

**Turkish as an immigrant and heritage language in the
UK: Effects of exposure and age at onset of
bilingualism on grammatical and lexical development
of the first language**

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To my mum, Funda Ateřtrk...

Abstract

Recent decades have brought an extensive amount of research that informs our understanding of the complex relationship between the languages in a multilingual mind and how this is shaped by biological, cognitive and external factors. The current study is an attempt to contribute to this understanding by providing a comprehensive picture of the structural and lexical development of Turkish as an immigrant and heritage language in the UK and its predictors. It specifically aims to gain insights into the roles of age at onset of bilingualism (AaO) and quantity/quality of L1 contact in this development by bringing together the body of research that was traditionally carried out separately either with early bilinguals/heritage speakers or late bilinguals (attriters). The spoken performance of a total of 92 Turkish-English bilinguals with a wide AaO range (0–42) divided into three age ranges and of 44 monolinguals was investigated.

This approach allowed us to control for the quality of input available to the speakers within this community and test the impact of AaO to see whether these factors remain equally predictive of L1 knowledge across a wide range of linguistic abilities including past tense, overall structural complexity, foreign accentedness, and word formation. The synthesis of the findings obtained from three empirical studies written as chapters of this thesis suggested that this was not the case. The productivity in word formation, for example, was largely independent of AaO effect and past L1 experience, while both factors were at play in the remaining properties showing a dynamic, nonlinear interaction between the two. While in older bilinguals the transfer from the L2 to L1 was mostly subtle (due to late AaOs), for younger bilinguals, L1 development was variable and affected by a range of additional factors. Findings are discussed within the premises of various theoretical approaches.

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List of Abbreviations

1	first person
2	second person
3	third person
2L1	simultaneous bilinguals
A3pl	plural
AaO	age at onset of bilingualism
ABL	ablative case
ACC	accusative case
adverbial	adverbial clause
AIC	Akaike Information Criterion
ALEQ	Alberta Language Environment Questionnaire
AOR	aoist
ATH	Activation Threshold Hypothesis
BILEC	Bilingual Language Exposure Calculator
CDS	Child-directed-speech
CG	control group
CHAT	Codes for the Human Analysis of Transcripts
CLI	cross-linguistic influence
CP	critical period
CPH	Critical Period Hypothesis
CS	child-speech
CV	converb marker
D.PAST	DI past tense
DAT	dative case
Dexp	direct experience evidential form
EB	early bilingual
embednoun	embedded (non-finite) noun clause
embedpp	embedded postpositional clause
embedrelative	embedded relative clause
EV	Ethnolinguistic Vitality
EV.COP	evidential copula
evid	evidentiality status
exist	existential
f	frequency
FAR	foreign accent ratings
FFs	functional features
fMRI	functional magnetic resonance imaging
GEN	genitive case
GLMM	generalised linear mixed effects models
HL	heritage language

HS	heritage speaker
IBs	immigrant bilinguals
IH	Interference Hypothesis
IMPF	imperfective
INDexp	indirect experience evidential form
infE	inferential evidential
INT	semi-structured interview
L1	first language
L2	second language
LB	late bilingual
lemmafreq	lemma frequency
LOC	locative case
LOR	length of residence
M.PAST	mİş past tense
MPP	morphological productivity performance
MSG	Moundridge Schweitzer German
N/A	not applicable
NEG	negative
NL	the Netherlands
NNPs	non-native-like performers
NP	noun phrase
NPP	nominal productivity performance
NPs	native-like performers
Obj	object
OSV	object-subject-verb
P.COP	past copula
P1sg	first person singular possessive
PART	participle
PastPart	past participle
PCA	Principal Component Analysis
PD	picture description task
PL	plural
PoS	Part of Speech
POSS	possessive
r	rank
repE	reportative evidential
SD	standard deviation
SES	socio-economic status
SG	singular
SLA	second language acquisition
SLM	Speech Learning Model
SQ	sociolinguistic questionnaire
SUB	subordinator
Subj	subject

suffreq	suffix template frequency
SVO	Subject-Verb-Object
TAM	tense-aspect-modality
TNH	total number of hours
ToM	theory of mind
TTR	type-token ratio
UB	usage-based theory
UK	United Kingdom
US	United States
V	verb
V2	verb-second
V-final	verb-final
VN	verbal noun marker
VOT	voice onset time
VPP	verbal productivity performance

Chapter 1 Introduction

“And yet, a visitor to Stoke Newington in North London, or to certain adjacent districts in the London boroughs of Hackney and Haringey, could hardly fail to notice that he or she was in a 'Turkish' area —the names of the shops, cafes and kebab-houses being the most obvious indication” (King, Thomson, Mai, & Keles, 2008b, p. 424)



The Turkish-speaking community¹, the vast majority of which live in London, constitutes a relatively small part (approximately 1 per cent) of the UK’s total immigrant population (Salt, 2015). According to the official listings in 2015, 87,000 live in the UK with Turkey as their country of birth, and 42,000 of them own a UK citizenship (Salt, 2015). This number excludes heritage language speakers (the UK-born generation). The small size of this community is presumably one of the reasons why Turkish as an immigrant/heritage language in the UK has been studied relatively less in comparison to the amount of research conducted with other Turkish-speaking communities in Europe.

As indicated by King et al. (2008b) above, and is exemplified in the pictures taken by two of my participants² in the Hackney area, it is impossible to deny the existence of “little Turkey” (this is how it is called by Turkish immigrants) in London. In fact, it is possible to spend the whole day in these dense Turkish areas without using much English, as using frequently occurring English words (e.g. shop, bus, busy, appointment, return) with Turkish morphology and grammar is enough to communicate with others (e.g. *Shop-tan bir şey isti-*

¹ The Turkish-speaking community living in the UK (with the vast majority living in London) subsumes Cypriot Turks from Cyprus and Turks and Kurds from Turkey (Demir, 2012; King, Thomson, Mai, & Keles, 2008b; Lytra, 2012). In this study, Turkish-speaking community is used to refer to Turks and Kurds who migrated from mainland Turkey only.

² I thank Ahmet Yaylacı and Gülbeyaz Mekanlı-Üresin who took the pictures for this study.

yor mu-sun? “Do you want anything from the shop?”). Despite the frequent use of Turkish, it sounds different in comparison to Turkish spoken in Turkey, especially regarding the variety spoken by subsequent generations. What causes this difference or what exactly differs is not immediately clear (other than clear code-switching behaviour) even to a linguist listening to Turkish in the streets of “little Turkey” during a trip to London. The current study aims to provide a comprehensive picture of the structural and lexical development of Turkish as an immigrant and heritage language in the UK and its predictors. Despite being a small community, with all its fascinating language use practices, the Turkish-speaking community in London has as much to offer to linguistic research as the other Turkish-speaking communities in other European countries.

My personal motivation to carry out this research on immigrant Turkish and especially on the property called “evidentiality” (see Chapter 3) goes back to two years I spent in Germany during my master’s study. It was my first time abroad, and unlike the situation for many Turkish people back in Turkey, there was no one in my immediate or extended family who had immigrated to a country in Europe as a guest worker (or for any other reason) and stayed there with their family. I did not even know that the Turkish variety spoken abroad would sound quite different. There, the first friend I made was a lovely Turkish girl who was born in Germany. She was 20 years old when we first met. She had fluent Turkish and had very strong ties to the Turkish culture. Still, something was different about the way she spoke Turkish (mostly something to do with her accent and intonation patterns, but something more that I could not tell). As we became closer and conversed more in Turkish, I realised that whenever she wanted to refer to a past event, she was quite hesitant in her choice of one of the two past tense markers in Turkish. One day, when we were talking about differences between German and Turkish language and culture, she told me something that fascinated me. She mentioned that each time before she uttered something in the past, she would always explicitly think what to use, and in order to make the correct choice between the past tense markers, she would use some techniques to remind herself. She learned these techniques from her older sister. Although this information was quite remarkable and certainly caught my attention, my master’s study was on Anglophone studies, and I had to do something with Anglophone culture or languages in my thesis. After I graduated, I wanted to pursue my PhD in the UK. I did not know that there was a small but dense Turkish immigrant community in the UK. So, I wrote a proposal on multicompetence in instructed learners. I came to the UK and went to London for a day trip in the first week of my arrival and ended up in a Turkish

restaurant that I found on the internet. I was actually in a Turkish area, and hearing Turkish in the streets of “little Turkey” reminded me of my conversation with my Turkish friend in Germany. I was lucky that my supervisor was an expert in the first language attrition field. She was happy to discuss what I had in mind for my new PhD proposal, and so my journey started.

One thing we need to know about this immigrant community in the UK is that it is quite diverse regarding their background, such as their social class, ethnicity, socio-economic status (SES), educational background, religious and political interests, as well as their motivation for migration (Lytra, 2012). It has both similarities to and differences from other Turkish immigrant populations in the other European countries with respect to their background.

The first wave of migration started in the 1970s with males from rural areas of Turkey with relatively low levels of formal education seeking jobs mirroring the guest worker migrant populations in other European countries (Charsley, Storer-Church, Benson, & Van Hear, 2012; King, Thomson, Mai, & Keles, 2008a). In the following decade, however, military coups and political issues that occurred in Turkey led to the second wave of migration of a population with a more intellectual background, with higher levels of education and urban origin (Mehmet Ali 2001 as cited in King et al., 2008b). One of the other causes of migration on the other hand, involved the Ankara agreement signed between Turkey and the UK in 1963, resulting in the foundations of small businesses, such as restaurant ownership, kebab shops, off-licence shops, and cleaning companies (King et al., 2008b) which continues to be a reason for migration even today.

Apart from these waves, the late 80s and early 90s witnessed a wave of migration from eastern rural areas with mostly Kurdish backgrounds (mainly asylum-seekers), immigrated from Turkey due to political conflicts (Demir, 2012; King et al., 2008b). Around similar times (the early 90s), a relatively large Turkish/Kurdish population also started fleeing due to religious conflicts (feeling undervalued due to their *Alevi* identity and culture, a religious sect in Islam that is the second most common one after the *Sunni* sect) in central/eastern Anatolia (Demir, 2012). Therefore, the majority of the immigrant population who migrated from Turkey are *Alevi*s, with either Kurdish or Turkish ethnicity background. As Demir notes, *Alevi* Kurds’ religious identity in the UK seems to have outweighed their ethnic identity, which is why the majority of *Alevi* Kurds consider themselves as more Turkish than Kurdish and seem to have something more in common with Turkish *Alevi*s rather than

Kurdish *Sunnis* (see Demir, 2012 for an extensive review). This, of course, reflects on their language use habits with a preference for Turkish as the language of communication in religious rituals in *Alevi* centres, and even within the family (Demir, 2012). In fact, it is not uncommon to find a significant number of *Alevi* Kurds in London who are not able to speak Kurdish at all (as with the ones in the current study).

The migrants eventually settled down, obtained UK citizenships, started families (or continued their families in the UK) and had UK-born children (heritage speakers). The majority of the Turkey-born participants in the current study migrated during the late 1980s and early 1990s, and the rest in the early 2000s as migrant children, late teens or in their early twenties. Their education level is rather high in comparison to that of Turkish immigrants in Germany or the Netherlands. Based on the findings obtained from the sociolinguistic questionnaire, their main reasons for migration are (from the most common to the least): religious and political conflicts, job opportunities, family reunions, language learning purposes, better education opportunities and marriage. Those who came with their families as migrant children (early bilinguals) continued their studies in the UK, at least at the secondary school level, while the others went to university either in Turkey or the UK.

Studies conducted with Turkish immigrants in other European countries have demonstrated their loyalty to their origin, language maintenance and wish to pass this on to next generations, and a preference to socialise with other Turks more than the host country citizens —although this has been shown to change depending on employment status, education level or generation descent— (Backus, 2012; Crul & Doornik, 2003; Ersanilli & Koopmans, 2011; Yağmur & Akıncı, 2003; Yılmaz, 2013). Among the underlying reasons for this high degree of maintenance, Backus (2012) considers the rarity of international marriages, frequent high quality contact with the native language (frequent contact with monolinguals back in Turkey during summer holidays and the availability of the Turkish media in the host countries), living in areas where there is a dense Turkish population (as in north London), the availability of Turkish organizations and foundations, and the strong association between religion and language.

The participants of the current study confirm many of these observations and the fact that these all depend on the generation descent. Generally speaking, the participants in the current study (even around 50 per cent of the UK-born ones) prefer socialising with Turkish-speaking members more than they do with Brits. This might have something to do with the

fact that they have been recruited through religious or political organisations founded by the Turkish-speaking community in London that they attend regularly to socialise.

The frequency of first language (L1) use for daily interactions among friends and family, as well as L1 contact through the Turkish media, is quite high. This does not mean that they do not identify with the English lifestyle or the language. They all consider England as their home and appreciate that the UK provides better lifestyles than Turkey could have. They use English mainly at work and at school but also for socialising with non-Turkish friends/neighbours. Their emotional ties to their Turkish identity are still strong. They find it crucial to pass the heritage language on to the next generation, especially because it is the communication language with the grandparents back in Turkey. Yet, many of the participants indicated that monolingual Turkish people back in Turkey are able to recognise that they do not sound quite like them. This has been repetitively pointed out by younger generations as well. In their case, it seems that identity or belongingness is something they question every day too, as some of them feel lost between the two countries (this is something that is called hybrid identity by Backus, 2012, p. 773). How these efforts succeeded and resulted in full L1 maintenance in the grammar of the immigrants and a fully-fledged L1 grammar in their children is, however, still a question. In fact, there has been a significant number of studies which report a slow, moderate change mostly taking up in the third generation.

1.1 Characteristics of Turkish in diaspora varieties and its transmission to next generations

Turkish as an immigrant/heritage language in Europe in contact with European languages such as German, Dutch, and French has been extensively studied in both children and adults from a diverse perspective (Aarssen, 2001; Akıncı, 2003; Arslan, De Kok, & Bastiaanse, 2015; Backus, 2012; Bamyacı, 2015; Doğruöz & Backus, 2009; Gürel & Yılmaz, 2011; Huls & van de Mond, 1992; Pfaff, 1991; Scheele, Leseman, & Mayo, 2010; Treffers-Daller, Ozsoy, & van Hout, 2007; S. Wright & Kurtoğlu-Hooton, 2006; Yılmaz, 2013 among them). Previous research conducted with late bilingual Turks (speakers who left their native language environment post-puberty, usually in early adulthood) in Europe has not pointed to any significant L1-divergent performance except for subtle contact-related changes in their preferences in binding domains of pronouns (Gürel & Yılmaz, 2011 see below for a summary), their use of very complex subordination structures (Yılmaz, 2011) as well as in lexical accessibility (Yılmaz & Schmid, 2012). Findings coming from studies conducted

with subsequent generations (early bilinguals) on the other hand, demonstrated a trend towards avoidance of complex structural properties such as subordination (non-finite verbal morphology) and/or relying on more analytical means (Huls & van de Mond, 1992; Onar Valk & Backus, 2013; Pfaff, 1993; Treffers-Daller et al., 2007), reduction in the past tense system and the narrative structure (Aarssen, 2001; Akıncı, 2003; Arslan, De Kok, et al., 2015), less target-like performance in nominal reference (problems with derivational morphology and null pronouns) (Pfaff, 1991, 1993), and development of a foreign accent (Kupisch, Hailer, Klaschik, & Stangen, 2014). Their speech is also known as including frequent patterns of code-switching (more intense and different than those in the speech of the first generation of immigrants), bilingual compound words, and loan translations with semantic extension (see Backus, 2012 for a review of studies).

This non-convergent grammar has often been attributed to the effects of frequent contact with the dominant language and reduced contact with the first language community, factors related to family background (e.g., language transmission strategies of the families, and low socioeconomic background), lack of schooling in the L1, and so on. For example, Scheele et al. (2010) concluded that low background education levels of the Turkish families in the Netherlands hindered them from implementing available language sources to enrich the language learning experience of their children and boost their vocabulary development. Pfaff (1993) reports on the longitudinal development of four early bilingual children (two of them are Turkish-dominant and the other two are German-dominant) in Germany. It appears that Turkish-dominant children (those who were exposed to more Turkish) performed more target-like in a variety of structural and morphosyntactic properties including the distribution of overt subjects and non-finite clauses, anchored tense preferences in narratives and the use of case marking in comparison to those who were German-dominant.

Turkish is a pro-drop language which makes overt subject pronouns redundant unless they are required by the discourse topic. As Pfaff's analyses showed, while the Turkish-dominant bilingual children did not have difficulties in producing sentences with null subjects as in 1.1, German-dominant children had a tendency to produce sentences with redundant overt subjects as in 1.2. Note that in this sentence, the use of the overt pronoun/subject *sen* ("you") given in bold characters is very unusual and redundant because the subject can be attested from the personal agreement marker (given in bold italics) at the end of the verb.

1.1

Orhan, sarı topu alabilir miyim?

“Orhan, may I take the yellow ball?”

1.2

Peter, sen bana topu verir misin?

“Peter, will you give me the ball?”

(Pfaff, 1993, p. 128)

Regarding these diaspora varieties of Turkish, although the importance of the generation descent has been emphasized (Huls & van de Mond, 1992), we know relatively little about any systematic roles played by age at onset of bilingualism (AaO) which might have led to these differences between the generations. The possibility that the subsequent generations might be receiving modified input from the parental generation (e.g. Backus & van der Heijden, 2002; Verhoeven, 2004) or that the transmission of the first language to the next generations is incomplete (Schaufeli, 1993) have also been suggested several times. That notwithstanding, this has not been systematically investigated either and the exact roles played by any sort of modifications in the input quantity and quality available to these speakers through previous generations have remained understudied.

The current study addresses these gaps by bringing together the body of research that was traditionally carried out separately either with late bilinguals (first language attrition) or early bilinguals/heritage speakers (heritage language acquisition). It specifically aims for an in-depth exploration of the effects of age at onset of bilingualism and quality/quantity of contact with the first language on structural and lexical development (maintenance or loss) of Turkish as an immigrant and heritage language in the UK by looking at the effects of these factors in similar linguistic categories revealed to be affected in the previous literature. The rest of this section provides introductory information on the investigations carried out in these two research fields that the current study aims to bring together, namely first language attrition and heritage language bilingualism. These sections start with definitions of the terminology and are followed by main factors playing roles in the research conducted in these fields with references to recent findings, background theory and explanations. Note that these sections will not include any explicit explanations for any theoretical framework that remains beyond the scope of the research carried out in this thesis. The aims of the study, along with research questions and associated hypotheses are given in Section 1.4.

1.2 First language attrition

L1 loss can be either pathological or non-pathological (Schmid, 2011). The main cause of the former is neurological and it might result in speech disorders such as aphasia. The non-pathological language loss, on the other hand, might result from normal ageing and/or bilingualism, the latter indicating a language contact situation usually in an immigrant context. This type of L1 loss has been captured by the term *first language attrition* which is defined as “the non-pathological decrease in a language that had previously been acquired by an individual” (Köpke & Schmid, 2004, p. 5).

Research investigating first language attrition in bilinguals has traditionally been carried out in an immigrant context where a second language (L2) is predominantly spoken, although attrition-like phenomena are not limited to the bilinguals in an immigrant setting (see Cook, 2003). The current study is carried out in the traditional setting of L1 attrition and investigates participants who have been separated from their L1 environment as immigrants. As indicated by Schmid (2008, p. 10), attrition is “a process of loss, of forgetting, of deterioration”. As stated by Schmid, a certain length of residence in an L2 environment results in reduced contact with the native language and its community. Additionally, another language starts occupying a more dominant position in the minds of the speakers. During this process, what an attriter has to deal with is the competition between the language systems and the reduced amount of contact with the L1, which makes the L1 a perfect candidate to observe attrition, i.e. a decrease in L1 proficiency (Schmid, 2008). L1 attrition research in bilinguals thus aims for an in-depth exploration of what happens to the L1 under these circumstances.

1.2.1 How does attrition manifest itself in the native language?

Change in one’s native language can be manifested as a cross-linguistic influence (CLI) or as an internal modification in the L1 system, which are referred to as externally-induced or internally-induced changes respectively (Seliger & Vago, 1991). An externally-induced change implies modifications in the L1 system occurring due to effects of the other developing language (L2) in the forms of interference and transfer, i.e. cross-linguistic influence. An internally-induced change, on the other hand, is realised as simplifications, regularisations and/or generalisations resulting in reductions in the overall complexity

predominantly due to lack of L1 contact, and not enough levels of activation (Seliger & Vago, 1991).

The basic notion underlying L1 attrition research that a native language system can be eroded raises significant questions about the stability and the nature of the computational language system, which has led to discussions about competence, i.e. L1 knowledge system versus performance, i.e. control of the L1 knowledge (Seliger & Vago, 1991; Sharwood Smith & Van Buren, 1991). In a study conducted with three generations of Dutch immigrants in New Zealand on the mental lexicon, Hulsen (2000) showed that while there was deterioration in the productive skills (captured via a picture naming task) across generations, receptive skills (captured via a picture matching task) were rather unaffected, even in the third generation. Similarly, recent investigations suggest that deviations from the L1 grammar in the production of attriters are not necessarily indicative of changes in the representation of the language but of a failure to inhibit the competing language system (Chamorro, Sorace, & Sturt, 2016; Schmid, 2013; Schmid, Köpke, & Bot, 2013; Tsimpli, Sorace, Heycock, & Filiaci, 2004). In other words, “the emerging system is a DERIVATION of the fully-fledged L1 system, not an APPROXIMATION, as in the case in second language acquisition (SLA)” (Schmid, 2010, p. 1). Revealing what other parts of the L1 can be affected, and to what extent and why is still important in order to inform our understanding of the complex relationship between the languages in a multilingual mind and how this is shaped by biological, cognitive and external factors. As noted by Schmid and Köpke (2007, p. 4) “[t]he fundamental difference of the native L1 system from anything else we know can best be explored from a perspective which investigates not only how this system affects others, but also how the L1 itself is subject to influences from outside”.

There has been an ample amount of research in the field of first language attrition investigating L1 knowledge of immigrants from wide methodological and theoretical perspectives in different linguistic domains. Some of these are discussed below.

1.2.2 Areas affected by attrition and the selectivity phenomenon

Previous attrition research has been conducted on linguistic abilities and/or properties such as lexical retrieval, diversity, and accessibility (Ammerlaan, 1996; Hulsen, 2000; Schmid & Jarvis, 2014; Yağmur, Bot, & Korzilius, 1999; Yılmaz & Schmid, 2012), verbal fluency (Ammerlaan, 1996; Schmid, 2007; Schmid & Dusseldorp, 2010), word order (Gürel, 2015; Seliger, 1991), inflectional morphology (Schmid, 2002, 2012; Steinkrauss, Lahmann, &

Schmid, 2016), verbal morphology (Silva-Corvalán, 1994), binding properties of pronouns and their interpretation (Gürel, 2004, 2007; Tsimpli et al., 2004), production, comprehension and/or processing of relative clauses or embedded clauses (Dussias, 2004; Kasparian & Steinhauer, 2017; Yağmur, 1997; Yılmaz, 2011), phonology and pronunciation (Bergmann, Nota, & Schmid, 2017; Chang, 2012; de Leeuw, Mennen, & Scobbie, 2011, 2012; de Leeuw, Schmid, & Mennen, 2010; de Leeuw, Tusha, & Schmid, 2017; Hopp & Schmid, 2013; Stoehr, Benders, van Hell, & Fikkert, 2017), and event conceptualizations (Bylund, 2009a; Bylund & Jarvis, 2011).

At the morphosyntactic level, for instance, attrition manifests itself in the form of simplifications or of L2-based restructuring. This can be observed more clearly in more complex properties at the interface between syntax and other domains such as semantics or discourse-pragmatics (Sorace, 2000; Tsimpli et al., 2004). Gürel and Yılmaz (2011), for example, investigated L2-induced effects on the knowledge of binding properties of overt and null subject pronouns in L1 Turkish of two different immigrant groups, Turkish-Dutch and Turkish-English bilinguals, in order to allow for generalisations about L2 effects on the same L1. As exemplified in 1.3, the subject of the embedded clause, the pronoun *he*, can refer to both Paul (co-indexed with *i*) or can pick up any other antecedent (co-indexed with *j*) in English.

1.3

Paul_i thinks that [*he*_{*i/j*} is good in Physics].

As argued by the authors, while both English and Dutch pronominals behave as described, Turkish displays a different picture. As opposed to both English and Dutch, Turkish is known to be a null-subject language. It, therefore, allows for both overt and null subject pronouns in embedded clauses.

1.4

a. Paul_i [*o-nun*_{*i/*j*} *fizik-te iyi ol-duğ-u*]-nu düşün-üyor.

b. Paul_i [*pro*_{*i/j*} *fizik-te iyi ol-duğ-u*]-nu düşün-üyor.

c. Paul_i [*kendisi-nin*_{*i/j*} *fizik-te iyi ol-duğ-u*]-nu düşün-üyor.

Paul he-GEN/pro/self-GEN physics-LOC good be-VN-3SG.POSS-ACC think-IMPF

“Paul thinks that he is good in physics.”

As it can be seen in 1.4b and 1.4c, while the overt Turkish pronoun *kendisi* (“self”) and the null pronoun *pro* in the subject position of the embedded clauses given in brackets operate similarly to English and Dutch pronouns regarding what antecedents they might refer to, the overt pronoun *o* (“he/she”) given in 1.4a can only be co-referential with a disjoint antecedent. This means that the pronoun *o* is in direct competition with its equivalent forms in the L2s tested, while the null pronoun and the pronoun *kendisi* lack counterparts in both English and Dutch. Given this, Gürel and Yılmaz predicted that only the pronoun *o* would be affected by the binding domains of the pronouns in the L2s with which Turkish was in contact, while the forms which do not have a corresponding L2 structure would be fully retained.

The analyses showed that the interpretation of the pronoun *o* was affected as expected and this could be traced back to the binding domain principles of the equivalent form *he/she* in both English and Dutch. Although the analyses showed that the antecedent preferences of the bilinguals for the other two pronouns showed a clear difference from those of the controls too, the authors did not attribute this to L2 transfer. Instead, they argued for an internally-induced change presumably due to reduced amounts of L1 contact which might have affected the participants’ accessibility to different readings and resulted in more restricted preferences for the antecedents.

Bergmann et al. (2015) carried out an investigation on morphosyntactic processing in German-English bilinguals to find out whether the ability to detect morphosyntactic errors in L1 German would be affected by attrition. The comparison of online responses obtained using an EEG technique from both the attriters and the controls, however, did not reveal any erosion in the ability to detect verbal (non-finite verb inflections) or nominal (grammatical gender) morphosyntactic violations/errors. The authors concluded that once ingrained and entrenched upon full acquisition, L1 grammar remains rather intact.

On the other hand, a recent investigation, which employed a similar technique to detect sensitivity of Italian-English late bilinguals to identify different types of L1 relative clause structures, revealed significant differences between the controls and attriters (Kasparian & Steinhauer, 2017). As stated by the authors, identification of subject and object relative clauses in Italian is ambiguous as Italian has a relatively flexible word order and the relative pronoun *che* (“that/who”) can refer to either the object or subject of the embedded clause. It is, however, possible to identify thematic roles by relying on semantic cues and overt morphological marking for number agreement, while English speakers have to rely on the allowed fixed word order to interpret sentences. In addition to the fixed word order allowed

in English subject relative clauses (V-NP, *the man who loves **the woman***) and object relative clauses (NP-V, *the woman who the man **loves***), Italian syntactically allows an additional word order in both subject and object relative clauses as exemplified in 1.5 and 1.6 respectively.

