([stop+fricative in (13a, b) and [stop+liquid] in (13c)], there is *plateau sonority* between C_2 to C_3 ([stop+stop] in (13d, e)). In (13f), the *sonority rises* from the *stop* (C_1) to the *fricative* (C_2) and *falls* from the *fricative* (C_2) to the *stop* (C_3).

3.3 Standard Modern Greek *syllable* and *phonotactics*[24]

Standard Modern Greek (henceforth SMG) has CV, V, CVC and VC type *syllable*s and allows *clusters* consisting of up to three-*consonant*s in *onset* position, but disallows *branching coda*s[25](Pagoni 1993). It is an *open-syllable* language (Setatos, 1974:22), so words are *syllabified* in CV *syllable*s unless there are *word-internal clusters*. The maximum *syllable* type in SMG words is $(C_1)(C_2)(C_3)V(C)$ (e.g. σκνίπες /sknipes/ 'gnats', which is *syllabified* as /skni.pes/)[26].

Although all *consonant*s present in the *phonemic inventory* of SMG can be found in *onset* position (both *word-initially* and word-internally)[27], the only *consonant*s allowed in *coda* position are /s/ and /n/[28] in *word-final syllable*s[29]. In *word-medial* position, the only *consonant*s allowed in *coda*s are *coronal sonorants* /n, l, r/.

SMG *syllabification* is *subject* to *language-specific constraints*, namely SMG *phonotactics* and *directionality*[30] and to *universal principles*, namely the *Maximal Onset Principle* (cf. 3.1.2), the *Syllable Contact Law* (cf. 3.1.2), the *Structure* Preservation *constraint*[31], as well as the *locality condition*[32] and the *Principle of Prosodic Licensing*[33]. *Directionality* in SMG is right-to-left (Kappa, 1995), meaning that a *syllable* is formed starting from the rightest *vowel* and a maximal *onset* containing a *legal consonant cluster* and continuing with the next *syllable* on its left. *Coda*s are formed only after the maximal possible *onset*s are formed. In addition, *word-medial clusters* are not only *subject* to *phonological principles*, but they can also be dictated by morphology, for example the word εκτόνωση /ektonosi/ 'decompression' is *syllabified* as /ek.'to.no.si/, despite [kt] being a *legal cluster* in SMG *onset*s and despite of the *Maximal Onset Principle*, because of *morphological boundaries* (/ek-/ is a prefix). In such cases, *syllabification* is informed by *morphological criteria*[34]. However, the *syllabification* of /ektonosi/ as /e.'kto.no.si/, where *phonological criteria* prevail, is also acceptable for *native speakers* of SMG.

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[24] This section is based on Kappa (2013:63-68, 73-77) unless stated otherwise.

[25] With the exception of some ancient Greek words still rarely used in formal registers and some Katharevousa (a purist, artificial variety of Greek that was used in formal registers and is no longer in use, cf. Mackridge, 1985:6-11) words that allow [obstruent+s] *coda*s which were once allowed at *word-final* position by Ancient Greek *phonotactics* (e.g. βλαξ /vlaks/ 'idiot', βασιλεύς /vasilefs/ 'king') (Steriade, 1982; Itô, 1986). There is also the exception of *loanwords* (e.g. τανκς /tanks/ 'tanks', φιλμ /film/ 'film') (cf. Kappa 2013a and Kappa, in press, Chapter 4).

[26] The maximum *syllable* type of SMG is $(C_1)(C_2)(C_3)V(C_1)(C_2)(C_3)$, if *loanwords* are considered to be part of SMG *grammar* (e.g. τανκς /taŋks/ 'tanks') (Setatos, 1974: 34).

[27] *Velars* /k, g, x, γ/ in *onset* position are *realized* as [c, ɟ, ç, ʝ] before *front vowels* /i, e/.

[28] /n/ is rarely found in *word-final coda* position, as it is often deleted (e.g. των ανθρώπων /tonanθropon/ → [tonanθropø] 'of the humans') or epenthesized with an /e/ (e.g. παίζουν /pezun/ → [pezune] 'they play'), forming an open *syllable* (Joseph and Philippaki-Warburton, 1987: 236).

[29] With the exception of words coming from Katharevousa (cf. footnote 25) which can end in /r/ (e.g. ύδωρ /iðor/ 'water'), loanwords (e.g. κλαμπ /klab/ 'club', τσεκ /tsek/ 'check') and *onomatopoeic exclamations* (e.g. αχ βαχ /axvax/) (cf. Kappa 2013a and Kappa, in press, Chapter 4).

[30] The direction of *syllabification* in a language (Itô, 1986: 10)

[31] *Lexical rules* do not introduce distinctions not present in *lexical entries*. This means that *lexical rules* maintain the *underlying representation* and any additional rules introducing *marked specifications* are applied in the *postlexical domain* (Kiparsky, 1985)

[32] The local domain in which a *phonological rule* can be applied (cf. Trask, 1996: 210)

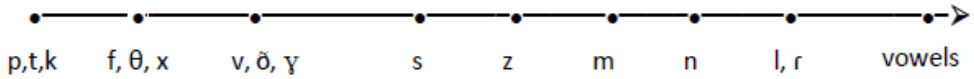
[33] A *well-formedness principle* which dictates that every *phonological unit* must be organized as part of a *prosodic structure* (cf. Kenstowicz, 1994; Itô, 1986)

[34] Additional examples of *morphological criteria* working together with *phonotactic constraints* in SMG are the words ευστροφία /ef.stro.'fia/ 'wittiness', εκστρατεία /ek.stra.'tia/ 'campaign', έκπληξη /'ek.pli.ksi/ 'surprise' and εκδρομή /ek.ðro.'mi/ 'excursion'. Apart from /ef/ and /ek/ *prefixed* words, SMG does not allow *four-consonant clusters* in *onset* position, while it accepts the occurrence of *reversed sonority onset-initially*, but only when the first *cluster-member* is a *fricative*.

Similarly, *native speakers* prefer the *syllabification* of εκροή /ekroi/ ‘’ as /e.kro.’i/, which abides by the Maximal *Onset* Principle, in spite of the fact that /ek-/ is, again, a prefix.

According to Kappa (1995), the *sonority* of *labial* and *coronal nasal*s, as well as the *sonority* of *voice*less *fricatives* and *voice*less *stops* is distinct. Kappa (1995) revises the *sonority* scale proposed for SMG by Malikouti-Drachman (1987), where *voice*less *stops* had the same *sonority* as *voice*less *fricatives* and the *sonority* was the same across *nasal*s. The Minimum *Sonority* Distance (cf. 3.1.2) for SMG is ≥4, thus *clusters* found in *onset* position are of the type: [stop+nasal/liquid] or [fricative+coronal nasal/liquid]. The *Sonority* Scale proposed by Kappa (1995) (cf. 3.1.2) for SMG is shown in (14)[35].

(14) *Sonority Scale for* SMG (Kappa, 1995:138)



SMG *phonotactics* allow various *consonant clusters*, both *word-medially* and *word-initially* (cf. Setatos, 1974; Kappa, 1995:147 et seq.). The following *cluster types* (15) are found *word-initially* in SMG (adapted from Kappa (2013b:73):

(15) *Word-initial two-consonant clusters in* SMG

	Cluster type	Examples
a.	[stop+liquid]	pl/bl, kl/gl, pr/br, tr/dr, kr/gr *tl/*dl
b.	[stop+nasal]	pn, kn, tm *tn/*dn, *bn, *gn, *dm
c.	[stop+fricative]	ps, ks, pç (i.a.) *bz, *gz, *ts/*dz
d.	[stop+stop]	pt, kt *bd, *gd, *tk, *tp
e.	[fricative+liquid]	fl/vl, fr/vr, xl/ɣl, xr/ɣr, θr/ðr *ðl, *sl[36]/*zl, *sr/*zr
f.	[fricative+nasal]	θn, xn/ɣn, zm *sn/*zn, *sm, *ɣm, *ðm, *vm/*fm
g.	[fricative+stop]	sp, st, sk, ft, xt, zb *vg, *vb, *θt, *ðd, *θk, *xp (i.a)

[35] Malikouti-Drachman (1987) and Kappa (1995) do not include the voiced stops [b,d,g] in the Sonority Scale, because they claim that [b,d,g] do not have phonemic value but are derived from an underlying [nasal+stop] sequence.

[36] /sl/ is an acceptable *cluster* in *loanwords* (e.g. Σλαβικός /slavikos/ ‘Slavic’)

h.	[fricative+fricative]	γð, vð *fx
i.	[s/z+fricative]	sf, sθ, sx, zɣ, zv *fs
j.	[nasal+nasal]	mn

Clusters that violate the *Minimum Sonority Distance principle* (cf. 3.1.2), such as */sn, zn, sm, ɣm, ðm, vm, zl, zr/ are not allowed *word-initially* (cf. 15e,f), however [voiceless stop+voiceless fricative] *clusters* (but not [voiced stop+voiced fricative] *clusters* */bz, gz/), which comply with the OCP (cf. 3.2) are present in *onset* position (cf. 15c), although they violate the *Minimum Sonority Distance* principle. In addition, the *clusters* in (16) are disallowed by the OCP which, in SMG, does not allow *homorganic clusters* in *onset* position. In addition to that, Drachman (1990) suggests that any *articulatory feature* can only appear once in an *onset cluster* in SMG. This results in *consonant*s with dissimilar *place of articulation* in *onset clusters*. Reversed-*sonority clusters*, i.e. [fricative+stop] *clusters* in (15g) and [s/z+fricative] *clusters* in (15i), as well as *sonority*-plateau *clusters*, i.e. [stop+stop] *clusters* in (15d), [fricative+fricative] *clusters* in (15h) and [nasal+nasal] *clusters* in (15j) are present in SMG *onset*s *word-initially*. It also has to be mentioned that, in SMG, [obstruent+obstruent] *clusters* must always *agree* in *voicing*. According to Kappa (2013b) the absence of words starting with /km/ and /xm/ *clusters* is just an *accidental gap*.

(16) *Clusters not allowed in* SMG *onsets due to the OCP (adapted from Kappa, 2013b: 74)*

Illegal clusters	place of articulation
* tn, tl[37], ðn, ðl, sl, sr	[coronal]
*pm, fm	[labial]
*fn, fm, θm	[+front]

In *word-medial onset* position, SMG allows the same *cluster* types as in *word-initial* position (17). The *clusters* in bold are *illegal* in *word-initial* position and accepted in *word-medial* position, or vice-versa.

(17) *Word-medial two-consonant clusters in* SMG

	Cluster type	Examples
a.	[stop+liquid]	pl/bl, kl/gl, pr/br, tr/dr, kr/gr, **tl/dl**
b.	[stop+nasal]	pn, kn, tm, **tn, bn, dm, km** *dn, *gn/*gm, *pm/*bm
c.	[stop+fricative]	ps, ks, pç, **bj**, **gz, kf, kθ, kx, kð, kv** *bz, *pf, *bv, *pθ, *bð, *px, *bɣ, *gv, *ts/*dz (i.a.)

[37] But cf. the archaic words τλήμων /tlimon/ 'forbearing', τλημοσύνη /tlimosini/ 'forbearance'.

d.	[stop+stop]	pt, kt *bd, *gd, *tk, *tp
e.	[fricative+liquid]	fl/vl, θl, fr/vr, xl/ɣl, xr/ɣr, θr/ðr *ðl, *sl/*zl, *sr/*zr
f.	[fricative+nasal]	θn, , xn/ɣn, zm, **xm**, **fn, vn, ðn, zn, vm, ðm, ɣm, θm** *sn, *sm, *ɣm, *fm
g.	[fricative+stop]	sp, st, sk, ft, xt, **fp, xp** *vg, *vb, *θt, *ðd, *θk ***zb**
h.	[fricative+fricative]	sf, sθ, sx, zv, **fx, fs** ***zɣ**
i.	[nasal+nasal]	mn

The *three-consonant cluster* types found *word-initially* and *word-medially* in SMG and some examples for each type are shown in (18) (adapted from Kappa (2013b: 76).

(18) *Three-consonant clusters in* SMG

Cluster type		Examples
a.	[s+stop+liquid]	str, spr, skl
b.	[s+stop+nasal]	skn, spn
c.	[s+fricative+liquid]	sfr, sθr
d.	[s+fricative+nasal]	sθm, sxn
e.	[fricative+stop+liquid]	ftr, xtr
f.	[fricative+fricative+liquid]	fxr, fθr, vɣr, vɣl
g.	[fricative+fricative+nasal]	vɣn, vɣm, vzm
h.	[stop+stop+liquid]	ptr, ktr, kpl, kpr
i.	[stop+fricative/s+liquid]	kfr, kvr, kθr
j.	[fricative+stop+fricative/s]	ftç, fps
k.	[fricative+fricative/s+stop]	fxt, fsk, fst
l.	[fricative+fricative+fricative/s]	sθç, fsç

Clusters (18a-d) start with a *sibilant*, followed by a *well-formed two-consonant cluster* of [stop/fricative+nasal] or [stop/fricative+liquid]. *Sibilants* are more *sonorous* than *stops* and *fricatives*, thus the two first members of *clusters* (18a-d) have *reversed sonority*. *Clusters* (18e-k) are the result of *affixation*, as the *prefixes* /ef-/, /ek-/, /ðis-/, /pros-/ are *affixed* to *roots* starting with a *well-formed two-consonant cluster*.

Four-consonant clusters are scarce in SMG. They are only found *word-medially* and are always the result of *affixation* of the *prefixes* /ef-/ and /ek-/ to *roots* starting with *three-consonant clusters* which are *legal* in SMG *phonotactics*. The *four-consonant cluster* types found *word-medially* in SMG and some examples for each type are shown in (19) (adapted from Kappa (2013b: 77).

(19) *Four-consonant clusters in* SMG

Cluster type	examples
a. [stop+s+stop+liquid]	kstr
b. [f+s+stop+liquid]	fspl, fstr

3.4 Conclusion

To sum up, the *syllable* is a fundamental *constituent* of word *prosodic structure*. It is further analyzed into *onset* and *rhyme*, while the *rhyme*'s *structure* can contain two *constituents*: *nucleus* and *coda*. The *nucleus* is the only *universally obligatory constituent* in *syllable structure*, whereas *onset* and *coda* can be absent, depending on a language's *phonotactics*. Of all the possible *syllable* types (CV, CVC, V, VC) the *open syllable* type CV is *universal* and *unmarked*. While *nuclei* typically contain a *vowel*, *word-initial consonant*s and *consonant*s found between *vowel*s, *word-medially*, are *syllabified* in *onset* and *coda* position abiding by *universal* and *language-specific principles* and *constraints*.

The maximum *syllable pattern* in SA is $(C_1)(C_2)(C_3)(C_4)V(C_1)(C_2)(C_3)$ and the maximum *syllable pattern* in SMG (for non-*prefixed* words of *native* origin) is $(C_1)(C_2)(C_3)V(C)$. All *consonant*s in SA can be *syllabified* in *coda* position *word-finally*, forming *clusters* of up to 3 *consonant*s (there can also be extra-*syllabic consonant*s directly *attached* to the *syllable node* as *appendices*). On the contrary, SMG *word-final coda*s (in words of *native origin*) can only contain one of the two *coronals* [n] and [s] and *complex coda*s are not allowed. *Word-medially*, both languages allow only *simple coda*s. SA *coda*s contain a *nasal*, a *liquid*, a *fricative* or a *stop*, while SMG *word-medial coda*s can only contain one *coronal sonorant* [n], [l] or [r]. In both languages, *syllabification* is *subject* to *universal principles* (the *Maximal Onset Principle*, the *Sonority Principle* and the *Syllable Contact Law*) as well as to *language-specific constraints* (*phonotactics*).

It should also be highlighted that, while in the *Sonority Scale* proposed for SA by Dodi (2004) /s/ and /z/ have the same *sonority* as all *fricatives*, being discerned only by *voicing*, in the *Sonority Scale* proposed for SMG by Kappa (1995) /s/ and /z/ are more *sonorous* than /f, θ, x/ and /v, ð, ɣ/.

4. Experimental Design

This chapter treats the experimental part of this study in detail. There is a detailed presentation of the goals and predictions of the experiment, the background of the participants, the *stimuli* used in the experimental procedure and, finally, a detailed description of the experimental procedure and its limitations.

4.1 Goals and predictions

The goal of this experiment is to explore *cluster* perception and *production* in *heritage speakers*. To this end, the phonotactic knowledge of *heritage speakers* of Albanian who are *dominant* in SMG is tested via a *metalinguistic nonce-word syllabification* task, as the *heritage speakers*' *syllabification patterns* reveal their knowledge of phonotactic *constraints* in the *heritage language* (cf. Chapter 3, for a detailed discussion on *syllable* and *phonotactics*).

As the relevant research to this day has presented *data* indicative of *dominant language interference* in the phonetics and *phonology* of *heritage language*s (cf. 2.3), the main hypothesis of this study is that *heritage speakers* will exhibit *patterns suggesting interference* of their *dominant language phonotactics* with the *syllabification* of their *heritage language*. To be more specific, SMG *phonotactic constraints* are expected to be *transfer*red to the *phonological grammar* of Albanian by Albanian *heritage speakers* who are dominant in SMG. This means that *consonant*s in SA *clusters* which do not comply with SMG *phonotactics* (cf. 3.2, 3.4) are expected to be *syllabified* under separate *syllables*, influenced by SMG *phonotactics* (cf. 3.3).

In addition to exploring the *patterns* of *dominant language* interference with the *heritage language syllable structure* and *phonotactics*, this experiment aspires to bring forth *data* that will shed some light on the *constraints* that guide *syllabification* in a language that is *acquire*d in a *natural setting* during the *critical period*, but its *grammar* is *incompletely acquire*d or *attrited* later in life (cf. 2.2).

4.2 Participants

5.2.1 Experimental group

The participants in the *experimental group* were six (N=6, Female=4). Of these, four (N=4) were SA *heritage speakers*, namely adult Albanian-Greek *bilinguals*, who were born in Albania and moved to Greece during infancy (0;4-2;0). They fit the profile of second-generation immigrants (cf. 2.1), as they moved to Greece in early childhood, before the *acquisition* of their L1 was completed and before formal schooling started. Due to their age at the time of their arrival in Greece, their only interactions in their L1 were those in the setting of their family and they fit the definition of *simultaneous bilinguals* (cf. 2.2). The *experimental group* includes one (N=1) participant (Aggeliki) who arrived in Greece at age 11 (11;0), after completing 6 years of formal schooling (elementary school) in Albania (child immigrant, cf. 2.1). Her mother's *native* language is SMG and her father's *native* language is SA. She is a *simultaneous bilingual* who *acquire*d both languages in infancy, as they were spoken in her family environment. Until the age of 11, she lived in a SA-speaking environment, with SA being the language of community, school, institutions and media, thus receiving reduced *input* in SMG. At the age of 11, her *input* in SA was significantly reduced in quantity and quality, as SMG became the language of her environment and she only interacted in SA with one parent at home. Her profile fits the *heritage speaker* definition, as she is an adult whose *input* in the *heritage language* became insufficient during her prepubescent years and within the *critical period*, resulting in *attrition* effects in the *heritage language,* and in SMG becoming the *dominant language* of the participant (cf. 2.2). One participant (N=1) was born in Greece and raised a *simultaneous bilingual*, in a SMG-speaking environment, with insufficient *input* in Albanian. He is a minor (14 years old), but was included in the experiment as he is

postpubescent and his language *acquisition* is, supposedly, complete at the end of the *critical period* (cf. note 3) at least concerning *phonology*.

The language used by all participants in their everyday interactions is SMG. They stated that they use SMG to communicate with friends and with their siblings. However, almost everyone (with the exception of Vassiliki and Alex who have always used SMG at home) communicated in SA at home while they were growing up. Most of them (with the exception of Thodoris) communicate in SMG with their mother, but not with their father, with whom they continue interacting in SA as adults. All participants have some relatives in Albania they often communicate with, using the *heritage language*. Almost all participants are literate in the *heritage language*, with one exception (Alex). Two (N=2) of them have had some mother tongue classes in a formal setting, one (N=1) of them went to school in Albania, while three (N=3) of them where taught reading and writing at home by family members (Florida was taught SA in both a formal and a home setting). All participants in the *experimental group* grew up in Greece, and underwent formal schooling in the Greek educational system, completing (at the minimum) Greek secondary education. They grew up in major Greek cities, with no notable exposure to dialects, SMG being the *ambient language* and the language of media and institutions in their environment.

The self-assessments of the participants' *heritage language proficiency* varied. Three (N=3) participants reported an average *proficiency* in the *heritage language*, one (N=1) reported advanced *proficiency*, and two (N=2) participants reported low *proficiency*, with *receptive skills* limited to oral language and rudimentary *productive skills*, fitting the description of an *overhearer* (cf. note 5).

Florida and Participant 1 are related (twins). Although they have shared family background, their educational backgrounds differ, as Florida has had SA classes in a formal setting, while her sister has not.

The *experimental group*'s participation in this experiment was voluntary.

The *experimental group*'s background information is presented in detail in (20)

(20) Participants' background information (experimental group)

	Florida	**Participant 1**	**Vasiliki**	**Thodoris**	**Aggeliki**	**Alex**
Gender	Female	Female	Female	Male	Female	Male
Age (years)	23	23	28	24	40	14
Education	university	vocational	high school	master's	vocational	junior high school
Location	Athens	Athens	Denmark	Thessaloniki	Rethymno	Thessaloniki
Place of growing up	Athens	Athens	Athens	Thessaloniki	Athens	Thessaloniki
Born in Greece	NO	NO	NO	NO	NO	Yes
Age of arrival in Greece (years;months)	2;0	2;0	0;4	0;9	11;0	N/A
Mother's native language	SA	SA	SA	SA	SMG	SA

Father's native language	SA	SA	SA	SA	SA	SA
Siblings	2	2	1	1	1	1
Language used to communicate with mother (usually)	SMG	SMG	SMG	SMG	SMG	SMG
Language used to communicate with father (usually)	SA	SA	SMG	SA	SA	SMG
Language used to communicate with siblings (usually)	SMG	SMG	SMG	SMG	SMG	SMG
Language used to communicate with friends	SMG	SMG	SMG	SMG	SMG	SMG
Language used at home while growing up	SA	SA	SMG	SA	SA	SMG
Relatives in Albania (communication in SA)	YES	YES	YES (2-3)	YES (a few)	YES	YES
Studied SA in a formal setting	YES	NO	NO	YES	*primary school in Albania*	NO
Studied SA in an informal setting (e.g. with a parent)	YES	YES	YES	NO	NO	NO
Reported proficiency in Albanian	Average	Average	*Overhearer*	Advanced	Average	*Overhearer*
Notes	Participant 1's twin	Florida's twin				

5.2.2 Control group

The participants in the *control group* are two (N=2, Female=2). They are the *baseline*: first generation immigrants who are presumably the *input* source for *heritage speakers* (cf. 2.3, note 7). They are adults who grew up in Albania and immigrated to Greece in early adulthood (at the age of 19). They have lived in Greece for 19-25 years and they use mainly Greek in their everyday

interactions. Both *baseline* participants have two children with whom they communicate in Greek (Alma reports some *code-switching*, sometimes using SA too with her children). They both report that their youngest children have low *proficiency* in SA, describing the *proficiency level* of *overhearers*, while their eldest have a better level of receptive and productive skills. Evelina's eldest can speak in SA, but her *proficiency* is low, while Alma's eldest has an advanced *proficiency* in SA, which she ascribes to longer visits to the homeland and, consequently, longest exposure to the language. At the time of the experiment, both *baseline* participants had undergone some formal teaching in Greek language. Alma had Greek classes organized by a Non-Governmental Organization (Arsis), for one semester, while Evelina had 3 weeks of private tutoring with a SMG teacher, at the time of the experiment. Evelina reports heavy *attrition*, forgetting words and not being able to pronounce SA *phonemes* the way she would like to. She also reported people commenting on her foreign accent during her visits to Albania. Alma (who lives closer to the border and visits family in Albania at least once a year) also reports little *attrition*. She affirms she forgets words, but her *pronunciation* is perceived as *native* by people in her homeland and does not report any comments on her accent.

The *control group*'s participation in this experiment was voluntary.