1.5 Subject relative clause, NP-V

Il poliziotto (Subj) che I ladri (Obj) arresta registra I nomi.

“The policeman (Subj) that the thieves **arrests** registers the names.”

1.6 Object relative clause, V-NP

I ladri (Obj) che arresta il poliziotto (Subj) attendono in macchina.

“The thieves (Obj) that arrests **the policeman** (Subj) wait in the car.”

(Kasparian & Steinhauer, 2017, p. 3)

Participants were asked to rate the acceptability of various sentences including all four syntactically possible relative clause structures in Italian on a five-item Likert scale. The differences in the participants’ preferences were evaluated to be L2-induced as the attriters rejected sentences similar to those given in 1.5 and 1.6 in L1 Italian which were grammatically correct in Italian but incorrect in English. The linguistic variability within the attriter group was linked to L2 proficiency and amount of L1 contact. The authors concluded that “even a ‘stabilized’ L1 grammar is subject to change after a prolonged period of L2 immersion, and reduced L1 use especially in linguistic areas promoting cross-linguistic influence” (Kasparian & Steinhauer, 2017, p. 1). As the authors acknowledged, the discrepancy between these two studies employing an EEG technique might relate to the fact that in the latter, the investigated structures were in a direct competition with the L2 forms, supporting the argument by Gürel and Yılmaz (2011) above.

As much as these findings seem to challenge the recently established view that attrition does not affect the underlying language system, perhaps testing these participants after they have been re-exposed to L1 Italian might show a different picture. Chamorro et al. (2016), for instance, recently employed an innovative methodology by comparing the antecedent preferences of a group of attriters of Spanish to another group who were re-exposed to L1 Spanish for pronominal subjects. As the eye-tracking data showed, the attrition effect reported in the attriter group was reduced in the re-exposed group even though the re-exposure period was only a week-long. This seems to be an indication that attrition does not

leave permanent changes and attriters are sensitive to the quality of input (Chamorro, Sorace, et al., 2016). Without any doubt, more research is needed to see the extent to which other properties and languages are affected by re-exposure.

Previous findings vary regarding phonology and pronunciation. While a number of studies examining L1 pronunciation or changes in the segmental articulation system reported attrition in the L1 accent of late bilinguals due to late bilingualism effects (Bergmann et al., 2017; de Leeuw et al., 2011, 2012, 2010; Hopp & Schmid, 2013), some of them observed full maintenance (e.g. Yeni-Komshian, Flege, & Liu, 2000). Studies provide various evidence regarding the effects of external factors on the degree of attrition as well, an indication that the contribution of these factors is still unclear. De Leeuw et al. (2010), for example, showed professional L1 contact—which allows inhibition of the L2 while using the L1—to be a better predictor of the degree of foreign accent maintenance than length of residence (LOR) and/or AaO in long-term migrants of German in both the NL and Canada. Bergman et al. (2017), however, showed a significant negative correlation between native-like pronunciation and length of residence in L1 German, but no significant correlations between the amount of L1 use and accentedness. They also revealed that the non-native traces they found in the L1 accent of their speakers were not due to changes in the segmental articulation system as predicted by the Speech Learning Model (SLM, see Chapter 4). This was at least confirmed not to be the case for the sounds chosen for investigation in this particular study.

In a recent investigation, Stoehr et al. (2017) showed the determining role played by quantity and quality of contact in a broader sense. The aim of the study was to investigate to what extent the immersion context results in successful acquisition of a second language and maintenance of the first language regarding voice onset time (VOT) values of some consonants. The performance of two groups of late bilinguals in the Netherlands was compared: a group with L1 Dutch-L2 German and another group with L1 German-L2 Dutch. While the former group participants were exposed to their L2 German only in home context, the latter group participants were exposed to their L2 Dutch both at home and outside the home. This means that their L1 German use was very limited. As the findings showed, participants who were immersed in the L2 Dutch context achieved native-like VOT values in the L2, but this resulted in a certain level of attrition in their L1 German. While this underlines the significance of quantity and quality of contact and cross-linguistic influence

in both L2 acquisition and L1 attrition, whether these VOT changes lead to a foreign accent should be addressed further.

Finally, as the study carried out by Hopp and Schmid (2013) showed, native speakers of German perceived German immigrants in the Netherlands as sounding more native-like in comparison to German immigrants in Canada. The authors thus speculated that the typological and phonological similarity between the L1 and L2, e.g. German and Dutch might have contributed to the maintenance of L1 sound categories.

At the lexical level, findings seem to be more conclusive and concrete. The lexicon seems to be more vulnerable to L2 interference in comparison to the linguistic categories in the other previously mentioned domains. Both the recognition and production of early-learned as well as high-frequency words have been shown to be accessed and retrieved faster than late-learned and low-frequency words in bilingual L1 processing and L1 attrition contexts (Ammerlaan, 1996; Hulsen, 2000; Montrul & Foote, 2014; Olshtain & Barzilay, 1991). This was revealed to be affected by the age of bilingualism or the generation descent, i.e. early bilinguals have been demonstrated to be slower in lexical production and retrieval (Ammerlaan, 1996; Hulsen, 2000). The source of the difficulties observed in the lexical retrieval and accessibility among bilinguals has been suggested to be low levels of activation (M. Paradis, 2007 see below the Activation Threshold Hypothesis). Attrition manifests itself also in the forms of an increased amount of hesitation markers (less fluent speech) (Schmid & Fägersten, 2010), and less diverse and sophisticated vocabulary, mostly captured via type-token ratio (TTR)³ or D⁴ measures but also via other improved lexical diversity measures (Schmid, 2007; Schmid & Jarvis, 2014; Yılmaz & Schmid, 2012). These investigations rely on a broad range of data collection methods, such as picture naming and matching tasks, verbal fluency tasks, spontaneous or elicited free speech data, and lexical judgment tasks,

³ TTR measures are traditionally used to measure lexical diversity in samples of spoken or written data. In this method, lexical diversity of a text is calculated by dividing the total number of different words (types) by the total number of words (tokens) found in the text. It is, however, not considered as a reliable measure of lexical diversity anymore especially because TTR measures tend to vary as a function of text length (see Jarvis, 2002; McCarthy & Jarvis, 2010 for details).

⁴ Different solutions and new measures such as D (also known as VOCD), which is a computerized approximation of lexical diversity based on probabilities, have been suggested to overcome the problem of text length dependency of traditional TTR measures (see Malvern, Richards, Chipere, & Durán, 2004 for details about the calculation of D). In reality, however, several other studies revealed the dependency of this measure on text length as well (e.g. McCarthy & Jarvis, 2007, see also 2010 for other improved measures).

but the findings obtained through these tasks do not always correlate (see Schmid & Köpke, 2009 for more detailed information).

Questioning the validity of typically used measures in L1 lexical attrition research, Schmid and Jarvis (2014) carried out an analysis of lexical diversity and sophistication, with an aim of comparing the findings obtained via free speech tasks and more formal tasks. The investigation was carried out with L1 German speakers residing in either Canada or the Netherlands. The investigation of lexical diversity, sophistication and verbal fluency showed that the attriters diverged from the controls in all measures, but the best predictors of attrition were the lexical diversity and sophistication measures obtained through the interview data, rather than formal tasks or elicited free speech tasks.

As evidenced by these studies, any linguistic area can be affected by attrition, but not all properties in every linguistic domain are affected to the same degree or vulnerable to the effects of external factors to the same extent. The degree of attrition might manifest itself differently leaving some properties completely unaffected. This has been borne out as “the selectivity phenomenon” (Seliger, 1991). It should also be noted that there is a great individual variability in speakers experiencing language attrition. In order to address the sources of this variability and the selectivity of attrition, attrition research to date has been conducted within perspectives of various approaches such as the Generative Framework (Gürel, 2002, 2015; Sharwood Smith & Van Buren, 1991), Dynamic System Theory (De Bot, 2007; Herdina & Jessner, 2002; Opitz, 2004), Interface Hypothesis (Iverson, 2012; Tsimpli et al., 2004), Activation Threshold Hypothesis (Gürel, 2004, 2007; Schmitt, 2010), and the Critical Period Hypothesis (Bylund, 2009b).

In this thesis, the selectivity is addressed from a cognitive and psycholinguistic perspective. For this reason, in the following sections, the focus will mainly be on psycholinguistic and cognitive factors, and brain mechanisms which are revealed to play roles in first language attrition. Additionally, we will also discuss potential effects of some external factors on first language attrition relevant to the scope of the research carried out in this thesis. We will then review key theoretical approaches that provide the basis and conceptual framework to the current study, namely the Activation Threshold Hypothesis, Critical Period Hypothesis, and Interference Hypothesis.

1.2.3 Predictors of individual variation in attrition

1.2.3.1 Age at onset of bilingualism

As noted by Montrul (2008, p. 31), “the effects of L1 attrition in a variety of grammatical areas are really minor to negligible in adult late bilinguals, as opposed to the more dramatic effects language attrition or incomplete acquisition can have in children (early bilinguals)”. This observation about the differences between adult and child immigrants gave rise to an indirect conclusion about the role that age at onset of bilingualism (AaO) might be playing in the stability of the L1 and its susceptibility to attrition (Köpke & Schmid, 2004). This is further evidenced in various empirical studies conducted with child immigrants (Isurin, 2000; Kaufman & Aronoff, 1991; Montrul, 2002, 2008; Schmitt, 2004; Turian & Altenberg, 1991) or with adults across a wide AaO range (Ahn, Chang, DeKeyser, & Lee-Ellis, 2017; Ammerlaan, 1996; Bylund, 2009a; Hakuta & D’Andrea, 1992; Montrul, 2002; Pelc, 2001; Silva-Corvalán, 1994; Yeni-Komshian et al., 2000). While participants with AaO over 10-12 were found to be indistinguishable from monolinguals, those with AaO below this range were reported to show more variability with the majority of them performing outside the control range. Although researchers seem to agree on that an early exposure in itself does not constitute a sufficient criterion for becoming native-like in the L1 when another language becomes more dominant before puberty (see Köpke & Schmid, 2004), the nature of this role played by AaO and the underlying mechanism is still a matter of much debate in the literature.

Age effects for L1 attrition, to date, have been evaluated from the perspectives of two competing theoretical accounts that were extensively used to account for age effects in second language acquisition: the Critical Period Hypothesis (CPH) and the Interference Hypothesis (IH). The predictions of these accounts and their implications for L1 attrition phenomena are discussed below.

1.2.3.2 L1 contact

Although continuous L1 use upon emigration is often assumed to be a necessary factor in order to maintain it, the role of L1 contact for L1 maintenance is indeed less clear cut and conclusive in comparison to, for example, the role AaO plays. Findings are mixed. While attempts to relate the degree of L1 loss to frequency of L1 contact have often failed (Schmid & Jarvis, 2014; Yilmaz, 2013), some studies showed the effect of a certain type of L1 use,

namely L1 use for professional purposes such as at work, in a club or a church (de Leeuw et al., 2010; Schmid & Dusseldorp, 2010; Steinkrauss et al., 2016).

In a comprehensive investigation of the role of L1 use for L1 maintenance, Schmid (2007) classified three modes of L1 use based on Grosjean's model and set out how activation-inhibition patterns between the L1 and L2 in these modes would relate to the degree of L1 loss/maintenance. Within this framework, L1 use for professional purposes, which some of the studies above reported to be explanatory, is classified as an intermediate mode of L1 use. In an intermediate mode, as Schmid explains, both the L1 and L2 are highly active, but the need to inhibit the L2 is rather strong, as code-switching in this context (L1 use at work, church, the club, as well as with the interviewer) would not be deemed appropriate. As shown by the analyses, however, none of these L1 use variables that Schmid classified systematically explained the sources of attrition found in the lexical performance of long-term German immigrants in Canada and the Netherlands. She concluded that once the L1 is stabilised, L1 accessibility would not depend strongly on frequency or recency of L1 use, but inhibition would become an important part of this process. Schmid (2016) thus suggests that L1 contact might help maintain the L1 only when it requires inhibition of the L2. It seems that more research is necessary in order to reveal the role of L1 contact for L1 maintenance in other linguistic domains in different immigrant settings.

Perhaps, the extent to which the degree of attrition is predicted by L1 contact is mediated by the age when speakers leave their native language environment or become bilingual. We should note that the role of L1 contact seems to be more pronounced among pre-puberty attriters. Previous studies conducted with early bilinguals showed a clear L1 contact effect on the maintenance of the L1 general proficiency and accent, independent of the need to inhibit the L2 (Bylund, Abrahamsson, & Hyltenstam, 2010; Hakuta & D'Andrea, 1992; Yeni-Komshian et al., 2000). In the case of post-puberty bilinguals, on the other hand, even in extreme cases of traumatic experiences accompanied with prolonged lack of continuous L1 contact (for around 50 years), an investigation carried out on the structural complexity and accuracy in the L1 German of the Holocaust survivors with adolescent AaOs (11–15) showed almost no erosion (Schmid, 2012). Given these observations, the role of quantity and quality of L1 contact and its relevance to the AaO of the participant seems to require further investigation in L1 attrition research.

1.2.3.3 Attitudinal factors, motivations, and identity

The role of attitudes, motivations towards the L1 and L2 as well as the link between identity and the native language of immigrants is often presumed to be important for L1 retention (Köpke, 2007). That notwithstanding, previous research findings are inconclusive. Participants who reported to have positive attitudes towards maintaining their L1 or culture usually did not perform differently in the L1 linguistic tasks than the ones who did not (Schmid, 2007; Schmid & Dusseldorp, 2010; Yılmaz, 2013) with exceptions (Bylund & Ramírez-Galan, 2014). Similarly, studies carried out within the Ethnolinguistic Vitality Theory—which examines the relationship between language and identity within a speech community by assessing factors affecting groups and individual perceptions such as status of the minority language, availability of educational support for the minority language, the rate of international marriages and immigration in the speech community and so on (see Yağmur, 2009 for details)—showed inconclusive results about the relationship between attrition and attitudes (Hulsen, 2000; Yağmur et al., 1999).

A very likely underlying reason for failures seems to relate to the difficulty of collecting such data. As underlined by Schmid (2011), on the one hand, researchers have to rely on self-reported data, and this might not be reliable. On the other hand, these views and attitudes change over time (see also Cherciov, 2013; Prescher, 2007) and questionnaires might fail to capture the unpredictable nature of this process. Addressing these methodological problems and questioning the exact role of attitudes in L1 attrition, Cherciov (2013) showed that changing attitudes can be best captured by interview data (see also Schmid, 2002). This investigation further evidenced that “a positive attitude is not in and of itself a guarantee against language attrition” as in order for a positive attitude to predict L1 proficiency it seems that it needs to be “conducive to an active effort” (Cherciov, 2013, p. 15).

Another problem Schmid (2011) points out is that Ethnolinguistic Vitality (EV) questionnaires are usually based on group factors that apply to almost everybody in the same community, such as policies of the L2 government on immigrants. In order to reveal the role played by the EV, however, one needs to compare EVs of different groups with a similar immigration setting (Schmid, 2011). This might prove more informative and help extend our understanding of how attitudes contribute to L1 retention. One such study was successful in capturing this (Ben-Rafael & Schmid, 2007). They investigated the effects of different language ideologies of the host country (implemented at two separate times) on the motivations, attitudes and L1 retention of two groups of immigrants (French-speaking versus

Russian-speaking) in Israel. Given that the French-speaking immigrants were faced with a more ideological language policy in comparison to the Russian-speaking group, this resulted in an increase in their code-switching behaviour and thus a certain degree of attrition in their L1. The less strict ideologies and more pragmatic attitudes towards the Russian-speaking community, on the other hand, were reflected in their L1 retention patterns. In other words, this study was successful in capturing that immigrant groups with high EV tend to maintain their L1 even across generations, while the L1 of those with low EV levels is more vulnerable to erosion.

As a further remark closely relevant to the discussion on the relationship between attitudes, identity and attrition, Köpke (2007) identifies a strong link between attitudes and the reported difference in the degree of attrition observed between early and late bilinguals. As she explains, early and late bilinguals do not have the same kind of motivation towards integrating with the L2 culture and the language or share similar views on the relationship between L1 and identity. For adults, for example, losing their L1 might be strongly connected to losing their identity, while it would not mean anything to very young learners, and they would easily learn the new language at the expense of abandoning the L1. According to Köpke (2007), this motivational difference has a more explanatory power for the degree of attrition than that of maturational age effects (see Section 1.2.4.2). Available research to date, however, does not seem to support this claim as yet (see Schmid's study conducted with the Holocaust survivors with adolescent AaOs in Section 1.2.4.3 which showed no L1 erosion despite extreme cases of traumatic experiences and negative attitudes these speakers had towards their L1).

1.2.3.4 Length of residence

The length of residence (LOR) in the L2 setting is usually assumed to be one of the prerequisites of attrition. Not many studies, however, confirmed its precise effect for the amount of L1 attrition. Many researchers assume a minimum amount of length of residence (usually 8–10 years) for participants to make sure that the residence was long enough for attrition to set in (see Schmid, 2011). Previous studies that looked at the effect of LOR of more than ten years on L1 proficiency, however, usually do not report any effects (Bot & Clyne, 1994; Bylund, 2009a; Schmid, 2002) with a few exceptions (e.g. Hopp & Schmid, 2013). Hopp and Schmid (2013) found that the longer the long-term German attriters stayed in Canada, the less native-like they sounded.

Dussias (2004), on the other hand, showed in an eye-tracking experiment that L1 relative clause attachment preferences of Spanish-English bilinguals converged on English forms, even after a short period of time of residence in the L2 environment. Similarly, Chang (2012) demonstrated that phonological features of an L1 could be influenced by those of an L2, even after a very short-time of immersed L2 learning (around six weeks). Given that the L1 speakers in these latter groups of studies are at a very beginning stage of L2 learning, these LOR effects might not be due to attrition per se but because the learners “have to inhibit their more dominant L1 very strongly, leading to processing difficulties which will appear similar to attrition” (Köpke, 2007, p. 13). To what extent this holds true and how exactly LOR affects the attrition process seems to require a further investigation. It is also likely that LOR effect is subject to the typological similarity between the language pairs, the tasks used to collect data as well as the language domain under investigation.

1.2.3.5 Linguistic Aptitude

Linguistic aptitude, which typically indicates a linguistic advantage/ability to learn new languages, has been investigated (mostly in SLA research) to bring an explanation as to whether it would play a different role in the L2 attainment of early versus late bilinguals (e.g. Granena & Long, 2013). Linguistic aptitude has been suggested as one of the cognitive factors that might have a potential for L1 retention as well (Köpke, 2007), and this has received some attention in L1 attrition research only recently. Bylund et al. (2010) suggest that high levels of linguistic aptitude have the potential to compensate for the loss caused by maturational age effects and help learners achieve high levels of L1 proficiency or retain the previously acquired L1 knowledge. As for its role in late bilingualism, it seems that linguistic aptitude might have a different effect depending on the linguistic domain. While Hopp and Schmid (2013) reported its predictive role in the maintenance of L1 accent in German-English late bilinguals, Bylund and Ramírez-Galan (2014) confirmed its trivial role in the maintenance of L1 proficiency, measured by a grammaticality judgment task in Spanish-Swedish late bilinguals.

The inconsistency between the findings of these studies might have been caused by different approaches taken to measure the linguistic aptitude levels of the participants. Perhaps, this is something that requires further exploration in the future.

1.2.3.6 Education level

It is widely acknowledged that education enhances grammatical and vocabulary development and some certain structures can only be acquired at school (Rothman, 2009). This would especially be important for early learners and heritage speakers who did not have a chance to receive formal education in their L1 or had to immigrate before they were able to complete a certain education level in the L1 country (e.g. Pires & Rothman, 2009).

The role of background education level on the degree of L1 maintenance in late bilinguals seems to relate closely to task demands (Köpke, 2007) and does not appear to be attrition-specific. In tasks that require metalinguistic knowledge and integration of more cognitive abilities, such as a task that asks participants to construct sentences from scrambled words which include relative clauses, both the attriters and controls with a higher education level tended to do better (Yağmur, 1997). Sometimes, however, task demands yield different results in the same individual, independent of educational attainment. A study conducted by Major (1992 as cited in Köpke, 2007), for example, showed better L1 convergence in VOT measures obtained from a read-aloud task (a formal task) than the values obtained from free speech.

1.2.3.7 Literacy

Literacy has been suggested to play a cognitive role in attrition (Köpke, 2007). As underlined by Köpke, literacy can help maintain the L1 in different ways, such as in the form of keeping in contact with the L1, increasing motivations towards maintaining the L1 and so on. The most important of all, however, appears to be its contribution to the representation of language in the brain “as it adds orthographic representations and synaptic connections” (Köpke, 2007, p. 21).

In a recent study conducted with six adolescent Russian-English bilinguals with an AaO range of 4 to 6 years, Schmitt (2016) found that three participants, who were illiterate in their L1 Russian (but not in their L2 English), performed significantly worse than the literate ones in a variety of linguistic abilities, such as in the type/token ratio measure, word order and case marking in free speech. The effect of L1 illiteracy might have been this dramatic due to the fact that the Russian language uses letters from Cyrillic script. In cases where both the L1 and L2 use the same script, gaining literacy through schooling in the L2 might help L1 literacy development and prevent the reported detrimental effects of illiteracy on L1 proficiency (Polinsky, 2015).

1.2.4 Theoretical models

1.2.4.1 *Activation Threshold Hypothesis*

According to the Activation Threshold Hypothesis (ATH), retrieval of linguistic information from memory requires a certain level of activation (threshold) of neural impulses (M. Paradis, 2007). The threshold of the items that are used more frequently and recently decreases, which facilitates their retrieval next time. Given this, the role of L1 contact for L1 maintenance and how inhibition-activation works in this process are often discussed within the framework of the ATH (M. Paradis, 2007).

Its implication to an immigrant context centres around the idea that while the forms that are in competition between the L1 and L2 will be subject to attrition, the ones that do not have equivalent forms will be retained, even though they are not used frequently (Gürel, 2004, 2007). The L2 form (and its grammatical restrictions) with a lower activation threshold (due to frequent and recent use) will be preferred over the L1 form (Gürel, 2004, 2007). One such previous investigation was carried out on binding properties of three types of Turkish pronouns (with only one of them being in competition with the third person English pronoun in terms of their binding domains in embedded clauses) in the L1 of Turkish-English late bilinguals in Canada (Gürel, 2004, see also 2007 for L2 Turkish effects on L1 English binding domains). Gürel provided evidence that only the pronoun *o*, the binding domain of which is in competition with the English pronoun *he/she*, was affected. Participants preferred the English binding domain in Turkish embedded clauses due to the recent and frequent use of English, although this domain was not allowed in Turkish. As hypothesised at the beginning of Gürel's study, since the binding domains of the two other Turkish pronouns were not in competition with the English ones, the preferences for these were not affected in the attriter population.

Another very important implication of the model for L1 attrition is its prediction for the effect of inhibition. Activation of a particular item or items in the L2 due to recency and frequency will help enhance the inhibition of the competing L1 items. As a result, "the use of the L1 may be doubly impeded: by lack of activation of L1, on the one hand, and the need to strongly inhibit the highly active L2 on the other" (Köpke, 2007, p. 13). Given this, L1 items are at a disadvantage and thus subject to loss. Loss here, however, is considered as an access problem due to fluctuations in the activation-inhibition patterns of the languages in a bilingual mind. In that sense, the predictions of this model are in line with the contemporary

understanding of first language attrition research in that attrition remains as an access problem that does not affect the underlying language system, at least in the case of late bilingualism (Chamorro, Sorace, et al., 2016; Schmid, 2013).

The model makes further predictions for selectivity. Items stored in declarative memory, which is responsible for explicit learning, such as vocabulary, are predicted to be more vulnerable to attrition in comparison to the ones stored in procedural memory, responsible for implicit learning, e.g. syntax, phonology (M. Paradis, 2007). This is mainly because implicit learning is assumed to be unconscious and the access to this knowledge is automatic. This, in turn, makes this knowledge less susceptible to the competition and the fluctuations in the frequency of use.

Evidence for this claim is not warranted. A relatively recent lexical accessibility study carried out within this framework did not provide evidence for the ATH predictions. Yılmaz and Schmid (2012) collected data from long-term Turkish immigrants residing in the Netherlands via a picture naming task, and also measured lexical diversity as well as disfluency in data collected through a semi-structured interview (spoken data). They compared the performance of the attriters to that of monolinguals. While there was not any statistical difference in the speed and accuracy of attriters and controls in the picture naming task, they observed that attriters tended to use less diverse vocabulary and hesitated more in the free speech task. However, neither frequency of L1 contact nor attitudes towards L1/L2 explained the individual variability (the source of attrition). This did not allow them to attribute their findings to the predictions of the ATH. Instead, the authors attributed this to a failure in accessing information due to limited processing sources of bilinguals. The authors think that the ATH can still provide a valid explanation for the activation-inhibition phenomenon, which is common to all bilinguals but does not do so for the effect of L1 frequency.

As discussed previously, L1 input quantification methods are much more improved today. They do not only take into consideration the mode of language use (monolingual mode, bilingual mode, intermediate mode), but also the domain (using it with pets, in dreams and so on) and type of L1 use (interactive, passive) (Schmid, 2007; Schmid & Dusseldorp, 2010). That notwithstanding, findings coming from investigations that rely on such self-report data are still inconclusive. As discussed by Schmid (2011), perhaps the answer lies in a close investigation of social networks of immigrants which might provide more solid information about more than just the quantity of the L1 contact. This would allow the researcher to

consider factors that might affect the use of L1 in a particular speech community, such as attitudes towards L1 use, the number of people it is used with, the context it is used in with different people, the emotional relationship of the individual to those people and so on. It is also likely that the daily communication would involve conversing with other attriters or speakers from the consequent generations who might be speaking a different variety (Köpke, 2007). In other words, the quality of the contact might play a bigger role for attrition rather than its quantity and the questionnaires might be failing to capture this effect (Schmid, 2007).

1.2.4.2 The Critical Period Hypothesis

The Critical Period Hypothesis is based on the notion that the brain loses its plasticity during a certain period owing to maturation in the neural connections responsible for language learning. The traditional view of the CPH in SLA research thus predicts loss of capacity for implicit language acquisition past this critical period, usually around age 12 (Pallier, 2007). Given this, the chances of becoming native-like in a second language past this period become reduced (Abrahamsson & Hyltenstam, 2009).

Plasticity indicates that “synaptic connections are not fully mature in the first years of life, facilitating quick adaptations to new situations” (Köpke, 2007, p. 10). As hypothesised by Köpke (2007), greater plasticity in young immigrants would enhance their adaptation to the L2 environment and L2 learning, which in turn would have consequences for their L1 maintenance. In late bilinguals (with AaO>12), on the other hand, the role played by plasticity is expected to be reversed, i.e. loss of plasticity in the brain helps maintain the L1 to a greater degree, while this also implies difficulties in adapting to the L2 environment and the language. Evidence providing support for these predictions about the role of brain plasticity and age of bilingualism effects in L1 attrition comes from a series of studies conducted with early versus late bilinguals, as well as from extreme cases of attrition as experienced by international adoptees whose L1 exposure ceases completely upon adoption.

Similarities in the performance of early bilinguals of Spanish with AaO up to 10 and late American L2 learners of Spanish with AaO>11 led Montrul (2008) to question whether both L2 acquisition and L1 attrition might be constrained by a similar mechanism, i.e. one that predicts irreversible qualitative changes in the language learning capacity due to loss of brain plasticity. In light of these findings, Montrul (2008) argues for a critical period with an offset between the ages of 8 and 10 for L1 attrition. This indicates that while the chances of

becoming native-like in the L2 before this period are increased, this at the same time suggests adverse effects on the degree of L1 attrition, echoing the point raised by Köpke (2007) above. In a similar fashion, Bylund (2009b) talks about irreversible maturational effects for L1 attrition and maintenance. He provides evidence from advances in SLA research and an adoptee study reported by Hyltenstam et al. (2009). This adoptee study was conducted with 21 adult Korean adoptees in Sweden with AaO range 1–10, whose L1 input ceased completely upon adoption (for an average of 22 years). The main aim was to trace whether some of the L1 remnants could be recovered by a relearning methodology in the adoptee participants. The linguistic performance of the adoptees was compared to that of advanced Swedish learners of Korean. Both groups of participants were enrolled in a foreign language classroom at a university, learning Korean for an average of three years with an advantage in favour of the second language learner group (L1 Swedish speakers). The second language learners were at an advantage in terms of many other things as well, such as regular daily use of Korean in comparison to the adoptees. As the analyses showed, while the adoptees were outperformed by the second language learners in a grammaticality judgment task in Korean, there was no statistical significance between the two groups in the VOT perception test. The individual analysis, however, showed that the performance of some of the adoptees was better than the best-performing second language learners. Additionally, the best regaining performance belonged to the adoptees with the oldest AaOs, i.e. the amount of regaining was a function of an increasing AaO.

In light of this evidence, Bylund (2009b, p. 706) proposes “a small gradual decline in attrition susceptibility during the maturation period followed by a major decline at its end (posited at around age 12)”. This has found further support in another study conducted with Chinese adoptees in Canada on the perception of L1 lexical tonal contrasts (Pierce, Klein, Chen, Delcenserie, & Genesee, 2014). This study revealed the paramount role of AaO as early as 12.8 months of age on the maintenance of the perception of Chinese lexical tone contrasts among Chinese adoptees, despite being deprived of continuous L1 input upon adoption for an average of 12.6 years. As the functional magnetic resonance imaging (fMRI) results showed, when the participants were asked to differentiate lexical pair tonal contrasts in nonword syllables in Chinese, the size of the activated brain regions was bigger as a function of an increasing AaO. In other words, early exposure to a language has long-lasting irreversible traces even if the language was not available for more than a decade.

Based on this view, L1 proficiency of late bilinguals is expected to be relatively intact due to the post-puberty age of bilingualism and thus more resistant to the effects of external factors such as L1 contact, and motivations, while the L1 proficiency of early bilinguals would be expected to be more vulnerable to erosion within the critical period (Bylund, 2009b; Montrul, 2008).

Given, however, that early separation from the L1 environment and reductions in the amount of continuous L1 input might also result in low degrees of L1 attainment (incomplete acquisition of some of the properties), both Bylund (2009b) and Montrul (2008) acknowledge that the level of loss in early bilinguals would not depend only on age of bilingualism. Both authors consider AaO as the strongest predictor of the degree of bilingualism, while they consider other factors, such as amount of L1 contact, level of linguistic aptitude, motivations towards L1/L2 etc., as complementary or compensatory to the effects of irreversible maturational constraints. Bylund (2009b) underlines that since the susceptibility to attrition would alter gradually as a function of age, this would mean that the explanatory power of the non-maturational factors would also change accordingly. In other words, while the amount of L1 contact would be more beneficial for the development of L1 in a four-year-old, a ten-year-old would not depend on it that much due to reduced susceptibility to attrition at that age.

1.2.4.3 The Interference Hypothesis (IH)

In this view, increases in L1 proficiency results in the entrenchment of the L1 which causes interference and provides a filter for L2 learning, which appears as age effects in the ultimate L2 attainment (Herschensohn, 2009). The proponents of this approach claim that the changes in language learning capacity are reversible as the brain is still plastic, at least during the first ten years (Pallier, 2007). Evidence for this claim comes from studies that examine extreme cases of attrition (adoptee studies), as discussed below.

In a series of language identification and word recognition behavioural experiments, Pallier et al. (2003) showed that an early AaO did not provide adult Korean adoptees (n=8) — who were adopted between 3 and 8 years of age by French families— with any advantage in recognising Korean words/sentences in comparison to monolingual French participants who did not have any knowledge of Korean. Similarly, the fMRI investigation did not further show any differences in the brain activity of the adoptees when they were exposed to Korean and two other languages (Japanese and Polish) that they did not have any knowledge of. The

brain areas that were activated when the participants were exposed to French, on the other hand, were the same in both groups.

In a follow-up study conducted with 18 adult Korean adoptees with AaO range of 3–9, Ventureyra et al. (2004) investigated whether some remnants of the L1 could be reactivated through re-exposure. The main aim was to assess whether Korean adoptees would be able to discriminate between voiceless consonants better than native controls of French speakers who had never been exposed to Korean before. The adoptees formed two groups: a group with re-exposure to language through visits to Korea, and another one without re-exposure. As the findings showed, the adoptees' perception of Korean phoneme differences was not better than that of French monolinguals with no previous knowledge of Korean, and being re-exposed to the L1 did not make a difference either.

Taken together, the conclusion derived from these studies is that early exposure to a language (even up until the age of 10) is not necessarily advantageous in adulthood if the exposure to it stops completely as this allows another language to replace the first one (Pallier et al., 2003; Ventureyra et al., 2004). It seems that in a way, native-like attainment in an L2 depends on losing the first language completely. The authors claim that this explains findings of previous SLA research, where L2 learners even with AaO as young as 6 years were found to fail to attain native-like performance. This is because their L1 constrained their L2 learning, indicating an inverse relationship between L1 and L2 proficiency.

Substantial counter-evidence to the IH account has been provided by a series of other studies conducted with adoptees (Bylund, Abrahamsson, & Hyltenstam, 2012; Hyltenstam et al., 2009; Schmid, 2012). Hyltenstam et al. (2009) report on two of their studies for ultimate L1 and L2 attainment respectively, the first one conducted with adult Korean adoptees in Sweden and the second carried out with adult Latin American adoptees in Sweden. These studies, as reported by the authors (Hyltenstam et al., 2009, p. 125), evidenced that (1) even in extreme cases of attrition, adoptees exhibit phonetic advantages in relearning their language in comparison to advanced second language learners of that language and higher degree of L1 regaining has been achieved by the participants with the oldest AaOs, 2) complete replacement of the L1 is unlikely as L2 ultimate attainment of the adoptees is subject to maturational age effects as well, and 3) native-like attainment in one of the languages does not require the loss of the other.

Similarly, with an aim to directly test whether L1 proficiency constraints L2 attainment, Bylund et al. (2012) investigated L1 and L2 performance of 30 early Spanish-Swedish bilinguals. The data were collected through a grammaticality judgment task as well as a C-Test (see Chapter 2 for the description of C-Test). As the results revealed, participants who were able to attain native-like L2 proficiency were also the ones whose performance was within the monolingual range in the L1. Unlike what an IH account predicts, the relationship between the L1 and L2 proficiency was a positive one. In other words, this research demonstrated that low L1 proficiency is neither a prerequisite for L2 native-like attainment, nor does it provide a filter for L2 learning.

Finally, Schmid (2012) provided evidence for long-term advantages of early exposure in L1 maintenance and L2 development in German Holocaust Survivors. She investigated L1 German and L2 English proficiency of two groups of child/adolescent immigrants who escaped from the Nazi Germany between the ages of 11 and 15 (1) without their parents, who were adopted by English-speaking families (Kinder transport migrants), and (2) with their parents, who continued using their L1 (family migrants). The linguistic background profile of the former group was claimed to resemble that of the adoptees, as their L1 exposure/use became severely reduced due to two traumatic experiences they had been through (escaping from persecution without their families and the start of the war between their country of origin and the host country soon after adoption), which might have shaped their attitudes and views towards their L1 (Schmid, 2012).

The analyses were carried out on a wide range of morphosyntactic and syntactic properties in the previously-conducted historical interviews of the Holocaust survivors, both in German (L1) and English (L2). As the findings revealed, the only category that groups differed significantly in was accuracy in nominal inflections in L1 German. There were not any significant differences between groups in any of the measures in L2 English performance and AaO did not correlate with any of the measures neither in the L1 nor the L2. Schmid ascribed the fact that Kinder transport immigrants were less accurate in nominal morphology than the family migrants to the existence of a highly active L2 that was in competition with a highly inhibited L1. The fact that the L1 was otherwise intact seems to be an indication that even severe cases of attrition (due to severe inhibition of L1 input for around 50 years) would not provide any advantage for L2 proficiency or any disadvantage (except one particular error type) for L1 proficiency in the case of 'post-puberty' adoption (Schmid,

2012). This finding allows her to conclude that "native language proficiency does stabilize around puberty" and that "[t]his process appears to be irreversible" (Schmid, 2012, p. 302).

Taken together, the evidence provided in these studies is more compatible with irreversibility in the neural changes rather than with the entrenchment of the L1 view. That notwithstanding, as pointed out by Schmid (2012), the IH account can only be refuted if the L1 and L2 proficiency of a similar profile of participants with pre-puberty ages of adoption was compared to that of post-puberty adoptees to see whether there is a discontinuity or linearity in the AaO-L1 proficiency function.

Until then, the implication of the IH to less severe attrition contexts where L1 continues to be used to some degree is that the brain does not lose its plasticity during the first 10 years of life. The degree of attrition, therefore, depends on the availability of the L1 upon immigration which would prevent L1 from severe attrition (Pallier, 2007).

1.3 Heritage language bilingualism

Various definitions of the terms heritage language (HL) and heritage language speaker (HS) are available in the previous literature. Some of these definitions are very broad and consider speakers who do not have any knowledge of the HL as heritage speakers only because they are connected to the language culturally (see Montrul, 2016c for detailed information). In the current research, I am interested in the linguistic knowledge/performance of "bilingual" HSs who are able to communicate in the HL but who might have different levels of HL proficiency. The starting point is Rothman's definition as it describes the background of the participants in the current study regarding acquisition conditions the best. According to Rothman (2009, p. 156):

"[a] language qualifies as a heritage language if it is a language spoken at home or otherwise readily available to young children, and crucially this language is not a dominant language of the larger (national) society. Like the acquisition of a primary language in monolingual situations and acquisition of two or more languages in situations of societal bilingualism/multilingualism, the heritage language is acquired on the basis of an interaction with naturalistic input and whatever in-born mechanisms are at play in any instance of child language acquisition."

Rothman's definition lays out the acquisition conditions of a heritage language where there is a clear reference to naturalistic input at home. As it is clear from this definition, there might be different contexts where the language spoken can be considered a heritage

language. In addition to immigrant children growing up in an L2 country, Rothman's definition additionally allows young children who are exposed to naturalistic input in a language outside the home to which they do not have any cultural connection to be considered heritage speakers as well. Similarly, national minority languages (e.g. Welsh in the UK), as well as indigenous and aboriginal languages (e.g. Dyirbal in Australia) are also considered heritage languages and the speakers who speak these languages are considered heritage speakers (Montrul, 2016c).

The current study is carried out in an immigration context in Europe — which is the most widely studied context in heritage language acquisition investigations — where speakers share a cultural bond with the heritage language and usually have a larger community to rely on in addition to their family. In this context, heritage speakers are usually the children of the first generation of immigrants who either arrived in the L2 country during early childhood or were born in the L2 setting.

1.3.1 Heritage language development and ultimate attainment in adulthood

Depending on the timing of the L2 introduction, HSs can be either simultaneous or sequential bilinguals. For sequential bilinguals, the L2 introduction usually starts between the ages of 3 and 6 depending on the educational policy of the majority country, i.e. the age when the nursery and/or primary school education starts. Strikingly, however, also pointed out by Montrul (2016a), in the literature of bilingual first language acquisition, simultaneous bilingual children (also known as 2L1 children because they acquire two languages from birth as their first language) are not referred to as heritage speakers. In fact, speaking a home language that is not the same as the language spoken in the mainstream society qualifies these speakers as heritage speakers too (Kupisch & Rothman, 2016; Montrul, 2016a). As underlined by Montrul (2016a), the consistent finding in the literature that 2L1 children mostly develop age-appropriately in both of their languages until around the ages of 3–4 might lead to a misleading assumption that these speakers end up as balanced bilinguals in adulthood. Although this might well be the outcome (e.g. Kupisch, Lein, et al., 2014), it is indeed not unusual to find studies conducted with 2L1 heritage language speakers reporting less target-like grammatical behaviour (simplified or divergent) or delayed acquisition in the L1 during childhood or adulthood, as opposed to monolingual acquisition behaviour in some properties (Antonova Ünlü & Wei, 2016; Hoff et al., 2012; La Morgia, 2011; Montrul, 2002, 2004, 2008, 2016c; Silva-Corvalán, 2016). Antonova Ünlü and Wei (2016), for example, report on the L1 development of a Turkish-Russian simultaneous bilingual child in a

longitudinal study covering between the ages of 2;11 and 4;0. The main aim of the study was to investigate whether a bilingual child would converge fully on the gender morphology in the weaker language (Russian) in a Turkish environment. The analyses showed that at the age of 4;0 while form-related genders were acquired age-appropriately and were intact, the child has been reported to lag behind in comparison to his monolingual Russian pairs in semantic-related genders used in second person contexts. The authors speculated that this might be due to the fact that the frequency of the structure in the input the child hears (from a limited number of speakers) was quite limited, and presumably not enough for full convergence.

Without much doubt, exposure to L1 becomes even more reduced in the following years especially with the start of mainstream schooling. The heritage language may thus continue to show delayed development during the school years (Montrul, 2016a). Depending on a number of various factors (which will be reviewed in Section 1.3.4), ultimately some HSs obtain native-like or near-native L1 proficiency, while the proficiency of some others remains at receptive level (Montrul, 2008, 2016c). Many studies report selective divergent L1 grammar in the HL by adulthood (see Section 1.3.5).

One of the aims of the HL research has thus been to account for the non-convergent ultimate L1 behaviour and investigate the possible predictors of this significant variability in the ultimate L1 proficiency that HSs retain (Benmamoun, Montrul, & Polinsky, 2013). This has been the topic of a vast amount of literature. This is something the current study hopes to contribute to, but it is not the only question that the HL bilingualism research is concerned with.

1.3.2 The scope of heritage language bilingualism research

Polinsky (2015) groups goals of the research in this field under four categories, as discussed below. In addition to a body of research that seeks to reveal the sources of non-convergent behaviour, another aim of the investigations in this field concerns the description of heritage speakers and heritage languages by making comparisons between different HLs and speakers of these languages. Still another aim involves investigating what HL structures tell us about the human language capacity and how this can inform the linguistic theory. Finally, as noted by Polinsky (2015), there is a body of research that aims to inform pedagogical understanding of the needs of these speakers in a HL classroom.

To sum up, heritage language bilingualism research explores similarities and differences between heritage language speakers, second language learners and native language speakers, and the outcomes of the investigation in this field have implications mostly for the linguistic theory and educational policies, but also for psycholinguistics, neurolinguistics, sociolinguistics, and contact linguistics (Benmamoun et al., 2013). The role of heritage speakers in diachronic change and appearance of new varieties has gained momentum recently in contact linguistics as they seem to lead the change (Doğruöz & Backus, 2009; Onar Valk & Backus, 2013).

As stated before, the current study intends to bring together the research carried out in the first language attrition and heritage language bilingualism fields by addressing the role of intergenerational attrition in transmission of the heritage language to next generations; and how this development in its ultimate state is shaped by quantity and quality of input. We will, therefore, approach heritage language acquisition here from the point of view of usage-based approaches which give a prominent role to input in acquisition. Usage-based approaches are also compatible with language change and provide firm explanations to the vulnerability of certain structures, i.e., selectivity in heritage language ultimate attainment (see Montrul, 2016c for other theoretical approaches).

In the rest of this section, we will first review usage-based approaches which provide the conceptual framework to the current study. This section will be followed by factors that contribute to the development of the heritage language and individual variation in ultimate attainment. We will then proceed to recent findings in the field to see which linguistic abilities show L1-divergent development in adulthood. Finally, we will review the available literature for explanations of heritage speaker behaviour.

1.3.3 Usage-based approaches and their implications for heritage/bilingual language acquisition and maintenance

As put forward by O’Grady, Lee and Lee (2011, p. 23) “[a] promising source of insights into heritage language learning comes from the broader study of the role of input in language acquisition”. Although input is the key element for language acquisition from any theoretical perspective, the usage-based theory (UB) simply considers input and its properties as the main components leading to acquisition. The main emphasis is on input, pragmatic/semantic cues, general cognitive learning mechanisms, working memory and so on, as well as on the interactions between them, rather than any innate language learning mechanism (Behrens,

2009; O'Grady, 2008). In other words, the usage-based approach mainly aims to explain how a complex human language system emerges from the interactions of different cognitive mechanisms with linguistic input (see Behrens, 2009; O'Grady, 2008 for comprehensive summaries).

Giving prominence to the role of experience, token and type frequencies are suggested to play important roles regarding this emerging language system. According to Tomasello (2003), while token frequency (how many times the form/expression occurs) helps in that the expressions attested in the input become entrenched and formulaic, type frequency (how many times the form/expression occurs in different contexts) enhances the schema formation and categorisations from these entrenched expressions through abstraction and analogical reasoning. Abstract rules are then gradually drawn out through generalisation strategies that young children possess. As a result, new linguistic structures emerge (Tomasello, 2003). Relying on cognitive linguistic perspectives, usage-based proponents consider linguistic expressions of any length to consist of form-function mappings (Behrens, 2009).

In line with a usage-based perspective, O'Grady et al. (2011) proposed the Input Strength Hypothesis, which has predictions for HL acquisition as well. According to this hypothesis, for successful acquisition to occur, what is prominent is the frequency of unambivalent form-function mappings called successful mappings. The authors provide an example of the definite article *the* in English, which does not always exhibit one-to-one form-function mappings regarding both specificity and definiteness at the same time. Underscoring that this is usually the case, i.e. monolingual children are provided with such confounding form-function mappings more than they are given successful mappings (even though this is a frequently occurring form), they suggest that in order to understand the role of input in language acquisition, the effect of input frequency should be calculated by taking into consideration the frequency of successful mappings.

O'Grady et al. (2011) further argue that the incomplete attainment observed in HSs can be explained from this point of view, as in the case of these speakers, the chances of hearing successful form-function mappings as frequently as their monolingual peers seem to be even more reduced, especially during the school period. Evidence supporting this claim comes from the re-evaluation of the findings of an earlier study conducted with child Korean HSs by Song, O'Grady, Cho and Lee (1997 as cited in O'Grady et al., 2011), where problems were detected in the interpretation of Object-Subject-Verb (OSV) sentences. Given that Korean allows free word order, the role of case marking is reported to be important regarding

the interpretation of thematic roles, especially in a sentence with OSV order. It seems to be the case, however, that Korean input exhibits a complex situation where form-function mappings of case markers subsume inanimacy, direct object and/or definiteness, i.e. it is opaque. Monolingual children hear a combination of these optimal or non-optimal form-function mappings. Given this, the authors emphasise the necessity of repeated exposure to these forms in order for a monolingual child to construct generalisations for the direct object, for instance. They claim that HSs might be at a disadvantage in this regard due to the interrupted and reduced amount of L1 input conditions. This is claimed to be one of the reasons for the divergent HL behaviour (incomplete) observed in the reported study, i.e. the acquisition of the form remained partial due to insufficient exposure (O’Grady et al., 2011).

In line with these evaluations, Gathercole (2007) proposes a classification of difficulty for morphosyntactic structures based on the transparency/opacity of their form-function mappings. She predicts that structures with more than one form-function mapping (opaque form-function mappings) would be more difficult in general, appear quite late and require more input to be acquired in comparison to transparent mappings, which are predicted to appear earlier, be easier and would not require that much input to be acquired in monolingual acquisition. Providing data from Spanish-English and Welsh-English bilingual children, Gathercole (2007) also claims that more opaque structures would be more difficult to acquire for bilingual children and would appear later, i.e. lag behind the monolingual acquisition. This is claimed to be due to the fact that bilingual children (or HSs) are exposed to a lesser amount of input in both of their languages. In some cases it is even likely that the required amount of input is “insufficient for obtaining the critical mass for abstracting out the relevant rules”, and thus some of the difficult opaque structures might develop incompletely (Gathercole, 2007, pp. 241–242).

The significant role that input plays in the acquisition and development of a heritage language has been emphasised to be equally important to keep the unambivalent mappings active and prevent attrition in adulthood in ultimate HL attainment (O’Grady et al., 2011).

1.3.4 Predictors of individual variation in HL development

Although heritage language development is considered to be mainly driven by input conditions as we saw above, there are indeed a number of other factors that contribute to this development and variability in HL proficiency. As noted by Montrul (2010, p. 19) “heritage language acquisition is a complex process with a host of linguistic, affective, political,

educational, social and cultural variables affecting its outcome". We will try to have a quick look at some of these variables relevant to the current research below.

1.3.4.1 Input quantity

Although we already discussed the role of input quantity above and how insufficient amount of input might result in an attainment which clearly diverges from that of monolingual development, here we will focus on conditions that determine the amount of input a heritage language speaker can get in a dual language context. The amount of input received in one language mostly depends on the conditions, such as how often the family members speak to the child in the target language and how often the child uses this language to respond to them, as well as on the availability of further opportunities to use the language in other domains with different speakers (Unsworth et al., 2014). Additionally, the number of the siblings and the generation descent of the parents have also been suggested and shown to affect the amount of input a child can receive (Flores, Santos, Jesus, & Marques, 2017). The amount of exposure to the HL within the family is also dependent on the attitudes of the family members towards maintaining and transmitting it to next generations (Pérez Leroux, Cuza, & Thomas, 2011). Furthermore, the proficiency in the HL might have been shaped by the parents' language transmission strategies (Aalberse & Muysken, 2013; Montrul, 2008).

Some of the adult HSs included in the current study, for example, reported that whenever they intended to respond to a question that a parent asked in Turkish in English, they were warned to try harder to respond in Turkish. Two participants even reported that their parents forbade speaking English at home when they were growing up. It is, however, not a given that this strategy leads to positive attitudes in these HSs towards transmitting Turkish to their children. One of these participants reported above claimed that she did find it very difficult to learn English at school since there was a demand at home to speak only Turkish. For this reason, she did not adopt the same language transmission strategy or attitude towards promoting Turkish to her children. In fact, she indicated that she deliberately chose not to speak Turkish to the last-born child (who was 5 years old at the time of testing) and she was very happy with the results regarding her L2 development. The other participant, on the other hand, appreciated that her father promoted Turkish as the home language, as otherwise her Turkish would not have reached this level. She tried to employ a similar strategy towards transmitting Turkish to her child.

Perhaps the discrepancy between the attitudes of these two HSs towards the HL and transmitting it to next generations lies in the type of strategy employed by their parents. While explicit strategies, e.g. forbidding speaking the L2 at home, might affect the attitudes negatively, implicit strategies, such as replying in Turkish to the child even though the question was asked in English or pretending the question (asked in English) was not understood, might promote positive attitudes towards using and transmitting the HL (Montrul, 2008).

1.3.4.2 Input quality

Input quality relates to the richness and diversity of the input in terms of the linguistic structures and vocabulary (R. Jia & Paradis, 2014). Input's being provided by native/non-native speakers and the proficiency of the input provider(s) in the target language are two other factors that have been assumed to play predictive roles in the quality of the structures provided to bilingual children (Gutierrez-Clellen & Kreiter, 2003; R. Jia & Paradis, 2014; Unsworth, 2016). For example, as we will see in Section 1.3.6.3, given that HSs' parents happen to be immigrants themselves, it is likely that the input they provide to their children is attrited and exhibits qualitatively different structures (Rothman, 2007), which is likely to be a reason for lower HL proficiency in adulthood.

Previous research also suggests that the larger the number of input providers, the more diverse the input will be (Gollan, Starr, & Ferreira, 2014; for a review see Hoff & Core, 2013). This, in turn, will affect both the quality and quantity of the input. Apart from these, what further relates to the quality of input is whether there is a larger language community to rely on outside the home contexts and to what extent the target language (the HL in this case) is used in different domains, such as exposure to the HL through the media, computer games, extracurricular activities, book reading, and the church/mosque (Aalberse & Muysken, 2013; R. Jia & Paradis, 2014).

1.3.4.3 Age at onset of bilingualism

As discussed in the section on first language attrition, AaO has been revealed to play an important determining role in the ultimate L1 proficiency with simultaneous bilinguals performing less native-like in comparison to sequential bilinguals (Bylund, 2009b; Montrul, 2002, 2008). As underlined by Montrul (2002), however, AaO is not the only variable accounting for the performance differences between simultaneous and sequential bilinguals, as many of the sequential bilinguals have also the advantage of being schooled in the HL

prior to emigration (late childhood bilinguals) and also being exposed to uninterrupted monolingual input for a longer amount of time (see also Flores, Rinke, & Rato, 2017). She thus considers AaO as a macro variable, which incorporates many other variables such as age at testing, amount of L1/L2 contact, and maturational state that is predictive of bilingual linguistic knowledge.

1.3.4.4 Literacy and formal schooling

As mentioned previously, literacy is a strong cognitive predictor of language development and stabilisation (Köpke, 2007). It is not very common among heritage speakers to be schooled in the HL. As a result, many of them are mostly exposed to the spoken variety only and do not acquire literacy in the HL. This results in their most developed skill in the HL being comprehension/listening, followed by production/speaking, while their reading and writing abilities remain rather weak (Benmamoun et al., 2013; Polinsky, 2015).

Lack of literacy and schooling or instruction in the HL in this group has been suggested and found to play a predictive role in the non-convergent behaviour reported (Bayram et al., 2017; Bylund & Díaz, 2012; Kupisch & Rothman, 2016). According to Kupisch and Rothman (2016), schooling is beneficial if a property is known to be enhanced through literacy, such as inflected infinitives in Portuguese or genitive case in German. They further claim that even for other properties that are not necessarily acquired through schooling, being taught in the HL at school is still highly beneficial as it exposes children to the standard variety and increases the chances of seeing the same grammatical structures in different contexts.

1.3.4.5 Attitudes and motivation

Attitudes, as we have discussed in the L1 Attrition section, might affect the development of the HL similarly. Feeling ashamed of speaking the HL, especially if the attitudes towards the minority language are negative in the mainstream society or when the minority language has a low prestige, and how teachers and school peers approach multilingual students/friends in the classroom can be considered as important predictors of maintaining HL proficiency (Aalberse & Hulk, 2016; Aalberse & Muysken, 2013; Polinsky, 2015). Above, we also discussed the case of two participants from the data of the current study whose attitudes towards transmitting the HL to their children were affected differently. This, in turn, will affect the proficiency of their children. Although attitudes have been proposed to predict HL

proficiency, the difficulties of collecting data on attitudes and their quantification might have resulted in this variable being studied relatively less.