The *control group*'s background information is presented in detail in (21)

(21) Participants' background information (control group)

	Evelina	**Alma**
Age (years)	44	38
Age of arrival (years)	19	19
Place of residence	Rethymno	Kozani
Total time in Greece (years)	25	19
Dominant language (frequency)	SMG	SMG
Children	2 adult	2 children (10 y.o. and 8 y.o.)
Language used with children	SMG	SMG and SA (code-switching)
Children's reported SA proficiency	very low (eldest), *overhearer* (youngest)	10 y.o. advanced (longer stays in Albania, longer exposure)/ 8 y.o. very low
Education	high school (Albania)	8-year compulsory education (Albania)
SMG classes	3 weeks (private tutoring)	1 semester (Arsis-NGO)
Reported attrition (phonetics/phonology)	heavy	little
Notes	people in Albania comment on her accent (perceived as foreign)	forgetting, but her reported level is good and her accent is *native*

4.3 *Experimental stimuli*

The present research focuses on *three-consonant clusters* in *word-internal* position in SA. The *clusters* studied are not accepted in SMG. In order to test this study's hypothesis, five types of *word-medial three-consonant clusters*[38] were used: [nasal + stop + liquid], [nasal + stop + fricative], [stop +

[38] As there are only two *timing units* in a *syllable onset*, in a $C_1C_2C_3$ consonant sequence, C_1 is *attached* to the *syllable node* as *appendix* (cf. 3.1), thus it cannot be part of the *cluster*. C_2 and C_3 form an *onset cluster* when there is *rising sonority* between them. For short, when referring to *clusters* in this thesis, all *consonant sequences* under the same *syllable* will be included.

fricative + fricative], [fricative + fricative + fricative] and [stop + fricative + stop][39]. There were 11 *clusters* used in total, as shown in (22). Twelve (N=12) *nonce-words* were created for each *cluster*, resulting in 132 *stimuli* in total. The *nonce-words* for each *cluster* were the same as the *nonce-words* for each other *cluster*, with the sole difference of the *cluster* in the second *syllable onset*.

(22) *Consonant clusters used in this experiment, grouped by cluster type*

1. [nasal + stop + liquid]	a. [mbl] b. [mpl]
2. [nasal + stop + fricative]	c. [ndj] d. [mbj]
3. [stop + fricative + fricative]	e. [kθj]
4. [fricative + fricative + fricative]	f. [zvj]
5. [stop + fricative + stop]	g. [bst] h. [bsk] i. [kst] j. [ksk] k. [ksp]

All *clusters* were *word-medial* and all *nonce-words* were *disyllabic*. Half *nonce-words* were *stressed* in the first *syllable* (in this case, the *penultimate*) (N=66) (cf. (23a)) and half *nonce-words* were *stressed* in the *final syllable* (N=66), in order to control for *stress* effects (cf. (23b, c)). The *stress* in SA words typically falls on the two *final syllable*s and its position is *subject* to *vowel* quality and to *syllable weight*. Typically, *closed final syllable*s are *stressed*, unless they contain a schwa [ə] (e.g. [ar.'mik] 'enemy', but ['a.fər] 'near') . *Open final syllable*s are also *stressed*, provided that they contain a *high* or a *low vowel* (e.g. [cer.ˈʃi] 'cherry'). If they contain a *mid-vowel* [e, o, ə], the *stress* falls on the *penultimate* (e.g. ['ba.bo] 'midwife') (Trommer and Grimm, 2004).[40]. For this reason, the *nonce-words* created for this experiment end in a *closed syllable*, or an *open syllable* containing [a] or [i] when they are *stressed* in the final *syllable*. *Nonce-words* that are *stressed* in the *penultimate* have an *open final syllable* containing [e] or [o].

The *non-target syllable* always started with a *voice*less stop *onset* (thus being less *marked* and less *perceptually strong* than the target *syllable*) and was always an *open syllable*, to avoid additional *cognitive load* and effects due to extra *consonant*s in the *sequence* (cf. (23)). The target *syllable* always had a *complex* (*three-consonant*) *onset*, which was the *cluster* under investigation and was either *open*

[39] [k] and [c] are *allophonic* in SMG but have *phonemic value* in SA. In SMG, [k] becomes [c] before *front vowels* [i] and [e], while in SA [k] becomes [c] only before [e] and, still, the *palatalization* is *morphology-dependent* (cf. Lengeris, 2013: 36-37; Nikolou, 2013:82-83). In an effort to avoid effects that are due to this language pair's differences in *phonetic systems* and *palatalization rules*, [bsk] and [ksk] *clusters* always become [bsc] and [ksc] before [i] or [e] in this experiment, as the sequences [ce], [ci] are accepted by both languages.

[40] There are numerous exceptions, but Trommer and Grimm (2004) base their algorithm and their consequent analysis on statistical frequency (cf. Trommer and Grimm, 2004: 20).

(23a, c) or *closed* (23b). *Closed syllable*s always had *simple coda*s. The *segments* used in the *nonce-word* formation were only *segments* that SMG and SA share, to avoid any additional effects. A comprehensive table of all the *nonce-words* used in the experiment can be found in Appendix II.

(23) *Examples of nonce-words used in the experiment*:

a. pikthje [‘pi.kθje]

b. tundjep [tu.’ndjep]

c. pambla [pa.’mbla]

The *three-consonant clusters* used in the experiment, the *two-consonant clusters* that can result from their syllabification as heterosyllabic sequences, in two consequent syllables, and whether they are *legal* in SMG and SA *onset*s and *coda*s are shown in (24).

(24) *Clusters SMG and* SA

Cluster		***Word-initial*** **SA**	***Word-medial*** **SA**	**Word-final SA**	***Word-initial*** **SMG**	***Word-medial*** **SMG**	**Word-final SMG**
nasal + stop + liquid							
[mbl]		YES	YES	NO *(but: [mbɫ])*	NO	NO	NO
two member clusters that can result	**[mb]**	YES	YES	YES	NO *(but: prenasalization)*	NO *(but: prenasalization)*	NO
	[bl]	YES	YES	NO	YES	YES	NO
[mpl]		NO	YES	NO	NO	NO	NO
two member clusters that can result	**[mp]**	YES	NO	YES	NO	NO	NO
	[pl]	YES	YES	NO	YES	YES	NO
nasal + stop + fricative							
[ndj]		YES	YES	NO	NO	NO	NO
two member clusters that can result	**[nd]**	YES	YES	YES	NO *(but: prenasalization)*	NO *(but: prenasalization)*	[n]
	[dj]	YES	YES	NO	NO	NO	NO
[**mbj**]		YES	YES	NO	NO	NO	NO

two member clusters that can result	**[mb]**	YES	YES	YES	NO (but: prenasalization)	NO (but: prenasalization)	NO
	[bj]	YES	YES	NO	YES	YES	NO
stop + fricative + fricative							
[kθj]		YES	YES	NO	NO	NO	NO
two member clusters that can result	**[kθ]**	YES	YES	YES	NO	YES	NO
	[θj]	YES	NO	NO	[θç]	[θç]	NO
fricative+ fricative + fricative							
[zvj]		YES	YES	NO	NO	NO	NO
two member clusters that can result	**[zv]**	YES	YES	NO	YES	YES	NO
	[vj]	YES	YES	NO	[vʝ]	[vʝ]	NO
stop + fricative + stop							
[bst]		NO	YES	NO	NO	NO	NO
[bsk]		NO	YES	NO	NO	NO	NO
[kst]		NO	YES	YES	NO	NO	NO
[ksk]		NO	YES	NO	NO	NO	NO
[ksp]		NO	YES	NO	NO	NO	NO
two member clusters that can result	**[bs]**	NO	YES	NO	NO	NO	[s]
	[ks]	YES *(only in Greek loanwords)*	YES	YES	YES	YES	YES (loanwords)
	[st]	YES	NO	YES	YES	YES	[s]
	[sk]	YES (also [sc])	NO (but [sc])	NO	YES (also [sc]: allophonic)	YES (also [sc]: allophonic)	[s]
	[sp]	YES	YES	NO	YES	YES	[s]

4.4 Experimental procedure

During the experiment, the participant saw the *stimuli* appearing one-by-one on display, while hearing a recording of the same *stimuli* list. The *stimuli* appeared at the center of the display, in white background. The pace was chosen by the participant, by pressing a button (the right arrow) on their keyboard. Each *nonce-word* was played only once and the recording stopped after each *stimulus* and resumed when the participant pressed the button to continue to the next *stimulus*. The participant had to *syllabify* each *nonce-word* into its two *syllable*s orally, according to their *linguistic intuition*. The *syllabification* had to be done immediately after the *stimulus* was presented and there was no time for the participants to reflect on their answer. The *syllabification* provided by the participant was recorded. Background information on each participant's background (cf. 4.2) was collected through a questionnaire after the experiment.

In order to eliminate *fatigue effects*, the *stimuli* were divided into two groups with sixty-six (N=66) *nonce-words* each. Thus, each participant had to *syllabify* sixty-six (N=66) *nonce-words*. The *nonce-words* were presented in a distinct, pseudorandomized order for each participant, while no successive *nonce-words* containing the same *cluster* were presented to any of the participants, to avoid any effects from the successive presentation of a *cluster*.

The experiment took place at each participant's home and the *data* were recorded using Audacity® (Audacity Team, 2012) and transcribed by the researcher. The transcribed *data* are presented in Appendix III and discussed in Chapter 5.

4.5 Limitations

This experiment had two major limitations that impeded a more sophisticated experimental procedure. First, there were time limitations. As this research is part of a master's thesis, the experiment should be completed within a limited timeframe. This limitation, together with the small volunteer pool and the absence of SA monolingual volunteers (that would, ideally, record the *experimental stimuli* and participate in the experimental procedure as a second *control group* with no signs of *attrition*), resulted in the experimental setup described in 4.4, which was the best feasible setup in this context.

5. Discussing the *data*

This experiment tested the *syllabification* of *three-consonant clusters* in *disyllabic nonce-words*. This means that the participants heard and read *nonce-words* containing *consonant sequences* of three *consonants* and had to decide which of those *consonants* are part of the same *syllable.* There are three main possible outcomes:

a) the three *consonants* can be perceived as a *cluster*, which means that all three *consonants* are either *syllabified* under σ_1, with C_1 in the *coda* and C_2 and C_3 being *attached* to the *syllable node* as *appendices*, or *syllabified* under σ_2, with C_2 and C_3 forming a *complex onset*[41] and C_1 being *attached* to the *syllable node* as an *appendix*.
b) C_1 and C_2 can be perceived as *cluster*, *syllabified* in a *complex coda* under σ_1[42], while C_3 is *syllabified* in the (*simple*) *onset* of σ_2. A complex coda can be present in SA (but not in SMG) *syllables*.
c) C_2 and C_3 can be perceived as *cluster*, *syllabified* in a *complex onset* under σ_2 (but, cf. note 41), while C_1 is *syllabified* in the (*simple*) *coda* of σ_1. This is in line with SMG *syllable structure*, as SMG disallows *complex codas*, but allows *complex onsets* (cf. 3.3). However, not all *clusters* formed by C_2 and C_3 of the *three-consonant clusters* in the *stimuli* are allowed in SMG *onsets* (cf. (24)).

Apart from these three outcomes, a *cluster* can be *simplified* by *deletion*, *epenthesis* or *fusion*. Of these *processes*, only *fusion* was present in the *dataset* presented here, and it was a rare outcome.

The *data* in this experiment reveal a great *variability*, both between groups and within each group. Even more interestingly, there is great *individual variability*. In this chapter, we discuss the *syllabification patterns* for each *cluster type*, within an Optimality Theory approach, proposing a *constraint ranking* for each *pattern*. At the end of this chapter, we argue for the interaction of *multiple parallel grammars* in every *subject*'s *phonological grammar*. A comprehensive table of all the experimental *data* can be found in Appendix III.

5.1 The *data* for each *cluster* type

5.1.1 [nasal+stop+liquid] clusters.

Two *clusters* of the type [nasal+stop+liquid] were tested. The *three-consonant clusters* of this type consisted of a *labial nasal* [m] (C_1), a *voiced* or an *unvoiced homorganic stop* [b/p] (C_2) and a *lateral liquid* [l] (C_3). The *nasal* in the *clusters* of this type is impressionistically considered to be a *labial nasal* and not part of a *prenasalised stop*. The *data* were not analyzed *phonetically* in order to confirm this assumption.

The *data* show that [nasal+stop+liquid] *sequences* are not perceived as a *cluster*[43] for the vast majority of *heritage speakers*. [mbl] is *syllabified* under σ_2 (cf. 25a-b) in 30.56% of times, on average, and [mpl] is *syllabified* under σ_2 only by Aggeliki (100% of her *data*). On the other hand, the *baseline syllabifies* the three *consonant*s under σ_2 (66.67% on average for [mbl] and 58.33% on average for [mpl]). Interestingly enough, although Alma always (100%) *syllabifies* the three *consonant*s under σ_2, Evelina only does so for 33.33% of the *stimuli* for [mbl] and 16.67% for [mpl].

[41] When the cluster is ill-formed, C_2 will also be an *appendix.*
[42] In this case, C_2 will be an appendix
[43] Here, when the three *consonants* are *syllabified* as *cluster*, I assume that the first *consonant* of the *cluster* (C_1) is *attached* to the *syllable node* (*appendix*), while the remaining two *consonants* (C_1 and C_2) are *attached* to a *branching onset* (cf. 3.1.1).

The *heritage speaker* group prefers to *syllabify* the *nasal* in *coda* position and the [stop+liquid] in the *onset* of σ_2, as a *cluster* (cf. 25c-d). This is true for 61.11% of the [mbl] *stimuli* and 69.44% of the [mpl] *stimuli*. This is the most frequent *syllabification* for all *heritage speakers*: 66.67% for Florida, participant 1, Vasiliki, and Thodoris, and 100% for Alex in [mbl] *stimuli* and 66.67% for Florida and participant 1, 83.33% for Vasiliki and 100% for Thodoris and Alex in [mpl] *stimuli*, while Aggeliki always (100%) *syllabifies* the three *consonant*s as a *cluster* under σ_2, in both cases ([mbl] and [mpl]). In addition to that, Evelina, who is part of the *baseline* group, opts for a *syllabification* of the *nasal* in the *coda* of the first *syllable* for 16.67% of the *stimuli* for [mbl] and 33.33% for [mpl].

Two *heritage speakers* (Florida and participant 1, who are twins) sometimes *fuse* the *nasal* and the *stop* (cf. 25e). In the case of [m] and [b], the two *phonemes* have the same *place of articulation* (*labial*), the same *voicing* (*voiced*) and they differ in *manner of articulation* ([m] is *nasal* and [b] is a *stop*). After the *fusion*, the *phoneme* in the *output* is a *voiced labial obstruent* [b], thus keeping the *manner of articulation* of [b]. In the case of [m] and [p], the two *phonemes* have the same *place of articulation* (*labial*), but different *voicing* ([m] is *voiced*, while [p] is *voiceless*) and *manner of articulation* ([m] is *nasal* and [p] is a *stop*). After the *fusion*, the *phoneme* in the *output* is a *voiced labial obstruent* [b], hence keeping the *manner of articulation* of [b] and the *voicing* of [m].

The one *control* participant (Evelina) *syllabifies* [mb] in *coda* position (25f) in 50% of the data for [mbl]. [mb] (but not [mp]) are *legal coda clusters* in SA (but not in SMG) (cf. (24)).

Finally, there is *voicing* of [p] in [mpl] *clusters* (cf. 25h) in 2.78% of the *heritage* group *data* (only in Vasiliki's *data*) and in 25% of the *baseline* group *data* (only in Evelina's *data*). *Voicing* is attested only in *nonce-words* that are *stressed* in *penultimate*. However, the *data* are not enough to consider this to be an effect of *stress*.

Apart from *voicing*, no effect of *stress* position or *environment* was found in this *dataset*.

(25) a. [ko.mblo] (Alma)

b. [ci.mplek] (Aggeliki)

c. [pam.blo] (Thodoris)

d. [kom.plo] (Thodoris)

e. [ko.blo] (Florida)

f. [komb.lo], [pemp.lik] (Evelina)

h. /tumple/ → [tu.mble] (Evelina)

The percentages of each *syllabification pattern* for each participant and the average for each *pattern* are shown in (26) (for [mbl] *cluster*) and (29) (for [mpl] *cluster*) for *heritage speakers* and in (27) (for [mbl] *cluster*) and (30) (for [mpl] *cluster*) for the *baseline*. The average for the totality of participants is shown in (28) (for [mbl] *cluster*) and (31) (for [mpl] *cluster*). All percentages are rounded down to the second decimal place.

(26) *Heritage speakers' syllabification patterns for [mbl] (%)*

Syllabification	**Florida**	**Partic. 1**	**Vasiliki**	**Thodoris**	**Aggeliki**	**Alex**	**Average *heritage***
[.mbl]	16. 67	0	33. 33	33.33	100	0	30.56
[.bl]	16. 67	33.33	0	0	0	0	8.33
[m.bl]	66. 67	66.67	66.67	66.67	0	100	**61.11**
[mb.l]	0	0	0	0	0	0	0

(27) *Baseline's syllabification patterns for [mbl] (%)*

Syllabification	**Evelina**	**Alma**	**Average *Baseline***
[.mbl]	33.33	100	**66.67**
[.bl]	0	0	0
[m.bl]	16.67	0	8.33
[mb.l]	50	0	25

(28) *Total syllabification patterns for [mbl] (%)*

Syllabification	**Average**
[.mbl]	39.58
[.bl]	6.25
[m.bl]	47.92
[mb.l]	4.16

(29) *Heritage speakers' syllabification patterns for [mpl] (%)*

Syllabification	***Florida***	***Partic. 1***	***Vasiliki***	***Thodoris***	***Aggeliki***	***Alex***	***Average heritage***
[.mpl]	0	0	0	0	100	0	16.67
[m.pl]	66.67	66.67	83.33	100	0	100	**69.44**
[.bl]	33.33	33.33	0	0	0	0	11.11
[m.bl]	0	0	16.67	0	0	0	2.78
[.mbl]	0	0	0	0	0	0	0

(30) *Baseline's syllabification patterns for [mpl] (%)*

Syllabification	***Evelina***	***Alma***	***Average Baseline***
[.mpl]	16.67	100	58.33
[m.pl]	33.33	0	16.67
[.bl]	0	0	0
[m.bl]	0	0	0
[.mbl]	50	0	25

(31) *Total syllabification patterns for [mpl] (%)*

Syllabification	**Average**
[.mpl]	27.08
[m.pl]	56.25
[.bl]	8.33
[m.bl]	2.08
[.mbl]	6.25

The *three-consonant clusters* [mbl] and [mpl] are *ill-formed*. The *sonority* falls from C_1 to C_2, rising again from the *stop* to the *liquid*. While the *Maximal Onset Principle* calls for *syllabify*ing the three *consonant*s in *onset* position, the *Sonority Sequencing Principle* dictates that the *nasal* be *syllabified* as *coda* in the first *syllable*, while the second *syllable* should start with a *two-consonant cluster* [stop+liquid] in the *onset*, that is *well-formed*, as the *sonority* rises. Abiding by the *Sonority Sequencing Principle* can also lead to *syllabification* of the *nasal* and the *stop* in *coda* position ([mb.l]). In this case, the *sonority* falls in the *coda* and the *cluster* is *well-formed*. However, this option is more *marked*, as it leads to a *complex coda*. *Fusion* also results in a *well-formed cluster* ([bl]) in *onset* position and to a *coda-less*, hence *unmarked*, first *syllable*. As [mpl] sequences are extremely *marked*[44], the *voiceless obstruent* should be *assimilated* (*voicing*). *Fusion* could also be a strategy to avoid [nasal+voiceless obstruent] sequences. Cf. (24) for the *clusters accepted* in *word-initial*, *word-medial*, and *word-final* position in SA and SMG.

There are no [mpl] or [mbl] *clusters* in SMG, neither *word-initially* nor *word-medially*. There are [mpl] and [mbl] *word-initial clusters* in SA. According to Papafilis (2003) there are 11 entries that start with [mbl] and only 1 entry that starts with [mpl], which is a different orthography for a [mbl]-starting word[45]. The *clusters* [bl], [pl] are *legal* in both SMG and SA *onset*s. In SA, there are 114 entries starting

[44] "*Nasal leak* [airflow through the nose at the time the *obstruent* begins, that is due to the preceding *articulation* of the *nasal*] and *velum raising* cooperate to facilitate continuous *voicing* throughout a *nasal-obstruent cluster*" (Kager, 1999:61). So, due to *articulatory mechanisms*, *post-nasal voicing* is widespread *cross-linguistically* (Kager, 1999:61) (cf. Huffman, 1993; Hayes and Stivers, 1995 among others)

[45] mblak [mblak] 'to grow old' and mplak [mplak] 'to grow old'

with [mb], 46 entries starting with [bl] and 136 entries starting with [pl] (Papafilis, 2003). If the *syllabification patterns* are driven by *cluster legality* in word margins, then [bl] and [pl] *clusters* are good candidates for *onset* position. Indeed, about half of the nonce-words (47.92% of [mbl] *stimuli* and 56.25% of [mpl] *stimuli*, in the merged *dataset*, cf. (28) and (31)) were *syllabified* with a *nasal* in *coda* position and a [pl] or [bl] *cluster* in the *onset*. In the *experimental group*, the *heritage speakers* opt for [bl] *onset*s in 72.22% of their *data* (8.33% due to *fusion*, 61.11% due to *syllabification* of the *nasal* in *coda* position and 2.78% due to *syllabification* of the *nasal* in *coda* position and concurrent *voicing* of the *voiceless stop*). In the *control group*, the *baseline* opts for [bl] *clusters* in 16.66% of their *data* (8.33% of which is due to *syllabification* of the *nasal* in *coda*, and 8.33% is due to *syllabification* of the *nasal* in *coda* position and concurrent *voicing* of the *voiceless stop*, but only in *data* coming from Evelina) and for [pl] *clusters* in 16.67% of their *data* (again, only due to *syllabification* of the *nasal* in *coda*, and only in *data* coming from Evelina).

5.1.2 [nasal+stop+fricative]

Two *clusters* of the type [nasal+stop+fricative] were tested. The *three-consonant clusters* of this type consisted of a *nasal* [m/n] (C_1), a *homorganic stop* [b/d] (C_2) and a *voiced fricative* [j] (C_3) (cf. note 22). The *nasal* in the *clusters* of this type is impressionistically considered to be a *labial nasal* and not part of a *prenasalised stop*. The *data* were not analyzed *phonetically*, in order to confirm this assumption.

The *data* show that [nasal+stop+fricative] *sequences are not perceived as cluster*[46] by the vast majority of *heritage speakers*. [ndj] is *syllabified under* σ_2 (cf. 32a) in 30.55% of *stimuli*, on average (50% by Thodoris, 100% by Aggeliki, 33.33% by Alex and zero times by everyone else). At the same time, [mbj] is *syllabified* under σ_2 in 16.67% of the *stimuli* (50% by Thodoris, 100% by Aggeliki and 16.67% by Alex). The *baseline* mostly perceives [mbj] as a *cluster*, *syllabify*ing the three *consonant*s under σ_2 in 66.67% of the *data* on average. However, [ndj] is *syllabified* as a *cluster* in only 16.67% of the *baseline data* on average. So, *heritage speakers* accept the [ndj] *cluster* more than the [mbj] *cluster*, while the exact opposite happens in the *control group*. Although Alma always (100%) *syllabifies* the three *consonant*s of [mbj] under σ_2, she only *syllabifies* [ndj] as a *cluster* in 33.3% of her *data*. At the same time, Evelina never *syllabifies* [ndj] as a *cluster*, but she opts for a *syllabification* of [mbj] under σ_2 in 16.67% of her *data*.

Like in the [nasal+stop+liquid] *clusters*, the *heritage speaker* group prefers to *syllabify* the *nasal* in the *coda* of σ_1 and the [stop+fricative] in the *onset* of σ_2, as a *cluster* (cf. 32b-c). This is true for 66.67% of the [ndj] *stimuli* and 69.44% of the [mbj] *stimuli*. This is the most frequent *syllabification* for most *heritage speakers*: 100% for Florida, participant 1, and Vasiliki, and 66.67% for Alex in [ndj] *stimuli* (Thodoris and Aggeliki prefer the *syllabification* of [ndj] as a *three-consonant cluster* under σ_2) and 100% for Florida and participant 1, 83.33% for Vasiliki, 50% for Thodoris and 83.33% for Alex in [mbj] *stimuli*, while Aggeliki always (100%) *syllabifies* the three *consonant*s under σ_2. Additionally, Evelina, who is part of the *baseline* group, opts for a *complex coda* with a [nasal+stop] *cluster* in the *coda* of σ_1 (cf. 32d) (83.33% for [ndj] stimuli, but 50% for [mbj] *stimuli*). Two *heritage speakers* also *syllabify* the *nasal* and the stop in a *complex coda*, in σ_1 (Thodoris, in 16.67% of his *data* for [ndj] and Vasiliki, in 16.67% of her *data* for [mbj]). Interestingly enough, Alma, a control participant, *syllabifies* the *nasal*

[46] Here, when the three *consonants* are *syllabified* as *cluster*, I assume that the first *consonant* of the *cluster* (C_1) is *attached* to the *syllable node* (*appendix*), while the remaining two *consonants* (C_1 and C_2) are *attached* to a *branching onset* (cf. 3.1.1).

in *coda* position in 66.7% of her *data* for [ndj], but always (100%) *syllabifies* [mbj] as a *cluster*, under σ_2.

No effect of *stress* position or *environment* was found in this *dataset*.

(32) a. [ce.mbje] (Aggeliki)

b. [kon.djo] (Vasiliki)

c. [cem.bje] (Alex)

d. [tund.je] (Evelina)

The percentages of each *syllabification pattern* for each participant and the average for each *pattern* are shown in (33) (for [ndj] *cluster*) and (36) (for [mbj] *cluster*) for *heritage speakers* and in (34) (for [ndj] *cluster*) and (37) (for [mbj] *cluster*) for the *baseline*. The average for the totality of participants is shown in (35) (for [ndj] *cluster*) and (38) (for [mbj] *cluster*). All percentages are rounded down to the second decimal place.

(33) *Heritage speakers' syllabification patterns for [ndj] (%)*

Syllabification	**Florida**	**Partic. 1**	**Vasiliki**	**Thodoris**	**Aggeliki**	**Alex**	**Average *heritage***
[.ndj]	0	0	0	50	100	33.33	30.55
[n.dj]	100	100	100	33.33	0	66.67	**66.67**
[nd.j]	0	0	0	16.67	0	0	2.78

(34) *Baseline's syllabification patterns for [ndj] (%)*

Syllabification	***Evelina***	***Alma***	***Average Baseline***
[.ndj]	0	33.3	16.67
[n.dj]	16.67	66.7	**41.67**
[nd.j]	83.33	0	41.67

(35) *Total syllabification patterns for [ndj] (%)*

Syllabification	**Average**
[.ndj]	27.08
[n.dj]	**60.42**
[nd.j]	12.5

(36) *Heritage speakers' syllabification patterns for [mbj] (%)*

Syllabification	**Florida**	**Partic. 1**	**Vasiliki**	**Thodoris**	**Aggeliki**	**Alex**	**Average *heritage***
[.mbj]	0	0	0	50	100	16.67	16.67
[m.bj]	100	100	83.33	50	0	83.33	**69.44**
[mb.j]	0	0	16.67	0	0	0	2.78

(37) *Baseline's syllabification patterns for [mbj] (%)*

Syllabification	***Evelina***	***Alma***	***Average Baseline***
[.mbj]	33.33	100	**66.67**
[m.bj]	16.67	0	8.33
[mb.j]	50	0	25

(38) *Total syllabification patterns for [mbj] (%)*

Syllabification	**Average**
[.mbj]	37.50
[m.bj]	**54.17**
[mb.j]	8.33

Like the *clusters* of the type [nasal+stop+liquid] (cf. 5.1.1), the *three-consonant clusters* [ndj] and [mbj] are *ill-formed*. The *sonority* falls from C_1 to C_2, rising again from the *stop* to the *fricative*. While the *Maximal Onset Principle* calls for *syllabify*ing the three *consonant*s in *onset* position, the *Sonority Sequencing Principle* dictates that the *nasal* be *syllabified* as *coda* in the first *syllable*, while the second *syllable* should start with a *two-consonant cluster* [stop+fricative] in the *onset*, that is *well-formed*, as the *sonority rises*. Abiding by the *Sonority Sequencing Principle* can also lead to *syllabification* of the *nasal* and the stop in *coda* position ([nd.j] or [mb.j]). In this case, the *sonority* falls in the *coda* and the *cluster* is *well-formed*. However, this option is more *marked*, as it leads to a *complex coda*. *Fusion* also results in a *well-formed cluster* ([bj]) in the *onset* of σ_2 and to a *coda-less*, hence *unmarked*, first *syllable*. Both [bj] and [dj] are *legal onsets* in SA (cf. (7)).

There are no [ndj] or [mbj] *clusters* in SMG, neither *word-initially* nor *word-medially*, but there are [ndj] and [mbj] *word-initial clusters* in SA. Cf. (24) for the clusters accepted in *word-initial*, *word-medial*, and *word-final* position in SA and SMG. According to Papafilis (2003), there are 13 entries that start with [ndj] and 6 entries that start with [mbj] in SA. *Heritage speakers* in this study accepted [ndj] *clusters* nearly twice as much as [mbj] *clusters* (30.55% and 16.67% respectively). The *cluster* [dj] is *legal* both in *word-initial* and in *word-medial* position in SA, but is *not accepted* in SMG. The *cluster* [bj] is *accepted* in both SMG and SA *onset*s, both *word-initially* and *word-medially*. In SA, there are 148 entries starting with [nd], 53 entries starting with [dj], 6 entries starting with [bj] and 114 entries starting with [mb] (Papafilis, 2003). This means that, if the *syllabification pattern*s are driven by *cluster legal*ity in word margins, then [dj] and [bj] *clusters* are good candidates for *onset* position. If *syllabification* is driven by *dominant language interference*, then *heritage speakers* should avoid [dj] *onset*s, that are not *accepted* in SMG. The latter is not the case, as *heritage speakers* produced [dj] *onset*s in 66.67% of their relevant *data* on average. At the same time, less proficient *heritage speakers* (Florida, Participant 1 and Vasiliki) produced [nd] *onset*s in 100% of their relevant *data*.

5.1.3 [stop+fricative+fricative]

One *cluster* of the type [stop+fricative+fricative] was tested, namely a *cluster* consisting of a *voiceless stop* [k] (C_1), a *voiceless fricative* [θ] (C_2), and a *voiced fricative* [j] (C_3) (cf. note 22).

The *data* show that [stop+fricative+fricative] *sequences* are not perceived as a *cluster*[47] for the vast majority of *heritage speakers*. [kθj] is *syllabified* as a *cluster* under σ_2 (cf. 39a) in 22.22% of *stimuli*, on average (33.33% by Thodoris, and 100% by Aggeliki). The *baseline* mostly perceives [kθj] as a *cluster*, *syllabifying* the three *consonant*s under σ_2 in 41.67% of the *data* on average. This result comes only from Alma (83.33% of her *data* for this *cluster*), as Evelina never produces this *syllabification*.

Most *heritage speakers* (72.23% on average in the *experimental group*'s *data*) *syllabified* the *stop* in the *coda* of σ_1, forming a *complex onset* in σ_2. Of this percentage, only the 16.67% represents a [θj] *onset cluster* (cf. 39b), while 55.56% of the *experimental group*'s *data* for [stop+fricative+fricative] represent an *onset* with a [θç] *cluster* in σ_2 (100% in Florida's *data*, 50% in Thodoris' and Alex's *data*, and 66.67% in Vasiliki's and participant 1's *data*) (cf.39c). Similarly, Evelina, who is a *baseline* participant chooses [θç] *clusters* in *onset* position in 50% of her relevant *data*, but also [kθç] *cluster onset*s (cf. 39d) in 16.67% of her relevant *data*. Alma, a *control group* participant, produces a [k] *coda* in σ_1 and a [θj] *cluster* in the *onset* of σ_2 only once (16.67% of her *syllabification*s for this *cluster*), but never produces a [θç] *cluster*. These *data* show that participants, especially *heritage speakers*, do *assimilate voicing* in their *cluster* productions, which is obligatory in both their languages (SA and SMG), but this only happens in about half the *data* and this is not always the case for most participants.

No effect of *stress* position or environment was found in this *dataset*.

(39) a. [pi.kθje] (Aggeliki)

b. [pek.θjik] (Participant 1)

c. [tuk.θçe] (Florida)

d. [tu.kθçep] (Evelina)

The percentages of each *syllabification pattern* for each participant and the average for each *pattern* are shown in (40) for *heritage speakers* and in (41) for the *baseline*. The average for the totality of participants is shown in (42). All percentages are rounded down to the second decimal place.

(40) *Heritage speakers' syllabification patterns for [kθj] (%)*

Syllabification	***Florida***	***Partic. 1***	***Vasiliki***	***Thodoris***	***Aggeliki***	***Alex***	***Average heritage***
[.kθj]	0	0	0	33.33	100	0	22.22
[.kθç]	0	16.67	16.67	0	0	0	5.56
[k.θç]	100	66.67	66.67	50	0	50	**55.56**
[k.θj]	0	16.67	16.67	16.67	0	50	16.67

[47] Here, when the three *consonants* are *syllabified* as *cluster*, I assume that the first two *consonants* of the *cluster* (C_1 and C_2) are *attached* to the *syllable node* (*appendices*) under σ_2, while the remaining *consonant* (C_1) is *attached* to the *onset* (cf. 3.1.1).

(41) Baseline's syllabification patterns for [kθj] (%)

Syllabification	***Evelina***	***Alma***	***Average Baseline***
[.kθj]	0	83.33	**41.67**
[.kθç]	16.67	0	8.33
[k.θç]	50	0	25
[k.θj]	33.33	16.67	25

(42) Total syllabification patterns for [kθj] (%)

Syllabification	***Average***
[.kθj]	27.08
[.kθç]	6.25
[k.θç]	**47.92**
[k.θj]	18.75

The *three-consonant cluster* [kθj] is not *well-formed*. There is *rising sonority* from the stop to the *fricative* but, according to the *sonority scale* proposed for SMG (cf. 3.3), [j] is more *sonorous* than [θ] for SMG, but there is a *sonority plateau* in SA (cf. 3.2). When the stop is *syllabified* as *coda*, the second *syllable* starts with a *two-consonant cluster* that is *well-formed* in SMG and *accepted* in SA (cf. (7)). However, in the data where *voice assimilation* is present, there is *plateau sonority* between C_2 and C_3 in both languages, so the second *syllable* starts with a *two-consonant cluster* that is *ill-formed* in both SMG and SA., but this *cluster* ([θç]) is *accepted* in SMG. Cf. (24) for the *clusters accepted* in *word-initial*, *word-medial*, and *word-final position* in SA and SMG.

The *cluster* [kθj], is *allowed* in both *word-initial* and in *word-medial* position in SA. The *cluster* [θj] is *legal* in SA *onset*s *word-initially*, but not *word-medially*, and it is *allowed*, only after *voicing assimilation* ([θç]) in SMG *onset*s. According to Papafilis (2003), there are 11 entries starting with [kθj] in SA, though they all are one word's derivatives. There are 5 entries starting with [kθ] (which is also *legal* in SMG, *word-medially*), though they all are one word's derivatives, and 20 entries starting with [θj], though they all are one word's derivatives. There are no words starting with or containing a [θç] *cluster*, as there is no [x] or [ç] *phoneme* in SA. However, /j/ is usually assimilated and produced as [ç], as *voice assimilation* in the domain of *word* is a common *phonological process* in both SA and SMG (cf. Nikolou, 2013). As the *clusters* mentioned above seem to be rare in SA, at least *word-initially*, *word frequency effects* cannot be ruled out.

5.1.4 [fricative+fricative+fricative]

One *cluster* of the type [fricative+fricative+fricative] was tested, namely a *cluster* consisting of three *voiced fricatives*: a *sibilant* [z] (C_1), a *labial* [v] (C_2), and [j] (C_3) (cf. note 22).

The *data* show that [fricative+fricative+fricative] *sequences* are not *perceived* as a *cluster*[48] for the vast majority of *heritage speakers* and for all *control participants*. [zvj] is *syllabified* as a *cluster* under σ_2 (cf. 43a) in 30.56% of *stimuli*, on average, by *heritage speakers* (33.33% by Thodoris, 100% by Aggeliki, 16.67 by Florida, participant 1 and Vasiliki and not at all by Alex). The average percentage is even lower in the *control group* (16.67%), as both participants produced this *syllabification* in 16.67% of their *data*.

The vast majority of the *data* coming from both groups show a preference towards *syllabify*ing the *sibilant* as a *simple coda* in σ_1 and the *cluster* [vj] as a *complex onset* in σ_2 (cf.43b). The average percentage is 69.44% for the *experimental group*, where everyone but Aggeliki demonstrated a clear preference to this *pattern*. Meanwhile, the average percentage in the *control group* is 83.33% where, again, everyone preferred this *syllabification pattern*.

No effect of *stress position* or *environment* was found in this *dataset*.

(43) a. [ce.zvje] (Aggeliki)

b. [koz.vjo] (Florida)

The percentages of each *syllabification pattern* for each participant and the average for each *pattern* are shown in (44) for *heritage speakers* and in (45) for the *baseline*. The average for the totality of participants is shown in (46). All percentages are rounded down to the second decimal place.

(44) *Heritage speakers' syllabification patterns for [zvj] (%)*

Syllabification	***Florida***	***Partic. 1***	***Vasiliki***	***Thodoris***	***Aggeliki***	***Alex***	***Average heritage***
[.zvj]	16.67	16.67	16.67	33.33	100	0	30.56
[z.vj]	83.33	83.33	83.33	66.67	0	100	**69.44**

(45) Baseline's syllabification patterns for [zvj] (%)

Syllabification	***Evelina***	***Alma***	***Average Baseline***
[.zvj]	16.67	16.67	16.67
[z.vj]	83.33	83.33	83.33

(46) Total syllabification patterns for [zvj] (%)

Syllabification	***Average***
[.zvj]	27.08
[z.vj]	72.92

[48] Here, when the three *consonants* are *syllabified* as *cluster*, I assume that the first two *consonant*s of the *cluster* (C_1 and C_2) are *attached* to the *syllable node* (*appendices*) under σ_2, while the remaining *consonant* (C_1) is *attached* to the *onset* (cf. 3.1.1).

While the *Maximal Onset Principle* calls for *syllabifying* the three *consonant*s in *onset* position, the *three-consonant cluster* [zvj] is not *well-formed*. There is *sonority plateau* between C_1 and C_2 and between C_2 and C_3 in SA. Following the *Sonority Scale* proposed for SMG (Kappa, 1995) (cf. 3.3, 3.4), /z/ is more *sonorous* than the following *fricative*, which means that there is *reversed sonority cluster-initially*, followed by *sonority plateau*. When the first *consonant* of the *cluster* is *syllabified* as *coda*, the second *syllable* starts with a *two-consonant cluster* that is *accepted* in SMG and SA *onsets* (cf. (7)). Cf. (24) for the *clusters* accepted in *word-initial, word-medial,* and *word-final* position in SA and SMG.

The *cluster* [zvj] is not *allowed* in SMG but it is *allowed* in both *word-initial* and *word-medial onset*s in SA. However, according to Papafilis (2003), there is only 1 entry starting with [zvj] in SA (zvjerdh /zvjerð/ 'to wean' or, metaphorically, 'to alienate'). The *cluster* [vj], is *allowed* in both *word-initial* and in *word-medial onset* position in SA and SMG. There are 73 entries starting with [vj] in a SA dictionary (Papafilis, 2003). The *cluster* [zv] is also *accepted* in both SMG and SA, and there are 29 entries in a SA dictionary (Papafilis, 2003). This implies that *word frequency effects* could result in *syllabification* of [zvj] in two different *syllables*, as *heritage speakers* might have never heard the word /zvjerð/.

5.1.5 [stop+fricative+stop]

Five *clusters* of the type [stop+fricative+stop] were tested. They all consisted of a *labial voiced stop* [b] or a *velar voiceless stop* [k] (C_1), a *voiceless sibilant* [s] (C_2) and a *voiceless stop* [t], [k], or [p] (C_3).

The *data* show that [stop+fricative+stop] *sequences* are not *perceived* as a *cluster*[49] for the vast majority of *heritage speakers* and for all control participants. [bst] is *syllabified* as a *cluster* under σ_2 (cf. 47a) in 19.44% of *stimuli*, on average, by *heritage speakers* (only 16.67% by Alex, but 100% by Aggeliki). The average percentage is even lower in the *control group* (16.67%), a result which comes only from Alma (in 33.33% of her relevant *data*). The *cluster* [bsk] is *syllabified* as a *cluster* under σ_2 (cf. 47b) in 22.22% of the *experimental group*'s *data* (66.67% by Aggeliki, and 16.67% by Florida, participant 1, Thodoris and Alex), and in 8.33% of the *control group*'s *data*. Again, the result comes only from Alma (16.67%). The *cluster* [kst] was *syllabified* under σ_2 (cf. 47c) in 27.78% of the *experimental group*'s *data* and in 16.67% of the *control group*'s *data* (33.33% by Alma and zero by Evelina). The *cluster* [ksk] is *syllabified* as a *cluster* under σ_2 (cf. 47d) in the 8.33% of the *experimental group*'s *data* and not at all at the *control group*'s *data*. Finally, the *cluster* [ksp] is *syllabified* under σ_2 (cf. 47e) in 8.33% of the *experimental group*'s *data* (only by Aggeliki, in half her relevant *data* (50%)) and in 8.33% of the *control group*'s *data*.

The vast majority of the *data*, coming from both groups, show a preference towards *syllabifying* the first *stop* as a *simple coda* in σ_1 and the [s+stop] *clusters* [st], [sk] and [sp] under σ_2 (cf.47f-j). The sequence [st] was *syllabified* as a *cluster* under σ_2 by *heritage speakers*, in 50% of the relevant *data*, where it was part of a [kst] *cluster* and in 75% when it was part of a [bst] *cluster*. [sk] was *syllabified* as an *onset cluster* in 63.89% of the relevant *data*, where it was part of a [ksk] *cluster* and in 72.22% when it was part of a [bsk] *cluster*. Finally, [sp] was *syllabified* as *cluster* under σ_2 in 66.67% of the relevant *data*, where it was part of a [ksp] *cluster*. In the *control group*, [st] was *syllabified* as *cluster* under σ_2, in 58.33% of the relevant *data*, where it was part of a [kst] *cluster* and in 50% when it was part of a [bst] *cluster*. [sk] was *syllabified* as an *onset cluster* in 58.33% of the relevant *data*, both when

[49] Here, when the three *consonants* are *syllabified* as *cluster*, I assume that the first and the second *consonant* of the *cluster* (C_1 and C_2) are *attached* to the *syllable node* (*appendices*) under σ_2, while C_3 is *attached* to the *onset* (cf. 3.1.1).

it was part of a [ksk] *cluster* and when it was part of a [bsk] *cluster*. Finally, [sp] was *syllabified* as an *onset cluster* in 41.67% of the relevant *data*, where it was part of a [ksp] *cluster*.

Intriguingly, there were several *data* where there was a *complex coda* in the first *syllable* and a *simple onset* in the second *syllable* (cf. 47k-o). In the *experimental group*, [bs] was a *coda* in σ_1 in 5.56% of the relevant *data* (both as part of [bst] and as part of [bsk]). Even more interestingly, the results do not come from the same participants in both instances. Florida and Alex *syllabify* the *cluster* [bst] as [bs.t] in 16.67% of their relevant *data* (that is, only once), while Aggeliki *syllabifies* the *cluster* [bsk] as [bs.k] in 33.33% of her relevant *data*. The *cluster* [ks] was a *coda* in 22.22% of the relevant *data*, as part of the *cluster* [kst], in 27.78% of the relevant *data* when it was part of [ksk] and in 25% of the relevant *data*, as part of [ksp]. In the *control group*, Alma never produces *complex codas*, while Evelina produces [bs] in *coda* position in 66.67% of her relevant *data* (both when [bs] is part of [bst] and when it is part of [bsk]. Evelina also *syllabifies* [ks] in *coda* position: in 50% of her relevant *data* when it is part of [kst], in 83.33% when it is part of [ksk] and in 100% when it is part of [ksp].

No effect of *stress position* or *environment* was found in this *dataset*.

(47) a. [pe.bstik] (Alma)

b. [pa.bska] (Aggeliki)

c. [te.ksti] (Aggeliki)

d. [pi.ksce] (Aggeliki)

e. [to.kspo] (Aggeliki)

f. [kob.sto] (Florida)

g. [kab.ska] (Vasiliki)

h. [tuk.step] (Thodoris)

i. [tuk.sce] (Evelina)

j. [cek.spe] (Alex)

k. [pebs.tik] (Evelina)

l. [cebs.ce] (Aggeliki)

m. [peks.tik] (Evelina)

n. [ceks.ce] (Alex)

o. [toks.po] (Alex)

The percentages of each *syllabification pattern* for each participant and the average for each *pattern* are shown in (48) for *heritage speakers* and in (49) for the *baseline*. The average for the totality of participants is shown in (50). All percentages are rounded down to the second decimal place.

(48) *Heritage speakers' syllabification patterns for [stop+fricative+stop] clusters (%)*

Syllabification	***Florida***	***Partic. 1***	***Vasiliki***	***Thodoris***	***Aggeliki***	***Alex***	***Average heritage***
[.bst]	0	0	0	0	100	16.67	19.44
[b.st]	83.33	100	100	100	0	66.67	**75**
[bs.t]	16.67	0	0	0	0	16.67	5.56
[.bsk]	16.67	16.67	0	16.67	66.67	16.67	22.22
[b.sk]	83.33	83.33	100	83.33	0	83.33	**72.22**
[bs.k]	0	0	0	0	33.33	0	5.56
[.kst]	33.33	33.33	0	16.67	83.33	0	27.78
[k.st]	66.67	50	83.33	83.33	0	16.67	**50**
[ks.t]	0	16.67	16.67	0	16.67	83.33	22.22
[.ksk]	16.67	0	0	0	33.33	0	8.33
[k.sk]	83.33	100	83.33	100	0	16.67	**63.89**
[ks.k]	0	0	16.67	0	66.67	83.33	27.78
[.ksp]	0	0	0	0	50	0	8.33
[k.sp]	100	83.33	100	83.33	0	33.33	**66.67**
[ks.p]	0	16.67	0	16.67	50	66.67	25

(49) Baseline's syllabification patterns for [stop+fricative+stop] clusters (%)

Syllabification	***Evelina***	***Alma***	***Average Baseline***
[.bst]	0	33.33	16.67
[b.st]	33.33	66.67	**50**
[bs.t]	66.67	0	33.33
[.bsk]	0	16.67	8.33
[b.sk]	33.33	83.33	**58.33**
[bs.k]	66.67	0	33.33
[.kst]	0	33.33	16.67
[k.st]	50	66.67	**58.33**
[ks.t]	50	0	25
[.ksk]	0	0	0
[k.sk]	16.67	100	58.33
[ks.k]	83.33	0	41.67
[.ksp]	0	16.67	8.33

[k.sp]	0	83.33	**41.67**
[ks.p]	100	0	50

(50) Total syllabification patterns for [stop+fricative+stop] clusters (%)

Syllabification	***Average***
[.bst]	18.75
[b.st]	68.75
[bs.t]	12.5
[.bsk]	18.75
[b.sk]	66.67
[bs.k]	12.5
[.kst]	25
[k.st]	52.08
[ks.t]	22.97
[.ksk]	6.25
[k.sk]	62.5
[ks.k]	31.25
[.ksp]	8.33
[k.sp]	60.42
[ks.p]	31.25

The *Maximal Onset Principle* calls for *syllabifying* the three *consonant*s in *onset* position, but the *three-consonant clusters* of the type [stop+fricative+stop] are not *well-formed*. There is *rising sonority* from the first *stop* to the *sibilant*, but *reversed sonority* between the *sibilant* and the *stop* that follows. As the *sibilant* is in the middle of the *three-consonant cluster*, it cannot form a *well-formed cluster* even if one of the *marginal consonant*s is not part of the *cluster*. This means that, if the *sibilant* forms a *complex coda* with the first *stop* of the [stop+fricative+stop] *cluster* (C_1), this *coda* will have *rising sonority* and will, thus, be *ill-formed*. Additionally, if the *sibilant* forms a *complex onset* with the second *stop* of the [stop+fricative+stop] *cluster* (C_3), this *onset* will have *reversed sonority* and thus, be *ill-formed*. However, in SMG *reversed sonority* is accepted in *onsets*, when the first *consonant* is a *fricative* (cf. 3.3)

The *clusters* [bst], [bsk], [kst], [ksk], and [ksp] are *accepted* only in *word-medial* position in SA. The *cluster* [bs] is *accepted* in SA *onset*s only *word-medially*. The *clusters* [ks] and [sp] are *accepted clusters* in both *word-initial* and *word-medial* position in both SA and SMG, while [st] and [sk] are *accepted*

only in *word-initial* position in SA and *accepted* in any *onset* in SMG. Cf. (24) for the clusters *accepted* in *word-initial*, *word-medial*, and *word-final* position in SA and SMG. According to Papafilis (2003), there are only 2 entries starting with [ks] in SA (both are Greek loanwords). There are 26 entries starting with [sk], 77 entries starting with [sp], and 138 entries starting with [st]. [ks] and [st] are also *accepted* in *word-final coda* position in SA. So, *frequency effects* can be an explanation for the *syllabifications* in this *dataset*.

Concluding, there was no *effect* of *cluster legality* or *cluster acceptability* attested in the *dataset* studied in section 5.1. The only *effect* that may be present is that of *word-frequency*.

5.2 Participants and their *data*

This section describes the *syllabification pattern*s that each participant used in the experiment. The number of times each *heritage speaker* used each of the *pattern*s that are described in 5.1 is shown in detail in (51) and the relevant percentages in (52), while the same information for the *control group* is presented in (53)-(54). The same information is presented in graphical form in *figures 1-3* for *heritage speakers*, and in *figures 4-6* for the *baseline*. In *figures 7-9* there is a contrastive presentation of the average for each group.

Nearly all *heritage speakers* in this study perceived the *clusters* under investigation as *heterosyllabic consonant sequences*, in the vast majority of their *syllabification*s. In a total of 66 *stimuli* for each participant, 51 (77.27%) of them, on average, were perceived as *heterosyllabic consonant sequences* by *heritage speakers*. Five participants in the *experimental group* (Florida, Participant 1, Vasiliki, Thodoris and Alex) perceived most of the *clusters* as *heterosyllabic consonant sequences*. Out of 66 *stimuli* in total, Florida followed a *syllabification* of a *heterosyllabic consonant sequence*, with a *complex* (*two-consonant*) *onset* in σ_2 in 56 (i.e. in 93.33% of the *syllabifications* of the three *consonants* as a *heterosyllabic sequence* in her data), Participant 1 in 55 (i.e. 90.16%), Vasiliki in 59 (i.e. 95.16%), Thodoris in 50 (i.e. 96.15%) and Alex in 46 (i.e. 75.41%). On the contrary, Aggeliki, who completed elementary school in Albania (which means that she studied SA in a formal setting for 6 years) never produced this *pattern* and most of her *syllabification*s treated the *three-consonant cluster* as a *cluster* under σ_2 (56 out of 66 *syllabification*s, or 84.85% of her total *data*).