1.3.5 Affected areas in the ultimate HL attainment

A vast amount of previously conducted studies investigating ultimate attainment in the heritage language point to a non-convergent L1 grammar in a number of linguistic domains at both production and comprehension levels.

Morphosyntax, in particular, inflectional morphology has been reported to be the most affected domain (Montrul, 2008, 2010). HL knowledge has been found to diverge from the monolingual norms in a variety of different languages such as Russian, Spanish, Arabic, and Turkish in nominal morphology (case, gender, and number) (e.g. Benmamoun, Albirini, Montrul, & Saadah, 2014; Benmamoun et al., 2014; Montrul, Bhatt, & Bhatia, 2012; Montrul, Davidson, Fuente, & Foote, 2014; Polinsky, 2008) and verbal morphology (agreement, tense, aspect, mood, non-finite subordination) (e.g. Arslan, Bastiaanse, & Felser, 2015; Arslan, De Kok, et al., 2015; Montrul, 2009; Montrul et al., 2012; Rothman, 2007; Silva-Corvalán, 1994; Treffers-Daller et al., 2007; van Osch & Sleeman, 2016). What these studies reveal is that HSs do have a tendency to simplify complex systems by relying on default forms, and/or omitting some required forms in obligatory contexts.

Both judgments and the oral performance of Hindi HSs, for example, have been found to be eroded regarding the case system in Hindi in comparison to the oral performance and judgments of late bilinguals (native Hindi speakers) in the US included as a control group (Montrul et al., 2012). As the authors indicate, in ergative-absolutive languages, the subject of a transitive verb needs to be marked with the ergative case and the subject and object of an intransitive verb with the absolutive case. In nominative-accusative languages such as German, English, and Spanish, on the other hand, while the subjects are marked as nominative, the objects of intransitive verbs take the accusative case. Hindi, as reported by the authors, might behave like both depending on the context and thus yields a very complex situation regarding the interaction between case marking and verbal agreement. In perfective aspect, for example, the subject of a transitive verb is marked with the ergative case (*-ne*), whereas the subject can be nominative when the verb is in imperfective aspect (Montrul et al., 2012). Intransitive verbs, on the other hand, do not licence the ergative case. Analyses of the data collected via a production task and a grammaticality judgment task showed that the case marking was affected in general at both production and representational level in

certain contexts, but some of the case markers such as the ergative case were affected to a greater extent. This manifested itself in the form of omissions as well as over-generalizations of the markers to the contexts where they would not be required (as described above) or in the form of an inability to judge the ungrammaticality of the sentences as in 1.7, which include omission or overgeneralization of case markers. In 1.7, the verb is intransitive and therefore the subject *Sitaa* should not be marked with the ergative case (-*ne*).

1.7

**Sitaa-ne bahut-haNs-ii*.

Sita.MSG-ERG a lot laugh-PERF.FSG

“Sita laughed a lot.”

(Montrul et al., 2012, p. 148)

Regarding verbal morphology, on the other hand, as shown by studies conducted with adult Mexican/Spanish heritage speakers in the US/Netherlands, speakers retain the ability to distinguish between past, present and future tenses (Silva-Corvalán, 1994) but show substitutions, and omissions with aspectual and mood differences (Montrul, 2002, 2009; Silva-Corvalán, 1994; van Osch & Sleeman, 2016). Another verbal morphology category revealed to be affected in the performance of HSs is evidentiality, an indication of the source of knowledge in a proposition (Aikhenvald, 2004). In Turkish, it is encoded in the past tense system and is expressed through finite verb inflection. Depending on whether the speaker is a direct witness of the past event or not, he or she will be forced to choose between two different past tense markers: the direct experience marker *-DI* for witnessed events or the indirect experience marker *-mİş* for nonwitnessed events (Aksu-Koç, 2009). The choice of one particular marker over the other furthermore requires the control of pragmatic and semantic components differentiating between different sources of information (visual, inferential, reportative).

1.8

Minik	köpek	tüm	kurabiye	-ler	-i
small	dog	all	cookie	PL	ACC
			ye	-di.	
			eat	D.PAST	

“The little dog ate all of the cookies.”

In 1.8, for example, the choice for the direct experience marker *-DI* by the speaker is an indication that the past event was witnessed by the speaker and that s/he had direct visual access to the event.

1.9

Minik	köpek	tüm	kurabiye	-ler	-i
small	dog	all	cookie	PL	ACC
			ye	-miş.	
			eat	M.PAST	
				(reportative or	
				inferential)	

“(Apparently, reportedly), the little dog ate all of the cookies.”

Depending on the source of the information available to the speaker, the choice of the indirect experience marker *-miş* in 1.9 might either indicate that the speaker inferred (inferential) what happened from the resultative states of the event (an empty cookie jar) or was told (hearsay/reportative) what happened by a third party (Slobin & Aksu, 1982).

Studies conducted with adult Turkish HSs in Germany and the Netherlands showed that the evidentiality system as described above was simplified (Arslan, Bastiaanse et al., 2015; Arslan, De Kok et al., 2015). The findings of Arslan, De Kok et al. (2015) obtained through an online comprehension task, for example, demonstrated that bilinguals were less sensitive to violations in evidentials than to time reference violations echoing the selectivity observations mentioned above.

The main source of the morphosyntactic changes has usually been shown to be incomplete acquisition or attrition due to insufficient amounts of L1 contact either during childhood or later in adulthood. It seems to be also the case that some sort of cross-linguistic influence is responsible for some of the simplifications and omissions especially when the L2 that the L1 is in contact with does not include the property under investigation or when the property is not licensed in the L2 the same way it is licensed in the L1. This was, for instance, partly the case regarding the numbering system in Palestinian and Egyptian Arabic.

The numbering system in Arabic is reported to be quite complex and a late-acquired property. As reported by Albirini, Benmamoun, and Saadah (2011), it requires knowledge of the agreement rules between numbers and nouns, knowledge of the location of the numbers when used together with a noun, as well as the gender and number of the noun it precedes or follows. An investigation of the numerals in nominal agreement morphology in

the oral production of adult Palestinian and Egyptian HSs in the US reported an error rate of up to 25 % in HSs while the performance by both groups of monolinguals was at the ceiling. The authors concluded that as much as some of the errors are likely to be a result of incomplete acquisition/attrition presumably because the input was not enough to acquire some of the late-acquired distinctions, some others are likely to be a result of transfer from English (such as placing numbers before or after the noun). This is exemplified in 1.10 below where the heritage speaker places the number *waahid* (“one”) before the noun, a transfer effect from English, although it should have been placed after the noun.

1.10

*Elwalad xad waahid Difdaṣ Saḥiir

the boy took one frog small

“The boy took one small frog.”

(Albirini et al., 2011, p. 289)

Ultimate attainment of HSs in terms of complex syntactic phenomena, on the other hand, has been investigated in terms of production and comprehension of properties such as subordinate clauses (O’Grady, Lee, & Choo, 2001; Onar Valk & Backus, 2013; Polinsky, 2011; Treffers-Daller et al., 2007), word order (Hopp & Putnam, 2015), preposition stranding (Pascual y Cabo & Gómez Soler, 2015), passive constructions (Bayram et al., 2017) and the areas at an interface with syntax such as distribution of subject pronouns (Montrul, 2004; Silva-Corvalán, 2016). In contrast to the morphosyntactic properties above, here it seems that when L1 allows for optionality between two structures, the HL preferences change towards favouring the structure which is also allowed in the L2.

Turkish, for example, allows for both non-finite and finite subordination. Although the same meaning can be achieved by using either structure (see examples below), non-finite subordination is more common and is achieved through verbal morphology. It should be noted here that verbs that contain a nominalising (subordinating) suffix are called non-finite verbs, whereas verbs that are fully inflected for tense-aspect and person are called finite verbs. There are three types of non-finite verbs: verbal nouns (VN), participles (PART) and converbs (CV) forming non-finite noun, relative and adverbial clauses respectively (Göksel & Kerslake, 2005).

In 1.11, the verb of the non-finite noun clause, the verbal noun (VN), is marked with a nominalising suffix, *-DIK* (note that the subordinate clauses are given in brackets for ease

of reference). In many of the cases except for those where the verb is marked with *-mAK*, the subject of a non-finite noun clause can be attested from the possessive marker *-ı* on the VN as illustrated in bold characters below. If the subject of the non-finite noun clause is an overt subject and if the subject of the main clause and the subordinate clause are not the same, then the overt subject of the subordinate clause is marked by the genitive case. Similar agreement rules apply in the cases of the other non-finite clauses mentioned above, showing a morphologically complex situation regarding their formation (see Göksel & Kerslake, 2005). A finite subordinate clause, on the other hand, can either directly connect to the main clause or can be linked to it by using a subordinator such as *ki* (“that”) as shown in 1.12 (see Göksel & Kerslake, 2005 for details).

1.11

[Türkiye'	-ye	taşın	-dığ	-ı	-nı]
Turkey	DAT	move	VN	2SG.POSS	ACC
		duy	-du	-m	
		tell	D.PAST	1SG	

“I have heard that you moved to Turkey.”

1.12

Duy	-du	-m	ki	[Türkiye	-ye	taşın
hear	D.PAST	1SG	SUB	Turkey	DAT	move
					-miş	-sın]
					M.PAST	2SG

“I have heard that you moved to Turkey.”

Both Treffers-Daller et al. (2007) and Onar Valk and Backus (2013) confirmed that Turkish adult HSs avoided morphologically costly non-finite embedded clauses and relied on more analytical means such as giving the same meaning by using finite subordination as exemplified in 1.12, which also structurally resembles the subordination formation in the L2s tested (e.g. Dutch or German).

In Treffers-Daller et al. (2007), the avoidance strategy observed among heritage speakers has been considered as an indication of simplification of the HL grammar. They also

mentioned the possibility that these structures might have never been completely acquired as non-finite subordination is a relatively late acquired phenomenon. Given, however, that the returnee group (former HSs who returned to Turkey in adolescent ages) they included among their informants with LOR of 8 years converged fully on the monolingual performance, their findings seem to lend support to the idea (see the next section) that questions the correct use and meaning of the term “incomplete acquisition” (e.g. Pascual y Cabo & Rothman, 2012; Pires & Rothman, 2009). If we consider these findings from the perspective of usage-based approaches, it is likely that even if the critical mass was not reached when these speakers were in a bilingual context (in Germany), with improved input conditions upon return to the L1 country, it was possible to reach the necessary critical mass for a native-like development.

Similarly, some authors evaluate the erosion they found in terms of restructuring of the L1 system rather than attrition or incomplete acquisition. Hopp and Putnam (2015) report non-convergent word ordering in specific subordinate clause structures in German HSs speaking a moribund variety of German in the US. As different from English, which has a canonical Subject-Verb-Object (SVO) word order in both matrix and subordinate clauses, Moundridge Schweitzer German (MSG) displays an asymmetric word order across matrix and subordinate clauses and the word order in neither clausal structure is the same as in English. While the canonical position for the verb in MSG matrix clauses is the second position (V2), in certain subordinate clauses, the verb needs to be placed at the end of the subordinate clause (V-final). This is exemplified in 1.13. Note that the first sentence is the matrix clause and the clause following *dass* (“that”) is the subordinate clause.

1.13

Gestern hat Udo gesagt, dass Paul Bier getrunken hat.

yesterday has Udo said that Paul beer drunk has.

(Hopp & Putnam, 2015, p. 186)

1.14

.... dass da lieber Gott hat uns auch net alles genomm wie dat in Oklahoma

....that the dear God has us also not everything taken like there in Oklahoma

“that the dear God hasn’t taken everything away from us like in Oklahoma.”

(Hopp & Putnam, 2015, p. 195)

As the analyses of elicited spoken data and acceptability judgment task data showed, in *weil* (“because”) and *dass* (“that”) subordinate clauses, participants showed a high tendency to misplace the verb in the second position as in 1.14, where it should have been V-final. The judgment data also interestingly evidenced that the participants did not reject the V2-order or accept the V-final order in subordinate *dass* clauses. The authors evaluated this divergent behaviour in these special types of subordinate clauses from a feature re-assembly perspective, as discussed below in the following sections (Lardiere, 2008; see Putnam & Sánchez, 2013 for the application of feature re-assembly approach to HL contexts in Section 1.3.6.4. They reject this change to be an outcome of attrition or incomplete acquisition as in their view, this was not a sign of a reduced grammar and participants did not necessarily adopt the SVO word order structure of English. It was an extension of the matrix clause MSG word order into MSG subordinate clauses, i.e. systematic restructuring (internal modification) owing to reduced activation levels due to contact with English.

Studies investigating different heritage languages or birth languages of adoptees in terms of phonology, phonetics and/or pronunciation, on the other hand, point to two main observations. First, early exposure to a language is more advantageous in relearning it in adulthood in comparison to second language learners of that language. This has advantages regarding perception (Hyltenstam et al., 2009) and production, e.g. VOT and foreign accent ratings (Au, Knightly, Jun, & Oh, 2002; but see Ventureyra et al., 2004 for null results). Moreover, it also has long-lasting traces in the brain, even if the production ability was completely lost, as evidenced in the differentiation of tonal contrasts in Chinese in contact with French (Pierce et al., 2014 see the First Language Attrition Section for a summary). Second, despite the advantages over second language learners, heritage speakers are still perceived as sounding less native-like in comparison to monolinguals of that language (Flores & Rato, 2016; Kupisch, Lein, et al., 2014; Kupisch, Hailer, et al., 2014; Lein, Kupisch, & Weijer, 2015) and the VOT of certain consonants or vowels they produce might not be native-like (Hrycyna, Lapinskaya, Kochetov, & Nagy, 2011; Lein et al., 2015; but see Llama & López-Morelos, 2016 for native-like VOT by HSs of Spanish). The advantage of early exposure in phonetic contrast perceptions seems to depend on the degree of difficulty of the phonemic contrast between the L1 and the L2 (Ahn et al., 2017). As shown by this recent study investigating the role of AaO in a group of Korean-English HSs and post-puberty learners, HSs (with AaO up to age 12) failed to perceive L1-specific phonemic contrasts but did not have problems with the other contrasts that are more similar to the L2

sounds. It seems that even phonological competence might be subject to a selective process in the cases of early bilingualism.

Kupisch, Lein et al. (2014) studied French as an HL in a German context across different domains, including VOT and global foreign accent, as well as properties pertaining to morphosyntax, such as gender and prepositions. All of the participants were simultaneous French-German bilinguals, grew up with a one-parent-one-language method residing in Germany, but differed regarding the dominant language context they spent the most time in. Eleven participants were schooled in French in France for the first 19 years of their lives and then migrated to Germany, and ten others grew up in a German context throughout their lives. There were no differences between the groups in any of the morphosyntactic categories included. As the analyses for global foreign accent showed, however, participants who spoke French as their HL in Germany were perceived as sounding less native-like than the ones who grew up mainly in France. There were no differences between the two groups in VOT. The HSs in Germany, however, differed significantly from monolinguals in the VOT measure of /t/ and /k/. The authors discussed that the non-native attainment might be due to CLI and that some of the French sounds might have assimilated into German sounds (as predicted by Flege's Speech Learning Model, see Chapter 4), and that this might have created the non-native-like pronunciation perception in the native judges.

As shown by Flores and Rato (2016), HSs might retain this non-native-like pronunciation even after the return to their L1 country. They compared foreign accent ratings of Portuguese HSs in Germany with AaO range 0–6 to that of monolinguals and late L2 learners. The HS group additionally included a group of returnees who returned to Portugal between the ages of 11 and 29 and have been residing there for between six months and 14 years. As their findings showed, the HSs, in general, were perceived as sounding more native-like than the L2 learners, an indication of an advantage of early exposure, and a later AaO was also associated with a more native-like L1 accent. Yet, even those who have resided in the L1 environment for 14 years sounded less-native like than the controls and did not sound better than the HSs residing in the L2 country, Germany. As the authors evaluated, it seems that “acquired non-native traces may last in returnees' speech over a lifetime and may never be modified to reflect monolingual speech” (Flores & Rato, 2016, p. 179). This means that L1 accent might resist changes in the input environment unlike what has been reported above regarding the improvements in returnees' production of non-finite clauses (Treffers-Daller

et al., 2007). These findings thus seem to suggest a selective role played by biological age effects.

Finally, lexical proficiency investigations of HSs are under-researched (Montrul, 2010, 2016c). The available research to date investigating lexical abilities of heritage speakers is scarce but looked at the phenomenon from a wide perspective in different heritage languages. While in many of these studies, the baseline of comparison is usually monolinguals, it is possible to find studies that compare HS performance to that of additional groups, such as late L2 learners or returnees (e.g. Kim, 2013; Rakhilina, Vyrenkova, & Polinsky, 2016; Treffers-Daller, Daller, Furman, & Rothman, 2016). Revealing what HSs can or cannot do in comparison to L2 learners, monolinguals and returnees is not only beneficial in terms of revealing whether early exposure to a language provides any advantages regarding the speed of accessibility (Montrul & Foote, 2014), but also contributes to our understanding of the potential for the development of the heritage language beyond a certain level if the input environment becomes quantitatively and qualitatively more ideal, even in post-puberty ages (Treffers-Daller et al., 2016).

Montrul and Foote (2014), for example, investigated the lexical accessibility of a group of adult Mexican HSs and a group of adult late English learners of Spanish in the US. The main focus was on the effects of global AaO of Spanish and age of acquisition (AoA) of individual words (early- versus late-acquired words in Spanish as an L1 and/or L2) and their impact on the speed of lexical processing. The data was collected via a lexical decision task and a Spanish-English translation task. In the lexical decision task, participants were given an equal number of adjectives, verbs and nouns, which consisted of an equal number of words described based on their AoA, as follows: early L1-late L2, late L1-early L2 and early L1-early L2. The same classification was used based on AoA of Spanish words (not English words) in the lexical translation task.

As their findings showed, early exposure to L1 Spanish provided the HSs with only a non-significant slight advantage regarding the accuracy performance in early L1-late L2 words over the L2 learners. This was not the case regarding the speed of processing, however. Within the groups, on the other hand, word AoA played a determining role in speed and accuracy of access, with early-acquired words (either in the L1 or L2) being recognised faster and more accurately in comparison to late-acquired words. Given that an early AaO did not provide the heritage speakers with a speed advantage over the L2 speakers of the same language, the authors concluded that “[l]exical access rests almost exclusively on experience

rather than on predetermined linguistic knowledge” (Montrul & Foote, 2014, p. 291). Language experience here refers to acquisition conditions, frequency of occurrences of linguistic properties and amount of input/output factors (Montrul & Foote, 2014). The prominent role played by linguistic experience (especially when it involves a qualitative change), but not AaO, in HL lexical development can be further observed in the performance of returnees (Treffers-Daller et al., 2016 see Chapter 5 for details).

Although the source of retaining a smaller size of vocabulary and less sophisticated lexicon among HSs is also suggested to relate to domain-specific language exposure and use patterns (Hoff & Core, 2013; Montrul, 2016c), an examination of young Iranian simultaneous and sequential HSs’ lexical richness in New Zealand did not establish a relationship between input quantity, on the one hand, and lexical diversity and lexical sophistication measures on the other (Gharibi & Boers, 2017). The data was collected via a film retelling task from two groups of Iranian HSs with an age range of 6–18: simultaneous and sequential bilinguals. Information about parental attitudes as well as exposure patterns was collected via a sociolinguistic questionnaire.

While the findings clearly showed that HSs, in general, had a less diverse and sophisticated vocabulary at their disposal in comparison to monolingual controls, older HSs were more target-like in comparison to younger HSs. This main effect of age at testing was thus an indication that there was linguistic development in terms of lexical diversity and sophistication, even under reduced input conditions. There was also a clear difference between sequential and simultaneous bilinguals, where sequential bilinguals were found to have full convergence on monolingual performance. Given that vocabulary acquisition has been suggested to develop independently of a biological age component in the previous literature, the authors attributed this AaO finding rather to the differences between the amount of input received by these two groups of HSs. According to the researchers, the lack of a statistical relationship between input quantity and lexical richness measures, mentioned above, can be thus explained by the confounding AaO effects.

To conclude, it seems that any linguistic domain can be affected in HSs at both production and representational level as different from the findings of studies reviewed for first language attrition in late bilinguals. As we have discussed before, there are many factors contributing to the individual variability in this attainment, some of which might be more pronounced in specific domains (e.g. the effect of linguistic experience versus AaO on lexical attainment on the one hand, and on L1 accent on the other). As we have already seen in the brief

literature reviewed above, there have been different proposals to account for the observed outcome. In the next section, we will have a more detailed look at each proposal.

1.3.6 Explanations for the non-convergent behaviour in heritage grammars

1.3.6.1 Incomplete acquisition/ Acquisition without mastery

HL acquisition has generally been considered as resulting in incomplete acquisition or acquisition without mastery (Montrul, 2008, 2016c). In this view, the main sources of the outcome in heritage languages are reduced amount of input, which is interrupted due to early ages of bilingualism. In many of the previously reviewed research studies above which showed reductions and simplifications, many researchers evaluated their findings from an incomplete acquisition perspective. Complex properties governed by interfaces, properties that lack a counterpart in the L2, and late acquired properties seem to be especially vulnerable.

As suggested by Polinsky (2011) and Montrul (2008), however, an incomplete outcome can be seen most clearly in longitudinal designs and/or studies that compare the performance of HS/bilingual children to that of adult HSs. Such evidence comes from one recent longitudinal contribution conducted with two (Mexican) Spanish-English bilingual siblings and a group of (Mexican) Spanish-English adult immigrants (including HSs from second and third generations) in North America (Silva-Corvalán, 2016). The longitudinal data were obtained from the bilingual siblings until 6 years of age, and their performance was compared to that of adult HSs in order to trace the development of the HL.

The analyses were carried out in terms of grammatical properties of subjects, verbal clitics and tensed verbs. The longitudinal data evidenced that until around the age of 3, the bilingual siblings developed age-appropriately in L1 Spanish, but with the start of schooling around the age of 4, the L1 input became considerably reduced due to exposure to the L2, and the L1 began to show convergence on L2 English in the form of using more overt subjects. Overall, the children's performance around the ages of 5–6 patterned similarly with adult HSs, especially in terms of an increase in the number of overt subjects, but also in terms of their omission rates of clitics and absence of some tenses in the Tense-Aspect-Modality system. With this, Silva-Corvalán claims that some aspects of the L1 show incomplete development in childhood, as the amount of L1 input is insufficient to acquire these structures fully and ultimately remain persistent in adulthood.

Similarly, building on such research, and with an assumption that much of the L1 change happens during the schooling in the L2, Montrul (2016a) compared the production of school-aged HSs to that of adult HSs in null and overt subjects in L1 Spanish in order to understand the relationship between the beginning and end state of the HL development. She highlights the importance of the period of 5–17 years of age to pinpoint the consequences of extensive exposure to the L2 on the L1 (HL) development. In order to trace the L1 development, she included two groups of age-matched monolinguals (monolingual children and adults) as controls. A group of first generation immigrants of Mexican origin in the US served as another control group in order to trace qualitative changes, if any, in the input provided to the HSs.

The analyses of the narratives showed parallels in the use of redundant overt pronouns in both child and adult HS populations' production and that of child monolinguals in comparison to that of adult monolinguals. She attributed the fact that monolingual children did not reach the adult distribution to developmental patterns. It seems that a similar developmental pattern applies in the case of bilingual children. The fact that adult HSs patterned similarly with bilingual children echoes well with Silva-Corvalán's (2016) conclusion about the persistence of early non-convergent behaviour into adulthood. Given that the performance of adult immigrants diverged significantly from that of monolingual adults as well, Montrul (2016a) discussed that this non-native-like behaviour in adult HSs might have been further reinforced with qualitatively different input received as young adults as a result of daily interactions with attrited relatives.

1.3.6.2 Attrition

Previously in this chapter, we reviewed attrition studies conducted with mainly late bilinguals and discussed a number of factors that contribute to this outcome. Given that, the attrition phenomena will not be discussed here any further, but it should be noted that it is indeed not only limited to late bilingual populations. In heritage language development, as much as some of the properties might develop incompletely into adulthood as shown in the previous section, it is also highly likely that some of the HL properties that are mastered fully in childhood can be lost/attrited in the later stages (O'Grady et al., 2011; Polinsky, 2011). As claimed by Montrul (2010), however, even partially-acquired properties can be lost due to disuse, and/or both of these processes (incomplete acquisition and attrition) might be responsible for the non-native-like mastery of some properties in adulthood. In the absence of longitudinal data to disentangle attrition and/or incomplete acquisition in HSs, in

some studies, incomplete acquisition has rather been used as an umbrella term to refer to both (Montrul, 2009; Polinsky, 2006).

1.3.6.3 Qualitatively different input

As an alternative approach to attrition and incomplete acquisition, some researchers linked the non-native-like performance of HSs to the inherent properties of input they received from their parents (O'Grady et al., 2011; Rothman, 2007, 2009; Verhoeven, 2004). The input available to HSs through their parents (usually the first generation of immigrants) is likely to be both quantitatively and qualitatively different from the monolingual input for reasons such as reduced L1 contact that leads to attrition, diachronic change, CLI, or a shift in language choice patterns (Lohndal & Westergaard, 2016; Pires & Rothman, 2009; Rothman, 2007, 2009; Verhoeven, 2004). Chapter 3 provides more details about this phenomenon.

Although this claim can be best confirmed by carrying out a longitudinal study and investigating the child-directed speech to detect which structures in the input are actually modified (Montrul, 2016a), with the lack of such designs, Rothman (2009) and Pascual y Cabo and Rothman (2012) suggest including a group of first generation immigrants to represent the parental generation. They caution against evaluating all HL divergences from an incomplete acquisition or attrition perspective, before assessing the HL input conditions this way.

Available evidence to date suggests that any qualitative change in any property in the parental variety might affect HL grammars. Pascual y Cabo (2013), for instance, showed that one of the reasons why Cuban HSs in the US allow an ungrammatical optional use of agentive syntax with *gustar*-like verbs (class III psych-predicates) was because of the loss of another property (dative marking) in the L1 of the input providers. Similar conclusions were drawn by Montrul & Sánchez-Walker (2013) in the use of differential object marking (see Chapter 3 for a summary of this study) and by Montrul (2016a) (as cited in the section of Incomplete Acquisition above) where she observed a performance difference between adult immigrants and monolinguals in the use of redundant overt pronouns. She observed that adult and child HSs performed similarly which was also different from the monolingual adult attainment. In the end, Montrul (2016a) discussed that this non-native-like behaviour in adult HSs is mainly an outcome of partial acquisition at an earlier time that continued into adulthood, but that this might have been further reinforced with qualitatively different input received as young adults, but not as children, from the first generation of immigrants as a

result of daily interactions with attrited relatives. The reason why Montrul did not attribute the adult HS performance to qualitatively different input received during childhood is the fact that the group of parental generation participants included in the study might not be representative of parents of these speakers as children. In sum, these studies suggest that HSs are sensitive to the qualitative properties of the input spoken around them as both children and adults (Treffers-Daller et al., 2016).

1.3.6.4 The Putnam and Sánchez model

Another approach that considers HL development as different but not incomplete or interrupted has been offered by Putnam and Sánchez (2013). In this model, input and intake are considered as different. While they adopt a generative point of view for the role of input in language acquisition, they claim that intake refers to how the brain is involved in making sense of the structures in the raw input and in acquiring them.