No *heritage speaker syllabified* the *clusters* in the experiment as a *cluster under* σ_1. *Complex coda*s, with the two first *members* of the *cluster* (C_1 and C_2) in *coda* position and the third *member* (C_3) in the *onset* of σ_2, are rare in the *syllabification*s of Florida (only 1, or 1.67% of her *syllabifications* of the three consonants as a *heterosyllabic sequence*), Participant 1 (2, or 3.28% of her *syllabifications* of the three *consonants* as a *heterosyllabic sequence*), Vasiliki (3, or 4.84%) and Thodoris (2, or 3.85%). Aggeliki and Alex produced *complex coda*s somewhat more often. Aggeliki produced *complex coda*s 10 times (i.e. in 100% of her *syllabifications* of the three consonants as a *heterosyllabic sequence*) and Alex 15 times (i.e. in 24.59% of the *syllabifications* of the three consonants as a *heterosyllabic sequence* in his *data*). All *complex coda*s in the *experimental group data* are of the type [stop+fricative], namely [bs] and [ks].

Fusion was not present in the *data* of every *cluster* type. In fact, *two-consonant clusters* which are a result of *fusion* were observed only in [labial nasal+homorganic stop] *sequences*, in the *clusters* [mbl] and [mpl]. The *stimuli* containing these two *clusters* were 12 for each participant (6 containing [mbl] and 6 containing [mpl]. *Fusion* was mainly attested in Florida's (3 times, or in 4.54% of the *clusters* where *fusion* was attested) and participant 1's *data* (4 times, or in 6.06% of the *clusters* where *fusion* was attested). There was no *fusion* in Vasiliki's, Aggeliki's, Thodoris', or Alex's *data*.

Voice assimilation was observed between [nasal+homorganic voiceless stop] in [mpl] *clusters* (*voicing* of the *voiceless stop*) and between [voiceless fricative+voiced fricative] in [kθj] *clusters*. The *stimuli* containing these two *clusters* were 6 for each *cluster*, for each participant (12 in total) and, intriguingly, although *voice assimilation* is obligatory in both SMG and SA, *voice assimilation* was not frequent in the *data* coming from the *experimental group*. *Voice assimilation* was present 6 times in Florida's and in Vasiliki's *data* (i.e. in 50% of the *stimuli* containing the *clusters* in question), 5 times in participant 1's *data* (or in 41.67%) 3 times in Thodoris' and Alex's *data* (or 25%) and not at all in Aggeliki's *data*. In Florida's, participant 1's, Thodoris' and Alex's data, *assimilation* was present only in *data* containing the [kθj] *cluster*. In Vasiliki's *data*, *assimilation* was present 5 times in *data* containing the [kθj] *cluster* and one time in *data* containing the [mpl] *cluster*. This means that there was only one instance of *voicing assimilation* in [nasal+voiceless stop] *clusters* in the *data* of the *experimental group*.

The scarcity of *assimilation* can be due to an effect of the *stimuli*, i.e. because of the fact that the *stimuli* were *nonce-words*, participants tried to repeat the exact *segments* they heard and read, ignoring any *phonological rules* and *processes* and focusing on the task.

(51) *Number of times each heritage speaker (experimental group) used each strategy to syllabify the clusters in the experiment and number of occurrences of fusion and/or assimilation*

Pattern	***Florida***	***Partic. 1***	***Vasiliki***	***Thodoris***	***Aggeliki***	***Alex***	***Average heritage***
Cluster under σ_2	6	5	4	14	56	5	15
Heterosyllabic	60	61	62	52	10	61	**51**
Heterosyllabic complex onset	56	55	59	50	0	46	44.33
Heterosyllabic complex coda	1	2	3	2	10	15	5.5
Fusion	3	4	0	0	0	0	1.17
Assimilation	6	5	6	3	0	3	3.83

(52) *Percentages for syllabification patterns and of the occurrences of fusion and/or assimilation for each heritage speaker (experimental group)*

Pattern	***Florida***	***Partic. 1***	***Vasiliki***	***Thodoris***	***Aggeliki***	***Alex***	***Average heritage***
Cluster under σ_2	9.09	7.57	6.06	21.21	84.85	7.58	22.73
Heterosyllabic	90.90	92.42	93.93	78.79	15.15	92.42	77.27
Heterosyllabic complex onset	93.33	90.16	95.16	96.15	0	75.41	75.03
Heterosyllabic complex coda	1.67	3.28	4.84	3.85	100	24.59	23.04
Fusion	4.54	6.06	1.51	0	0	0	2.02
Assimilation	50	41.67	50	25	0	25	31.94

Figure 1. Patterns % of syllabification of the experimental stimuli by heritage speakers (experimental group)

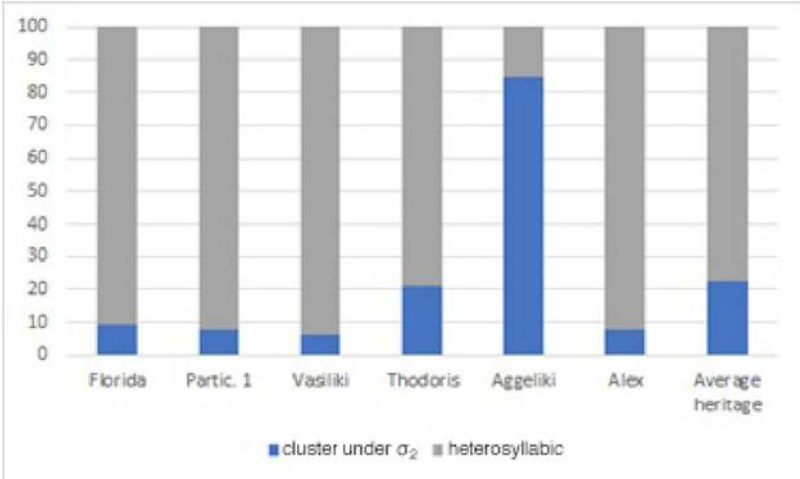


Figure 2. Patterns (% of the heterosyllabic data) of heterosyllabic syllabification of the experimental stimuli by heritage speakers (experimental group)

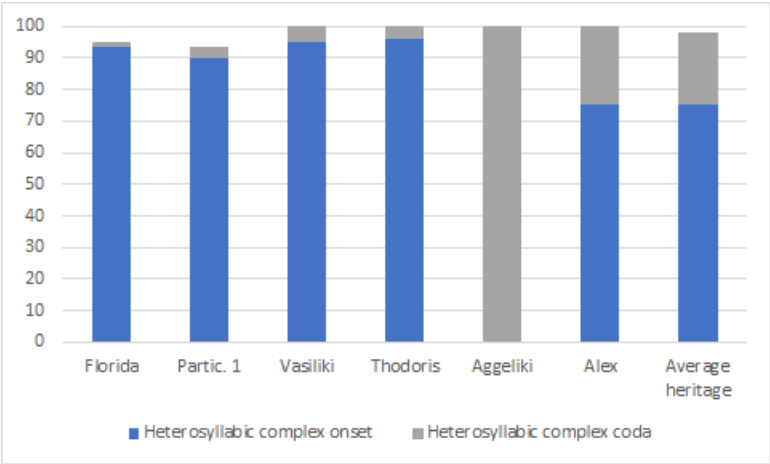
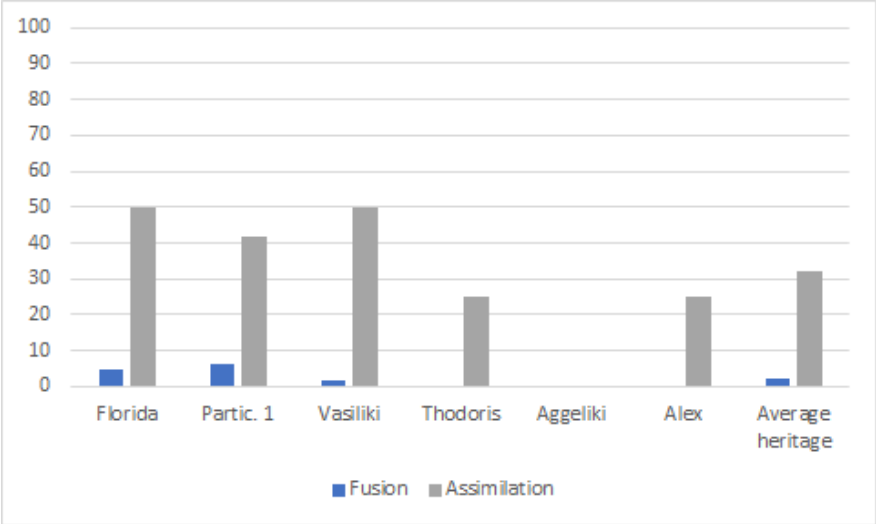


Figure 3. Occurrence of fusion and assimilation in the data of heritage speakers (experimental group), percentage of the relevant data, where fusion and/or assimilation could be applied



There was great *diversity* in the *control group*. Alma, who reports little or no *attrition syllabified* the *clusters* under σ_2 in about half the *stimuli* (32 out of 66, or 48.48% of the total). In 51.51% of her *data*, Alma *syllabified* the *clusters* as *heterosyllabic consonant sequences*, always with a *simple coda* in σ_1, followed by a *complex onset* in σ_2. The difference with Evelina is striking. Evelina, who reports heavy *attrition* in the domain of *phonetics-phonology*, *syllabified clusters* under σ_2 only 10 times (15.15%), *syllabify*ing the first *consonant* in *coda* position in σ_1 and a *two-consonant cluster* in σ_2 *onset* 23 times (in 41.07% of the *heterosyllabic syllabifications* in her data). *Complex coda*s are present in half of Evelina's *data* (33 times, i.e. in 58.93% of her *syllabifications* of the *clusters* as *heterosyllabic consonant sequences*), but not at all present in Alma's *data*. *Fusion* was not present in the *control group*'s *dataset*.

Voice assimilation was observed between [nasal+homorganic voiceless stop] in [mpl] *clusters* (*voicing* of the *voiceless stop*) and between [voiceless fricative+voiced fricative] in [kθj] *clusters*. *Voice assimilation* was present only in the *data* coming from Evelina (7 times, or in 58.33% of the *stimuli* containing the *clusters* in question). *Assimilation* was present in Evelina's *data* 4 times in [kθj] *stimuli* and 3 times in [mpl] *stimuli*. There was no *assimilation* in Alma's *data*. Again, this is probably due to an effect of the experiment and does not reflect the *subjects' phonological grammar*.

(53) *Number of times each baseline participant (control group) used each strategy to syllabify the clusters in the experiment and number of occurrences of fusion and/or assimilation*

Pattern	**Evelina**	**Alma**	**Average *Baseline***
Cluster under σ_2	10	32	21
Heterosyllabic	56	34	45
Heterosyllabic complex onset	23	34	28.5
Heterosyllabic complex coda	33	0	16.5
Fusion	0	0	0
Assimilation	7	0	3.5

(54) *Percentages for syllabification patterns for each baseline participant (control group) and of the occurrences of fusion and/or assimilation*

Pattern	**Evelina**	**Alma**	**Average *Baseline***
Cluster under σ_2	15.15	48.48	31.81
Heterosyllabic	84.85	51.51	68.18
Heterosyllabic complex onset	41.07	100	70.54
Heterosyllabic complex coda	58.93	0	29.47
Fusion	0	0	0
Assimilation	58.33	0	29.17

Figure 4. Patterns % of syllabification of the experimental stimuli by the baseline (control group)

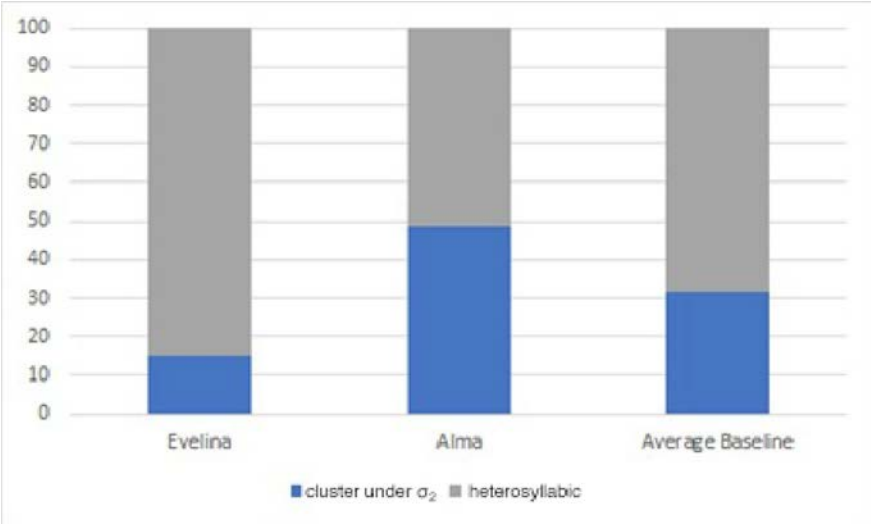


Figure 5. Patterns (% of the heterosyllabic data) of heterosyllabic syllabification of the experimental stimuli by the baseline (control group)

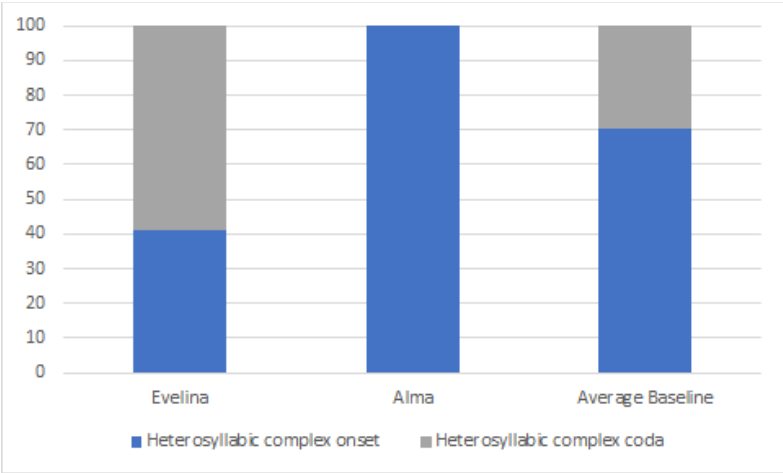


Figure 6. Occurrence of fusion and assimilation in the data of the baseline (control group), percentage of the relevant data, where fusion and/or assimilation could be applied

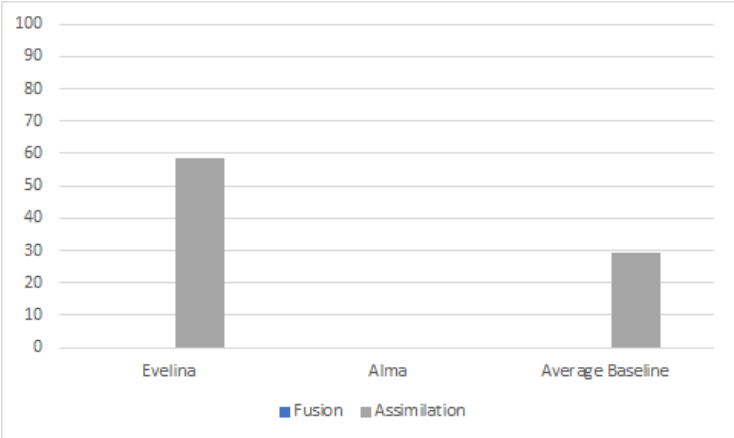


Figure 7. Average syllabification patterns of the baseline (control group) and the heritage speakers (experimental group) %

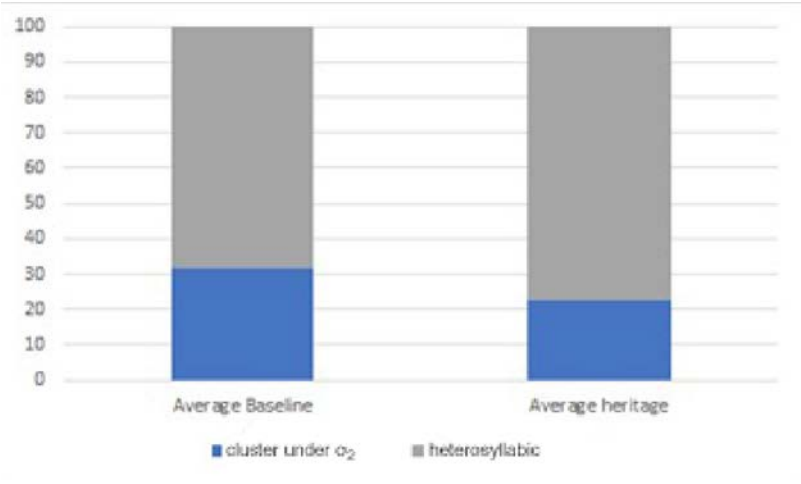


Figure 8. Average patterns of heterosyllabic syllabification in the baseline (control group) (experimental group) and in heritage speakers %

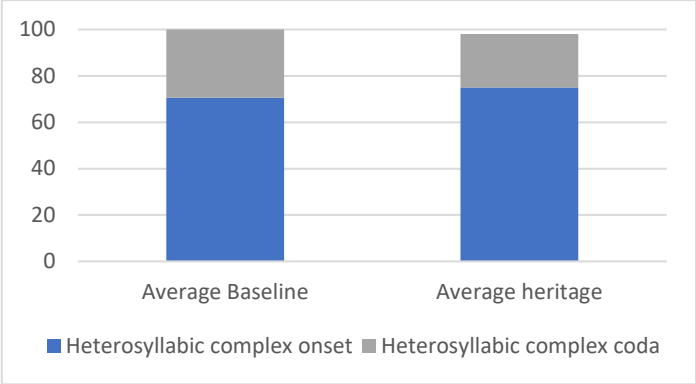
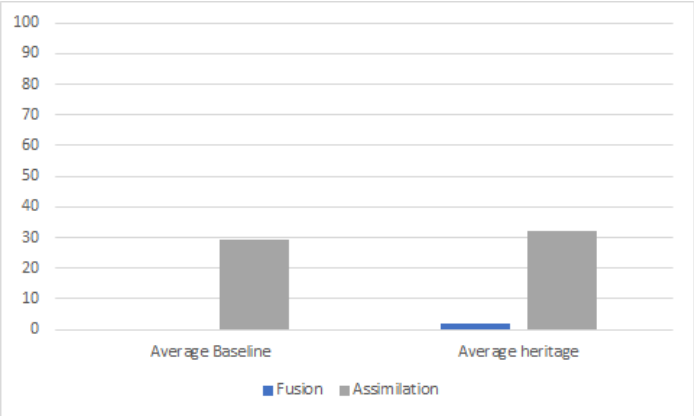


Figure 9. Average occurrence of fusion and assimilation in the data of the heritage speakers (experimental group) and the baseline (control group), percentage of the relevant data, where fusion and/or assimilation could be applied



5.3 Discussion of the *data* in the *framework* of *Optimality Theory* (OT)

5.3.1 Some basics of Optimality Theory[50]

Optimality Theory (henceforth: OT) (Prince and Smolensky, 1993; McCarthy and Prince, 1993a, b) is a *framework*, development of *Generative Grammar*, that allows for *cross-linguistic variation.* It is based on the idea that there are *constraint conflicts*, whose *resolution* is reflected on the *surface form*, or *representation*. The *surface representation* (*output*) is the best possible -or optimal- *surface form*, as it is the *representation* that induces the least serious *violations* on a list of *ranked* and *violable constraints*. The *constraints* are *universal*, but their *ranking* is language-specific. The *ranking* means that the *higher-ranked constraint* has to be satisfied before all others. Every outcome will definitely *violate* some *constraints* in any *grammar*, but it is less possible for forms that *violate higher-ranked constraints* to *surface*. *Markedness* (or *well-formedness*) *constraints* favor *universally unmarked structure*s, while *faithfulness constraints* preserve the *structure* and the *lexical contrasts*, meaning that they call for congruence with the lexical *input*. So, *markedness constraints* apply pressure towards *unmarked structure*s, and are in clash (and counterbalance) with *faithfulness constraints* that preserve the *language contrasts* which would not exist if all *structure*s were *unmarked*. All candidate *output*s are simultaneously *evaluated* and the optimal *output* is chosen, according to a *grammar*'s *constraint ranking*.

Tableaus, like the one in (55a) are used to graphically represent the *constraint ranking* and the *evaluation* of the *candidate structure*s. On the top of the first column, there is the *input*, or *underlying form* in //. The rest of the column is filled with the candidate *output* forms in [ ]. The *constraints* are on the top of each column, the *higher-ranked* first. The symbol (*) here, does not mark *ungrammaticality*, but it denotes a *constraint* violation. One (*) is used for every violation. This means that, if a *candidate form violates* a *constraint* more than once, there will be more than one (*) symbols. The symbol (!) marks a *fatal violation*, that excludes the *candidate*, while the symbol (☞) marks the *optimal candidate*, with the least serious *violations*, that will *surface* as *output*.

When the *ranking* between two or more *constraints* is irrelevant for the selection of the optimal *output* form, the lines in the *tableau* are dashed. In (55), the *constraint ranking* is the following:

(55) constraint 1 >> *constraint* 2, *constraint* 3>> *constraint* 4

(55a) *Example of an OT tableau*

/input/	constraint 1	constraint 2	constraint 3	constraint 4
[candidate 1]			*!	
☞ [candidate 2]				*
[candidate 3]		*!		

The *constraints* that are relevant for the *evaluation* of the *output candidates* in the present study are described below.

Well-formedness constraints or *Markedness constraints:*

*COMPLEX^{ONS}: *Onsets* are *simple*, *clusters* are not allowed in *onsets*[51]

[50] This section is based on Kager (1999) and McCarthy (2004)

[51] This *constraint* is violated when there is more than one *consonant* at the left *syllable margin*, even if they do not form a *well-formed cluster* under *onset*.

*COMPLEX^{COD}: *Coda*s are *simple*, *clusters* are not allowed in *coda*s (*appendices* are not allowed at the right *syllable margin*)

ONSET: *Syllable*s must start with a *consonant* in *onset* position

NO-CODA: *Syllables* must be *open*, with no *consonant* in *coda* position. One *violation* for every *closed syllable*

*NC̥: Sequences of *nasal* plus *voiceless obstruent* are not allowed[52]

AGREE[voice]$_{OBST}$: *Obstruents* in *clusters* should *agree* in *voicing*

*APPENDIX-LEFT: A *consonant* at the left *syllable margin* must be immediately *dominated* by *onset*[53], i.e. *appendices* are not allowed at the left edge of a *syllable*[54].

Faithfulness Constraints

CONTIG-IO: (CONTIGUITY) No *epenthesis* or *deletion*

UNIFORMITY-IO: No element in the *output* can have multiple correspondents in the *input*[55]

IDENT-IO(ObsVce): Correspondent *obstruents* are identical in their specification for *voice* (no changes in the *voicing* of *obstruents*)[56]

IDENT-IO(voice): The specification for the *feature* [voice] of a *segment* in the *input* has to be preserved in its *correspondent* in the *output*.

The *resolution of conflict* between *Coda* and *Onset constraints* results in whether compliance with or *violation* of the *Maximal Onset Principle* (cf. 3.1.2).

5.3.2 Data discussion

There is great *variability* in the *syllabification patterns* in this *dataset*. There are three *syllabification patterns* that account for the data in this study (cf. 5.1; 5.2; APPENDIX III), namely:

a. *syllabification* of the *cluster* under the second *syllable* (σ_2), with no *coda* in the first *syllable* (σ_1) and a *three-consonant sequence* under σ_2. In this case, the first *consonant* (C_1) is considered to be *attached* to the *syllable node* of σ_2, as *extrasyllabic* (*appendix*), while the second *consonant* (C_2) may also be an *appendix*, when it does not form a *well-formed cluster* with the third *consonant* (C_3). C_2 is *attached* to the *syllable node* as *appendix* in the cases of [stop+fricative+fricative], [fricative+fricative+fricative] and [stop+fricative+stop] *clusters* (cf. 3.1.1).
b. *syllabification* of the *cluster* as a *heterosyllabic consonant sequence*, with C_1 *syllabified* as a *simple coda* in the first *syllable* (σ_1) and a *two-consonant cluster* under the second *syllable* (σ_2). In this case, C_2 may be an *appendix*, when it does not form a *well-formed cluster* with the third *consonant* (C_3). C_2 is *attached* to the *syllable node* as *appendix* in the cases of [stop+fricative+fricative], [fricative+fricative+fricative] and [stop+fricative+stop] *clusters* (cf. 3.1.1).

[52] This *constraint* is violated by [mp] sequences in [mpl] *clusters* in the *data* of this study
[53] cf. Goad and Rose, 2004:131
[54] This *constraint* is *violated* by every *appendix* at the left *syllable margin*, in the case of this study: by C_1 in *three-consonant sequences* and by C_2 when there is *reversed sonority* or *sonority plateau* between C_2 and C_3
[55] This *constraint* is violated by *fusion*, which is present in the *data* of this study
[56] Kager (1999:70)

c. *syllabification* of the *cluster* as *a heterosyllabic consonant sequence,* with C_1 and C_2 under the first *syllable* (σ_1) and a *simple onset* in the second *syllable* (σ_2).

There are three distinct *constraint rankings* ((56)-(58)) that result in these three *patterns surfacing*.

The *syllabification* of the *consonant clusters* of this experiment under σ_2, where C_1 is *attached* to the *syllable node* as an *appendix*, is a result of the *constraint* ranking in (56), which favors *open*, CV *syllable*s, while *COMPLEX^{ONS} and *APPENDIX-LEFT, which are *violated* by *three-consonant clusters*, have a *low ranking*.

In (56a), there is an example with a *nonce-word* from the *experimental stimuli* that ends with an *open syllable*, where C_2 and C_3 form a *well-formed cluster* in the *onset* of σ_2, while C_1 is an *appendix*, *attached* to the *syllable node* of σ_2.

In (56b), there is an example with a *nonce-word* from the *experimental stimuli* that ends with an *open syllable*, where C_2 and C_3 form an *ill-formed cluster* (*reversed sonority*), so C_3 is *syllabified* in the *onset* of σ_2 and C_1 and C_2 are *appendices*, *attached* to the *syllable node* of σ_2.

In (56c), there is an example of a *nonce-word* that ends with a *closed syllable*, where C_2 and C_3 form a *well-formed cluster* in the *onset* of σ_2, while C_1 is an *appendix*, *attached* to the *syllable node* of σ_2.

In (56d) there is an example of a *nonce-word* that ends with a *closed syllable* where C_2 and C_3 form an *ill-formed cluster* (*reversed sonority*), so C_3 is syllabified in the onset of σ_2 and C_1 and C_2 are *appendices*, *attached* to the *syllable node* of σ_2.

(56) CONTIG-IO, ONSET, NO-CODA, *COMPLEX^{COD} >>*COMPLEX^{ONS} >> *APPENDIX-LEFT

(56a)

/kondjo/	CONTIG-IO	ONSET	NO-CODA	*COMPLEX^{COD}	*COMPEX^{ONS}	*APP-LEFT
☞ [ko.ndjo]					*	*
[kon.djo]			*!		*	
[kond.jo]			*!	*		
[kondj.o]		*!	*	*		
[ko.djo]	*!				*	

(56b)

/pikspe/	CONTIG-IO	ONSET	NO-CODA	*COMPLEX^{COD}	*COMPEX^{ONS}	*APP-LEFT
☞ [pi.kspe]					*	**
[pik.spe]			*!		*	*
[piks.pe]			*!	*		
[piksp.e]		*!	*	*		
[pi.spe]	*!				*	*

(56c)

/pemblik/	CONTIG-IO	ONSET	NO-CODA	*COMPLEX^{COD}	*COMPEX^{ONS}	*APP-LEFT
☞ [pe.mblik]			*		*	*
[pem.blik]			**!		*	
[pemb.lik]			**!	*		
[pembl.ik]		*!	**	*		
[pe.blik]	*!		*		*	

(56d)

/cikstek/	CONTIG-IO	ONSET	NO-CODA	*COMPLEX^{COD}	*COMPEX^{ONS}	*APP-LEFT
☞ [ci.kstek]			*		*	**
[cik.stek]			**!		*	*
[ciks.tek]			**!	*		
[cikst.ek]		*!	**	*		
[ci.stek]	*!		*		*	*

The *syllabification* that results in a *simple coda* in σ_1 and a *complex onset* in σ_2 is a result of the *constraint* ranking in (57), which favors *syllable*s with a *simple coda* and *syllable*s with an *onset*, while *COMPLEX^{ONS} which is *violated* by *complex onsets*, and NO-CODA that is violated by *codas* have a low *ranking*.

In (57a), there is an example with a *nonce-word* from the *experimental stimuli* that ends with an *open syllable*, where C_2 and C_3 form a *well-formed cluster* in the *onset* of σ_2, while C_1 is an *appendix*, *attached* to the *syllable node* of σ_2.

In (57b), there is an example with a *nonce-word* from the *experimental stimuli* that ends with an *open syllable*, where C_2 and C_3 form an *ill-formed cluster* (*reversed sonority*), so C_3 is *syllabified* in the *onset* of σ_2 and C_1 and C_2 are *appendices*, *attached* to the *syllable node* of σ_2.

In (57c), there is an example of a *nonce-word* that ends with a *closed syllable*, where C_2 and C_3 form a *well-formed cluster* in the *onset* of σ_2, while C_1 is an *appendix*, *attached* to the *syllable node* of σ_2.

In (57d) there is an example of a *nonce-word* that ends with a *closed syllable* where C_2 and C_3 form an *ill-formed cluster* (*reversed sonority*), so C_3 is *syllabified* in the *onset* of σ_2 and C_1 and C_2 are *appendices*, *attached* to the *syllable node* of σ_2.

(57) CONTIG-IO, ONSET, *COMPLEX^{COD}>>*APPENDIX-LEFT >> *COMPLEX^{ONS}, NO-CODA

(57a)

/tundje/	CONTIG-IO	ONSET	*COMPLEX^{COD}	*APP-LEFT	*COMPEX^{ONS}	NO-CODA
[tu.ndje]				*!	*	
☞ [tun.dje]					*	*
[tund.je]			*!			*
[tundj.e]		*!	*			*
[tu.dje]	*!				*	

(57b)

/koksko/	CONTIG-IO	ONSET	*COMPLEX^{COD}	*APP-LEFT	*COMPEX^{ONS}	NO-CODA
[ko.ksko]				**!	*	
☞ [kok.sko]				*	*	*
[koks.ko]			*!			*
[koksk.o]		*!	*			*
[ko.sko]	*!			*	*	

(57c)

/pendjik/	CONTIG-IO	ONSET	*COMPLEX^{COD}	*APP-LEFT	*COMPEX^{ONS}	NO-CODA
[pe.ndjik]				*!	*	*
☞ [pen.djik]					*	**
[pend.jik]			*!			**
[pendj.ik]		*!	*			**
[pe.djik]	*!				*	*

(57d)

/pekspik/	CONTIG-IO	ONSET	*COMPLEX^{COD}	*APP-LEFT	*COMPEX^{ONS}	NO-CODA
[pe.kspik]				**!	*	*
☞ [pek.spik]				*	*	**
[peks.pik]			*!			**
[peksp.ik]		*!	*			**
[pe.spik]	*!			*	*	*

The *syllabification* that results in a *complex coda* in σ_1 and *simple onset* in σ_2 is the result of the *constraint ranking* in (58), which favors *syllable*s with a *simple onset,* even if this leads to a *complex coda* (which is more *marked* than a *complex onset* (cf. 3.1.1)) where NO-CODA and *COMPLEX^{COD} which are *violated* by *codas* have a *low ranking*.

In (58a), there is an example with a *nonce-word* from the *experimental stimuli* that ends with an *open syllable*, where C_2 and C_3 form a *well-formed cluster* in the *onset* of σ_2, while C_1 is an *appendix*, *attached* to the *syllable node* of σ_2.

In (58b), there is an example with a *nonce-word* from the *experimental stimuli* that ends with an *open syllable*, where C_2 and C_3 form an *ill-formed cluster* (*reversed sonority*), so C_3 is *syllabified* in the *onset* of σ_2 and C_1 and C_2 are *appendices*, *attached* to the *syllable node* of σ_2.

In (58c), there is an example of a *nonce-word* that ends with a *closed syllable*, where C_2 and C_3 form a *well-formed cluster* in the *onset* of σ_2, while C_1 is an *appendix*, *attached* to the *syllable node* of σ_2.

In (58d) there is an example of a *nonce-word* that ends with a *closed syllable* where C_2 and C_3 form an *ill-formed cluster* (*reversed sonority*), so C_3 is *syllabified* in the *onset* of σ_2 and C_1 and C_2 are *appendices*, *attached* to the *syllable node* of σ_2.

(58) CONTIG-IO, ONSET, *COMPLEX^{ONS}, *APPENDIX-LEFT >> NO-CODA, *COMPLEX^{COD}

(58a)

/komblo/	CONTIG-IO	ONSET	*COMPEX^{ONS}	*APP-LEFT	NO-CODA	*COMPLEX^{COD}
[ko.mblo]			*!	*		
[kom.blo]			*!		*	
☞ [komb.lo]					*	*
[kombl.o]		*!			*	*
[ko.blo]	*!		*			

(58b)

/tukste/	CONTIG-IO	ONSET	*COMPEX^{ONS}	*APP-LEFT	NO-CODA	*COMPLEX^{COD}
[tu.kste]			*!	**		
[tuk.ste]			*!	*	*	
☞ [tuks.te]					*	*
[tukst.e]		*!			*	*
[tu.ste]	*!		*	*		

(58c)

/pembjik/	CONTIG-IO	ONSET	*COMPEX^{ONS}	*APP-LEFT	NO-CODA	*COMPLEX^{COD}
[pe.mbjik]			*!	*	*	
[pem.bjik]			*!		**	
☞ [pemb.jik]					**	*
[pembj.ik]		*!			**	*
[pe.bjik]	*!		*		*	

(58d)

/tukspep/	CONTIG-IO	ONSET	*COMPEX^{ONS}	*APP-LEFT	NO-CODA	*COMPLEX^{COD}
[tu.kspep]			*!	**	*	
[tuk.spep]			*!	*	**	
☞ [tuks.pep]					**	*
[tuksp.ep]		*!			**	*
[tu. spep]	*!		*	*	*	

In addition to the above, two *phonological processes* are present in this *dataset* (cf. 5.1; 5.2), namely:

a. *fusion* of two *consonant*s as a strategy to avoid [nasal+voiceless obstruent] *clusters* [mpl] which *violate* *NC̥, and as a strategy to *simplify* the *three-consonant cluster* [mbl].
b. *Voicing assimilation* between [m] and [p] in [mpl] *clusters*, again, to avoid *violation* of *NC̥, and between [θ] and [j] in [kθj] *clusters*, as *voicing assimilation* in *obstruents* is obligatory in both SA and SMG (cf. 5.1.3).

There are seven distinct *constraint rankings* that result in these two *processes* (cf.59-65).

The *syllabification* that results in *fusion* in [mpl] *clusters* in the experiment is the result of the *constraint ranking* in (59), where *NC̥ is *highly ranked* and UNIFORMITY-IO that is *violated* by *fusion* has a *low ranking*. In (59a), there is an example with a *nonce-word* from the *experimental stimuli* that ends with an *open syllable*. There was no *fusion* attested in *stimuli* that contain the [mpl] *cluster* and end in a *closed syllable* (cf. 5.1.1).

(59) *NC̥, ONSET, CONTIG-IO >> NO-CODA >> *APPENDIX-LEFT >> COMPEX^{ONS} >> UNIFORMITY-IO

(59a)

/tumple/	*NÚ	ONSET	CONTIG-IO	NO-CODA	*APP-LEFT	*COMPEX^{ONS}	UNIFORMITY-IO
[tu.mple]	*!				*	*	
[tum.ple]	*!			*		*	
[tumpl.e]	*!	*		*			
[tu.mble]					*!	*	
[tum.ble]				*!		*	
[tumb.le]				*!			
[tumbl.e]		*!		*			
☞ [tu.ble]						*	*
[tu.ple]			*!			*	

The *syllabification* that results in *fusion* in [mbl] *clusters* of the type [nasal+voiced stop+liquid] is the result of the *constraint ranking* in (60), where CONTIG-IO is *highly ranked* and *COMPEX^{ONS} is *ranked higher* than UNIFORMITY-IO, which is *violated* by *fusion*. In (60a), there is an example with a *nonce-word* from the *experimental stimuli* that ends with an *open syllable*. In (60b), there is an example with a *nonce-word* that ends with a *closed syllable*.

(60) ONSET, CONTIG-IO >>*COMPLEX^{COD}, *APPENDIX-LEFT, NO-CODA >> *COMPEX^{ONS}, UNIFORMITY-IO

(60a)

/komblo/	ONSET	CONTIG-IO	*COMPLEX^{COD}	*APP-LEFT	NO-CODA	*COMPEX^{ONS}	UNIFORMITY-IO
[ko.mblo]				*!		*	
[kom.blo]					*!	*	
[kombl.o]	*!		*		*		
[komb.lo]			*!		*		
[ko.mlo]		*!				*	
☞ [ko.blo]						*	*
[kob.lo]					*!		

(60b)

/tumblep/	ONSET	CONTIG-IO	*COMPLEX^{COD}	*APP-LEFT	NO-CODA	*COMPEX^{ONS}	UNIFORMITY-IO
[tu.mblep]				*!	*	*	
[tum.blep]					**!	*	
[tumbl.ep]	*!		*		**		
[tumb.lep]			*!		**		
[tu.mlep]		*!			*	*	
☞ [tu.blep]					*	*	*
[tub.lep]					**!		

Fusion in [mbl] and [mpl] *clusters* of the type [nasal+stop+liquid] cannot happen when *faithfulness constraints* are *ranked* higher than *well-formedness constraints*, as in (61). *Constraints* that are *violated* by *syllable structure* are not relevant here and can be at any *ranking* after UNIFORMITY-IO and CONTIGUITY-IO, depending on the *syllabification* of the *output* (cf. (56)-(58) for the different *rankings* of *COMPLEX^{COD}, NO-CODA, *COMPEX^{ONS}, *APPENDIX-LEFT, and ONSET for each *syllabification pattern*). As *syllabification* is not relevant here, the *output candidates* in the *tableaus* are not *syllabified*.

(61) UNIFORMITY-IO, CONTIG-IO

(61a)

/komblo/	UNIFORMITY-IO	CONTIG-IO
☞ [ko.mblo]		
[komlo]		*!
[koblo]	!*	

Voicing in [mpl] *clusters* is the result of the *constraint ranking* in (62), where *NC̥, UNIFORMITY-IO (which is *violated* by *fusion*), and CONTIGUITY-IO (which is *violated* by *epenthesis* or *deletion*) are *highly ranked*. In (62a), there is an example with a *nonce-word* from the *experimental stimuli* for the *cluster* [mpl] that ends with an *open syllable*. *Constraints* that are *violated* by *syllable structure* are not relevant here and can be at any *ranking* after IDENT-IO(voice), depending on the *output* (cf. (56)-(58) for the different *rankings* of *COMPLEX^{COD}, NO-CODA, *COMPEX^{ONS}, *APPENDIX-LEFT, and ONSET for each *syllabification pattern*). As *syllabification* is not relevant here, the *output candidates* in the *tableaus* are not *syllabified*.

(62) *NC̥ >> UNIFORMITY-IO, CONTIG-IO >> IDENT-IO(voice)

(62a)

/pamplo/	*NC̥	UNIFORMITY-IO	CONTIG-IO	IDENT-IO(voice)
[pamplo]	*!			
[paplo]			*!	
[pamlo]			*!	
[pablo]		*!		*
☞ [pamblo]				*

When *assimilation* is not applied in [nasal+voiceless obstruent] *clusters*, it is a result of the *constraint ranking* shown in (63), where *NC̥ is *ranked* lower than *faithfulness constraints.* Constraints that are *violated* by *syllable structure* are not relevant here and can be at any *ranking* after *NC̥, depending on the *output* (cf. (56)-(58) for the different *rankings* of *COMPLEX^{COD}, NO-CODA, *COMPEX^{ONS}, *APPENDIX-LEFT, and ONSET for each syllabification pattern). As *syllabification* is not relevant here, the *output candidates* in the *tableaus* are not *syllabified*.

(63) CONTIG-IO, UNIFORMITY-IO, IDENT-IO(voice) >> *NC̥

(63a)

/pamplo/	CONTIG-IO	UNIFORMITY-IO	IDENT-IO(voice)	*NC̥
☞ [pamplo]				*
[paplo]	*!			
[pamlo]	*!			
[pablo]		*!	*	
[pamblo]			*!	

Voicing in [kθj] *clusters* is the result of the *constraint ranking* in (64), where AGREE[voice]$_{OBST}$ is *ranked higher* than *faithfulness constraints*. *Constraints* that are *violated* by *syllable structure* are not relevant here and can be at any *ranking* after IDENT-IO(ObsVce), depending on the *syllabification* of *output* (cf. (56)-(58) for the different *rankings* of *COMPLEX^{COD}, NO-CODA, *COMPEX^{ONS}, *APPENDIX-LEFT, and ONSET for each *syllabification pattern*). As *syllabification* is not relevant here, the *output candidates* in the *tableaus* are not *syllabified*.

(64) AGREE[voice]$_{OBST}$ >> CONTIG-IO >> IDENT-IO(ObsVce)

(64a)

/tukθjep/	AGREE[voice]$_{OBST}$	CONTIG-IO	IDENT-IO(ObsVce)
[tukθjep]	*!		
☞ [tukθçep]			*
[tujep]		**!	
[tukθep]		*!	
[tugðjep]			**!

When *voicing assimilation* is not applied in [voiceless fricative+voiced fricative] *clusters*, it is a result of the *constraint ranking* shown in (65), where AGREE[voice]$_{OBST}$ is *ranked* lower than *faithfulness constraints*. *Constraints* that are *violated* by *syllable structure* are not relevant here and can be at any *ranking* after AGREE[voice]$_{OBST}$, depending on the *syllabification* of *output.* (cf. (56)-(58) for the different *rankings* of *COMPLEX^{COD}, NO-CODA, *COMPEX^{ONS}*,* *APPENDIX-LEFT, and ONSET for each *syllabification pattern).* As *syllabification* is not relevant here, the *output candidates* in the *tableaus* are not *syllabified*.

(65) IDENT-IO(voice), CONTIG-IO >> AGREE[voice]$_{OBST}$ >> *COMPLEX^{COD}, NO-CODA, *COMPEX^{ONS}, ONSET

(65a)

/tukθjep/	IDENT-IO(voice)	CONTIG-IO	AGREE[voice]$_{OBST}$
☞ [tukθjep]			*
[tukθçep]	*!		
[tujep]		**!	
[tukθep]		*!	
[tugðjep]	**!		

5.4 Interpretation of the results

According to the *data* presented in detail in this chapter, the vast majority of the *heritage speakers* who participated in this study (with the sole exception of Aggeliki) usually complies with *grammar* (57) CONTIG-IO, ONSET, *COMPLEX^{COD}>>*APPENDIX-LEFT >> *COMPLEX^{ONS}, NO-CODA, syllabifying *three-consonant clusters* as *heterosyllabic consonant sequences,* with a *simple coda* in the first *syllable* and a *complex onset* in the second *syllable* (e.g. [tun.dje], Vasiliki). However, at the same time, they also comply with two additional, *peripheral grammars*, at a low *statistical frequency*: the one in (56) CONTIG-IO, ONSET, NO-CODA, *COMPLEX^{COD} >>*COMPLEX^{ONS} >> *APPENDIX-LEFT, which dictates *open syllables* (e.g. [ko.zvjo], Thodoris) and the one in (58) CONTIG-IO, ONSET, *COMPLEX^{ONS}, *APPENDIX-LEFT >> NO-CODA, *COMPLEX^{COD}, which results in *complex codas* (e.g. [piks.ce], Alex). Additionally, they are not settled as to whether use *phonological processes* (*fusion* and *assimilation*),

using the *grammars* in (59)-(65) indecisively and interchangeably[57] (e.g. [tu.ble], participant 1; [tuk.θçep], Vasiliki, but [kom.plo], participant 1; [pe.kθjik], Vasiliki). Aggeliki, who moved to Greece at the age of 11, *syllabifies* the *clusters* in the *experimental stimuli* as a *cluster* under σ_2 (e.g. [pa.ndja]) in the vast majority of her data, thus usually complying with the *grammar* in (56), as she produces an open σ_1. Nevertheless, she also uses another *peripheral grammar* (i.e. (58)) at a considerably *lower frequency* (e.g. [koks.po]). The fact that there is no *fusion* and *assimilation* in her *data* indicates that she applies the *grammars* described in (61), (63) and (65) where *faithfulness constraints* are *highly ranked* (e.g. [pi.mple], [pi.kθje])(but, cf. note 57).

This *variability* was also present in the *data* coming from the *baseline*. Evelina, the one that reports *phonological attrition* in her self-assessment, mostly complies with the *grammar* in (57) CONTIG-IO, ONSET, *COMPLEX^{COD} >> *APPENDIX-LEFT >> *COMPLEX^{ONS}, NO-CODA, preferring *heterosyllabic syllabifications* with a *simple coda* followed by a *complex onset* (e.g. [kon.djo]). Nevertheless, her *heterosyllabic syllabifications* vary, as she produces either *simple* (grammar in (57)), or *complex codas* (which result from the grammar in (58)) (e.g. [tund.je]) at similar *frequencies*. Nonetheless, a *statistically infrequent grammar* is also observed here, as she sometimes *syllabifies three-consonant clusters* as a *cluster* under σ_2, abiding by the *grammar* described in (56) (e.g. [ko.zvjo]). *Assimilation* (which is an implementation of the *grammars* in (62) and (64)) is present in half of Evelina's *data*, an outcome that might imply indecisiveness, as she also uses the *grammars* in (63) and (65) at an equal *frequency* (e.g. [kok.θço] but [tuk.θje]) (but cf. note 57). Alma, who reports only slight *attrition*, also uses the *grammars* (56) and (57) interchangeably (e.g. [pe.kstik], but [tuk.step]) , at about the same *frequency*, but she never produces *complex codas*, *assimilation* or *fusion*, thus never implements the *grammars* in (58), (59), (60), (62) and (64).

The great *within-subject variability* attested in the *subjects* of the *experimental group* (*heritage speakers*), as well as the impressive *variability* in the *data* of the *control group* (both *within-subject* and *between-subjects*), call for an analysis that describes them and accounts for them. The approach of the *Multiple Parallel Grammars model* (Kiparsky, 1993**;** Anttila, 2002a, 2002b**;** Anttila and Cho, 1998**;** Revithiadou and Tzakosta 2004a, 2004b**;** Tzakosta, 2004, among others) argues for *multiple parallel grammars* that are distinct from each other and are *activated simultaneous*ly, forming distinct *developmental paths* which children, but also *L2 learners*, follow during *language development*. According to the *Multiple Parallel Grammar*s *model*, there are three stages in *phonological acquisition*: At first, *unmarked structure*s prevail, and *markedness constraints* overcome *faithfulness constraints*. In the *second stage*, there is great *variation* and the child has access to every possible *grammar* including the adult *native speaker grammar*. Children can follow any possible *developmental path* in order to achieve the *target grammar* (e.g. Revithiadou and Tzakosta 2004b; Tzakosta 2004:224, 226). The *parallel grammar*s are driven by the UG, *target-language typology* and *positive evidence* (Tzakosta 2004, 2006). *Grammar*s that are *typologically* closer to the *target grammar* are present in every *developmental stage* and statistically frequent, while *peripheral grammar*s which produce very *marked* or very *unmarked output*s are statistically less frequent and are, eventually, dropped (Revithiadou & Tzakosta 2004a). In the *final stage*, children settle on the *target grammar* (the *native* adult *grammar*), where *faithfulness constraints* are ranked higher than *markedness constraints* (Tzakosta 2004, 2006). In the course of L2 *acquisition*, the *speaker* uses parallel *grammar*s whose *typology* is present in L1, in L2, as well as in the UG (Tzakosta, 2007:102). Given the poor quality and

[57] Though this could be an effect of the experiment and not reflect their actual intuitions about *phonological processes*, as *fusion* and *assimilation* result in *unmarked structures* and *assimilation* is obligatory in both their languages.

quantity of *input* during the course of *heritage language acquisition* and the lack of *positive evidence* that would help reach the *native adult grammar* (Albanian, in this case), *variability* in *heritage phonology* can be due to *multiple parallel grammar*s that are still *active*. Thus, *incomplete acquisition* can mean that the *speaker* is "stuck" in the *second developmental stage*. This is in line with Montrul's (2008, 2016) claim that *heritage grammars* resemble *grammars* in early *stages* of L1 and L2 *development* (cf. 2.2).

In the case of the present study, there is great *variability* in the *syllabification* of *simultaneous* and *sequential bilinguals*. The two participants of the *control group* grew up *monolingual* in a SA speaking environment, but moved to Greece as young adults and *acquire*d Greek as their L2 in an *immersion* environment. Having lived in Greece for decades, interacting in SMG in the society they live in but, also, at home with their children who were born in Greece and have always been *dominant* in SMG, they have started manifesting signs of *attrition*. Alma, who visits her homeland quite often, reports slight *attrition* which she describes as reduced *fluency* and "forgetting words". Her *data* show little *variability*. She accepts half of the *three-consonant clusters* of SA in the experiment and *syllabifies* them as such. She does not accept only those *clusters* that are not *accepted word-initially* in SA ([stop+fricative+stop] *clusters*) and the *cluster* [zvj], which is extremely rare *word-initially* in her L1 (found only in the word zvjerdh /zvjerð/ 'to wean', 'to alienate')[58]. This means that the slight *variability* found in Alma's *data* can be due to *frequency effects* and/or possible *prescriptive rules* of *syllabification*. For instance, *prescriptive rules* of SMG (Triantafyllidis, 1990:20) and SA (as described in Xhaferaj, 2018:232) dictate that a *consonant sequence* is *syllabified* under the same *syllable* only if there is a word in the language starting with at least the first two *consonant*s of said *sequence*. Thus, it is possible that Alma complies with only one *grammar* for SA, the one she *acquire*d when she completed the *phonological acquisition* of her L1, and that her *phonology* remains intact.