According to this approach, the HL acquisition is not “interrupted” or “incomplete”, but a continuum involving exposure shifts to lexical items in the L1 and L2, which results in different levels of activation of functional features (FF) depending on language use (rather than exposure) patterns in both of the languages. As the authors express, lower activation levels for the production purposes (infrequent language use) would result in the features becoming less available to retrieve. According to them, these changes in the activation of formal features that are necessary for the morphosyntactic production of language might be responsible for some features being replaced by formal features that are more activated in the L2, leading to a feature reassembly (Lardiere, 2008). This leads to an outcome that is still complete but different from monolingual L1. In a way, this model explains different levels of HL proficiency based on activation levels of the languages of a bilingual over the lifespan.

In order to provide evidence, the authors re-evaluated findings of some previously conducted studies from the perspective of their model. One of these studies was carried out by Sánchez (2004). Sánchez (2004) originally examined syntactic convergence in tense, aspect and evidentiality in adolescent Quechua-Spanish HSs within the premises of the Functional Convergence Hypothesis (FCH). According to the FCH, if the languages in contact have a common functional feature category, which is [+past] in Sanchez's study, including interpretable features that are different from or similar to each other, activation of both languages (as a result of exposure and use) in terms of this formal category would give rise

to convergence in interpretable features of this category that differ between the languages. Despite the presence of the same functional category of [+past] in both of the languages, Spanish past tense includes aspectual morphology, while Quechua past tense includes evidentiality morphology that distinguishes between reportative and attested past tense (Sanchez 2004). Lending some support to the FCH point of view, Sánchez (2004) observed convergence in the past tense interpretable features of both languages towards the features that are not inherently included in the past functional category in each language in the narratives of the HSs. In other words, activation of features resulted in evidentiality-like features in Spanish, while aspectual forms appeared in Quechua as well. Interpreting these findings from Putnam and Sánchez model's perspective, it seems that "processing Spanish for comprehension triggers acquisition of the association between tense and aspect and the mapping of these features onto a single morpheme", i.e. a gradual reassembly (Putnam & Sánchez, 2013, p. 495).

A relatively recent study has applied this approach to Spanish-English child HSs with age range 5;0–10;8 in the investigation of grammatical gender and phrasal noun-adjective word order (Cuza & Pérez-Tattam, 2016). The data was collected via a picture naming task specifically designed to elicit different word order patterns with the gender concord. The findings are informative and conform well to a feature-reassembly approach in HL grammars, as the main observation was that L1 [+strong] gender functional features showed restructuring under the L2 [-strong] gender features. Their findings also showed a merged grammatical system that included both L1 and L2 features, in line with what Putnam and Sánchez (2013) proposed. The language use measure, however, did not predict the performance as would have been expected according to the Putnam and Sánchez model. It seems, however, that the participant group was quite homogeneous regarding their language use patterns, which might be a reason for not having observed any language use effects. The authors thus called for further research.

To sum up, interaction between two languages is a complex phenomenon, and it seems that these approaches are not "mutually exclusive and all have some role to play in the ultimate answer" to non-convergent HL grammars (Bayram, Pascual y Cabo, & Rothman, *forthc*, p. p). In this thesis, we address the sources of non-convergent HL attainment observed in the data by taking both strong and weak points of all these explanations above into consideration to best explain the data.

1.4 The current study

With its design, the current study attempts to bring together the research carried out in the first language attrition and heritage language bilingualism fields to address the role of AaO in the degree of L1 maintenance and the role of input quantity and quality in transmission of the heritage language to next generations. By doing so, it aims an in-depth exploration of the effects of AaO and quality/quantity of L1 contact on structural and lexical development (maintenance or loss) of Turkish as an immigrant and a heritage language in the UK across three generations of adult Turkish immigrants: late bilinguals with AaO > 12, early bilinguals with AaO range 7–11 and UK-born heritage language speakers with AaO range 0–5. The investigation is carried out on evidentiality, structural complexity, L1 foreign accent, as well as morphological productivity in the production of L1 Turkish. We seek answers to the following general questions which will be treated extensively and more specifically in three different individual research studies written as chapters of this thesis:

- What is the extent of L1 loss in immigrant speech in relation to age at onset of bilingualism (AaO), and does AaO play a role in the degree of attrition of the perceived L1 accent and/or overall structural complexity in Turkish?
- If it does, what does this role reveal about the nature of the age effects (maturational or L1 entrenchment)?
- Does the input available to the Turkish HSs in the UK show any qualitative morphosyntactic differences from the monolingual input?
- Are the HSs sensitive to the frequency of the linguistic elements in the input spoken around them by other immigrant bilinguals?
- How do the quantity/quality of the input to which HSs were exposed at different stages of their acquisitional process, as well as their amount of language use in adulthood, relate to their overall morphosyntactic and lexical proficiency?

Given the findings of previous studies, the following hypotheses have been formulated:

- Longer periods of uninterrupted L1 exposure (later AaOs) will show strong positive correlations with the degree of L1 maintenance across various linguistic levels.
- The L1 performance of early bilinguals/heritage speakers will show more variation in comparison to that of late bilinguals and monolinguals.
- This variation is likely to be a result of a combination of various factors with prominent roles played by input quantity and quality.

- Heritage speakers will show sensitivity to qualitative and quantitative components of the L1 experience and modifications in the input available to them through other bilingual speakers in the same immigrant community.

The extent to which these hypotheses found support in the data will be discussed in details in individual chapters under the light of relevant theoretical accounts and a general discussion will be provided in the conclusion chapter (Chapter 6).

The rest of this thesis is designed as follows. Chapter 2 describes the methodology followed in the current study, with details about the tasks used and the quantification methods of variable calculations. Chapter 3 aims to test Rothman's (2007) qualitatively different input hypothesis by comparing the L1 performance of both adult HSs and first generation immigrants of Turkish descent (n=31) in the UK to that of matched monolinguals. The investigation is carried out in a grammatical category known to be vulnerable in heritage bilingual populations: evidentiality (Aarssen, 2001; Arslan, Bastiaanse, et al., 2015; Arslan, De Kok, et al., 2015; Karakoç, 2007). Findings are discussed within the premises of all four approaches proposed to explain the non-convergent L1 behaviour of HSs: incomplete acquisition, attrition and qualitatively different input and feature re-assembly.

Chapter 4 investigates the extent of L1 loss as a function of AaO. The study tests hypotheses formulated based on the implications of two competing accounts –which were originally proposed to account for age effects on second language learning– for L1 attrition: the Critical Period Hypothesis and the L1 entrenchment view (the Interference Hypothesis). Empirical evidence is provided from the spoken L1 performance of a group of long-term Turkish immigrants in the UK with AaO range 7–34 to that of monolingual controls across two linguistic features: structural complexity and L1 accent. The findings are discussed under the light of implications of these theoretical accounts for L1 attrition.

Chapter 5 assesses lexical abilities of adult HSs with a focus on the ability of adult Turkish HSs in the UK to employ frequently occurring (formulaic) word formation devices productively (across the entire range of their vocabulary, not just to a limited number of exemplars) and on the input-related predictors of this performance. It specifically aims to reveal how sensitive HSs are to the linguistic properties of the L1 input (frequency) spoken around them by previous generations of immigrants (AaO range 7–42), and the amount of past input they received from their parents who have a similar linguistic profile to that of the previous generations of immigrants included in this study. A group of matched monolinguals

is included for baseline comparisons. The findings are discussed from the perspectives of usage-based approaches.

Chapter 6 provides concluding remarks with a general overview of the findings and future directions for research. This chapter concludes with implications of the research carried out in this thesis and its limitations.

Note that the empirical studies given in Chapters 3, 4 and 5 have been submitted for publication. The citation information is as follows:

Chapter 3

Karayayla, T. (accepted). Effects of first language attrition on heritage language input and ultimate attainment: two generations of Turkish immigrants in the UK. In B. Brehmer, J. Treffers-Daller, & D. Berndt (Eds.), *Lost in Transmission: The role of attrition and input in heritage language development*. John Benjamins.

Chapter 4

Karayayla, T., & Schmid, M. S. (2019). L1 attrition as a function of age at onset of bilingualism: L1 attainment of Turkish-English bilinguals in the UK. *Language Learning*. (accepted for publication on 23 June 2018).

Chapter 5

Karayayla, T. (submitted). A usage-based approach to morphological productivity in adult Turkish heritage speakers in the UK: Convergence on the immigrant variety. *Linguistic Approaches to Bilingualism*.

I hereby certify that the empirical study given in Chapter 4 in this thesis is a collaborative work between myself and my supervisor Professor Monika S. Schmid. By the principle regulations of the university, I am required to explicitly acknowledge the nature of the contribution of the co-author(s). I state that the contribution of the co-author in this particular study involves drafting parts of the section entitled “Background to the Study”, and some parts of the data analyses.

Chapter 2 Methodology

This chapter presents the general design of the study. While Section 2.1 provides detailed background information on the participant characteristics, how they were recruited, as well as the criteria applied in their selection, Section 2.2 presents the methodology of the study where the data collection instruments and procedures of application are detailed. Section 2.3, on the other hand, provides information on the coding of the raw data and quantification of the independent and dependent variables. Note that each individual empirical study has its own methodology with a description of the participants as well as the data collection materials used. Overlaps are thus inevitable. In this section, special attention was thus paid more to parts that could not be included in the individual studies due to space concerns or carrying too much detailed information. In order to reduce the overlapping content and the repetitions as much as possible, the reader was referred to other chapters when necessary.

One further thing worthy of note here is that not all participants described here were included in each empirical study, except for the last one (Chapter 5). The decision of the inclusion of a particular group was made based on the scope and the aims of each study (see Chapters 3, 4 and 5). This applies to the number of participants of a particular group included in each study as well, which might not always reflect the original number given in this section. In Chapter 4, for example, the number of control group participants was reduced to 30 in all tasks, while it was originally 44. This was mainly because the task that was designed to investigate the degree of foreign accentedness in the L1 was originally designed for an equal number of participants in each group, namely 30 (see below the description of the materials). Similarly, due to reasons such as the need to control for the proficiency of the participants belonging to different groups, or the presence of missing data, some participants had to be discarded from some of the analyses. In this section, however, the information is provided based on the original number of participants.

Ethical approval (Appendix 1) to work with human participants was obtained from the University of Essex ethical committee, and written consent of participants was taken before starting experimental sessions with each participant. The participant consent form(s) can be seen in the Appendices section (Appendix 3 and Appendix 4).

2.1 Participants

2.1.1 Participant selection criteria and sociolinguistic information about the participants

A total of 92 adult bilingual speakers with Turkish as their native language in the UK and 44 monolinguals in Turkey participated in the study. During the selection of the bilingual participants, we aimed to cover a wide AaO range (0–42 years) to represent the Turkish immigrant population in the UK and the variety of Turkish spoken within this community as much as possible. This AaO range was divided into three age groups, differentiating between UK-born heritage speakers (HSs, AaO range 0–5), early sequential bilinguals (EBs, AaO range 7–11) and late bilinguals (LB, AaO>12). Note that throughout the study, these groups are sometimes referred to as the third generation, the intermediate generation and the first generation of immigrants respectively. Each group consisted roughly of an equal number of participants (n=30–31).

For the purposes of the study, the participants were selected mainly on the basis of their age at onset of arrival/bilingualism in the host country. The fact that we aimed at forming a homogeneous HS group with all members born in the UK or arriving before the age of three, which was the case for one participant only (Montrul, 2008), automatically set the AaO range to 0–5 in this group. Age 5 here means that the first contacts with L2 English took place once the child started primary school. The usual bilingualism age among the UK-born participants in this study is the age at which they start pre-schooling (age 3). This was the case for 26 speakers (83.8 %). L2 exposure started at the age of five for two participants (6.45 %), and three participants (9.67 %) stated that they had simultaneous exposure to both languages from birth.

The AaO range of the other groups, on the other hand, was determined based on the previous literature and the scope of the study. As mentioned before, Chapter 4 investigates the extent of L1 loss in relation to AaO. One of the caveats of carrying out such research is that it is very difficult to distinguish between the effects of incomplete acquisition and attrition in the outcome. This is especially the case for late-acquired properties, as there is a risk that these properties might not have stabilised before the participant becomes bilingual. With the lack of data that would show the participants' linguistic proficiency prior to emigration, one way previous literature approached this problem was to take the age of acquisition of the property as the reference point and attribute the L1-divergent behaviour of the participants with AaO

later than this age to attrition, and the performance of the rest to incomplete acquisition (e.g. Montrul, 2002). This is what determined our choice of setting the lowest limit to AaO 7 in the early bilingual group (see Chapter 4 for more information). Although these speakers are, in theory, also HSs, the fact that all participants in this group were exposed to Turkish in a monolingual environment for at least the first seven years of their lives and were schooled in the L1 between one and five years prior to emigration qualified their belonging to a different group, at least for the purposes of the current study. The distribution of AaO was quite homogeneous for ages 8, 9, 10 and 11 across the group (range 20 % – 26.67 %), but there were only three (10 %) participants with AaO at 7.

The decision of setting the lowest AaO limit to 12 in the late bilingual group, on the other hand, was again made on the basis of the previous literature, which considers age 12 as a cut-off point between early and late bilinguals (e.g. Bylund, 2009b). Note that the LB group was assumed to represent the parental generation of the HSs in the current study. More information about this can be found in Chapter 3. The mean value of AaO of the participants in this group was 22.35 (range 12–42). There was only one participant with AaO 12 and only one with AaO 42. Across the group, only seven (22.6 %) participants' AaO ranged between 12 and 16, and the rest were over 18 (77.42 %).

The LOR of the participants was set to a minimum of eight years to allow the L1 to be in contact with the L2 long enough for attrition to set in. The current age was limited to 65 to prevent potential effects of advancing age on language abilities. The oldest participants were 65, 58, 53 and 52 years old and all of them were in the LB group.

As another criterion, all speakers had to have Turkish parents. The heritage speakers were also asked to indicate their parents' AaO and the background education level, as these are known to be significant predictors of the degree of attrition the parents may have experienced and/or the quality and quantity of the input they provide to their children (Bylund, 2009; Montrul, 2008). Table 2.1 summarises the information about the parents obtained from the sociolinguistic questionnaire administered to the HSs (see below the description of the materials). It seems that the majority of the parents immigrated after the age of 12. While among the mothers, there was only one with AaO 8, there were four fathers with AaOs of 4, 4, 9, and 11. The mean value of AaO was 20.22 (range 8–31) for the mothers and 20.29 for the fathers (range 4–45).

Table 2.1: Parental background information of the HSs

	mother		father	
	n	%	n	%
AaO (mean)	20.22	N/A	20.29	N/A
AaO (Range)	8–31	N/A	4–45	N/A
LOR mean	27.67	N/A	31.35	N/A
LOR range	19–49	N/A	10–47	N/A
age mean	47.9	N/A	51.64	N/A
age range	38–64	N/A	41–67	N/A
AaO<12	1	3.22 %	4	12.9 %
range	8	N/A	3–11	N/A
AaO≥12	30	96.77 %	27	87.1 %
range	12–31	N/A	12–45	N/A
TOTAL	31	100 %	31	100 %

AaO=age at onset of bilingualism; LOR= length of residence; N/A=not applicable

The distribution of the parental highest education level completed, on the other hand, was quite homogeneous between mothers and fathers. While the largest proportions of both mothers and fathers had received primary education, 45.16 % and 38.71 % respectively, only 6.46 % of both mothers and fathers held a university degree. The distribution of the parental education level of the HSs can be seen in Table 2.2 below.

Table 2.2: Background education level of the HSs' parents

	mother		father	
	n	%	n	%
primary school	14	45.16	12	38.71
secondary school	6	19.35	8	25.81

high school	8	25.81	8	25.81
university	1	3.23	1	3.23
master	1	3.23	1	3.23
no education	1	3.23	1	3.23

Finally, any other acquired native language as a result of any kind of childhood bilingualism other than Turkish and English, such as Arabic, Kurdish, and Greek, was a criterion for exclusion, as this would have made it difficult to control the quality/quantity of L1 contact. Owing to the sociological diversity of the Turkish-speaking community in the UK, however, some participants inevitably had knowledge of another language other than Turkish and English. This was most often Kurdish but there were two participants who grew up in Cyprus (the Turkish part) before their arrival in the UK at the age of 8 and 13 respectively. These participants were included as participants because they both claimed that they did not acquire or use Cypriot Turkish as their parents were from Turkey. For the 11 participants with Kurdish roots, 5 of them (4 in the EB group and 1 in the HS group) claimed that they never acquired Kurdish as their parents' level of Kurdish was itself at receptive level. Three others (all in the HS group) claimed to have knowledge of Kurdish at receptive level. Their parents had never spoken to them in Kurdish but used to talk Kurdish among themselves to exclude their children from the conversation. One participant in the EB group claimed that she acquired Kurdish from her grandmother at the age of 6–7 but lost the ability to speak the language due to disuse and lack of input, as she immigrated to the UK with her parents at the age of 8. Finally, the remaining two participants (both in the LB group) stated to have minimum levels of Kurdish knowledge which was limited to formulaic language such as commonly used idioms. Some of this background information about the participant groups is summarised in Table 2.3.

Table 2.3: Summary of the basic background information of the groups

	LBs	EBs	HSs	CG
group size (n)	31	30	31	44
age (mean)	41.06	30.76	23.35	33.81
age range	25–65	19–45	18–43	18–66
age SD	8.01	6.23	5.88	11.8
AaO (mean)	22.35	9.33	2.8	N/A
AaO range	12–42	7–11	0–5	N/A
AaO SD	7.09	1.27	1.07	N/A
LOR (mean)	18.7	21.7	23.35	N/A
LOR (range)	8–40	11–37	18–43	N/A
LOR SD	7.44	6.34	5.88	N/A

LBs=late bilinguals; EBs=early bilinguals; HSs=heritage speakers; CG=control group; AaO=age at onset of bilingualism; SD=standard deviation; LOR=length of residence

The first contacts were made through some Turkish societies, mosques and organisations in London, and through personal contacts both in London and Colchester, UK. Among the associations and organisations, the *Pekünlüler Turkish Cultural Association*, the *Turkish Religious Foundation*, the *Turkish-Islamic Foundation* and the *DayMer Turkish and Kurdish Community Centre* have been very helpful in arranging the first appointments. The representatives of these organisations were given a description of the project with the selection criteria, and they were asked for their help in reaching their members who met those criteria.

In the description of the project, they were told that the study was on language change (see Schmid, 2011, p. 114 for details). The call for participation is available in Appendix 5 and Appendix 6. The same description of the project and call for participation was also shared on online Facebook pages of various small Turkish advertisements and Turkish societies founded by universities in London and at the University of Essex, especially to reach heritage speakers. Once the first appointments were arranged, the rest of the participants were reached via the snowball technique. The interviews took place mostly in cafes and sometimes in the participants' homes. Individual meetings lasted from one hour, 20 minutes to one hour, 45

minutes. Data was collected between the 10th of January 2015 and the 15th of March 2015 in London and Colchester in the UK.

A baseline for comparison was established through a control group (CG, n=44). Utmost attention was paid to make this group representative of the bilingual groups regarding age at testing, education level, city of birth and gender. This was achieved by creating a proportion sample based on the distributions of these variables across the bilingual groups. Once the data from the three experimental groups was collected, a quick analysis was run to see the overall distribution of gender, age, education level and city of birth across the groups and the sample as a whole. The decision for the criteria of control group participant selection was made as described below.

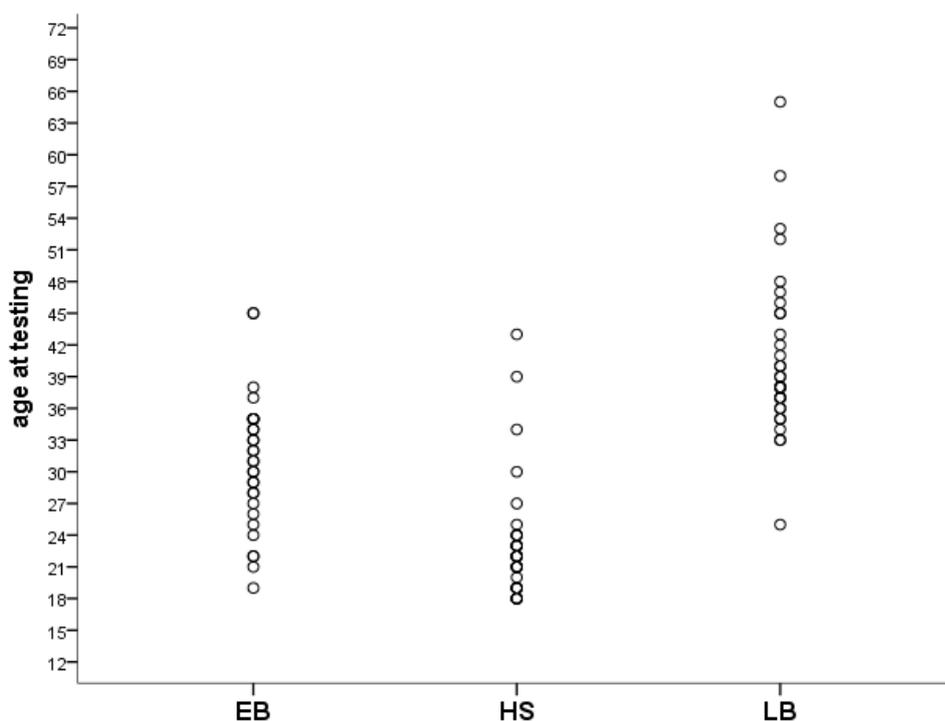


Figure 2.1: Age distribution across the bilingual groups (n=92)

EB=early bilingual; HS=heritage speaker; LB=late bilingual

First of all, as shown in Figure 2.1, the age distribution across the bilingual sample was a little bit skewed at the group level, with the potential to influence the aspects under investigation. Yet, this cannot be helped due to the background participant profile chosen for investigation, i.e. heritage speakers are younger than the two previous generations and early bilinguals tend to be younger than late bilinguals. On the basis of this distribution across the bilingual sample, three age categories were made: 18–23, 24–34 and 35–50, and

we aimed at having ten control group speakers in each category so that we could also track if there was an age effect. Two to three additional control group speakers for each age category were also included in case some data turned out to be unanalysable. This raised the target number of the overall control group speakers to 36. For the four oldest bilingual participants, with the ages of 52, 53, 58 and 65, four additional age-matched control group speakers, who also matched them in education level, gender and city of birth, were included in addition to the 36 speakers above.

As depicted in Table 2.4, the distribution of education level across the bilingual groups was in favour of either the university graduates/students or high school graduates/students. There were also four secondary school graduates across the whole sample, three of whom were in the EB group and one in the LB group. Excluding those four participants from the sample would result in a more homogeneous group in terms of educational background. However, rather than excluding them, I decided to include four additional control speakers who exactly matched those four participants in the bilingual sample in terms of education level, city of birth, age and gender. Unfortunately, only three secondary school graduates in Turkey could be found.

Table 2.4: Education level of the bilingual participants

		university		high school		secondary school	
	TOTAL	(n)	(%)	(n)	(%)	(n)	(%)
LBs	31	17	54.84%	13	41.94%	1	3.23%
EBs	30	16	53.33%	11	36.67%	3	10.00%
HSs	31	23	74.19%	8	25.81%	0	0.00%

LBs=late bilinguals; EBs=early bilinguals; HSs=heritage speakers

The city of birth distribution, as shown in Figure 2.2, at the group level and across the sample was unequal due to the fact that city of birth was not a criterion of selection. Although the city or the region participants came from was not hypothesised to predict differences, if any, in the L1 knowledge of the speakers for the aspects under investigation, special attention

was paid to keep the same proportion shown in Figure 2.2 in the control group. The participants came from diverse backgrounds. The cities were thus grouped into five regions based on Karahan's (1996) classification of Turkish regional dialects. According to this classification, the hometowns in the sample of Adana, Osmaniye, Hatay, Maraş and Gaziantep were considered as one group and were called the "Adana group". Similarly, the group of cities Ağrı, Kars, Erzurum, Tunceli, Elazığ, Malatya, Trabzon, Rize and Gümüşhane were called the "Ağrı group". In the "Ankara group", we included Ankara, Çorum, Kayseri, Yozgat, Konya, Karaman and Aksaray. The next group, called the "Aydın group", consisted of Aydın, Balıkesir, Denizli, Bursa, Eskişehir, İzmir, Muğla and İstanbul. Finally, the group with the smallest number of participants was called the "Sinop group", and comprised the cities of Sinop, Düzce, Samsun and Kastamonu.

The number of participants to include from each region was determined based on the overall regional percentages shown in Figure 2.2. While doing this, the original distribution of the educational level and gender was also kept in mind. The numbers were rounded up or down when necessary. In the end, the determined number of participants to include from each region was divided into three, so that each age group specified above could be represented equally.

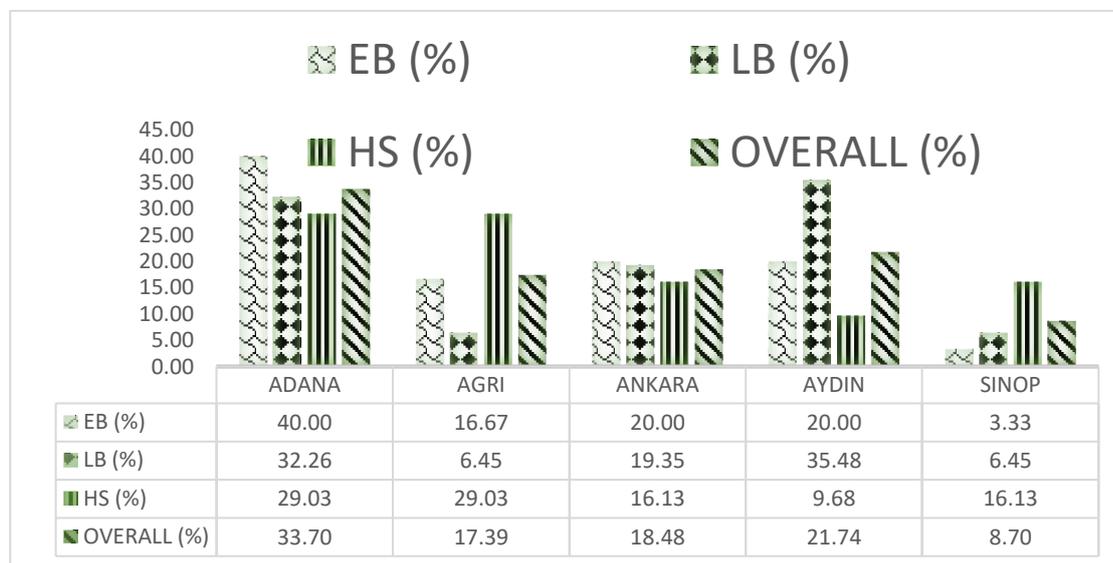


Figure 2.2: Distribution of city of birth across bilinguals (total $n=92$)

EB=early bilinguals; LB=late bilingual; HS=heritage speaker; OVERALL=the percentage based on the entire bilingual sample

Recall that we aimed at finding and including 36 CG speakers (excluding the four additional age and four additional education level-matched speakers). Given that overall, 33.69% of

the bilinguals were coming from the Adana region, we needed to include $(36 \times 33.69)/100=12$ controls from this region. Similarly, we aimed to include approximately $(36 \times 17.39)/100=6$ or seven participants from the Ağrı region, $(36 \times 18.48)/100=6$ or seven from the Ankara region, $(36 \times 21.74)/100=7$ or eight from the Aydın region and $(36 \times 8.69)/100=3$ from the Sinop region. To illustrate this, the situation for the Adana region was as follows. In the original distribution of gender across the sample, there were 18 women and 13 men coming from this region. We found six women and six men to represent the Adana group in the control group. As the next step, how many of these women and men held high school/university diplomas was checked in the original sample. With regard to this, three women with university degrees and three with high school education degrees were found. For males, on the other hand, four university graduates and two high school graduates were found. Finally, the total participant number of 12 was distributed equally across the three predetermined age groups (18–23, 24–34, 35–50). The same procedure was repeated for the other regions. Table 2.5 displays age and gender distribution across these five regional groups in the bilingual sample.