Evelina, who has lived in Greece for 25 years and reports heavy *attrition*, even in the domains of *phonetics* and *phonology*, rarely perceives the *clusters* used in the experiment as such. Even when she does, there is no uniformity, i.e. she does not *syllabify* a *cluster* type under the same *syllable* and a different type as *heterosyllabic*. She can *syllabify* a given *cluster* under the same *syllable*, as *heterosyllabic* with a *simple coda* and *complex onset,* or as *heterosyllabic* with a *complex coda* and a *simple onset*. Just like Alma, she never accepts *clusters* that do not occur *word-initially* in her L1 and she *syllabifies* [zvj], which is rare in SA, under the same *syllable* only once. However, the *variability* in her *data* implies some *attrition* in her *phonological grammar* and some employment of *multiple parallel grammar*s, at least for *phonotactics*.

In the *experimental group*, Aggeliki, who was raised *bilingual* (SA-SMG) in a SA-speaking *environment* and was *dominant* in SA before moving to Greece at age 11 and becoming *dominant* in SMG, shows very little *variability*. She *perceives* the vast majority of the *three-consonant* SA *clusters* as *clusters* and *syllabifies* only some [stop+fricative+stop] *clusters* as *heterosyllabic consonant sequences*, always with a *complex coda* and a *simple onset*. Although she produces *coda*s that are *disallowed* by SA *phonotactics* ([bs]), this is extremely rare (only two times). The rest of her *complex coda*s are *allowed* in SA ([ks]). Although Aggeliki reports heavy *attrition* in SA, her *data* suggest little to no *attrition*, at least in the domain of *phonology*. It seems that her *phonological acquisition* was complete before she left Albania as a child and that her *phonological grammar* is intact, at least for

[58] The *clusters* [zv] and [ks] (*clusters* formed by the two first members of the *clusters* Alma does not accept) are also rare *word-initially* in SA, while [bs] is *not accepted word-initially* (cf. 5.1.4 and 5.1.5)

phonotactics. However, this can also be a result of *prescriptive rules* she learnt at the Albanian school and still remembers, even if she has forgotten a large part of the *grammar* and vocabulary of SA.

The five remaining *heritage speakers* in the *experimental group* display considerable *variability*. In the vast majority of the *data*, they do not perceive the SA *clusters* in the experiment as *clusters* under the same *syllable*. When they do, it is sporadic. They also sporadically form *complex coda*s and they sometimes use *fusion* as a strategy to *simplify* the *cluster* or avoid *NC̥ violations. The *variability* attested in these five *subjects* implies the implementation of *multiple parallel grammar*s in their SA *phonology*, at least for *phonotactics*. I propose that the insufficient quantity and quality of *input* these *heritage speakers* received throughout the course of the *heritage language acquisition* resulted in *incomplete acquisition*, which translates into the use of multiple parallel *grammar*s at an age past the critical period and the period of *phonological acquisition* (cf. 2.2 for an extensive discussion on *incomplete acquisition* and the role of *input* in it). The *phonological acquisition* of the *heritage language* seems to be *fossilized* in a *developmental stage* where *multiple co-grammar*s are *activated*, as the *heritage speakers* have never reached the *adult native speaker proficiency level*, hence the *adult native speaker grammar* has never prevailed over the other, *peripheral grammar*s. Additionally, the poor quality and quantity of *input* the *heritage speakers* received during the *acquisition period*, results in poor *vocabulary* which can, in turn, result in *incomplete acquisition* of *heritage language phonotactics*, as many *clusters* are part of words the *heritage speakers* may have never heard. Of course, the *syllabification* of SA *three-consonant clusters* that are *not allowed* in SMG as *heterosyllabic consonant sequences* could also imply some *dominant language interference* in the *phonotactics* of the *heritage language*, but this cannot be confirmed by the results of this study. Finally, the *nature* of the *clusters* used in this study can definitely play a part in the results. This means that, *syllabifying* the *word-medial consonant sequence* as a *cluster* would mean that C_2 and C_3 would form a *complex onset* under σ_2 while C_1 would be *attached* to the *syllable node* as *appendix*. This is a very *complex* and *marked structure*, so it would be natural for participants to avoid it, especially if they do not recognize it as a *consonant cluster* due to insufficient *input*.

6. General discussion and concluding remarks-implications for future research

This thesis investigated the *metalinguistic intuitions* of *heritage speakers* of Standard Albanian in Greece, regarding the *phonotactics* of their *heritage language*. As *heritage speakers* tend to be *imbalanced bilinguals* who grew up in a community where their one language (in the case of the present study, Standard Modern Greek) is widely used in everyday life, media and institutions, while their other language (in the case of the present study, Standard Albanian) is restrained in the domain of home and family life. The language of their community becomes their *dominant language* while they demonstrate reduced *proficiency* in the language of their home, or *heritage language* (cf. 2.1). Even in cases when the *heritage speaker* is a *sequential bilingual*, who *acquired* the *minority language* as a *first language*, which is especially true for *child immigrants*, who are born in a country where their *home language* is widely used and, later in life but within the *critical period* (i.e. before puberty), move to a community where their *first language* has a *minority status*, the *majority language* tends to become their *dominant language*. Due to the reduced *input* they receive in the *heritage language*, the *acquisition* of this language is not typical and *incomplete acquisition* is the usual outcome. Moreover, even if the *heritage language* is *completely acquired*, it may be subject to *attrition* later in life, as *heritage speakers* tend to interact in the *minority language* less and less as they grow up and start interacting mainly with people outside their family (cf. 2.2).

Research on *heritage linguistics* has indicated signs of *incomplete acquisition* and/or *attrition* especially in *morphosyntax*, but also in the domains of *semantics, pragmatics, discourse* and *vocabulary* (cf. Montrul, 2016; Polinsky, 2018 for an extensive literature overview and discussion on the findings concerning the above-mentioned domains). Although *phonetics* and *phonology* seem to be rather unaffected by *incomplete acquisition* or *attrition*, the poor quality and quantity of *input* that *heritage speakers* receive seems to be affecting these domains as well. *Heritage speakers*' *phonetic* and *phonological attainment* lies on a continuum, somewhere in between L2 learners' *proficiency* and the *proficiency* of *native speakers*. Although *heritage speakers* tend to demonstrate an advantage in *perception* over L2 learners, their *perception* is not *native-like*, while their *segmental* and *suprasegmental production* diverges from *native*. Apart from the fact that *native speakers* tend to *perceive* a *foreign accent* in *heritage speakers*' *utterances*, as relevant experiments have shown so far, there are signs of *interference* from the *dominant language* not only in *production* of *segments* and *tones*, but also in *intonation* and *phonotactics*. However, the field of *heritage phonology* is far from being sufficiently studied and all the above indications have to be further confirmed.

The present study has focused on the *phonotactic representations* of *heritage speakers* of Standard Albanian, who grew up in Greece, hence Standard Modern Greek is their *dominant language*. As Albanians are the largest immigrant group in Greece today and, as a large population of them arrived in Greece in the early 1990s, there is a great number of Albanian *heritage speakers* living in the country nowadays. However, Albanian is far from being preserved in Greece, due to the speakers' desire to integrate in the community, but also due to the low status the language has, as an effect of racism and prejudice. The lack of institutional support, the ethnocentric language ideologies of the Greek school, which promote *monolingualism* and the ignorance of school teachers, who advise parents against using their *native language* at home only add to this fact. For this reason, *heritage speakers* of Albanian in Greece tend to have low *proficiency* in their *heritage language* (cf. 2.4).

This study used an experimental procedure in order to test *phonotactic representations* in *heritage speakers* of Albanian. Taking advantage of the *phonotactic* differences between Standard Albanian and Standard Modern Greek (cf. chapter 3), the experimental *stimuli* were created using *three-consonant clusters* of Standard Albanian that are accepted *word-medially* in *onset* position, but are

not accepted in Standard Modern Greek (cf. 4.3). The participants of this study, five *heritage speakers* of Albanian who were born in Greece or moved to the country during infancy and a *child immigrant* who moved to Greece at the age of 11, were asked to *syllabify* 66 *disyllabic nonce-words* that contained the *clusters* under investigation in *word-medial* position. Two Albanian immigrants, who have lived in Greece for 19-25 years were also tested, as a control group. The aim of this experiment was to check for *dominant language interference* effects in the *heritage speaker*'s *syllabification patterns*, as well as to investigate the *patterns* they *produce* and the *grammar* that drives these *patterns* (cf. chapter 4).

The data of this experiment show a really interesting *variability* in both the *heritage speakers* and the Albanian first generation immigrants (cf. 5.1, 5.2). This great *variability* advocates for *incomplete acquisition* effects in the *heritage speakers*, but also for *attrition* in the case of the immigrants and the *child immigrant*. In this thesis, I proposed that the results indicate the use of *multiple parallel grammars*, when it comes to *heritage language phonotactics*. *Heritage speakers* tend to not accept *three-consonant clusters* that are *not accepted* in their *dominant language* and *syllabify* them as *heterosyllabic*. However, they sporadically put additional *peripheral grammars* in use. The same phenomenon was observed in the *data* of the first generation immigrants who were the control group of this study, though to a lesser extent. The fact that the *heritage speakers* in this study employ *multiple parallel grammars* in *phonotactics* implies that the *acquisition* of their *heritage language phonology* remains in *a developmental stage* where *multiple parallel grammars* are used, a *developmental stage* attested in *child first language acquisition* as well as in *adult second/foreign language acquisition*. Thus, *heritage speakers* in this study seem to never attain the *native adult stage*, where *peripheral grammars* are left behind, a fact suggestive of *incomplete phonological acquisition*, at least for *phonotactics* (cf. 5.4).

However, it is hard to conclude whether the different *patterns* that are used are a result of *dominant language interference*, *cluster frequency* in the *heritage language*, or *input frequency*. As the input in the *heritage language* is poor in quality and quantity, it is rational to assume that *heritage speakers* may have never had the chance to hear and/or use *clusters* that are rarely found in the *heritage language*. However, this study's results call for corroboration. Future research should focus on testing the motivation behind the *patterns* in *heritage phonotactics*. Additional experiments should be conducted with larger groups of *heritage speakers*, ideally grouped by *proficiency* level in the *heritage language*, as well as larger samples of the *baseline*. These *syllabification patterns* should also be tested against *syllabification patterns* produced by *monolingual native speakers* of the *heritage language* (i.e. people who live in the country where the language has a *majority status* and have not lived abroad for an extended period of time, which could cause *attrition* effects). Finally, it would be interesting to find out what the *syllabification patterns* would be in *stimuli* consisting of real-words. *Heritage phonology*, and *heritage phonotactics* in particular, are fields of research that remain widely unexplored. Future research in this field would bring about results that would shed light not only on *heritage language acquisition* mechanisms, but on *language acquisition* mechanisms in general.

References

Albirini, Abdulkafi and Elabbas Benmammoun (2014). Aspects of second language transfer in the oral production of Egyptian and Palestinian heritage speakers. *International Journal of Bilingualism* 18 (3), 244-273.

Allen, Shanley (2007). The future of Inuktitut in the face of majority languages: Bilingualism or language shift?. *Applied Psycholinguistics*, *28*(3), 515-536.

Allen, Shanley, Martha Crago, and Diane Pesco (2006). The effect of majority language exposure on minority language skills: The case of Inuktitut. *International Journal of Bilingual Education and Bilingualism*, *9*(5), 578-596.

Alvord, Scott M., and Brandon M. Rogers (2014). Miami-Cuban Spanish vowels in contact. *Sociolinguistic Studies*, 8(1), 139.

Amengual, Mark (2016). Acoustic correlates of the Spanish tap-trill contrast: Heritage and L2 Spanish speakers. *Heritage Language Journal*, *13*(2), 88-112.

Androulakis, George, Anastasia Gkaintartzi, Roula Kitsiou & Sofia Tsioli (2016). Parents-Schools' communication and Albanian as a heritage language in Greece in Trifonas, Peter Pericles and Themistoklis Aravossitas (eds.) *Handbook of Research and Practice in Heritage language Education*. Springer International Publishing. 521-538.

Anttila, Arto (2002a). Variation and Phonological Theory. In Chambers, Jack K., Peter Trudgill, and Natalie Schilling-Estes (eds.) *The handbook of language variation and change*. Oxford: Blackwell. 206-243.

Anttila, Arto (2002b). Morphologically Conditioned Phonological Alternations. *NLLT,* 20(1), 1-42.

Anttila, Arto and Young-mee Yu Cho (1998). Variation and Change in Optimality Theory. *Lingua* 104. 31-56.

Applebaum, A., & Gordon, M. (2011). A comparative phonetic study of the Circassian languages. In Chundra Cathcart, Shinae Kang, and Clare S. Sandy (eds.) *Proceedings of the 37th Annual Meeting of the Berkeley Linguistics Society: Special Session on Languages of the Caucasus*, 37(2), 3-17.

Archakis, Argiris (2014). Immigrant voices in students' essay texts: Between assimilation and pride. *Discourse & Society* 25(3):297–314.

Asherov, Daniel, Alon Fishman, and Evan-Gary Cohen (2016). Vowel reduction in Israeli heritage Russian. *Heritage Language Journal*, *13*(2), 113-133.

Au, Terry Kit-Fong, Janet S. Oh, Leah M. Knightly, Sun-Ah Jun, and Laura F. Romo (2008). Salvaging a childhood language. *Journal of memory and language*, *58*(4), 998-1011.

Au, Terry Kit-Fong, Leah M. Knightly, Sun-ah Jun, and Janet S. Oh (2002). Overhearing a language during childhood. *Psychological Science* 13, 238 – 243.

Au, Terry Kit-Fong., and Janet S. Oh (2009). Korean as a heritage language. In Ping Li (ed.), *Handbook of East Asian Psycholinguistics, Part III: Korean Psycholinguistics*. Cambridge: Cambridge University Press. 268–275.

Audacity Team (2012) Audacity®. Version 2.3.0. Audio editor and recorder. Available from: http://audacityteam.org/ (Accessed 26/05/2019).

Bae, Sun-Hee (2015). *The Syntax-Phonology Interface in Native and Near-native Korean*. Ph.D. dissertation, Harvard University.

Baker, Wendy, and Pavel Trofimovich (2005). Interaction of native-and second-language vowel system(s) in early and late bilinguals. *Language and speech*, *48*(1), 1-27.

Barlow, Jessica A. (2014). Age of acquisition and allophony in Spanish-English bilinguals. *Frontiers in psychology*, *5*, 288.

Barlow, Jessica A., Paige E. Branson, and Ignatius S. Nip (2013). Phonetic equivalence in the acquisition of /l/ by Spanish–English bilingual children. *Bilingualism: Language and Cognition*, *16*(1), 68-85.

Benmamoun, Elabbas, Silvina Montrul & Maria Polinsky (2013). Defining an "Ideal" Heritage speaker: Theoretical and Methodological Challenges. *Theoretical Linguistics* 39:259-294.

Bevington, Gary Loyd (1970). *Albanian Phonology*. PhD dissertation, Amherst: University of Massachusetts. Distributed 1974, Munich Albanien-Institut.

Blevins, Juliette (1995). The syllable in phonological theory. In Goldsmith (ed.) *The handbook of phonological theory*. Oxford: Blackwell. 206-244.

Bley-Vroman, Robert (1989). What is the logical problem of foreign language learning? In Susan M. Gass & Jacquelyn Schachter (Eds.), *Linguistic Perspectives on Second Language Acquisition* (Cambridge Applied Linguistics). Cambridge: Cambridge University Press. 41-68.

Borowsky, Toni (1986). *Topics in English phonology*. PhD dissertation. Amherst: University of Massachusetts.

Bullock, Barbara E., and Chip Gerfen (2004). Phonological convergence in a contracting language variety. *Bilingualism: Language and cognition*, *7*(2), 95-104.

Bybee, Joan L. (2001). *Phonology and Language Use.* Cambridge: Cambridge University Press.

Bylund, Emanuel (2009). Maturational constraints and first language attrition. *Language learning*, *59*(3), 687-715.

Carletto, Calogero, Benjamin Davis, Marco Stampini & Alberto Zezza (2006). A Country on the Move: International Migration in Post-Communist Albania. *International Migration Review* 40: 767–785.

Chang, Charles B. (2016). Bilingual perceptual benefits of experience with a heritage language. *Bilingualism: Language and Cognition*, *19*(4), 791-809.

Chang, Charles B., and Yao Yao (2016). Toward an understanding of heritage prosody: Acoustic and perceptual properties of tone produced by heritage, native, and second language speakers of Mandarin. *Heritage Language Journal*.

Chang, Charles B., Yao Yao, Erin F. Haynes, and Russell Rhodes (2011). Production of phonetic and phonological contrast by heritage speakers of Mandarin. *The Journal of the Acoustical Society of America*, *129*(6), 3964-3980.

Chatzidaki, Aspasia (2005). Models of bilingual behaviour in Albanian pupils families: Empirical research findings. *Epistimes Ayogis, Thematic Issue: Bilingual Pupils in Greek Schools: Teaching Approaches and Theoretical Issues*, 3: 79–102.

Chatzidaki, Aspasia and Ioanna Xenikaki (2012). Language choice among Albanian immigrant adolescents in Greece: The effect of the interlocutor's generation. *Menon* 1 (1), 4-16.

Chatzidaki, Aspasia, and Christina Maligkoudi (2013). Family language policies among Albanian immigrants in Greece. *International Journal of Bilingual Education and Bilingualism*, 16(6), 675-689.

Chen, Ying, Yi Xu, and Susan Guion-Anderson (2014). Prosodic realization of focus in *bilingual production* of Southern Min and Mandarin. *Phonetica* 71: 249–70.

Chomsky, Noam (1981). *Lectures on Government and binding*. Dordrecht: Foris.

Chomsky, Noam, and Morris Halle (1968). *The sound pattern of English*. New York, NY: Harper and Row.

Clements, Nick, and Samuel Kayser (1983). *CV Phonology: A Generative Theory of the Syllable.* Linguistic Inquiry Monograph No. 9. Cambridge, MA: MIT Press.

Colantini, Laura, Alejandro Cuza, and Natalia Mazzaro (2016). Task-related effects in the prosody of Spanish *heritage speakers* and long-term immigrants. In Meghan E. Armstrong, Nicholas Henriksen, Maria del Mar Vanrell (eds.) *Intonational grammar in Ibero-Romance: Approaches across linguistic subfields*, Amsterdam/Philadephia: John Benjamins Publishing Company: 3-24.

Cook, Vivian (ed.) (2003). *Effects of the second language on the first*. Clevedon, Buffalo, Toronto, Sydney: Multilingual Matters.

Crain, Steven and Rosalind Thornton (1998). *Investigations in Universal Grammar: A guide to experiments on the acquisition of syntax and semantics.* Cambridge, MA: MIT Press.

Cushman, Ellen (2011). The Cherokee syllabary: A writing system in its own right. *Written Communication*, *28*(3), 255-281.

Damanakis, Michalis (1997). *I ekpedefsi ton palinostoundon ke alodapon mathiton stin Ellada. Diapolitismiki prosegisi [The education of repatriated and foreign pupils in Greece. An intercultural approach].* Athens: Gutenberg.

De Bot, Kees (2004). The multilingual lexicon: Modelling selection and control. *International Journal of Multilingualism*, *1*(1), 17-32.

De Houwer, Annick (1995). L'alternance codique intra-phrastique dans le discours de jeunes bilingues [Intra-sentential codeswitching in the discourse of young bilinguals]. *Acquisition et interaction en langue étrangère* 6, 39-64.

De Houwer, Annick (2009). *Bilingual first language acquisition*. Bristol: Multilingual Matters.

DeGraff, Michel (Ed.) (1999). *Language creation and language change: creolization, diachrony, and development*. Cambridge, MA: MIT Press.

Dendrinos, Bessie, and Bessie Mitsikopoulou (Eds.) (2004). *Policies of linguistic pluralism and the teaching of languages in Europe*. Athens: Metaixmio, and the National and Kapodistrian University of Athens.

Dimakos, Ioannis, and Katerina Tasiopoulou (2003). Attitudes towards migrants: What do Greek students think about their immigrant classmates? *Intercultural Education*, 14, 307–316.

Dodi, Anastas (2004). *Fonetika dhe fonologjia e gjuhës shqipe* [*The Phonetics and Phonology of the Albanian language*]. Tirana: The Albanian Academy of Sciences.

Drachman, Gaberell (1990). Onset clusters in Greek. In Mascaro, Joan and Marina Nespor (eds.), *Grammar in Progress. Glow Essays for Henk v. Riemsdijk.* Dordrecht: Foris. 113-123.

Ellis, Nick C. (2006). Selective attention and transfer phenomena in L2 acquisition: Contingency, cue competition, salience, interference, overshadowing, blocking, and perceptual learning. *Applied Linguistics*, 27, 164-94.

Ellis, Rod (1989). *Understanding second language acquisition*. Vol. 31. Oxford university press.

Fenyvesi, Anna (2005). Hungarian in the United States. In Anna Fenyvesi (ed.) *Hungarian language contact outside Hungary: Studies on Hungarian as a Minority Language. Amsterdam: John Benjamins.* 265-318.

Flege, James E. (2007). Language contact in bilingualism: phonetic system interactions. *Laboratory Phonology* 9, 354–381.

Frangoudaki, Anna, and Thalia Dragona (Eds.) (1997). *'Ti in' i patrida mas?' ethnokentrismos stin ekpedefsi* [*What is our country? Ethnocentrism in education*]. Athens: Alexandria.

Friedman, Victor A. (1986). *Albanian grammar*. 466-468.

Gkaintartzi, Anastasia (2012). *Issues of bilingualism in pre-school and early primary school children: social and educational dimensions* [in Greek]. PhD dissertation, Aristotle University of Thessaloniki.

Gkaintartzi, Anastasia, Angeliki Kiliari & Roula Tsokalidou (2014). 'Invisible' bilingualism- 'invisible' language ideologies: Greek teachers' attitudes towards immigrant pupils' heritage languages. *International Journal of Bilingual Education and Bilingualism*, 18, 1–15.

Gkaintartzi, Anastasia, Angeliki Kiliari & Roula Tsokalidou (2016). Heritage language maintenance and education in the Greek sociolinguistic context: Albanian immigrant parents' views. *Cogent Education*, 3, 1–17.

Gkaintartzi, Anastasia, Evi Markou & Roula Tsokalidou (2012). Communication with immigrant parents: when is it feasible and effective?. *Polydromo: periodical for bilingualism and multiculturalism in education and society*, 5. 8-16.

Goad, Heather, and Yvan Rose (2004). Input elaboration, head faithfulness and evidence for representation in the acquisition of left-edge clusters in West Germanic. In René Kager, Joe Pater, and Wim Zonneveld (eds.) *Constraints in phonological acquisition*. Cambridge University Press. 109-157.

Godson, Linda (2003). *Phonetics of language attrition: Vowel production and articulatory setting in the speech of Western Armenian heritage speakers*. Ph.D. dissertation, University of California San Diego.

Godson, Linda (2004). Vowel production in the speech of Western Armenian heritage speakers. *Heritage Language Journal* 2, 1-22.

Gogonas, Nikos (2007). *Ethnolinguistic vitality and language maintenance in second generation immigrants. A study of Albanian and Egyptian pupils in Athens*. Unpublished DPhil dissertation, University of Sussex.

Gogonas, Nikos (2009). *Language shift* in second generation Albanian immigrants in Greece. *Journal of Multilingual and Multicultural Development* 30, 95–110.

Gogonas, Nikos (2010). *Bilingualism and multiculturalism in Greek education*. Newcastle upon Tyne: Cambridge Scholars.

Gogonas, Nikos, and Domna Michail (2015). Ethnolinguistic vitality, language use and social integration amongst Albanian immigrants in Greece. *Journal of Multilingual and Multicultural Development*, 36(2), 198-211.

Goldsmith, John A. (1976). *Autosegmental phonology*. Doctoral Dissertation, MIT, Cambridge MA. (published (1979) by: Indiana University Linguistic Club).

Goldsmith, John A. (2011). The syllable. In John A. Goldsmith, Jason Riggle and Alan C. L. Yu (eds.) *The Handbook of Phonological Theory.* Cambridge, MA: Blackwell. 164-196.

Gor, Kira (2014). Raspberry, not a car: context predictability and a phonological advantage in early and late learners' processing of speech in noise. *Frontiers in psychology*, *5*, 1449.

Grosjean, François (1989). Neurolinguists, beware! The bilingual is not two monolinguals in one person. *Brain and language*, *36*(1), 3-15.

Grosjean, François (1998). Studying bilinguals: Methodological and conceptual issues. *Bilingualism: Language and cognition*, *1*(2), 131-149.

Grosjean, François (2001). The bilingual's language modes. In Janet Nicol (ed.), *One mind, two languages: Bilingual language processing*. Oxford: Blackwell.

Guion, Susan G. (2003). The vowel systems of Quichua-Spanish bilinguals. *Phonetica*, *60*(2), 98-128.

Gussmann, Edmund (2002). *Phonology: analysis and theory*. Cambridge University Press.

Harris, Michael J., and Stefan Th. Gries (2011). Measures of speech rhythm and the role of corpus-based word frequency: a multifactorial comparison of Spanish (-English) speakers. *International Journal of English Studies*, *11*(2), 1-22.

Hatziprokopiou, Panos (2006). Globalization, migration and socio-economic change in contemporary Greece. *Processes of social incorporation of Albanian and Bulgarian immigrants in Thes*saloniki.

Hayes, Bruce and Tanya Stivers (1995). *A phonetic account of postnasal voicing*. MS, University of California, Los Angeles.

Henriksen, Nicholas C. (2015). Acoustic analysis of the rhotic contrast in Chicagoland Spanish: An intergenerational study. *Linguistic Approaches to Bilingualism*, *5*(3), 285-321.

Hockett, Charles Francis (1955). *A manual of phonology*. Waverly Press.

Holmes, Janet (1992). *An introduction to sociolinguistics*. New York: Longman.

Hua, Zhu (2002). *Phonological Development in Specific Contexts: Studies of Chinese-Speaking Children*. Bristol: Multilingual Matters.

Hua, Zhu, and Barbara Dodd (2000). The phonological acquisition of Putonghua (modern standard Chinese). *Journal of child language*, *27*(1), 3-42.

Huffman, Marie K. (1993). Phonetic patterns of nasalization and implications for feature specification. In Marie K. Huffman and Rena A. Krakow (eds.) *Phonetics and phonology V: velars, nasalization and the velum*. San Diego: Academic press. 303-327.

Itô, Junko (1986). *Syllable theory in prosodic phonology.* Ph.D. dissertation, University of Massachusetts.

Iwasaki, Shoichi (2002). *Japanese*. Amsterdam/Philadephia: John Benjamins.

Jakobson, Roman (1941). *Kindersprache, Aphasie und allgemeine Lautgesetze*. Uppsala: Uppsala Universitets Aarskrift. (published in English (1968) *Child language, aphasia and phonological universals*. The Hague and Paris: Mouton Publishers.

Jannedy, Stefanie, and Melanie Weirich (2014). Sound change in an urban setting: Category instability of the palatal fricative in Berlin. *Laboratory Phonology*, *5*(1), 91-122.

Jannedy, Stefanie, Melanie Weirich, Louisa Helmeke (2015). Acoustic analyses of differences in [ç] and [ʃ] productions in Hood German. In Maria Wolters, Judy Livingstone, Bernie Beattie, Rachel Smith, Mike MacMahon, Jane Stuart-Smith and Jim Scobbie (eds.) *Proceedings of the XVIII ICPhS*, Glasgow. Glasgow: University of Glasgow Press.

Jessner, Ulrike (2003). The nature of cross-linguistic interaction in the multilingual system. In Cenoz, Jasone, Britta Hufeisen, and Ulrike Jessner (eds.) *The multilingual lexicon*. Dordrecht: Springer. 45-55.

Jia, Gisela, & Doris Aaronson (2003). A longitudinal study of Chinese children and adolescents learning English in the United States. *Applied Psycholinguistics*, *24*(1), 131-161.

Jia, Ruiting, and Johanne Paradis (2014). The Use of Referring Expressions in Narratives by Mandarin Heritage Language Children and the Role of Language Environment Factors in Predicting Individual Differences. *Bilingualism: Language and Cognition*, 18(4), 737–752.

Joseph, Brian D., and Irene Philippaki-Warburton (1987). *Modern Greek*. London: Croom Helm.

Jun, Sun-Ah (1996). *The Phonetics and Phonology of Korean: Intonational Phonology and Prosodic Structure*. New York: Garland.

Kager, René (1999). *Optimality Theory*. Cambridge, UK: Cambridge University Press.

Kahn, Daniel (1976). *Syllable-based Generalizations in English Phonology*. Indiana University Linguistic Club (IULC).

Kang, Yoonjung, and Naomi Nagy (2012). VOT merger in Heritage Korean in Toronto. In Paula Caxaj (ed.) *Proceedings of the 2012 Annual Conference of the Canadian Linguistic Association*, Toronto: Canadian Linguistic Association. 1–15.

Kang, Yoonjung, and Naomi Nagy (2016). VOT merger in heritage Korean in Toronto. *Language Variation and Change*, *28*(2), 249-272.

Kappa Ioanna (1995). *Silbenphonologie im Deutschen und Neugriechischen* [*Syllable phonology in German and Modern Greek*]. Ph.D. dissertation (unpublished) University of Salzburg.

Kappa, Ioanna (2013a). Syllaviki domi [Syllable structure]. In Revithiadou, Anthi & Vasileios Spiropoulos (eds.) *Contrastive study of Albanian and Greek grammatical structures*. [*Antiparavoliki meleti grammatikon domon Alvanikis-Ellinikis*]. Aristotle University Thessaloniki. 50-68.

Kappa, Ioanna (2013b). Fonotaktikoi periorismoi [Phonotactics]. In Revithiadou, Anthi & Vasileios Spiropoulos (eds.). *Antiparavoliki meleti grammatikon domon Alvanikis-Ellinikis* [*Contrastive study of Albanian and Greek grammatical structures*]. Aristotle University Thessaloniki. 69-78.

Kappa, Ioanna (in press). *Fonologia* [*Phonology*].

Katsikas, Christos & Eva Politou (1999). *Ektos taksis to diaforetiko? Tsigani, mionotiki, palinostoundes ke alodapi mathites stin eliniki ekpedeusi* [*Is difference out of the classroom? Roma, minority, repatriated and immigrant students in Greek education*]. Athens: Gutenberg.

Keel, William D. (2015). Noun Phrase Case Shift in Volga German Varieties on the Great Plains of Kansas. In Richard B. Page, and Michael T. Putnam (eds.) *Moribund Germanic heritage languages in North America: theoretical perspectives and empirical findings.* Leiden, Netherlands: Brill. 133-152.

Kenstowicz, Michael J. (1994). *Phonology in generative grammar*. Cambridge, MA: Blackwell.

Kiliari, Angeliki (2005). *Polyglosia kai glosiki ekpedeusi, mia kinonioglosiki prosegisi* [*Multilingualism and language education, a sociolinguistic approach*]. Thessaloniki: Vanias.

Kiliari, Angeliki (2014). Mathites alvanikis katagogis kai alvaniki glossa: Stasis, dexiotites, epithimies [Pupils of Albanian origin and Albanian language: Attitudes, skills, wishes]. In Anastasia

Gkaintartzi, Stavros Kamaroudis, Valbona Hystuna, & Maria Viskadouraki (Eds.), *Proceedings of international conference 2nd crossroad of languages & cultures.* Thessaloniki: Faculty of Education, Aristotle University of Thessaloniki.

Kim, Ji Young (2012). *Discrepancy between the perception and production of stop consonants by Spanish heritage speakers in the United States*. Paper presented at CASPSLaP [Current Approaches to Spanish and Portuguese Second Language Phonology], Columbia, South Carolina.

Kim, Ji Young (2015). Perception and Production of Spanish Lexical Stress by Spanish Heritage Speakers and English L2 Learners of Spanish. In Erik W. Willis, Pedro Martín Butragueño, and Esther Herrera Zendejas (eds.) *Selected Proceedings of the 6th Conference on Laboratory Approaches to Romance Phonology*. Sommerville, MA: Cascadilla Proceedings Project. 106-128.

Kiparsky, Paul (1985). Some consequences of lexical phonology. *Phonology*, *2*(1), 85-138.

Kiparsky, Paul (1993). Blocking in nonderived environments. In Sharon Hargus and Ellen M. Kaisse (eds.) *Studies in lexical phonology*. Academic Press. 277-313.

Knightly, Leah M., Sun-Ah Jun, Janet S. Oh, and Terry Kit-Fong Au (2003). Production benefits of childhood overhearing. *The Journal of the Acoustical Society of America*, *114*(1), 465-474.

Kondo-Brown, Kimi (Ed.) (2006). *Heritage language development: Focus on East Asian immigrants* (Vol. 32). Amsterdam/Philadephia: John Benjamins Publishing.

Köpke, Barbara, Monica S. Schmid, Merel Keijzer, and Susan Dostert (Eds.) (2007). *Language attrition: Theoretical perspectives*. Amsterdam/Philadephia: John Benjamins Publishing.

Kupisch, Tanja, Alyona Belikova, Öner Özçelik, Ilse Stangen & Lydia White (2017) Restrictions on definiteness in the *grammar*s of German-Turkish *heritage speakers*. *Linguistic Approaches to Bilingualism* 7(1). 1–32.

Kupisch, Tanja, Dagmar Barton, Katja Hailer, I. Stangen, Tatjana Lein, and Joost van de Weijer (2014a). Foreign accent in adult simultaneous bilinguals. *Heritage Language Journal*, *11*(2), 123-150.

Kupisch, Tanja, Deniz Akpınar, and Antje Stöhr (2013). Gender assignment and gender agreement in adult bilinguals and second language learners of French. *Linguistic Approaches to Bilingualism*, 3(2). 150-179.

Kupisch, Tanja, Tatjana Lein, Dagmar Barton, Dawn Judith Schröder, Ilse Stangen, and Antje Stoehr (2014b). Acquisition outcomes across domains in adult simultaneous bilinguals with French as weaker and stronger language. *Journal of French Language Studies*, *24*(3), 347-376.

Kurylowicz, Jerzy (1948). Contribution à la théorie de la syllable [Contribution in syllable theory]. *Biuletin Poskiego Towarszistwa Jezyko-Znawaczego*, *8*, 80-113.

Ladefoged, Peter, and Ian Maddieson (1996). *The sounds of the world's languages* (Vol. 1012). Oxford: Blackwell.

Laleko, Oksana, and Maria Polinsky (2016). Between syntax and discourse: topic and case marking in heritage speakers and L2 learners of Japanese and Korean. *Linguistic Approaches to Bilingualism*, *6*(4), 396-439.

Laleko, Oksana, and Maria Polinsky (2017). Silence is difficult: On missing elements in bilingual grammars. *Zeitschrift für Sprachwissenschaft*, *36*(1), 135-163.

Lambert, Wallace E., Richard C. Hodgson, Robert C. Gardner, and Samuel Fillenbaum (1960). Evaluational reactions to spoken languages. *The Journal of Abnormal and Social Psychology*, *60*(1), 44.

Lambert, Wallace E. (1977). The effects of bilingualism on the individual: cognitive and sociocultural consequences. In Peter Hornby (ed.), *Bilingualism: psychological, social and educational implications*. New York: Academic Press. 15–27.

Lass, Roger (1984). *Phonology: An introduction to basic concepts*. Cambridge University Press.

Leben, William R. (1973). *Suprasegmental phonology*. Doctoral dissertation, Cambridge, MA.: MIT.

Leben, William R. (1978). The representation of tone. In Victoria A. Fromkin (ed.), *Tone*. Academic Press. 177-219.

Lee, Chungmin (2007). Contrastive (predicate) topic, intonation, and scalar meanings. In Chungmin Lee, Matthew Gordon, and Daniel Büring (eds.), *Topic and Focus: Cross-Linguistic Perspectives on Meaning and Intonation*, Dordrecht: Springer. 151–75.

Lee-Ellis, Sunyoung (2012). *Looking into Bilingualism through the heritage speaker's mind*. Doctoral dissertation. University of Maryland

Lengeris, Angelos (2013). Phonetics [Fonitiki]. In Revithiadou, Anthi & Vasileios Spiropoulos (eds.) *Antiparavoliki meleti grammatikon domon Alvanikis-Ellinikis* [*Contrastive study of Albanian and Greek grammatical structures*]. Aristotle University Thessaloniki. 1-49.

Lenneberg, Eric H. (1967). The Biological Foundations of Language. *Hospital Practice*, 2:12. 59-67.

Louden, Mark L., and B. Richard Page (2005). Stable bilingualism and phonological (non) convergence in Pennsylvania German. In James Cohen, Kara T. McAlister, Kellie Rolstad, Jeff MacSwan (eds.) *ISB4: Proceedings of the 4th International Symposium on Bilingualism*. Somerville, Mass.: Cascadilla. 1384-1392.

Lowman, Guy Sumner (1932). The Phonetics of Albanian. *Language, 8*(4), 271-293.

Lukyanchenko, Anna, and Kyra Gor (2011). Perceptual correlates of phonological representations in heritage speakers and L2 learners. In Nick Danis, Kate Mesh, and Hyunsuk Sung (eds.) *Proceedings of the 35th Annual Boston University Conference on Language Development* (Vol. 2). Somerville, MA: Cascadilla Press. 414-426.

Łyskawa, Paulina, Ruth Maddeaux, Emilia Melara, and Naomi Nagy (2016). Heritage speakers follow all the rules. Language contact and convergence in Polish devoicing. *Heritage Language Journal*, *13*, 219-244.

Mackridge, P. (1985). *The Modern Greek language: A descriptive analysis of standard Modern Greek*. Oxford: Oxford University Press.

Maligkoudi, Christina (2009). Tmimata didaskalias tis Alvanikis stin Ellada. Prospathia mias protis katagrafis [Preliminary findings on Albanian mother-tongue courses in Greece]. *Epistimes Ayogis*, 1:91–106.

Maligkoudi, Christina (2010). *The language education of Albanian students in Greece: Government policies and family practices*. Ph.D. dissertation, University of Crete.

Malikouti-Drachman, Angeliki (1987). Syllables in Modern Greek. In Wolfgang U. Dressler, Hans C. Luschützky, Oskar E. Pfeiffer, John R. Rennison (eds.) *Phonologica* 1984. Cambridge: Cambridge University Press. 181-187.

Manos, Ioannis, Dora Papadopoulou, Vassiliki Makrygianni & Konstantinos Kolovos (2017). *Communities in Greece, Meletontas ptyches tis alvanikis metanasteusis stin Ellada*. Thessaloniki: CDRSEE.

Mattheoudakis, Marina, Aspasia Chatzidaki & Christina Maligkoudi (2017). Heritage language classes and bilingual competence: the case of Albanian immigrant children in Greece. *International Journal of Bilingual Education and Bilingualism*: 1–17.

Mayr, Robert, Jonathan Morris, Ineke Mennen, and Daniel Williams (2017). Disentangling the effects of long-term language contact and individual bilingualism: The case of monophthongs in Welsh and English. *International Journal of Bilingualism*, *21*(3), 245-267.

McCarthy, John. J. & Allan Prince (1993a). Generalized alignment. In *Yearbook of morphology 1993*. Dordrecht: Springer. 79-153.

McCarthy, John. J. & Allan Prince (1993b). *Prosodic morphology: Constraint interaction and* Sa*tisfaction*. Linguistics Department Faculty Publication Series. 14.

McCarthy, John. J. (ed.) (2004). *Optimality theory in phonology: a reader*. Malden, Oxford and Carlton: Blackwell Publishing.

McWhorter, John (2007). *Language interrupted: Signs of non-native acquisition in standard language grammars*. Oxford University Press.

Meisel, Jürgen (2001). The simultaneous acquisition of two first languages. In Cenoz Jasone and Fred Genesee (eds.), *Trends in bilingual acquisition*. Amsterdam: John Benjamins. 11-41.

Meisel, Jürgen (2004). The bilingual child. In William C. Ritchie, and Tej Bhatia (eds.) *The handbook of bilingualism*, Malden, Oxford and Carlton: Blackwell Publishing Ltd. 91-113.

Meisel, Jürgen (2007). The Weaker Language in Early Child *Bilingualism*: Acquiring a First Language as a Second Language? *Applied Psycholinguistics 28 (3),* 495-514.

Meisel, Jürgen (2011). Bilingual language acquisition and theories of diachronic change: Bilingualism as cause and effect of grammatical change. *Bilingualism: Language and Cognition*, *14*(2), 121-145.

Meisel, Jürgen (ed.) (1994). *Bilingual First Language Acquisition-French and German Grammatical Development.* Amsterdam: John Benjamins.

Memushaj, Rami (2010). *Fonetika e Shqipes Standarde*. [*Standard Albanian phonetics*]. Tirana: Toena.

Michail, Domna (2010). Boundary crossing and boundary maintenance among the Albanian immigrants and the Greek community in Argos Orestiko-Kastoria. In Evangelos Avdikos (Ed.), *Boundaries and Folk culture in the Balkans*. Athens: Pedio.

Mitakidou, Soula, & Evgenia Daniilidou (2007). Didaskalia ke mathisi tis elinikis os defteris glossas: Apopsis ekpedeftikon [The teaching and learning of Greek as a second language: Teachers' views]. In Konstantinos Dinas & Anna Chatzipanayotidi (Eds.), *Proceedings of the international conference on the Greek language as a second/foreign language. Research, teaching and learning*. Thessaloniki: University Studio Press.

Mitakidou, Soula, Evangelia Tressou & Evgenia Daniilidou (2007). Cross-cultural education. A challenge or a problem? *International Journal of Educational Policy, Research & Practice: Reconceptualizing Childhood Studies*, 8:67–81.

Montrul, Silvina (2002). Incomplete acquisition and attrition of Spanish tense/aspect distinctions in adult bilinguals. *Bilingualism: Language and cognition*, *5*(1), 39-68.

Montrul, Silvina (2008). *Incomplete acquisition in bilingualism: Re-examining the age factor* (Vol. 39). Amsterdam/Philadephia: John Benjamins Publishing.

Montrul, Silvina (2010). Current issues in *heritage language acquisition*. *Annual Review of Applied Linguistics* 30: 3-23.

Montrul, Silvina (2011). Multiple interfaces and incomplete acquisition. *Lingua*, *121*(4), 591-604.

Montrul, Silvina (2012). Is the heritage language like a second language?. *Eurosla Yearbook*, *12*(1), 1-29.

Montrul, Silvina and Tania Ionin (2010). Transfer effects in the interpretation of definite articles by Spanish heritage speakers. *Bilingualism: Language and Cognition* 13:449-473.

Montrul, Silvina (2016). *The acquisition of heritage languages*. Cambridge: Cambridge University Press.

Murray, Robert W., and Theo Vennemann (1983). Sound change and syllable structure in Germanic phonology. *Language*, 59(3), 514-528.

Nespor, Marina (1999) *Fonologia* [*Phonology*]. Bologna: Il Mulino (1993). Adapted in Greek by Marina Nespor and Aggeliki Ralli (translated in Greek by Aggeliki Ralli, Athanasios Natsis, Anna Papastavrou). Athens: Patakis.

Nikolou, Kalomoira (2013). Fonologikoi kanones tis Alvanikis [Albanian phonological rules]. In Revithiadou, Anthi & Vasileios Spiropoulos (eds.). *Antiparavoliki meleti grammatikon domon Alvanikis-Ellinikis* [*Contrastive study of Albanian and Greek grammatical structures*]. Aristotle University Thessaloniki. 79-88.

O'Grady, William, Hye-Young Kwak, On-Soon Lee, and Miseon Lee (2011). An emergentist perspective on heritage language acquisition. *Studies in second language acquisition* 33(2), 223-245.

Oh, Janet S., and Andrew J. Fuligni (2010). The role of heritage language development in the ethnic identity and family relationships of adolescents from immigrant backgrounds. *Social Development* 19 (1), 202-220.

Oh, Janet S., Sun-Ah Jun, Leah M. Knightly, and Terry Kit-Fong Au (2003). Holding on to childhood language memory. *Cognition*, *86*(3), B53-B64.

Oh, Janet S., Terry Kit-Fong Au, and Sun-Ah Jun (2010). Early childhood language memory in the speech perception of international adoptees. *Journal of child language*, *37*(5), 1123-1132.

Otheguy, Ricardo and Ana Celia Zentella (2012). *Spanish in New York*. New York, NY: Oxford University Press.

Pagoni, Stamatia (1993). *Phonological Variation in Modern Greek: a Government Phonology Approach.* Doctoral dissertation, UCL, London.

Pan, Ho-Hsien (2007). Focus and Taiwanese unchecked tones. In Chungmin Lee, Daniel Büring, and Matthew Gordon (eds.), *Topic and Focus: Cross-Linguistic Perspectives on Meaning and Intonation*. Dordrecht: Springer. 195–213.

Papafilis, Konstantinos (2003). *Leksiko Ellino-Alvaniko/Fjalor Shqip-Greqisht* [*Albanian-Greek Dictionary*]. M. Sideris editions.

Peña, Marcela, Janet F. Werker and Ghislaine Dehaene-Lambertz (2012). Earlier speech exposure does not accelerate speech acquisition. *Journal of Neuroscience*, *32*(33), 11159-11163.

Polinsky, Maria (2006). Incomplete acquisition: American Russian. *Journal of Slavic linguistics*, *14*(2), 191-262.

Polinsky, Maria (2008). Relative clauses in heritage Russian: Fossilization or divergent grammar. *Formal approaches to Slavic linguistics* 16, 333-358.

Polinsky, Maria (2011). Reanalysis in adult heritage language: New evidence in support of attrition. *Studies in second language acquisition*, *33*(2), 305-328.

Polinsky, Maria (2018). *Heritage Languages and Their Speakers*. Cambridge University Press

Prince, Alan and Paul Smolensky (1993) Optimality Theory: *Constraint* interaction in generative *grammar*. *Optimality Theory in phonology*, 3.

Rao, Rajiv (2013). Allophonic *variation* in the *voice*d stop *phonemes* of *heritage speakers* of Spanish. *7th Heritage language Summer Institute, University of Illinois at Chicago,* June, 18.

Rao, Rajiv (2014). On the status of the phoneme /b/ in heritage speakers of Spanish. *Sintagma: revista de linguística*, 37-54.

Rao, Rajiv (2015). Manifestations of /bdg/ in heritage speakers of Spanish. *Heritage Language Journal*, *12*(1), 48-74.

Revithiadou, Anthi & Marina Tzakosta (2004a). Markedness hierarchies vs. positional faithfulness and the role of multiple grammars in the acquisition of Greek. In Sergio Baauw and Jacqueline van Kampen (eds.) *Proceedings of GALA 2003*. *Generative Approaches to Language Acquisition* 2, Utrecht University, 377-388.

Revithiadou, Anthi & Marina Tzakosta (2004b). Alternative grammars in acquisition: markedness- vs. faithfulness-oriented learning. In Alejna Brugos, Linnea Micciulla, and Christine E. Smith (eds.) *Proceedings of the 28th Annual Boston University Conference on Language Development: Supplement*. Somerville: Cascadilla Press.

Roca, Iggy (1994). *Generative Phonetics*. Routledge.

Roca, Iggy, and Wyn Johnson (1999). *A course in phonology*. Wiley-Blackwell.

Ronquest, Rebecca (2013). An acoustic examination of unstressed vowel reduction in heritage Spanish. In Chad Howe, Sarah E. Blackwell, and Margaret Lubbers Quesada (eds.) *Selected proceedings of the 15th Hispanic linguistics symposium*. 151-171.

Saadah, Eman (2011). *The production of Arabic vowels by English L2 learners and heritage speakers of Arabic*. Doctoral dissertation, University of Illinois at Urbana-Champaign.

Saussure, Ferdinand de (1959). *Course in general linguistics*. Charles Bally and Albert Sechehaye (Eds.). Wade Baskin (Trans). NY: The Philosophical Society.

Schachter, Jacquelyn (1990). On the issue of completeness in second language acquisition. *Interlanguage studies bulletin (Utrecht)*, *6*(2), 93-124.

Schlyter, Suzanne (1993). The weaker language in bilingual Swedish-French children. In Ake Viberg, and Kenneth Hyltenstam (eds.) *Progression & regression in language: sociocultural, neuropsychological, & linguistic perspectives.* Cambridge: Cambridge University Press, 289-308.

Selkirk, Elisabeth O. (1982). On the major class features and syllable theory. In Mark Aronoff and Richard T. Oerle (eds.) *Language Sound Structure.* Cambridge, MA.: MIT Press. 107-136.

Setatos, Marios (1974). *Phonology of Modern Greek*. Athens: Papazisis.

Shelton, Michael, David Counselman, and Nicolás Gutiérrez Palma (2017). Metalinguistic intuitions and dominant language transfer in heritage Spanish syllabification. *Heritage language Journal*, *14*(3), 288-306.

Shin, Naomi Lapidus (2014). Grammatical complexification in Spanish in New York: 3sg pronoun expression and verbal ambiguity. *Language Variation and Change*, *26*(3), 303-330.

Silva-Corvalán, Carmen (1994). *Language Contact and Change: Spanish in Los Angeles*. Oxford: Clarendon.

Skourtou, Eleni (2002). Bilingual pupils in Greek School [Diglossoi mathites sto sxolio]. *Epistimes Ayogis* 4, 11–20.

Sorace, Antonella (1993). Incomplete vs. divergent representations of unaccusativity in non-native grammars of Italian. *Second Language Research*, *9*(1), 22-47.