Table 2.5: Distribution of gender and level of education across the regions in the bilingual sample

	Adana	Ağrı	Ankara	Aydın	Sinop	Total
female	18	7	8	12	5	50
high school	7	1	4	3		15
secondary school		2		1		3
university	11	4	4	8	5	32
male	13	9	9	8	3	42
high school	4	3	5	2	2	16
secondary school		1				1
university	9	5	4	6	1	25
Total	31	16	17	20	8	92

Once the criteria of selection were determined, the data was collected through personal contacts and the snowball technique in two big cities, İzmir and Ankara. As explained before, the city of birth was not considered to have a significant influence on the aspects under investigation. That is why, rather than visiting each city in each region to find participants, speakers who were originally from those regions, who spent at least the first 15–18 years of their lives there and then moved to these two big cities for reasons such as work, education, etc., were found and included as participants. Given the difficulty of finding participants matching these criteria, the actual distribution of the criterion variables across the CG might show slight differences from the originally planned counts and ratios. On some occasions, such as in the absence of a female participant matching the criteria, a matching male participant was included instead.

The final distribution of these variables in the actual CG is illustrated in Table 2.6 below. Note that the inclusion of additional oldest age-matched and education level-matched (for secondary school graduates) speakers has also resulted in an increase in the total number of participants predetermined to be taken from each region. Interviews lasted about one hour, and the data was collected between the 23rd of March and the 23rd of May 2015 from 44 participants.

Table 2.6: Gender and education level distribution across the regions (control group)

	Adana	Ağrı	Ankara	Aydın	Sinop	Total
female	5	5	4	7	1	22
high school	2	1	2	3		8
secondary school		2		1		3
university	3	2	2	3	1	11
male	8	4	4	4	2	22
high school	2	2	2	1	1	8
university	6	2	2	3	1	14
Total	13	9	8	11	3	44

In addition to the CG participants, another group of native speakers of Turkish university students (n=28) in Turkey were included as judges to rate the degree of the accent of each speaker, including the CG speakers (see below for details of the experiment and the participant profile of the native speaker judges).

2.2 Instruments

The data collection instruments employed in the current study were mainly adapted from the test battery of Monika S. Schmid available from the attrition website: <https://languageattrition.org/> (see also Schmid, 2004). The idea to develop a unified test battery for attrition research was put forward following the *International Conference on First Language Attrition: Interdisciplinary Perspectives on Methodological Issues* in 2002 (see the collection by Schmid, Köpke, Keijzer, & Weilemar, 2004 for a selection of papers presented at the conference). Such a common research design allows researchers to obtain more reliable data and ensures comparability of results across various immigrant groups and languages. Following this conference, it has been suggested that an attrition study should ideally include all three types of the following: data obtained from self-assessment tasks (e.g. Can-Do-Scale), formal elicitation tasks (e.g. C-Test), and tasks that elicit spontaneous speech (e.g. semi-structured interview) (Schmid, 2004). The test battery employed for the current study, therefore, included a variety of instruments: a sociolinguistic questionnaire, a C-Test in both Turkish and English, a Can-Do scale, a semi-structured interview, a picture description task and a foreign accent rating experiment. Among those, the ones that aimed at eliciting spoken language (i.e. the semi-structured interview and the picture description task) were audio-recorded and transcribed. Detailed information for each task, the motivation behind its choice, the procedure of application, data coding and quantification of some of the variables are provided below.

2.2.1 Sociolinguistic questionnaire

Information on the personal and linguistic background of the participants was obtained via a sociolinguistic questionnaire (SQ). The Turkish version of the questionnaire in the unified test battery of Monika S. Schmid mentioned above was adapted from Yılmaz (2013) with minor arrangements and modifications (Appendix 8). The changes involved reducing the number of questions which ask participants to self-evaluate their proficiency in other languages they speak and their opinions on speaking other foreign languages because this level of detail was not necessary for the current study. Additionally, the questions that ask

participants to report the frequency of current L1 contact in different situations were repeated for the period of the first five years upon their immigration in order to obtain a variable to represent their past L1 use required for the subsequent analyses.

The adapted version of the questionnaire consisted of the following subsections: personal background (e.g. age, AaO, sex, birth date, birthplace, length of residence, highest education level completed), linguistic background (e.g. the frequency of L1 use in general, the frequency of L1 use upon arrival in the UK with other people and within family, the frequency of current L1 use within the family and with other people, the frequency of visits to Turkey, the frequency of the passive exposure to the L1 via the media and internet), other languages known and the proficiency level, attitudes (specific questions about their views on maintaining their first language and passing it on to the next generations) and a few questions that asked whether they feel comfortable speaking Turkish with monolingual and/or bilingual people, whether they would consider going back to Turkey and why.

Given that one of the aims of the current study was to explore input-related sources of heritage language development across different linguistic levels, there was a need to add more detailed and specific language exposure and use questions for the HSs. For this purpose, additional questions about language experience were developed based on two extensive parental questionnaires: Bilingual Language Exposure Calculator (BILEC by Unsworth, 2016; Unsworth et al., 2014) and the Alberta Language Environment Questionnaire (ALEQ by R. Jia & Paradis, 2014; J. Paradis, 2011). Parental questionnaires are widely-used tools to obtain background linguistic information about the linguistic development of children (see Gutierrez-Clellen & Kreiter, 2003). In the absence of real observations or longitudinal research design, this is believed to be the most reliable method.

Note that both questionnaires have similar questions and include measures to estimate the amount of bilingual input, but the BILEC allows for more detailed and improved quantification of both the current and cumulative amount of language input received (see below Section 2.3 on coding and calculation of the variables). Moreover, by design, the BILEC can be used to obtain information from participants up to 18 years of age and can also be used with L2 adults with some modifications (Unsworth, 2016). For the purposes of the study, we therefore retained the BILEC's sections which included questions related to past/current language exposure and use at home, at daycare/school, and in extracurricular activities held outside of home & school. These questions were then modified according to the profile of our HSs.

One such modification involved repeating the same questions for the following age periods: 0–3, 3–5, 5–11 and 11–18. The participants were asked to report how much they think they speak/spoke Turkish/English with, or are/were spoken to by their mother/other family members at home, their teachers and friends at school, during these specific age periods. The aim of dividing the input into different age periods was to make an estimation of the approximate exposure to the input over the years. The age categories correspond to different educational stages in the UK, as follows: pre-school, daycare and foundation, primary school, secondary school and college.

The extracurricular activities section of the BILEC was expanded by adding slight details from the ALEQ. In this section we adapted from the ALEQ, passive exposure to the L1 via TV, newspapers and book reading (or being read to), as well as active language use with friends outside school/home or language exposure and use during any extracurricular activities (such as in sport or any other clubs) were included. Participants were asked about the frequency of these activities that they did during a week, as well as the amount of L1 or L2 they used doing these activities during the specified age periods. This allowed us to adapt one of the ALEQ's input quality measures called "richness" (more details about the calculation of this variable are provided below in Section 2.3). Note that, the BILEC does not provide a calculation for richness.

From both of the questionnaires, we also adapted questions which ask details related to the background of the parents of bilingual children such as parental background education level, AaO of the parents, proficiency of the parents in both L1 and L2, and whether the child has siblings. Such factors have been shown to play important roles in determining the quality and quantity of the input a heritage speaker can receive (see Section 1.3.4 for more information about these factors) and are thus considered important for the current study.

As a final modification, in both versions of the questionnaire used in the current study (for attriters and heritage speakers), the questions that related to the frequency of language use with different interlocutors asked the participants to report in percentages, as in "I use **95 %** Turkish with my relatives in Turkey" rather than in adverbs of frequency as in "I **always** speak Turkish with my relatives in Turkey". The rationale behind this decision was to ensure comparability between the questions we adapted from different questionnaires as the number of the items in the Likert Scales provided in the original questionnaires that we adapted were not the same or comparable. This modification also made the estimation of the frequency of

L1 contact more specific and straightforward. The questionnaires are included in the appendices (Appendix 7, Appendix 8, Appendix 9, and Appendix 10).

2.2.1.1 Procedure of application

The questionnaires were administered in Turkish in pen and paper format, and either the participants were asked to fill them in or the researcher asked them the questions verbally and noted down the answers.

The participants were free to ask for more information for clarification at any time. In the order of administration of the tests, the questionnaire was administered at the very beginning to warm them up and prepare them for the interview.

2.2.2 Semi-structured interview

Speaking is a skill “that is most characteristic of what native speakers know how to do” (Schmid & Jarvis, 2014, p. 746). It is thus plausible to assume that this will be one of the first skills that attrition/incomplete acquisition will affect, as it requires the online integration of linguistic knowledge. The most suitable data to capture attrition/incomplete acquisition phenomena in a group of bilinguals with a wide AaO range has been suggested to be free speech data, as it allows “every speaker to employ the full range of her language knowledge” without applying too much pressure on the cognitive load, and thus this prevents any observations of a ceiling effect in the performance of late bilinguals, or of failures in completing tasks because they are too demanding for early bilinguals (formal tasks, such as grammatically judgment tasks) (Schmid, Köpke, & Bot, 2012, p. 678).

Based on this, the current study relied on spoken data collected through a semi-structured interview to encourage participants to employ the full range of linguistic features available to them and spontaneously detect differences between bilinguals and controls, if any, in the accuracy of using evidentials (Chapter 3), the overall structural complexity (Chapter 4), the degree of accentedness (Chapter 4), as well as the ability to use word formation devices productively across the entire range of their vocabulary (Chapter 5) in L1 Turkish. It is, of course, acknowledged that free speech data is inadequate to derive conclusions on how these properties under investigation are processed and/or represented, which would require implementation of different tasks and methods. This is, however, beyond the scope of the research carried out in this thesis.

The interview consisted of seven questions, the first three of which were designed as warm-up questions, asking participants to introduce themselves and give their views on the health

and education systems, as well as working conditions, both in England and Turkey. Due to the difficulty of capturing different types of evidential forms in such daily topics, the next four questions were specifically designed to encourage participants to employ evidential forms. The reader can refer to Chapter 3 for both the comprehensive description of evidentiality in Turkish and specific details about the interview questions that were designed to capture these forms.

All participants produced speech samples based on the same questions, but the conversations were all spontaneous and informal. One thing that needs to be noted here is that the versions of the interviews employed with the CG and the HSs show slight differences from the ones employed with the others. For example, the HSs were not asked their views on working conditions in the UK and in Turkey, but on the education system because many of them were still studying at a university and thus would not have much knowledge about the working conditions. Similarly, control speakers were not asked to make a comparison between the health system of Turkey and the UK but only asked to express their views on the system in Turkey. This is because none of these speakers lived in the UK before and thus would not have an opinion on the topic. The interview questions for different groups are available both in Turkish and English in Appendices 11–16.

2.2.2.1 Procedure of application

The semi-structured interview was conducted with all participant groups, including the control group, following the sociolinguistic questionnaire and preceding the picture description task. The interviews, together with the picture description task, lasted between 10 and 40 minutes, with an average of 19.75 minutes across the entire sample.

2.2.3 Picture description task

A picture description task with each picture showing resultative states of past nonwitnessed events further allowed us to elicit and test specific evidential forms. Comprehensive information about the pictures (n=5) used and what specifically they were expected to elicit is provided in Chapter 3. The pictures are available in Appendix 17.

2.2.3.1 Procedure of application

Each participant was given the set of five pictures in coloured A4 size form and was asked to tell what s/he saw in the pictures. The narrations were audio-taped. They were asked to guess what might have happened in the pictures and how they knew about it. To prevent them from describing the pictures in simple continuous tense *-(I)yor* which is quite common

in Turkish to describe a picture, the researcher told them that the incident in the picture was something already happened and appeared in the newspaper yesterday. This was expected to encourage the participants to describe the pictures in past tense.

2.2.4 C-tests and Can-Do scales

The overall proficiency of the participants, both in Turkish and English, was measured by means of C-Tests and a self-estimated proficiency task.

A C-Test is a different version of the so-called cloze test (Schmid 2011). While in cloze tests participants are expected to fill in gaps in a text where some words are randomly deleted, in C-Tests, the deleting task is carried out based on certain criteria (Schmid 2011). Following the first sentence in the text, which is usually left intact, the second half of every second word is deleted and participants are asked to complete the partially-written words. Completing the missing words “requires the speaker to make full use of the natural redundancy of a text, which makes it possible to measure not only relatively low level skills (command of vocabulary, grammar, idioms) but also higher order skills such as awareness of intersentential relationships, global reading, etc.” (Schmid, 2004, p. 360). C-Tests, therefore, allow to test for overall language proficiency and have been extensively used in previous first language attrition and second language acquisition studies for this purpose. In the current study, C-Tests additionally allowed us to control and confirm participants’ bilingual status.

The English version of the test we employed in the current study was adopted from the test battery of Monika S. Schmid, which was constructed by Keijzer (2007), and the Turkish version was constructed from Turkish newspaper columns based on the explanations in Schmid (2011). The C-tests are available in Appendix 18 and Appendix 19. We included two texts for each language (Turkish and English), containing 20 gaps each. Written consent of the column writers Mehmet Tez (2014) and Metin Uyar (2014) in the Turkish newspaper *Milliyet* was taken, via email correspondence, to use their essays in our study (see Appendix 20).

Given that we attempted to use this test in a first language attrition study, the difficulty of the texts was important to prevent a ceiling effect (Schmid, 2011). Five texts constructed from newspaper texts were pilot-tested on seven native speakers of Turkish (international students at the University of Essex), and the ones that elicited 90 and 92 % of correct responses were chosen for this study. Heritage speakers might possibly score worse than the

other two groups in the Turkish version of the C-Test, given that they mostly do not receive education in their heritage language. This will be considered during the analysis.

Another word of caution is required for the effects of the education level of the participants on their score. Participants with higher education level tend to perform better in tasks that require metalinguistic knowledge and integration of cognitive abilities (Köpke, 2007). In a study where long-term Turkish immigrants to Australia were asked to construct relative clause sentences from scrambled words, not only attriters but also monolinguals with a higher education level outperformed those with lower education level (Yağmur, 1997). Given that C-Tests are formal tasks which require a good command of vocabulary and grammar but also awareness about sentence structures and relationships between different sentences in the text (Schmid, 2004), they are expected to show strong correlations with education level. This point will be taken into consideration during the analyses and comparisons between the groups (but recall that the education levels of all groups were uniformly high).

A Can-Do scale is another task included in the attrition test battery which also allows measuring general language proficiency. Its difference is that this task consists of questions about the abilities one has in a language for self-evaluation on a Likert scale. With regard to the main idea of including a control group who are desirably predominantly monolingual, a Can-Do scale constructed by Keijzer (2007) was adopted from the test battery and translated into Turkish by the investigator to control their proficiency in the English language, as the English C-Test would be too difficult at their level.

The Can-Do scale consisted of 43 items in total divided into the four language skills (speaking, listening, reading and writing), and the participants were asked to choose what they can do for each item on a five-point Likert scale from 1= I cannot do this at all, to 5= I can do this without any difficulty at all (see Appendix 21 and Appendix 22). An example item from the task, which assesses listening comprehension, is provided below:

- 1 “I can understand the majority of films in standard dialects.”= I cannot do this at all
- 2 = I can do this, but with much difficulty
- 3 = I can do this, although with some difficulty
- 4 = I can do this fairly easily
- 5 = I can do this without any difficulty at all

It would be ideal to apply the same Turkish version to the attriting groups to evaluate their self-assessed ability in Turkish. However, it was not employed not to overwhelm the participants by having too much to do. Moreover, Schmid (2014) has shown that the

performance of bilingual groups in both tasks (C-Tests and Can-Do scales) manifests a strong correlation. If this is the case, the results we obtained from the Turkish C-Test should show strong correlations with the results we would have obtained from their self-evaluation. We thus decided not to employ the Can-Do-Scale to the bilingual groups.

2.2.4.1 Procedure of application

The C-Test was always the last task applied to the participants due to having texts both in English and Turkish, and we did not want the English language to interfere with their L1 performance during the first stages of the experiment. No time limit was set to complete the task, but 15 to 20 minutes of completion time for the four texts (two English and two Turkish) were recorded by the researcher. It always took longer to complete the Turkish version by the heritage speakers and the English version by the first and intermediate generation participants. The participants were simply asked to complete the gaps in each text and were not allowed to go back to the previous one once completed.

The same procedure applied to the control group. They completed the same C-Test in Turkish, and although there was no time limit set for them either, the time they spent filling it out was obviously shorter (around five minutes for both texts). They also evaluated their own ability, on a five-point Likert scale (Can-Do scale), in the English language.

2.2.5 Perceived nativelikeness experiment

Global foreign accent rating experiments have proven useful in detecting changes in the L1 pronunciation of bilinguals (de Leeuw et al., 2010; Schmid & Hopp, 2014). In Chapter 4, we were interested in revealing what happens to one's L1 accent in an immigrant context as a function of their age at onset of bilingualism.

In this experiment, short speech samples from the spoken data elicited through the semi-structured interview with 30 participants from each one of four groups including the control group (total n=120) were extracted and pieced together to create one single audio file based on the method used in de Leeuw, Schmid and Mennen (2010). Although the control group size was bigger than the experimental groups in the original sample, for this experiment, the sample size was limited to 30 randomly-chosen speakers from each group. Special attention was given to include fully-finished utterances. The duration of the excerpts ranged from 10 to 21.3 seconds, with a mean value of 16.49 seconds.

The extracts were mostly taken from the answers to the questions about their childhood memories, but the content was different as each participant told a different story. This is

believed to prevent judges' answers from being affected due to becoming familiar with the same sentence (see de Leeuw et al., 2010). Utmost attention was paid not to include any lexical or grammatical errors, L2 borrowings or any proper nouns, such as person or place names. The background noise was cleared during the editing process of the experiment.

2.2.5.1 Procedure of application

Ethical approval was obtained to work with human participants at the Middle East Technical University in Ankara/Turkey (see Appendix 2). An announcement for a call for the paid research was made in three different undergraduate classes in the department of foreign language education. Twenty-eight native speaker judges with Turkish as their only native language (age range 19–23, $M=19.78$) were recruited among the first year university students studying foreign language education⁵ at the Middle East Technical University in Turkey. There were five males and 23 females. Participants/judges were given 15 Turkish Liras for their participation.

The single sound file was 52 minutes long and the experiment took approximately one hour to complete. It took place in a quiet room in the department. All the judges were given the instruction below before the experiment started and asked whether they thought the person speaking had a foreign accent, and if s/he did, to rate the degree of this foreign accent on a six-point Likert Scale, from 1= no accent to 6= strong accent.

“You will hear short excerpts of 10–20 seconds long from 120 speakers who are either bilingual or monolingual. After each excerpt you will have six-seven seconds to rate the degree of the foreign accent in their speech sample on a six-point scale where 1= no accent and 6= strong accent.”

Participants were informed not to confuse the regional accent with a foreign accent during the practice session employed before the experiment.

⁵ Various studies have found that familiarity with the language background and language combinations of the speakers to be rated can improve inter-reliability and also leads to raters being somewhat more lenient (e.g. Carey, Mannell, & Dunn, 2011), and that even non-native speakers are able to rate speakers reliably (e.g. Xi & Mollaun, 2011). In order to give all of our bilingual and monolingual participants the ‘best’ chance of being perceived as natives, we felt that the choice of bilingual raters would be better than choosing speakers entirely unfamiliar with the language that our speakers use in daily life.

2.3 Coding and calculation of the variables

2.3.1 Questionnaire data

2.3.1.1 Coding

The questionnaires were coded based on the instructions available on the language attrition website, <https://languageattrition.org/>, by using a modified version of the matrix provided for data entry.

2.3.1.2 Independent variables

2.3.1.2.1 Quantification of first language contact, linguistic identification, and cultural affiliation

Given the large number of questions designed to elicit answers for language use, asking about the frequency of L1 use with different interlocutors in different domains and so on, it was necessary to calculate average values over a set of such variables to reduce the number of these variables. This is, however, not as easy as it seems because it requires some kind of base to decide on which variables should form such a compound factor. As suggested by Schmid (2007), inconsistencies in the previous studies' results might have been caused by different methodologies employed to measure the impact of language use/contact. Following the approach taken by Schmid and Dusseldorp (2010), a Principal Component Analysis (PCA) was conducted to see which questions form a cluster, i.e. a compound variable.

The first step taken was to look at the correlations between variables related to L1 use, the importance given to maintenance of the L1 as well as language and cultural preferences to see which variables significantly correlated with each other. Based on the distributions of the answers across the three bilingual groups, however, some variables had to be excluded from the correlation analyses. This was either because they did not apply to the majority of the subjects (such as marital status and thus language use with the partner, or club membership and thus language use at clubs) or because the questions were not the same in the two different versions of the SQ applied to the heritage speakers and attriting groups (such as language use with the partner in the past, a question which does not exist in the HL SQ). After this elimination process, the items that significantly correlated with each other were selected. Following this, a reliability analysis (Cronbach's Alpha) was conducted for the items selected and these were grouped. An increase in the alpha value was a criterion to exclude some items from the group of variables.

The final step was to perform the PCA with varimax rotation to calculate the compound factors. High loadings of the items on one component determined the choice. As a result of this analysis, five different new variables were established, whose composite scores were computed for each participant as the means of the variables included in each component. Internal consistency of the new composite variables was established by means of a reliability analysis using “Cronbach’s Alpha if Item Deleted” component. Each new composite variable was then renamed to investigate its impact on the dependent variables for further analysis of the data. Each composite variable had a value between 0 and 1. The variables that fell into the following five categories are shown below with their reliability values (Cronbach’s Alpha⁶):

- L1 contact and proficiency (frequency of contacts with the L1 country, self-reported proficiency in Turkish), alpha= .625
- Interactive L1 use (L1 use with children, siblings, parents, grandparents in Turkey, other relatives in the UK, in written communication with relatives in the UK and in Turkey), alpha= .789
- L1 passive exposure (non-interactive L1 use, i.e. exposure through TV, radio and music), alpha= .649
- Linguistic identification (importance given to maintain their Turkish and that their children understand and speak it), alpha= .779
- Cultural identification (cultural preferences for friends and L1 use with friends and neighbours), alpha= .603

Table 2.7 below provides some descriptive values regarding the new compound variables.

Table 2.7: Independent variables

⁶ Note that a scale is usually considered reliable when the Cronbach’s Alpha values are between 0.7-0.8 and thus scales with values below 0.7 are generally considered to have low reliability (Field, 2005). However, values below 0.7 can be expected for social data constructs especially if they measure abilities, beliefs and the like or if the items in a scale cover diverse themes (Kline 1999 as cited in Field, 2005). Regarding the data of the current study, some caution is warranted as the reliability values of some of the newly established components are on the low side (alpha<0.7). It is very likely that this outcome is something expected because of the nature of the data as suggested above. We acknowledge, however, that this needs further investigation and confirmation.

Groups		Interactive L1 Use	L1 Contact & Proficiency	L1 Passive Exposure	Linguistic identification	Cultural affiliation
HSs	mean	0.77	0.66	0.55	0.92	0.43
	SD	0.13	0.14	0.27	0.12	0.23
	range	0.42–1.00	0.25–0.88	0.00–1.00	0.63–1.00	0.13–1.00
EBs	mean	0.81	0.75	0.58	0.92	0.61
	SD	0.14	0.15	0.22	0.13	0.14
	range	0.41–0.97	0.38–1.00	0.00–1.00	0.50–1.00	0.30–0.88
LBs	mean	0.92	0.84	0.58	0.93	0.66
	SD	0.07	0.13	0.21	0.8	0.2
	range	0.75–1.00	0.50–1.00	0.17–1.00	0.75–1.00	0.18–0.95

HSs=heritage speakers; EBs=early bilinguals; LBs=late bilinguals; SD=standard deviation

2.3.1.2.2 Quantification of the heritage language input

The input-related questions in the HL questionnaire were computed by making use of calculations recently proposed and tested in the BILEC which provides various algorithms to approximate bilingual children's language exposure up to 18 years of age (Unsworth, 2016; Unsworth et al., 2014).

One of the strongest points of the BILEC for the current study is the way it approximates cumulative length of exposure, which has traditionally been measured by subtracting the age of bilingualism from the chronological age of the bilingual child. In BILEC, this measure includes the sums of the language exposure the child has had over the individual years until the age at testing. In order to account for the current language exposure in different domains, such as at home, at school or during some extracurricular activities and during holidays, on the other hand, BILEC's calculations include the proportion of time spent in each domain by taking the age-specific waking hours of the child into consideration. This is to pinpoint the exact time spent with input providers during the time they are awake and how much target language exposure the child received during this time. All these language exposure measures in these domains are then incorporated into one exposure variable.

We adapted some of these calculations. Based on participants' answers, for each linguistic domain ((1) home, (2) school and (3) outside home and school, i.e. extracurricular activities), two kinds of "domain-specific" variables were derived in percentages for each age period: L1 exposure and L1 use. For the "home" domain, for example, there were four language use and four language exposure variables corresponding to each age period. These domain-specific exposure and use percentages were then incorporated into one age-specific exposure and one use variable for each age category based on proportions of time spent in each domain in a year. The final step was then to approximate cumulative percentages of exposure and use over the years until the age of 18 with the help of weighted mean calculations. The details of the calculations are given below. Note that below, we followed the same steps given in the BILEC data calculation manual, and adapted them to the data in the current study (Unsworth, 2016).

In order to derive these variables, the first step taken was to calculate the total number of age-specific waking hours and the total number of hours spent on each linguistic domain during each age period. Given that the participants of the current study were all adults at the time of testing, it was not possible to ask them or their parents how many hours they were awake per day when they were, let us say, 2 years old. Average approximations of waking hours for each age period were thus achieved based on reported findings of medical articles on sleep durations of children growing up in Europe (Iglowstein, Jenni, Molinari, & Largo, 2003; Mindell, Sadeh, Wiegand, How, & Goh, 2010; Olds, Blunden, Petkov, & Forchino, 2010). Note that the revealed sleep durations specific to age, sex, geography and culture in these articles all refer to similar values for the children who grow up in European countries. Despite their Turkish background, all of the HSs in the current study were born and grew up and schooled in the UK. Thus, the average sleep durations were calculated based on the values revealed for European children. Table 2.8 shows the estimated daily waking hours for the age periods specified in the current study. These values were multiplied by seven to give the total weekly waking hours to include in the further analyses.