Steriade, Donca (1982). *Greek Prosodies and the Nature of Syllabification.* Doctoral Dissertation, MIT, Cambridge, MA.

Tees, Richard C., and Janet F. Werker (1984). Perceptual flexibility: maintenance or recovery of the ability to discriminate non-native speech sounds. *Canadian Journal of Psychology/Revue canadienne de psychologie*, *38*(4), 579-590.

Thepboriruk, Kanjana (2015). Thai in Diaspora: Language and Identity in Los Angeles, California. Ph.D. Dissertation, University of Hawaii Mānoa.

Thomason, Sarah Grey, and Terrence Kaufman (2001). *Language contact*. Edinburgh: Edinburgh University Press.

Trask, Robert Lawrence (1996). *A dictionary of phonetics and phonology.* London and New York: Routledge.

Triantafyllidis, Manolis (1990). *Neoelliniki gramatiki* [*Grammar of modern Greek*]. Athens: Organismos Ekdoseos Didaktikon Vivlion (ΟΕΔΒ).

Trommer, Jochen & Angela Grimm (2004). *Albanian word stress*. Paper presented at the Manchester Phonology Meeting, May 20-22. [URL: https://home.uni-leipzig.de/jtrommer/papers/alb.pdf]

Tse, Holman (2016b). Contact-induced splits in Toronto Heritage Cantonese mid-vowels. *Linguistica Atlantica* 35, 133–55.

Tse, Holman (2017a). Variation and change in Toronto heritage Cantonese. *Asia-Pacific Language Variation* 2, 124–56.

Tse, Holman (2016a). *Phonetic vs. phonological considerations in inter-generational vowel change in Toronto Heritage Cantonese*. Paper presented in the Linguistic Society of America (LSA) 2016 Annual Meeting, 07 January 2016 - 10 January 2016, Washington, DC.

Tse, Holman (2017b). *Heritage language maintenance and phonological maintenance in Toronto Cantonese monophthongs? - But they still have an "accent"!* Paper presented at the Linguistic Society of America 2017 Annual Meeting, January 2017, Austin, TX.

Tsokalidou, Roula (2005). Raising 'bilingual awareness' in Greek primary schools. *International Journal of Bilingual Education and Bilingualism*, 8: 48–61.

Tsujimura, Natsuko (2013). *An introduction to Japanese linguistics*. John Wiley and Sons.

Tzakosta, Marina (2004). *Multiple Parallel Grammars in the Acquisition of Stress in Greek L1*. Ph.D. thesis. University of Leiden. LOT Dissertation Series 92.

Tzakosta, Marina (2006). Developmental Paths in L1 and L2 Phonological Acquisition: Consonant Clusters in the Speech of Native Speakers and Turkish and Dutch Learners of Greek. In Adriana Belletti, Elisa Bennatti, Cristiano Chesi, Elisa Di Domenico & I. Ferrari (eds.), *Language Acquisition and Development: Proceedings of GALA 2005. Generative Approaches to Language Acquisition*. Cambridge Scholars Press. 630-642.

Tzakosta, Marina (2007). Silaviki domi kai fonotaktikoi periorismoi stin ekmathisi tis ellinikis os defteris-ksenis glossas-mia antiparavoliki meleti [Syllabic structure and phonotactics in Greek as a second/foreign language learning-a contrastive study]. In Revithiadou, Anthi and Marina Tzakosta (2007). *Phonology in teaching Greek as a foreign language [I fonologia sti didaskalia tis ellinikis os ksenis glossas].* Athens: Patakis. 71-117.

Vago, Robert M. (1991). Paradigmatic regularity in first language attrition. In Herbert W. Seliger and Robert M. Vago (eds.) *First language attrition*. Cambridge: Cambridge University Press. 241-252.

van Rijswijk, Remy, Antje Muntendam, and Ton Dijkstra (2017). Focus marking in Dutch by heritage speakers of Turkish and Dutch L1 speakers. *Journal of Phonetics*, *61*, 48-70.

Vennemann, Theo (1988) The rule dependence of syllable structure. In Robert P. Stockwell (ed.) *On language: Rhetorica, phonologica, syntactica: A festschrift for Robert P. Stockwell from his friends and colleagues.* 257-83.

Walker, Willard, and James Sarbaugh (1993). The early history of the Cherokee syllabary. *Ethnohistory*, 70-94.

Werker, Janet F. (1989). Becoming a native listener. *American Scientist* 77, 54–59.

Werker, Janet F., and Richard C. Tees (1984). Phonemic and phonetic factors in adult cross-language speech perception. *The Journal of the Acoustical Society of America*, *75*(6), 1866-1878.

Whitney, William Dwight (1874). *Oriental and Linguistic Studies*. Scribner: Armstrong.

Xhaferaj, Artan (2018). Syllabification of Bi-Consonantal Clusters Between Vowels in Albanian. *International journal of English linguistics* 8 (5). 230-237.

Yang, Bei (2015). *Perception and production of Mandarin tones by native speakers and L2 learners*. Berlin, Heidelberg: Springer.

Yeni-Komshian, Grace H., James E. Flege, and Serena Liu (2000). Pronunciation proficiency in the first and second languages of Korean–English bilinguals. *Bilingualism: Language and cognition*, *3*(2), 131-149.

Yip, Virginia, & Steven Matthews (2007). *The bilingual child: Early development and language contact*. Cambridge, UK: Cambridge University Press.

Zec, Draga (2007). The syllable. In Paul de Lacy (ed.) *The handbook of phonological theory*. Cambridge University Press. 161-194.

APPENDIX I - STANDARD ALBANIAN AND STANDARD MODERN GREEK CONSONANTS (PHONEMES AND ALLOPHONES)

In the cases of pairs, the first *consonant* is *voiceless* and the second *consonant* is *voiced*. Table adapted from Lengeris (2013: 38)

Standard Modern Greek															
	Labial				*Coronal*						*Dorsal*				
	bilabial		labiodental		dental		alveolar		postalveolar		palatal		velar		glottal
stops	p	b			t̪	d̪	t	d			c	ɟ	k	g	
nasals		m		ɱ		n̪		n				ɲ		ŋ	
trill								r							
tap								ɾ							
fricatives			f	v	θ	ð	s	z			ç	ʝ	x	ɣ	
lateral approximants								l				ʎ			
affricates							ts	dz							
Standard Albanian															
stops	p	b					t	d			c	ɟ	k	g	
nasals		m						n				ɲ		ŋ	
trill								r							
tap								ɾ							
fricatives			f	v	θ	ð	s	z	ʃ	ʒ					h
lateral approximants							l	ɫ							
affricates							ts	dz	tʃ	dʒ					
glide											j				

APPENDIX II - *EXPERIMENTAL STIMULI*

Cluster type	*Cluster*	stressed penultimate		stressed final	
[nasal + stop + liquid]	[mbl]	1.	komblo	1.	kambla
		2.	tumble	2.	tumblep
		3.	pamblo	3.	pemblik
		4.	pimble	4.	pambla
		5.	tomblo	5.	tembli
		6.	cemble	6.	cimblek
	[mpl]	7.	komplo	7.	kampla
		8.	tumple	8.	tumplep
		9.	pamplo	9.	pemplik
		10.	pimple	10.	pampla
		11.	tomplo	11.	templi
		12.	cemple	12.	cimplek
[nasal + stop + fricative]	[ndj]	13.	kondjo	13.	kandja
		14.	tundje	14.	tundjep
		15.	pandjo	15.	pendjik
		16.	pindje	16.	pandja
		17.	tondjo	17.	tendji
		18.	cendje	18.	cindjek
	[mbj]	19.	kombjo	19.	kambja
		20.	tumbje	20.	tumbjep
		21.	pambjo	21.	pembjik
		22.	pimbje	22.	pambja
		23.	tombjo	23.	tembji
		24.	cembje	24.	cimbjek
[stop + fricative +fricative]	[kθj]	25.	kokθjo	25.	kakθja
		26.	tukθje	26.	tukθjep
		27.	pakθjo	27.	pekθjik
		28.	pikθje	28.	pakθja
		29.	tokθjo	29.	tekθji
		30.	cekθje	30.	cikθjek
[z + fricative + fricative]	[zvj]	31.	kozvjo	31.	kazvja
		32.	tuzvje	32.	tuzvjep
		33.	pazvjo	33.	pezvjik

		34.	pizvje	34.	pazvja
		35.	tozvjo	35.	tezvji
		36.	cezvje	36.	cizvjek
[stop + s + stop]	[bst]	37.	kobsto	37.	kabsta
		38.	tubste	38.	tubstep
		39.	pabsto	39.	pebstik
		40.	pibste	40.	pabsta
		41.	tobsto	41.	tebsti
		42.	cebste	42.	cibstek
	[bsk]	43.	kobsko	43.	kabska
		44.	tubsce	44.	tubscep
		45.	pabsko	45.	pebscik
		46.	pibsce	46.	pabska
		47.	tobsko	47.	tebsci
		48.	cebsce	48.	cibscek
	[kst]	49.	koksto	49.	kaksta
		50.	tukste	50.	tukstep
		51.	paksto	51.	pekstik
		52.	pikste	52.	paksta
		53.	toksto	53.	teksti
		54.	cekste	54.	cikstek
	[ksk]	55.	koksko	55.	kakska
		56.	tuksce	56.	tukscep
		57.	paksko	57.	pekscik
		58.	piksce	58.	pakska
		59.	toksko	59.	teksci
		60.	ceksce	60.	cikscek
	[ksp]	61.	kokspo	61.	kakspa
		62.	tukspe	62.	tukspep
		63.	pakspo	63.	pekspik
		64.	pikspe	64.	pakspa
		65.	tokspo	65.	tekspi
		66.	cekspe	66.	cikspek

APPENDIX III - TABLE OF DATA

		Group 1					Control		Group 2		
Cluster type	**Cluster**	**Input**	**Florida**	**Participant 1**	**Vasiliki**	**Thodoris**	**Evelina**	**Alma**	**Input**	**Aggeliki**	**Alex**
[nasal+stop+liquid]	**[mbl]**										
	stressed penultimate	['ko.mblo]	['ko.blo]	['ko.blo]	['ko.mblo]	['ko.mblo]	['komb.lo]	['ko.mblo]	['pi.mble]	['pi.mble]	[pim.ble]
		['tu.mble]	['tu.mble]	['tum.ble]	['tu.mble]	['tum.ble]	['tu.mble]	['tu.mble]	['to.mblo]	['to.mblo]	[tom.blo]
		['pa.mblo]	['pam.blo]	['pam.blo]	['pam.blo]	['pam.plo]	['pam.blo]	['pa.mblo]	['ce.mble]	['ce.mble]	[cem.ble]
	stressed final	[ka'mbla]	[kam.'bla]	[kam.'bla]	[kam.'bla]	[ka.'mbla]	[ka.mbla]	[ka.'mbla]	[pa.'mbla]	[pa.'mbla]	[pam.bla]
		[tu.'mblep]	[tum.'blep]	[tu.'blep]	[tum.'blep]	['tum.blep]	[tumb.lep]	[tu.'mblep]	[te.'mbli]	[te.'mbli]	[tem.bli]
		[pe.'mblik]	[pem.'blik]	[pem.'blik]	[pem.'blik]	[pem.'blik]	[pemb.lik]	[pe.'mblik]	[ci.'mblek]	[ci.'mblek]	[cim.blek]
	[mpl]										
	stressed penultimate	['ko.mplo]	['kom.plo]	['kom.plo]	['kom.plo]	['kom.plo]	['kom.plo]	['ko.mplo]	['pi.mple]	['pi.mple]	[pim.ple]
		['tu.mple]	['tu.ble]	['tu.ble]	['tum.ble]	['tum.ple]	['tu.mble]	['tu.mple]	['to.mplo]	['to.mplo]	[tom.plo]
		['pa.mplo]	['pa.blo]	['pa.blo]	['pam.plo]	['pam.plo]	['pa.mblo]	['pa.mplo]	['ce.mple]	['ce.mple]	[cem.ple]
	stressed final	[ka.'mpla]	[kam.'pla]	[kam.'pla]	[kam.'pla]	[kam.'pla]	[ka.mpla]	[ka.'mpla]	[pa.'mpla]	[pa.'mpla]	[pam.pla]
		[tu.'mplep]	[tum.'pleb]	[tum.'plep]	[tum.'pleb]	['tum.plep]	[tum.'plep]	[tu.'mplep]	[te.'mpli]	[te.'mpli]	[tem.pli]
		[pe'mplik]	[pem.'plik]	[pem.'plik]	[pem.'plik]	[pem.'plik]	[pem.blik]	[pe.'mplik]	[ci.'mplek]	[ci.'mplek]	[cim.plek]
[nasal+stop+fricative]	**[ndj]**										
	stressed penultimate	['ko.ndjo]	['kon.djo]	['kon.djo]	['kon.djo]	['ko.ndjə]	['kon.djo]	['ko.ndjo]	['pi.ndje]	['pi.ndje]	[pin.dje]
		['tu.ndje]	['tun.dje]	['tun.dje]	['tun.dje]	['tu.ndje]	['tund.je]	['tun.dje]	['to.ndjo]	['to.ndjo]	[ton.djo]
		['pa.ndjo]	['pan.djo]	['pan.djo]	['pan.djo]	['pand.jə]	['pand.jo]	['pa.ndjo]	['ce.ndje]	['ce.ndje]	[ce.ndje]
	stressed final	[ka.'ndja]	[kan.'dja]	[kan.'dja]	[kan.'dja]	[kan.'dja]	[kand.ja]	[kan.dja]	[pa.'ndja]	[pa.'ndja]	[pan.dja]
		[tu'ndjep]	[tun.'djep]	[tun.'djep]	[tun.'djep]	[tu.'ndjep]	[tund.'jep]	[tun.djep]	[te.'ndji]	[te.'ndji]	[te.ndji]
		[pe.'ndjik]	[pen.'djik]	[pen.'djik]	[pen.'djik]	['pen.djik]	[pend.jik]	[pen.djik]	[ci.'ndjek]	[ci.'ndjek]	[cin.djek]
	[mbj]										
	stressed penultimate	['ko.mbjo]	['ko.bjo]	['kom.bjo]	['kom.bjo]	['kom.bjo]	['komb.jo]	['ko.mbjo]	['pi.mbje]	['pi.mbje]	[pim.bje]
		['tu.mbje]	['tu.bje]	['tu.bje]	['tum.bje]	['tu.mbje]	['tumb.je]	['tu.mbje]	['to.mbjo]	['to.mbjo]	[tom.bjo]
		['pa.mbjo]	['pam.bjo]	['pa.bjo]	['pam.bjo]	['pam.bjo]	['pa.mbjo]	['pa.mbjo]	['ce.mbje]	['ce.mbje]	[cem.bje]
	stressed final	[ka.'mbja]	[kam.'bja]	[ka.'bja]	[kam.'bja]	[ka.'mbja]	[ka.'mbja]	[ka.'mbja]	[pa.'mbja]	[pa.'mbja]	[pa.mbja]
		[tu.'mbjep]	[tu.'bjep]	[tum.'bjep]	[tu.'bjep]	[du.'mbjep]	[tum.'bjep]	[tu.'mbjep]	[te.'mbji]	[te.'mbji]	[tem.bji]
		[pe.'mbjik]	[pem.'bjik]	[pem.'bjik]	[pemb.'jik]	[pem.'bjik]	[pemb.jik]	[pe.'mbjik]	[ci.'mbjek]	[ci.'mbjek]	[cim.bjek]
[stop+fricative+fricative]	**[kθj]**										
	stressed penultimate	['ko.kθjo]	['kok.θço]	['kok.θço]	['kok.θço]	['kok.θçə]	['kok.θço]	['ko.kθjo]	['pi.kθje]	['pi.kθje]	[pik.θje]
		['tu.kθje]	['tuk.θçe]	['tu.kθçe]	['tuk.θçe]	['tu.kθje]	['tuk.θje]	['tu.kθje]	['to.kθjo]	['to.kθjo]	[tok.θço]
		['pa.kθjo]	['pak.θço]	['pak.θço]	['pa.kθço]	['pak.θjo]	['pak.θço]	['pa.kθjo]	['ce.kθje]	['ce.kθje]	[cek.θçe]
	stressed final	[ka.'kθja]	[kak.'θça]	[kak.'θça]	[kak.'θça]	['kak.θça]	[kak.'θça]	[ka.'kθja]	[pa.'kθja]	[pa.'kθja]	[pak.θça]
		[tu.'kθjep]	[tuk.'θçep]	[tuk.'θçep]	[tuk.'θçep]	[tuk.'θçep]	[tu.kθçep]	[tu.'kθjep]	[te.'kθji]	[te.'kθji]	[tek.θjə]
		[pe.'kθjik]	[pek.'θçik]	[pek.'θjik]	[pe.'kθjik]	[pe.'kθjik]	[pek.'θjik]	[pek.θjik]	[ci.'kθjek]	[ci.'kθjek]	[cik.θjek]
[fricative+fricative+fricative]	**[zvj]**										
	stressed penultimate	['ko.zvjo]	['koz.vjo]	['koz.vjo]	['koz.vjo]	['ko.zvjo]	['ko.zvjo]	['koz.vjo]	['pi.zvje]	['pi.zvje]	[pis.vje]

		['tu.zvje]	['tuz.vje]	['tuz.vje]	['tuz.vje]	['tu.zvje]	['tuz.vje]	['tuz.vje]	['to.zvjo]	['to.zvjo]	[tos.vjo]
		['pa.zvjo]	['paz.vjo]	['pa.zvjo]	['paz.vjo]	['paz.vjo]	['paz.vjo]	['paz.vjo]	['ce.zvje]	['ce.zvje]	[ces.vje]
	stressed final	[ka.'zvja]	[ka.'zvja]	[kaz.'vja]	[ka.'zvja]	[kaz.'vja]	[kaz.'vja]	[ka.'zvja]	[pa.'zvja]	[pa.'zvja]	[pas.vja]
		[tu.'zvjep]	[tuz.'vjep]	[tuz.'vjep]	[tuz.'vjep]	['tuz.vjep]	[tuz.vjep]	[tuz.vjep]	[te.'zvji]	[te.'zvji]	[tes.vji]
		[pe.'zvjik]	[pez.'vjik]	[pez.'vjik]	[pez.'vjik]	[bez.'vjik]	[pez.'vjik]	[pez.vjik]	[ci.'zvjek]	[ci.'zvjek]	[cis.vjek]
[stop+fricative+stop]	**[bst]**										
	stressed penultimate	['ko.bsto]	['kob.sto]	['kob.sto]	['kob.sto]	['kob.sto]	['kobs.to]	['kob.sto]	['pi.bste]	['pi.bste]	[pi.bste]
		['tu.bste]	['tu.bste]	['tub.ste]	['tub.ste]	['tum.ste]	['tubs.te]	['tub.ste]	['to.bsto]	['to.bsto]	[tob.sto]
		['pa.bsto]	['pab.sto]	['pab.sto]	['pab.sto]	['pab.ʃto]	['pabs.to]	['pa.bsto]	['ce.bste]	['ce.bste]	[ceb.ste]
	stressed final	[ka.'bsta]	[kab.'sta]	[kab.'sta]	[kab.'sta]	[kap.'sta]	[kab.'sta]	[kab.sta]	[pa.'bsta]	[pa.'bsta]	[pab.sta]
		[tu.'bstep]	[tub.'step]	[tub.'step]	[tub.'step]	[tub.'step]	[tub.'step]	[tub.step]	[te.'bsti]	[te.'bsti]	[tebs.ti]
		[pe.'bstik]	[peb.'stik]	[peb.'stik]	[peb.'stik]	[peb.'stik]	[pebs.tik]	[pe.'bstik]	[ci.'bstek]	[ci.'bstek]	[cib.stek]
	[bsk]										
	stressed penultimate	['ko.bsko]	['kob.sko]	['kob.sko]	['kob.sko]	['kob.ʃko]	['kobs.ko]	['kob.sko]	['pi.bsce]	['pibs.ce]	[pib.sce]
		['tu.bsce]	['tu.bsce]	['tu.bsce]	['tub.sce]	['du.bsce]	['tubs.ce]	['tub.sce]	['to.bsko]	['to.bsko]	[tob.sko]
		['pa.bsko]	['pab.sko]	['pab.sko]	['pab.sko]	['pab.ʃko]	['pab.sko]	['pa.bsko]	['ce.bsce]	['cebs.ce]	[ce.bsce]
	stressed final	[ka.'bska]	[kab.'ska]	[kab.'ska]	[kab.'ska]	[kab.'ska]	[kabs.ka]	[kab.ska]	[pa.'bska]	[pa.'bska]	[pab.ska]
		[tu.'bscep]	[tub.'scep]	[tub.'scep]	[tub.'scep]	['tub.scep]	[tubs.cep]	[tub.scep]	[te.'bsci]	[te.'bsci]	[teb.sci]
		[pe.'bscik]	[peb.'ʃcik]	[peb.'scik]	[peb.'scik]	[peb.'scik]	[peb.'scik]	[peb.scik]	[ci.'bscek]	[ci.'bscek]	[cib.scek]
	[kst]										
	stressed penultimate	['ko.ksto]	['ko.ksto]	['ko.ksto]	['kok.sto]	['kok.ʃto]	['koks.to]	['kok.sto]	['pi.kste]	['pi.kste]	[piks.te]
		['tu.kste]	['tu.kste]	['tu.kste]	['tuk.ste]	['tu.kste]	['tuks.te]	['tu.kste]	['to.ksto]	['to.ksto]	[toks.to]
		['pa.ksto]	['pak.sto]	['pak.sto]	['paks.to]	['pak.ʃto]	['pak.sto]	['pak.sto]	['ce.kste]	['ce.kste]	[ceks.te]
	stressed final	[ka.'ksta]	[kak.'sta]	[kak.'sta]	[kak.'sta]	[kak.'.ʃta]	[kak.'sta]	[kak.sta]	[pa.'ksta]	[paks.'ta]	[paks.ta]
		[tu.'kstep]	[tuk.'step]	[tuk.'step]	[tuk.'step]	[tuk.'step]	[tuk.'step]	[tuk.step]	[te.'ksti]	[te.'ksti]	[teks.ti]
		[pe.'kstik]	[pek.'stik]	[peks.'tik]	[pek.'stik]	[pek.'stik]	[peks.'tik]	[pe.'kstik]	[ci.'kstek]	[ci.'kstek]	[cik.stek]
	[ksk]										
	stressed penultimate	['ko.ksko]	['kok.sko]	['kok.sko]	['kok.sko]	['kok.ʃko]	['koks.ko]	['kok.sko]	['pi.ksce]	['pi.ksce]	[piks.ce]
		['tu.ksce]	['tuk.sce]	['tuk.sce]	['tuk.sce]	['tuk.sce]	['tuk.sce]	['tuk.sce]	['to.ksko]	['toks.sko]	[toks.ko]
		['pa.ksko]	['pak.sko]	['pak.sko]	['pak.sko]	['pak.ʃko]	['paks.ko]	['pak.sko]	['ce.ksce]	['ce.ksce]	[ceks.ce]
	stressed final	[ka.'kska]	[ka.'kska]	[kak.'ska]	[kak.'ska]	[kak.'ska]	[kaks.ka]	[kak.ska]	[pa.'kska]	[paks.'ka]	[paks.ka]
		[tu.'kscep]	[tuk.'scep]	[tuk.'scep]	[tuk.'scep]	[tuk.'scep]	[tuks.cep]	[tuk.scep]	[te.'ksci]	[teks.'ci]	[teks.ci]
		[pe.'kscik]	[pek.'ʃcik]	[pek.'scik]	[peks.'cik]	[bek.scik]	[peks.cik]	[pek.scik]	[ci.'kscek]	[ciks.'cek]	[cik.scek]
	[ksp]										
	stressed penultimate	['ko.kspo]	['kok.spo]	['kok.spo]	['kok.spo]	['kok.ʃbo]	['koks.po]	['kok.spo]	['pi.kspe]	['pi.kspe]	[piks.pe]
		['tu.kspe]	['tuk.spe]	['tuk.spe]	['tuk.spe]	['tuk.spe]	['tuks.pe]	['tuk.spe]	['to.kspo]	['to.kspo]	[toks.po]
		['pa.kspo]	['pak.spo]	['pak.spo]	['pak.spo]	['pak.ʃpo]	['paks.po]	['pak.spo]	['ce.kspe]	['ce.kspe]	[cek.spe]
	stressed final	[ka.'kspa]	[kak.'spa]	[kak.'spa]	[kak.'spa]	[kak.'spa]	[kaks.pa]	[kak.spa]	[pa.'kspa]	[paks.'pa]	[paks.pa]
		[tu.'kspep]	[tuk.'spep]	[tu.'kspep]	[tuk.'spep]	[tuks.pep]	[tuks.pep]	[tuk.spep]	[te.'kspi]	[teks.'pi]	[teks.pi]
		[pe.'kspik]	[pek.'ʃpik]	[peks.'pik]	[pek.'spik]	[pek.'spik]	[peks.'pik]	[pe.'kspik]	[ci.'kspek]	[ciks.'pek]	[cik.spek]