The next step was to determine proportions of weekly time spent at home, at school and outside home and school. As indicated before, the specified age periods corresponded to different school periods in the UK. Although the time spent at school per day is more or less the same around the UK, participants were still asked to fill in the daily time they spent at different school stages. Additionally, they were asked to report the frequency of extracurricular activities they attended, if any, outside school, the frequency of watching TV,

reading or being read to and of computer-related language activities (such as two days per week, five hours a day). All these reported weekly times were totalled. Total time spent at school per week was calculated by multiplying the daily reported time by five (weekdays only).

Table 2.8: Estimated waking hours a day (average)

	age ranges			
	0–3	3–5	5–11	11–18
average waking hours	10.8	12.4	13.7	15.4

All these weekly hours, including the total waking hours per week, were then calculated for a year. Based on the average school holiday period in the UK (13 weeks), the weekly school time was multiplied by 39 weeks ($52-13=39$). It was, however, assumed that participants would continue doing all the activities throughout the whole year. Thus, reported weekly time spent on activities was multiplied by 52, and so was the total waking hours per week. The time spent per year at school and the time spent per year doing these activities were then totalled.

The participants were not asked about the exact time they spent at home. In order to approximate this, the totalled time spent at school and in activities reported by the participants was subtracted from the total waking hours per year. Note that “home” refers to time spent with input providers in the family (parents, older siblings and grandparents) only if they were in the same house with the child. Given this, activities such as TV watching, reading, etc. were considered activities done outside “home”, although they mostly take place at home.

If, for example, a participant reported that when s/he was 3–5 years old, s/he spent approximately a total of 18 hours per week on activities (TV, reading, etc.) and $5 \times 6 = 30$ hours per week at daycare, then this would mean that s/he spent $18 \times 52 = 936$ hours per year on activities, and $30 \times 39 = 1170$ hours per year at daycare. Given that a child between 3 and 5 is awake approximately 12.4 hours per day, s/he would be awake $12.4 \times 7 \times 52 = 4513.6$ hours per year. $1170 + 936 = 2106$ hours would have been spent on activities and at school. This would

mean that the remaining time, $4513.6 - 2106 = 2407.6$ hours a year, would have been spent at home with the input providers. All these calculations will, in the following steps, help us incorporate domain-specific L1 exposure and L1 use variables into one composite variable.

In the next step, we determined the average percentages of L1 exposure and L1 use in each domain. Let us start with the home domain. The participants were asked to recall and approximate the amount of L1 they were spoken to by the input providers, and the amount of L1 use they responded to in return, in percentages. Since all participants in the study were adults, asking them to report the amount of time each input provider spent with them on an average day from early ages onwards, would not have been rational and practical. To the best of my knowledge, there are not any previous studies conducted with this community which provide any sort of approximation for proportions of the time spent with different family members. It is, therefore, very difficult to estimate a separate proportion for each family member especially given that in some families grandparents also spend a considerable amount of time with the children. For the sake of home input and output calculations, we, therefore, assumed that each input provider (father, mother, siblings, grandparents etc.) spent an equal amount of time with the child, acknowledging that this might be slightly different from reality (future researchers may consider different possibilities for approximating the proportions). This means that the age-specific L1 home exposure and use were calculated as the mean value, namely the sum of the reported percentages divided by the total number of interlocutors. If the child reported that s/he was spoken to in 90 % Turkish by his or her mother, 100 % Turkish by his or her father, and reported not having any older siblings or grandparents, then the L1 exposure percentage at home was $= (0.9+1)/2=0.95$, i.e. 95 % Turkish.

Similar calculations were done for L1 exposure and L1 use at school. Following BILEC, it was assumed that the child would spend two-thirds of the school time interacting with the teacher and the rest (one third) with friends at school. That is why the percentage of L1 exposure and use at school was calculated as follows. If the participant reported that s/he got exposed to 5 % Turkish input by her teacher and 10 % Turkish input by her friends between the ages of 5 and 11, then L1 exposure at school during this age period would be $= [(0.05 \times 2) + (0.1 \times 1)] / 3 = 0.066$. In other words, the participant got exposed to 6.6 % Turkish during his/her primary school education.

Finally, in the third domain, “activities”, a differentiation was made between the activities that would not involve any language use (but exposure) and the ones that would. Given that

watching TV and reading books/magazines are mostly considered as sources of passive exposure, we did not include these sources while calculating the percentage of language use in this domain. All four activity categories, however, were included in the exposure calculation. Recall that each participant was asked to indicate the frequency of time they spent on each activity per week and the percentage of the L1 involved in it. This time they were not asked to report language exposure and use separately, unlike in the previous two domains. That is why, in the calculations, the reported percentage was assumed to be the same for both input and output. For the mean percentages, each reported L1 percentage was multiplied by the total hours spent on that activity on a weekly basis. All these calculations were totalled and divided by the total time spent on the activities altogether. If, for example, the participant reported to have spent three days per week, three hours per day watching TV in 100 % Turkish, five days per week, one hour per day on reading in 90 % Turkish but no other activity, between the ages of 11 and 18, then the exposure that the participant received from the activities during this age range was $= [(3 \times 3 \times 1) + (5 \times 1 \times 0.9)] / (9 + 5) = 0.96$. This means that the participant got exposed to 96 % Turkish from the activities during the period of 11–18. All these calculations were repeated for each age period for both L1 exposure and L1 use.

In the final step, all domain-specific exposure and use variables calculated for each age period were incorporated into one exposure and use variable respectively. This is the point where all the previously calculated yearly-spent times (proportional times) in each domain needed to be integrated into the calculations. In order to incorporate all L1 input sources coming from three domains (home, school and activities) into one exposure variable for the age period 5–11, for example, first the exposure variable of the first domain (home) for this age period was multiplied by the total number of hours (TNH) per year spent at home (as calculated previously). Similarly, the exposure variables of the second and third domains were all multiplied by the TNH per year spent in each respectively. All these were then totalled and divided by the total number of waking hours per year, as exemplified below. Note that the reported average waking hours for this age period was 13.7 per day. This is calculated for a week, first, by multiplying it by seven, and then for a year, by multiplying it by 52.

L1 exposure 5–11 = $[(\text{exposure at home} \times \text{TNH spent at home}) + (\text{exposure at school} \times \text{TNH spent at school}) + (\text{exposure through activities} \times \text{TNH spent on activities})] / 13.7 \times 7 \times 52$

The same procedure was repeated for each age period, and calculated for both L1 exposure and L1 use by using the pre-calculated variables, as described above. This procedure would result in four L1 exposure variables and four L1 use variables. At this point, an attempt was made to approximate L1 exposure and use over the years, i.e. cumulative scores. In order to do this, a weighted mean calculation was done by multiplying each one of the four exposure percentages by the corresponding years in each age period, which were then totalled and divided by 18. This resulted in two quantity-related cumulative predictor variables: cumulative L1 exposure and cumulative L1 use.

$$\text{cumulative L1 exposure} = [(L1 \text{ exposure } 0-3 \times 3) + (L1 \text{ exposure } 3-5 \times 2) + (L1 \text{ exposure } 5-11 \times 6) + (L1 \text{ exposure } 11-18 \times 7)] / 18$$

$$\text{cumulative L1 use} = [(L1 \text{ use } 0-3 \times 3) + (L1 \text{ use } 3-5 \times 2) + (L1 \text{ use } 5-11 \times 6) + (L1 \text{ use } 11-18 \times 7)] / 18$$

To account for the quality part of the input, another cumulative variable, called “richness”, was derived from the activities part of the questionnaire. This variable has been tested in both heritage language (R. Jia & Paradis, 2014) and bilingual L2 acquisition (J. Paradis, 2011) investigations. The calculation of this richness variable was adapted from R. Jia and Paradis (2014) and modified further, as described below.

In the first stage of calculating this variable, we made use of some previous calculations where the reported amount of time for the activities was multiplied by the reported L1 percentage involved in it. This would give us the total number of hours of Turkish involved in that activity. Additionally, the same calculation was done for the L2, as participants reported how much time they spent and how much of the L1 versus the L2 was involved in each one of these activities. The separate L1 and L2 richness score for each participant in each activity category was determined according to the largest value derived as a result of this multiplication. This value simply reflected the largest number of hours spent doing that particular activity in Turkish and English respectively. All the other scores were divided by this value. This method of data normalisation allowed us to evaluate each participant according to a common base. As a result, each participant received a richness score out of one in each category for each age period. Since there were five categories in the “activities” section, the scores each participant received from each category out of one were added up. This means that the highest possible L1 and L2 richness score was five. Note that the richness

scores were calculated separately for L1 and L2 and thus an L1 richness score of 4 does not mean that the score for L2 richness equals to 1.

This procedure is exemplified below for five HSs who participated in the study for ages 3–5 in two activity categories only, reading and TV watching, in L1 Turkish. Note that since we used only two activities here instead of five, the total possible richness score is two.

Table 2.9: L1 richness 3–5 scores for the activity reading books/magazines

Participant	(a)days		(c)L1 %	TOTAL (a)x(b)x(c)	(d1) reading 3-5 score
	a week	(b)hours a day			(divided by the biggest TOTAL score)
HS1	2	1	0.6	1.2	0.8
HS2	3	0.5	1	1.5	1
HS3	1	1	0.4	0.4	0.27
HS4	3	1	0.3	0.9	0.6
HS5	2	0.25	0.8	0.4	0.27

As explained above, first the reported weekly time spent on each activity was multiplied by the reported L1 percentage involved in it. In order to assign a value to each participant, all scores were divided by the largest value (given in bold characters) derived as a result of this multiplication. Each participant received a score out of one. The same was repeated for TV watching below.

Table 2.10: L1 richness 3–5 scores for the activity watching TV

Participant	(a)days a		(c)L1 %	TOTAL (a)x(b)x(c)	(d2) reading 3-5 score
	week	(b)hours a day			(divided by the biggest TOTAL score)
HS1	5	3	0.6	9	0.75
HS2	3	4	1	12	1

HS3	6	1	0.4	2.4	0.2
HS4	3	1.5	0.5	2.25	0.19
HS5	5	2	0.8	8	0.66

In the end, the values that each participant obtained from each activity were added to give a final score of richness for the age period of 3–5 out of two (Table 2.11).

Table 2.11: L1 richness 3–5 score (out of 2)

Participant	(d1+d2)
HS1	1.55
HS2	2
HS3	0.47
HS4	0.79
HS5	0.93

After deriving Turkish and English richness scores separately, cumulative measures for L1 and L2 richness were calculated by means of weighted calculations for the age period of 0–18.

In sum, four cumulative input quantity/quality (exposure and richness) and output quantity (use) variables were derived as predictors from the HL sociolinguistic questionnaire, which are shown in Table 2.12 below:

Table 2.12: Predictor input/output and richness variables

	mean (%)	range	SD
cumulative L1 exposure	0.449	0.16–0.75	0.115
cumulative L1 use	0.473	0.18–0.65	0.137
cumulative L1 richness	1.007	0–1.94	0.486

cumulative L2 richness	1.612	0.57–3.29	0.54
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L1=first language; L2=second language; SD=standard deviation

Note that in Chapter 3, rather than relying on the cumulative measures, we used age-specific sub-measures, mainly because the study was interested in revealing how the quantity/quality of the input that HSs were exposed to at different stages of their acquisitional process would relate to their accuracy performance in evidentiality. Based on the scope of the research carried out in Chapter 5, on the other hand, which aimed at investigating the relationship between the amount of past L1 experience and morphological productivity performance, it was more appropriate to use the cumulative measures.

2.3.2 Spoken data (The interview and picture description)

2.3.2.1 Transcription and coding of the spoken data

The transcription of the 44.9 hour-long recorded data (37.4 hours of interview + 7.5 hours of picture description) was done according to Codes for the Human Analysis of Transcripts (CHAT) conventions (MacWhinney, 2000) using conventional orthography and spelling. The data was cleared from proper nouns, errors, code switches, reformulations, retracings, repetitions, filler words as well as disfluency markers. While the pruned speech obtained from the interview overall consisted of 153,175 tokens, the pruned speech obtained from the picture description task consisted of 30,289 tokens. Note that these numbers show slight differences in the individual studies written as chapters of this thesis. This is because not all studies included all of the groups and/or both tasks (the interview and the picture description) at the same time.

Following the transcription of the data, each speech file was annotated for different types of clauses first (see below), and following this for finite verb inflection (tense-aspect-modality, TAM) markers in each sentence type, too (if applicable). The morphological parsing of the pruned data, on the other hand, was carried out by an automatic parser developed by Sak, Güngör and Saraçlar (2008) on the unannotated data files, but the output was corrected manually (see Chapters 4 and 5). The annotated features were then transferred to and organised in Excel first, and the statistical analyses were run either in SPSS or in the R statistical platform.

2.3.2.1.1 Annotation of sentence types and clauses

In order to obtain reliable measures and carry out analyses, the data was segmented into units of utterances. The criteria for the subdivision of speech segments were adapted from Foster, Tonkyn and Wigglesworth (2000), Berman and Slobin (1994), and Young (1995). Some conventions and suggestions used in the transcription manual prepared by Steinkrauss and Lahmann (2014) (for the investigation of L1 German and L2 English in Holocaust survivors) were also adapted if they were considered useful for the current study. The details of the criteria adapted are provided below with examples, where necessary, from the data.

The decision of what forms a unit of utterance was made according to the AS-Unit definition of Foster et al. (2000). An AS-Unit is “*an independent clause, or sub-clausal unit, together with any subordinate clause(s) associated with either*” (Foster et al., 2000, p. 365). In this definition, an independent sub-clausal unit refers to utterances that “can be elaborated to a full clause by means of ellipted elements from the context of discourse or situation” as well as utterances that can be considered as nonsentences, such as thanks, interjections or yes/no answers (Foster et al., 2000, p. 366).

Given this definition, any utterance (e.g. non-finite clauses, finite clauses, interjections, fragments, one-word utterances, thanks, yes/no answers) was coded with the help of the context, pauses and intonations (Steinkrauss & Lahmann, 2014). Independent or dependent clauses (finite or non-finite) and/or subclausal units that form one AS-Unit together were separated at their boundaries, i.e. each clause/fragment/subclausal unit was entered in a different tier but connected with “+” signs, as in 2.1, to indicate that they belong to the same AS-Unit (Steinkrauss & Lahmann, 2014). Single AS-Units, such as one simple independent clause or a yes/no answer, were entered in a single tier. As a result, an AS-Unit either consisted of one single tier line or several tier lines.

2.1

*XYZ: bir hastane-ye git-tiğ-imiz zaman +

%cla: adverbial \$finiteness:nonfinite \$suffix:DIK

one hospital-DAT go-VN-1PL.POSS when

*XYZ: + bir ücret öde-me-z-di-k eskiden.

%cla: mainclause

a price pay-NEG-AOR-P.COP-1PL earlier

“When we went to a hospital we would not pay anything.”

Among the principled criteria of data exclusion proposed by Foster et al. (2000), exclusion was carried out at level three. This means that greetings, quotations, one-word utterances, except for those consisting of a finite verb (a simple independent main clause in Turkish), interjections such as thanks or yes/no answers, false starts, repetitions and self-corrections were excluded from the count, and so were the code switches and fillers. Only the AS-Units that included finite or non-finite subordinate clauses with the main clause and simple independent clauses were included in the total count to analyse. This resulted in 28,240 AS-Units consisting of 38,236 clauses.

All fragments or non-independent sub-clausal units embedded within any of these clauses were kept within the clause. Formulaic expressions, such as *I think, you know, I assume, let me say*, were kept within the clause they belonged to, i.e. they were not considered as full verbs or separate single main clauses, but as fragments attached to the clause they were embedded in (Steinkrauss & Lahmann, 2014). Each clause type was annotated on a *cla* (clause) tier, and subordinate clauses were coded by their type (e.g. adverbial), finiteness (e.g. nonfinite) and sub-type depending on the type of the subordinating suffix (e.g. *-DİK*), subordinator, and/or postposition used, as in 2.1 above.

The only exception to the above definition of an independent sub-clausal unit in the current study was that sentences that were introduced with ellipsed utterances, where the verb is not repeated due to reasons such as grammatical reductions, were not considered as two different AS-Units, but only one, as shown in 2.2, 2.3, and 2.4 (Young, 1995). This is because separating them would have caused the full utterance to lose some of its semantic components. The omitted parts in the ellipsis construction were shown as bold in parentheses.

2.2

*XYZ: Ben-im makyaj-1m-1 yap-ar(-**mİŞ**) öyle iş-e gid-er-miş.

%cla: mainclause

My make-up-1SG.POSS-ACC do-AOR-(EV.COP) then work-DAT go- AOR-EV.COP

“S/he reportedly used to do my make-up and then go to work.”

2.3

*XYZ: Yemek ye-r(-**iz**) bir iki bira iç-er-iz.

%cla: mainclause

meal eat-AOR (-3PL) one-two beer drink-AOR-3PL

“We will eat out and drink one or two beers.”

2.4

*XYZ: Hem kendi-m için kork-uyor-du-m hem çocuğ-um için (**kork-uyor-du-m**)

%cla: mainclause

both self-1SG.POSS for being afraid-IMPF-P.COP-1SG and child-1SG.POSS for (being afraid- IMPF-P.COP-1SG)

“I was afraid for both myself and my child.”

The sentences that are coordinated by the subordinators/clitics *diye, da, ki, gibi, sanki miş, nasıl ki, dı mı, madem ki* were not considered as independent, but as finite subordinate clauses (Göksel & Kerslake, 2005) forming one AS-Unit. 2.5 below shows a finite adverbial clause formed with the subordinator *ki*.

2.5

*XYZ: Öyle çok üşü-dü-m +

%cla: mainclause

so much being cold-D.PAST-1SG

*XYZ: + ki dudak-lar-ım morar-dı.

%cla: adverbial \$finiteness:finite \$subordinator:KI

SUB lip-PL-1SG.POSS turn blue-D.PAST

“I was so cold that my lips turned into blue.”

If two finite sentences are combined with other coordinating conjunctions, such as *hem...hem..* (“both...and...”), *ne...ne...* (“neither... nor...”), *ve* (“and”), *ama/fakat* (“but”), or *çünkü* (“because”), they were considered as two AS-Units, as exemplified below (conjunctions are in bold).

2.6

*XYZ: araba sürücü-sü-nün **ne** ehliyet-i var-mış.

%cla: mainclause

car driver-3SG.POSS-GEN either driver license-3SG.POSS exist-EV.COP

*XYZ: **ne** ruhsat-1 var-mış.

%cla: mainclause

nor registration-3SG.POSS exist-EV.COP

“The driver had neither a driver licence nor registration.”

If, however, the coordinators above coordinate phrases/fragments/non-finite subordinate clauses/ellipted elements, instead of two sentences with two finite verbs, as in 2.7 (note that the English translation of the example does not follow the same structure in Turkish), they were considered as forming one AS-Unit. If, of course, this AS-Unit was a subordinate clause itself, then it was connected to its main clause by using “+” signs, as in 2.7. Brackets show the subordinate clauses and the conjunctions are written in bold.

2.7

*XYZ: ama [adam-in **ne** sigorta-sı ol-duğ-u için] [**ne** parası ol-duğ-u için] +

%cla: embedpp \$finiteness:nonfinite \$postposition:icin

but [man-GEN neither insurance-3SG.POSS be-CV-3SG.POSS for] [nor money-3SG.POSS be-CV-3SG.POSS for]

*XYZ:+ masraf-lar-1 halam karşıla-mış.

%cla: mainclause

expense-PL-ACC aunt-1SG.POSS cover-M.PAST.

“Since the man has neither an insurance nor money (reportedly), my aunt covered the expenses.”

Spoken Turkish is quite rich in terms of multiple subordinate clauses. Non-finite subordinate clauses of the same type that are employed by the same suffix referring to the same subject or modifying the same object were coded and counted only once, as long as they occurred consecutively. If not, they were counted as separate. 2.8 below shows two participles (relative clauses) that are formed with the same suffix, $-(y)An$, which modify the same subject. These two relative clauses were counted only as one and therefore were kept in the same tier, but were connected to their main clause with a “+” sign.

2.8

*XYZ: Sağlığı-na [önem ver-en] altı ayda bir [kontrol-e gid-en] +

%cla: embedrelative \$finiteness:nonfinite \$suffix:yAn

health-3SG.POSS-DAT [value give-PART] six month-LOC every [control-DAT go-PART]

*XYZ: + bilinçli bir insan anla-r bu-nu.

%cla: mainclause

conscious a human-being understand-AOR this-ACC.

“A conscious human-being who values his/her health and goes for check-ups every six months understands this.”

Similarly, if a sentence contains two consecutive verbs but one subject, unless coordinated with a coordinator as above (*ne...ne, hem...hem* etc.), it is considered as one single clause (Aksu-Koç, 1994) and only the first verb was taken into consideration.

2.9

*XYZ: Hızlıca ye-di-m bitir-di-m.

%cla: mainclause

Quickly eat-D.PAST-1SG finish-D.PAST-1SG

“I ate and finished it quickly.”

In cases where the first part of an AS-Unit was interrupted to give further information or to modify the topic, for example, and then was continued with the second part of the unit, the structures in-between were not included in that AS-unit, but coded as fragments or independent simple clauses depending on the grammatical structure of the interrupting utterance. These two parts of the same unit were considered as forming one AS-Unit (Steinkrauss & Lahmann, 2014).

The informal nature of the conversations also made it necessary to make further decisions on some structures. In Turkish, if the object of the verb *de* (“to tell”) is a full sentence with a tensed verb/predicate, that sentence forms a finite noun clause (Göksel & Kerslake, 2005). However, since this verb was frequently used in the data (as the participants were asked to tell us some stories experienced by themselves or by their friends, relatives, etc., which inevitably elicited many cases of the verb *de-*), it was necessary to specify a word limit to code the object sentence that was attached to this verb as a finite noun clause.

Following Treffers-Daller et al. (2007), if the sentence attached to the verb *de-* included less than or was equal to two words, that sentence was not considered as a finite noun clause but as a fragment attached to the main clause. All the other cases were, however, coded as finite noun clauses attached to the main clause (belonging to the same AS-Unit in separate tiers). If, however, the object of the verb *de-* consisted of more than one sentence, this object of the verb as a whole was considered as a quotation and enclosed in angled brackets, and was not included in the total word counts or further analyses.

Some Turkish sentences are not necessarily formed by an overt verb (verbless clauses). Following Berman and Slobin (1994), sentences that were not overtly formed with the present tense but formed with noun predicates corresponding to the verb “*to be*” were considered as simple independent main clauses. Such an example can be seen below (the predicate is in bold):

2.10

*XYZ: Türkiye ora-ya göre daha iyi **koşul-lar-da**.

%cla: mainclause

Turkey there-DAT according to more good condition-PL-LOC

“Compared to that place, Turkey is in a better condition.”

Note that AS-Units in the picture description transcriptions were coded but were not included in the structural complexity analysis (see below Section 2.3.2.2.2 for details about the calculation of this variable), as this task was specifically designed to elicit inferential evidential forms and thus used only for this purpose.

2.3.2.1.2 *Annotation of finite verbs and evidentiality*

Turkish is an agglutinative language and thus expresses TAM morphologically. As stated by Aksu-Koç (1994, p. 332), “[t]he Turkish tense-aspect-modality system can be characterized in terms of two main dimensions, one temporal, PAST-NONPAST, and one modal, DIRECT EXPERIENCE-INDIRECT EXPERIENCE”. Based on the purposes of the study carried out in Chapter 3, finite verbs found in both the picture description task and the semi-structured interview were coded for TAM markers. This was done only after the data was segmented into AS-Units. A “tense” tier was created to place under the “cla” tier, as in 2.11, only when applicable. As can be seen, the tense tier included the finite verb, the tense (e.g. mpast, dpast,

other, or present *-yor*), its evidentiality status (e.g. *-miş*, *-di* or *zero*), the type of evidential (e.g. reportative versus inferential) and finally the suffix (e.g. *-miş*).

Note that the coding was done for the TAM markers relevant for the property under investigation only (evidentiality encoded in the Turkish past tense system). This means that complex forms or simple forms that are constructed by other TAM markers that are not included in the coding table (Table 3.3 provided in Chapter 3, Section 3.5.3) were not coded or counted. In other words, there was not a tense tier under each cla tier. Chapter 3 provides a more comprehensive description of how the coding was done.

2.11

*XYZ: masraf-lar-ı hala-m karşıla-mış.

%cla: mainclause

%ten: < karşılamış > \$tense:mpast \$evid:mis \$mis:reportative \$suffix:mis

expense-PL-ACC aunt-1SG.POSS cover-M.PAST

“Reportedly, my aunt covered the expenses.”

2.3.2.1.3 Morphological Parsing of the Data

The morphological parsing of the words into their lemmas + suffixes was carried out automatically on the pruned data with the aid of the morphological parser and the disambiguator developed by Sak et al. (2008; 2009). These lemmatised words, as in **2.12**, produced by each participant were then organised in Excel. Here, in the example, after the base lemma *anla* "to understand", the information in the brackets provides its part of speech tag (PoS), which is a verb. This is followed by individual suffixes the word consists of separated by plus signs, and the description of the corresponding morphological features is given in brackets, e.g. [P1sg] (first person singular possessive). Note that a PoS might precede the description of the morphological feature if a particular suffix changes the word class of a stem (e.g. *DHk*[Noun+PastPart]). Uppercase letters show the lexical representation of a vowel or a consonant to indicate that surface forms might be realized differently depending on the rules of the vowel harmony and consonant devoicing (see Göksel & Kerslake, 2005). The past participle suffix represented as *-DHk*, for example, can be realized as *-dik*, *-dik*, *-duk*, *-dük* or *-tik*, *-tik*, *-tuk*, *-tüük*. While the capital H represents the surface form change of the vowels, the capital D is the representation for the consonant change between the letters d and t.

The description of the complete tagset⁷ can be found in Oflazer, Say, Hakkani-Tür, & Tür (2003). Please note that the raw output of the corpus also provides morphological features that were not realized in the actual utterance. Given that we are interested in the actual realizations, we removed these empty categories in the analyses and in the example below.

2.12

anla[Verb]+YAmA[Able+Neg]+DHk[Noun+PastPart]+ lAr[A3pl]+Hm [P1sg]

‘the things that I am/was not able to understand’

2.3.2.2 *Dependent variables*

2.3.2.2.1 *Evidentiality accuracy*

An error analysis was carried out and replacement errors (contextually inappropriate usages) were of interest in this respect. See Chapter 3 for details.

2.3.2.2.2 *Structural complexity*

The structural complexity measure consists of five sub-measures: the agglutination index (the ratio of the total number of morphemes over words per AS-Unit calculated per participant) (Huls & van de Mond, 1992), the number of three types of verbal complements and non-finite relative clauses counted per AS-Unit per participant. These types were reported to be the most problematic by Treffers-Daller et al. (2007). Following Lahmann, Steinkrauss and Schmid (2016), these measures were then incorporated into one structural complexity measure. See Chapter 4 for justification of the measures and more details.

2.3.2.2.3 *Morphological Productivity*

Following Gal (1989), the morphological productivity was measured by calculating the type frequency of a suffix template per person, i.e. the frequency of occurrences of a particular suffix template with different lemmas, found in the entire corpus. See Chapter 5 for details.

⁷ Note that the tagset of the parser is slightly different from the tagset we used in the other examples provided. The reason we did not adapt the parser’s output to the tagset we used across the study (which is more widely used) is to reflect the originality of the description of the parser output.

2.3.3 C-Tests and Can-Do scale

2.3.3.1 Coding and calculation of the dependent variable

A binary right/wrong taxonomy was applied in the scoring of the C-Tests. The right answers were totalled for each individual. This means that each individual received a score out of 40 for either C-Test. Table 2.13 below shows the mean scores obtained by groups (missing values are excluded from the mean calculations).

Table 2.13: C-test scores across groups

	n ⁸	L1 C-test max=40	L2 C-test max=40
HSs	27/28	22.33 (SD=8.85)	26.3 (SD=7.1)
EBs	28/25	25.32 (SD=6.64)	21.04 (SD=7.58)
LBs	31/24	30.97 (SD=4.3)	20.58 (SD=7.1)
CG	44/NA	30.23 (SD=5.83)	n/a

HSs=heritage speakers; EBs=early bilinguals; LBs=late bilinguals; CH=control group; max=maximum; SD=standard deviation

As for the Can-Do scale, a mean value was calculated among the 43 items for an overall impression of their self-assessed English language proficiency. Additionally, separate mean values were obtained for each proficiency skill based on the number of items included in the scale for each skill (see Appendix 21 and Appendix 22 for the Can-Do scale). Table 2.14 below shows the capabilities of the CG participants in English as a foreign language. It appears that the CG participants were predominantly monolingual.

Table 2.14: Can-Do scale

⁸ Note that some participants did not fill out the C-test or did not complete the whole test. In those cases, their data was considered as missing.

	Can-Do score (/5)
L2 listening	1.5
L2 reading	1.480519481
L2 speaking	1.439839572
L1 writing	1.402892562
L1 overall	1.44820296

2.3.4 Perceived nativelikeness

2.3.4.1 Calculation of the dependent variable

The foreign accent ratings (FAR) that each participant received from each judge (n=28) were averaged, and each participant received a FAR score out of six. A higher FAR was an indication that the speaker was perceived to sound less native-like.

Chapter 3 Effects of first language attrition on heritage language input and ultimate attainment: Two generations of Turkish immigrants in the UK

Abstract

The present study investigates spoken L1 performance of both adult heritage speakers (HSs, n=31) and first generation immigrants (LBs, n=31) of Turkish descent in the UK, in comparison to that of controls (CG, n=44) regarding the distribution of evidentiality encoded in the past tense system. This approach allows us to test whether the ultimate proficiency relates to qualitatively distinctive input conditions that the HSs might have been exposed to (Rothman, 2007). We further trace the effect of input reductions over time and continuous L1 use on the development of the heritage language. The analyses suggest that the HSs fail to attain monolingual L1 abilities regarding evidential structures. The primary source of this performance does not seem to be qualitatively modified input, as the evidential performance of the LBs is intact. The non-convergent L1 performance is rather linked to the amount of input, which has been found to be insufficient to compensate for the detrimental effects of early bilingualism on the L1. Findings are discussed within the premises of available approaches proposed to explain the non-convergent L1 behaviour of HSs.

3.1 Background to the study

Heritage language bilingualism is a special kind of bilingualism with respect to acquisition conditions and the sociolinguistic environment of the speakers (see Montrul, 2016c). In the current study, heritage speakers (HSs) are usually the children of the first generation of immigrants, and were either born in the L2 country or immigrated with their parents at a very young age (usually before age 5). These speakers acquire the minority/immigrant language at home and achieve bilingualism depending on the timing of the L2 acquisition, which can take place either from birth or the start of (pre)schooling in the L2 country (Montrul, 2016c; Rothman, 2009). Unsurprisingly, these speakers ultimately become

dominant in the L2, the societal and educational language, as the L1 use remains rather limited and is restricted to a certain number of domains (Benmamoun et al., 2013; Montrul, 2008).

The development of heritage languages (HLs) in both children and adults has been studied extensively in the last decades. Although HSs might develop age-appropriately during early childhood and obtain native-like levels of L1 proficiency in adulthood (Montrul, 2016c), it is not uncommon to find studies reporting less target-like grammatical behaviour in childhood that lags behind the monolingual performance. This is presumably because of the shift in language exposure patterns during school years (e.g. La Morgia, 2011; Montrul, 2008; Silva-Corvalán, 2016). As evidence points out, this pattern might continue into adulthood. There is indeed a large body of research reporting that HSs might not fully converge on adult-like linguistic development in the HL, especially in the area of nominal and verbal morphology in both production and comprehension (e.g. Albirini et al., 2011; Montrul, 2008, 2010, 2016c; Montrul et al., 2012, 2014; van Osch & Sleeman, 2016). It has also been shown that the degree of this attainment might show differences across various linguistic domains or linguistic categories within the same domain (Albirini et al., 2011; Montrul, 2008, 2009; Montrul et al., 2012).

Among the successful attempts accounting for these HL divergences, incomplete acquisition (Montrul, 2008) and language attrition (Polinsky, 2011) explanations have prevailed in the literature. In both approaches, the linguistic categories are presupposed to be available in the input (Rothman, 2007). This assumption is challenged by Rothman's (2007) input claim: the inherent properties of the input that HSs are exposed to might have changed due to attrition (and other possible reasons, such as shift, CLI and diachronic change) in the parental generation, which can provide an alternative explanation to the non-convergent L1 knowledge of HSs, at least for some grammatical categories (also Pascual y Cabo & Rothman, 2012; Pires & Rothman, 2009; Rothman, 2009).

The present study primarily aims to test Rothman's (2007) qualitatively different input hypothesis by comparing the L1 performance of both adult HSs and first generation immigrants of Turkish descent in the UK to that of monolinguals. The investigation is carried out in a grammatical category known to be vulnerable in heritage bilingual populations: evidentiality (Aarssen, 2001; Arslan, Bastiaanse, et al., 2015; Arslan, De Kok, et al., 2015; Karakoç, 2007). This approach allows us to estimate whether HL input is of native-like quality in terms of evidential structures, and evaluate further the extent of individual

variation in ultimate attainment with respect to quality/quantity of input received by HSs and amount of further L1 use.

3.2 Measuring input quantity and quality

Quantity of input refers to the amount of language input provided to a monolingual or bilingual child. Acquiring two languages limits the amount of input a bilingual child can receive in each language compared to a monolingual child (J. Paradis & Genesee, 1996; Scheele et al., 2010). Despite some inconsistencies, the great majority of research conducted with bilingual/HL speakers points to the predictive role that the amount of input received in the L1/L2 plays in the target language's lexical and grammatical development (Ågren, Granfeldt, & Thomas, 2014; De Houwer, 2007; Gathercole, 2007; Gutierrez-Clellen & Kreiter, 2003; Hoff et al., 2012; La Morgia, 2011; Unsworth et al., 2014).

Input quantity data is commonly examined through detailed parental questionnaires (e.g. Gutierrez-Clellen & Kreiter, 2003; R. Jia & Paradis, 2014; J. Paradis, 2011). Although the basic approach in these questionnaires is very similar, i.e. asking parents a series of questions about the target language use/exposure patterns of their children, input tends to be quantified differently across studies. This lack of an agreed sound quantification method may result in inconsistent findings.

Challenging traditional measures, recent research has proposed more reliable calculations for length of exposure, as well as current language exposure, by means of a measure called the "Bilingual Language Exposure Calculator" (BILEC) (Unsworth, 2016). BILEC considers different domains of language use in a child's environment, such as home, school and activities, and approximates the overall amount of exposure on the basis of the proportion of time spent in each domain with different input providers. All these calculations are carried out for the time the child is awake by taking their age-specific waking hours into consideration. The cumulative language exposure is then calculated by adding up the language exposure values estimated over the individual years until the age at testing. Although this technique improves the traditional measures, some caution is warranted as these are still approximations based on individual reports rather than real measures and observations (Unsworth, 2016).

Input quality, on the other hand, refers to how rich and diverse the input is in terms of linguistic structures and vocabulary (J. Paradis, 2011). Monolingual language acquisition has mainly associated it with the socioeconomic status (SES) of the family (Hoff, 2006)

and/or the education level of the parents. The underlying assumption is that parents, and especially mothers with higher levels of education (high SESs), would engage their children in activities, such as reading books, more frequently, providing richer and more diverse input (Hoff, 2006). This relationship between SES and input quality through home literacy activities, such as storytelling, book reading or educational TV watching, is, however, inconclusive in bilingual/HL contexts (Gutierrez-Clellen & Kreiter, 2003; Leseman, Scheel, Mayo, & Messer, 2009; Scheele et al., 2010). Apart from these, how well the input provider speaks the language (Gutierrez-Clellen & Kreiter, 2003; Unsworth, 2013), the time spent in the L1 country (De Houwer, 2009), and the number of input providers (Gollan et al., 2014), have all been suggested to increase the chance of hearing more diverse and rich HL input.

Reflecting these previous results, a composite variable called “richness” has been proposed and tested in both HL (R. Jia & Paradis, 2014) and early L2 acquisition (J. Paradis, 2011). This variable is derived from answers given to a series of questions in the questionnaire, where parents/participants are asked whether their children participate in activities such as TV watching, book reading or typing on the computer, and how much of these involve the L1 versus the L2. This kind of engagement with the HL, mainly outside the home and school contexts, has been shown to predict HL development in both child and adult HSs (Kondo–Brown, 2005).

As much as previous research demonstrates a “causal relationship” between input and language development, it has been argued that input should not be considered the only factor explaining the whole bilingual/HL acquisition process (Long & Rothman, 2014). Factors such as the timing of acquisition (Ågren et al., 2014; Tsimpli, 2014), age of bilingualism (Montrul, 2008), nature of the properties, e.g. transparency, complexity (Ågren et al., 2014; Gathercole, 2007) may also play roles in bilingual language development. It has been suggested that this causal relationship might hold during the early years of development only and then fade away once children have had enough input (critical mass) to acquire the property (Aksu-Koç, Terziyan, & Erguvanlı-Taylan, 2014; Gathercole, 2007).

In the case of HSs, however, who do not have a large linguistic community to rely on or diverse opportunities to use the language further, such examination may explain the extent of variation in the HL ultimate attainment with respect to input modifications, if not the whole acquisition. As proposed by O’Grady et al. (2011, p. 23) “[a] promising source of insights into heritage language learning comes from the broader study of the role of input in language acquisition”.

3.3 Effects of defective input on HL development

The term *incomplete acquisition* is used to capture the divergent L1 representational system found in HSs that might be a result of simply failing to acquire/master L1 structures because the L1 input was quantitatively not sufficient, and/or the acquisition process was interrupted by the extensive exposure to the L2 at an early age (Montrul, 2016c).

As far as this representational system is concerned, one factor which may be of additional importance relates to qualitatively distinctive input conditions that HSs might have been exposed to (Pires & Rothman, 2009; Rothman, 2007, 2009), and/or HSs' sensitivity to the spoken variety around them (Treffers-Daller et al., 2016).

If a property is not available to HSs, such as in the case of inflected infinitives in Brazilian Portuguese, which disappeared from the colloquial varieties in Brazil (due to diachronic change), and it can only be acquired via formal instruction, HSs that do not have access to L1 education can only be expected not to show knowledge of that property (Pires & Rothman, 2009). Alternatively, the property might be available in the input but in a qualitatively modified form due to attrition in the parental generation (Rothman, 2007; Verhoeven, 2004). Under such circumstances, HSs' acquisition cannot be labelled incomplete as it simply reflects the property of the language they are provided with (Pascual y Cabo & Rothman, 2012), i.e. their acquisition is a complete acquisition of the language variety which is/was available to them. This is one of the reasons why some researchers express their concerns with what the term *incomplete acquisition* entails, as they consider HL development as a continuum and an approximation of the norms of the spoken variety around them, rather than something that lags behind the monolingual variety (Kupisch & Rothman, 2016; Putnam & Sánchez, 2013; Treffers-Daller et al., 2016).

Given all these, Rothman (2009) and Pascual y Cabo and Rothman (2012) caution against evaluating HL competence divergences from an incomplete acquisition perspective before assessing the HL input conditions, and suggest including a control group of first generation immigrants for future studies as an alternative account, to control for effects of altered input.

If age at onset of bilingualism (AaO) is a strong predictor of L1 attrition (Bylund, 2009b; Montrul, 2008), the L1 performance of late bilinguals (LBs) and HSs should, in principle, differ primarily due to their AaO. As argued by Kaltsa, Tsimpli and Rothman (2015), any similarity found in the performance of these groups that differs from that of monolinguals

can be attributed to the effect of “attrited” input or convergence on the spoken variety around them (Treffers-Daller et al., 2016).

This has already been evidenced in some relatively recent studies. Pascual y Cabo (2013), for instance, showed that one of the reasons why Cuban HSs in the US allowed an ungrammatical optional use of agentive syntax with *gustar*-like verbs (class III psych-predicates) was because of the loss of a property (dative marking) in the L1 of the input providers. This property is relevant for the production of this class of verbs, corroborating Rothman’s (2007) input claim.

Montrul and Sánchez-Walker (2013) compared the oral performance of different bilingual groups in the US: first generation Mexican immigrants, child and adult HSs, and monolinguals in Mexico. They found significant omission rates of the property of differential object marking (where English lacks a counterpart) in the production of child and adult HSs, as well as LBs at the group level, suggesting vulnerability of the property to incomplete acquisition and attrition.

To further address the incomplete attainment, they divided the HL groups into two (omitters versus non-omitters) based on their accuracy performance. A higher level of L1 use was associated with better performance (non-omitters). As some attrition was found in the first generation as well, they speculated that variable performance among adult HSs who use their L1 with their parents and older relatives could be related to input quality they received from attrited parents. Similar conclusions were reached by Montrul (2016a) in an investigation of overt pronoun use, which used a similar design of participant groups. As Montrul and Sánchez-Walker (2013) claim, these findings demonstrate a complex relationship between background factors and their contribution to ultimate HL attainment, therefore signifying the roles input quantity/quality play in addition to the effects of other factors, such as CLI (see Kaltsa et al., 2015 for a similar argumentation).

In summary, as stated by Sorace (2014), despite extensive references in the literature to qualitatively different input that HSs might be exposed to, it is quite surprising that not many studies examined this. With this line of thinking, we hope to provide new empirical data and supplementary findings to the existing breadth of the literature reviewed above by investigating HL ultimate attainment from all these aspects – defective input and incomplete acquisition/attrition – in a non-European HL (Turkish) in contact with English. More precisely, we do not only control for the qualitatively different input available to HSs but

also trace the effect of input reductions over time on the development of the HL. This enables the best identification of the sources of non-convergent HL performance.

3.4 Evidentiality in Turkish

Evidentiality is a grammatical indication of how information is acquired, i.e. it refers to the source of knowledge in a proposition (Aikhenvald, 2004; DeLancey, 2001; Johanson, 2006; Lazard, 2001; Schroeder, 2000). Although there are ways to refer to sources of knowledge in all languages, evidentiality can be considered as grammaticalised in a language only if the grammatical system includes markers that semantically or pragmatically refer to the source of knowledge (Lazard, 2001). While Turkish grammaticalises evidentiality in its complex tense-aspect-mood (TAM) system with verbal morphology, English does not (Aksu-Koç, 1988, 2000, 2009; Göksel & Kerslake, 2005).

In references to past events, a native speaker of Turkish has to choose between two different verbal suffixes: the direct experience evidential (Dexp) form, *-DI*, and the indirect experience evidential (INDexp) form, *-mİş*⁹, which additionally subsumes inferential (infE) and reportative evidential (repE) usages. Uttering *bina yan-dı* (“The building burnt down”) with the Dexp marker, *-DI*, would mean that the speaker is a witness of the event, and thus has access to this information through the source knowledge of direct perception (visual access) and/or participation. Uttering *bina yan-mış* (“Apparently, I have been told that the building burnt down”) with the INDexp marker, *-mİş*, on the other hand, is an indication that the speaker did not witness the event directly but acquired the information via one of two sources: logical reasoning (inference) or hearsay (reportative). In the former, the speaker does not see the building burn down (a nonwitnessed event) but has access to physical or visual evidence (resultative states), e.g. remains after the fire, allowing the inference or the logical reasoning of the event (Aksu-Koç, 1988; Slobin & Aksu, 1982). In the latter, on the

⁹ Previous literature proposes an additional separate marker represented as *-(I)mİş* (Csato, 2000; Johanson, 2006). This marker works as a copula marker or as a clitic attaching to nominal predicates and/or already inflected verbs to form complex verbs (E. Sezer, 2001). This form is claimed to be a pure evidential marker conveying hearsay, which does not necessarily mark aspect or tense unless the time reference is specified by the discourse context and/or time adverbials, such as *dün* (yesterday) (Göksel & Kerslake, 2005; E. Sezer, 2001). In the current research, the focus will only be on the verbal past tense suffixes which mark both tense-aspect and evidentiality.

other hand, this information is acquired via linguistic reports and/or third parties, and again this is a nonwitnessed event uttered based on what was heard or read. Both forms of *-mİş* can be distinguished from the *Dexp* by the modal meaning of not witnessing the event (Aksu-Koç, 1988).

InfE forms require the tense to be past (anterior) with the effects of the event, i.e. remains after the fire, visible at the time of observation (resultative), as in the example above (Aksu-Koç, 1988; Bacanlı, 2008; Johanson, 2006; Şener, 2011). The *repE* form, on the other hand, behaves similarly to the *Dexp* in terms of its temporal/aspectual function: they both refer to anteriority and are compatible with both specific, e.g. yesterday, or non-specific, e.g. recently, time reference adverbs (Bacanlı, 2008; Şener, 2011). This means that they can both mark definite past or present perfect (see examples in the Methodology section).

3.4.1 Evidentials in monolingual and bilingual contexts

The longitudinal investigation of evidentiality pioneered by Aksu-Koç (1988) indicates the following order in monolingual acquisition: *Dexp* (around 1;6–2;0) < *infE* (2;0–2;6) < *repE* (2;0–3;0).

Complementary data provided by Aksu-Koç (2000) indicate that the first appearance of *-DI* is a reference to verbal change of states, as well as completed actions, which then extends to descriptions in the remote past. As the data showed, the suffix *-mİş*, on the other hand, first appears in nominal predicates as new information to mark the current states of the entities and includes a surprise element on the basis of direct perception. This extends gradually to picture stories, imitation of adult storytelling, pre-tense references to “physical or emotional states of third parties”, as well as imaginary role-plays (Aksu-Koç, 2000, p. 21). Around the age of 3, children use these forms correctly to refer to past events (Aksu-Koç, 2009). However, the ability to differentiate between witnessed versus nonwitnessed events on the basis of different sources of information, i.e. evidentiality, does not appear before the age of 3;6.

Children still show divergences in these usages, especially in the production of the *INDexp*, until the ages of 6–7 years old (Aksu-Koç, Ogel-Balaban, & Alp, 2009; Ozturk & Papafragou, 2008a, 2008b, 2016). There is a similar asymmetry in the comprehension of the two perspectives (direct versus indirect) (Aksu-Koç, 1988; Ozturk & Papafragou, 2008b, 2016). The correct production of evidential morphemes, however, precedes their overall

comprehension, as evident in tasks where 5–7 year-olds failed to attribute an utterance to the correct speaker who had access to that information (Ozturk & Papafragou, 2008a, 2016).

This has been suggested to possibly relate to the theory of mind (ToM), acquisition of knowledge, or perspective-taking abilities developing independently from language in a series of studies in Turkish (Aksu-Koç, 2009; Aksu-Koç et al., 2009; Ünal & Papafragou, 2016). In other words, children's assessment of the information source available to others might not yet be determined by the linguistic encoding of the source in their languages, although they produce these forms (Aksu-Koç, 2009). There is, however, evidence that shows that the ability to assess their own non-linguistic source of information precedes that of production of evidential morphemes (Ozturk & Papafragou, 2008a, 2016; Ünal & Papafragou, 2013, 2016).

The fact that the direct experience perspective/production develops earlier presumably relates to the transparency of the forms in the input, and the mapping of these forms onto conceptual source functions (after information source concepts develop) (Ozturk & Papafragou, 2016; Ünal & Papafragou, 2013). In terms of source marking, while *-DI* is a unifunctional marker, *-mİş* has more than one function. As proposed by Slobin (2001), forms that map into more than one meaning might be more difficult to acquire. Although evidential *-mİş* is not as transparent as *-DI* in the input, a longitudinal study conducted by Aksu-Koç et al. (2014) has indicated that both of these forms are acquired from the input which provides rich and diverse structures specified for form-function mappings. For less transparent structures, the interaction of frequency with transparency becomes more important, and children acquire these multifunctional structures only gradually (Aksu-Koç et al., 2014; see also Ünal & Papafragou, 2013).

Although limited in number, evidentials have received attention in bilingual contexts as well. Earlier research was concerned with whether young HSs would converge on the monolingual narrative structure in terms of a consistent temporal verb choice. Theoretically, it is possible to retell a story in all three modalities: *-mİş*, *-DI* and the present *-(I)yor*. Some forms might be more appropriate and traditional depending on the reference taken, e.g. the picture book of the story, or the read-aloud story (Karakoç, 2007). As noted by Aarssen (2001, p. 213), “[o]ne way of organising a narrative is to maintain an anchoring tense throughout the text” and use it appropriately in the required discourse.

Taking these as the main criteria, Aarssen's study conducted with 140 Turkish HSs aged 4–10 in the Netherlands showed that while younger HSs presented a high percentage of “unmotivated” (serving an inappropriate discourse function) and inconsistent (not sticking to one anchor form) tense shifts in their narratives of frog stories¹⁰, the rate of these shifts decreased with increasing age. The use of both forms of past tense appeared only after age 6, with a main preference of present *–(I)yor* as the anchored tense. Only 10-year-olds used the past tense forms as the anchor tense in their narratives, but still with some unmotivated shifts. Unlike these findings, however, none of the Turkish-German bilingual subjects (aged 5–8) in Karakoç's (2007) investigation took the *repE* as their basis (anchor) to retell the read-aloud story “Snow White”. This form occurred only in unmotivated shifts.

This kind of inappropriate contextual use seems to persist into adult HS performance. Arslan et al. (see below) have recently shown that evidentials are subject to attrition/incomplete acquisition due to their complex semantics as they require a differentiation between witnessed and nonwitnessed events on the basis of different information sources. An investigation of the spoken performance of adolescent HSs (aged 16–18) in the Netherlands, for instance, showed that they tended to use the direct evidential inappropriately in obligatory indirect evidential contexts, an indication of experiencing difficulties in differentiating between different sources of information (Arslan and Bastiaanse 2014 as cited in Arslan, Bastiaanse, et al., 2015). This led the authors to two conclusions: the HSs might have lost the evidential meanings of the *Dexps* and used them only to refer to past events, and that they retained the evidential meaning of the *INDexps*, at least to some limited degree, as these forms did not appear in place of the *Dexps*. As shown in a later study, evidentials in the performance of adult HSs were not only affected in production, but also in comprehension. This is demonstrated by reduced sensitivity to evidential violations in comparison to time-reference violations and to monolingual performance (Arslan, De Kok, et al., 2015). Interestingly, this reduced sensitivity did not differ between direct and indirect evidentials.

¹⁰ Frog story here refers to a picture story book called “*Frog, where are you?*” which consists of 24 wordless pictures created by Mercer Mayer in 1969 (Berman & Slobin, 1994). The pictures depict a series of events which allow researchers to elicit narrative speech from participants of any age (but especially children) and examine linguistic means that are used to relate different events and describe interactions between characters of the story in different situations such as expression of temporal relations, descriptions of locative trajectories etc. (Berman & Slobin, 1994).

Finally, in an eye-tracking experiment, Arslan, Bastiaanse et al. (2015) compared the online processing of evidentials in both Turkish-German LBs and HSs with respect to AaO. As their findings showed, both LBs and HSs responded to direct evidentials less accurately and more slowly in comparison to monolinguals. For indirect evidentials, surprisingly, no significant differences were revealed between groups (including monolinguals). The authors evaluated this finding in terms of providing support to their previous conclusions: the fact that Dexp were affected while INDexp remained intact seemed to indicate that both groups of bilinguals lost their sensitivity to the evidential value of the Dexp, but retained that of the INDexp.

In short, evidential forms seem to be affected in both child and adult HSs. Potential sources of this L1-divergent performance have, however, remained rather unclear. Despite not being in the scope of the study, the findings of Arslan, Bastiaanse et al. (2015) appear promising to show the influence of qualitatively different input due to reported attrition in the L1 of the LBs. This is yet to be identified.

3.5 The Study

The current research aims to integrate heritage language acquisition/ultimate attainment and first language attrition studies to address the following questions:

- Does the input available to the Turkish-English HSs in the UK show any qualitative differences from monolingual input in terms of evidential structures?
- Do the adult HSs differ in their overall accuracy of evidentials from that of Turkish monolingual speakers living in Turkey and from late bilinguals (LBs) in the UK?
- How do the quantity/quality of the input which HSs were exposed to at different stages of their acquisitional processes, as well as their language use in adulthood, relate to their overall accuracy in the use of evidentials?

As the direct evidential is the default past tense form and shares a surface similarity with the English past tense marker, it is expected to be more resistant to selectivity in immigrant groups when compared against indirect evidentials that require special pragmatic and semantic contexts. If this triggers any sort of attrition/CLI in the performance of the LBs, based on Rothman's (2007) input claim, this should be reflected in the HSs' performance. We, therefore, assume that qualitatively modified input received by the HSs will help explain HL divergences. Additionally, based on previous literature, being multifunctional and less

transparent, indirect evidentials would be more difficult and require more input to be acquired. They are therefore expected to be more vulnerable to input effects and be affected to a greater degree in comparison to direct evidentials in the HS performance.

3.5.1 Participants

The spoken performance of 31 UK-born adult HSs, 31 first generation immigrants (LBs), representative of the parental generation of the HSs, and 44 monolinguals (CG), as a reference group in Turkey, was investigated. Table 3.1 and Table 3.2 below provide basic background information about the participants.

Due to the sociological diversity among the Turkish-speaking community in the UK, participants were selected with care to control for the effects of any other known native languages, such as Kurdish or Arabic. The regional variation in Turkish, mostly limited to phonology and lexis (Lytra, 2012), would not affect the knowledge of evidentiality. Nevertheless, it has been controlled as much as possible by including a CG representative of the experimental group participants in terms of their city of birth, in addition to gender, age and educational background.

Three HSs were simultaneous bilinguals, mainly due to the effect of TV and older siblings. Two participants learnt English upon starting primary school at the age of 5. The rest became bilingual at around age 3 once they started preschooling ($M=2.8$). They were all exposed to Turkish from birth.

Table 3.1: Basic background information

	Groups	HS	LB	CG
	group size (n)	31	31	44
	mean	23.35	41.06	33.81
age	range	18–43	25–65	18–66
	SD	5.88	8.01	11.8
	mean	2.8	22.35	N/A
AaO	range	0–5	12–42	N/A
	SD	1.07	7.09	N/A
	mean	23.35	18.7	N/A
LoR	range	18–43	8–40	N/A
	SD	5.88	7.44	N/A

gender	female (n)	17	16	22
	%	54.84	51.61	50
	male (n)	14	15	22
	%	45.16	48.39	50

HS=heritage speaker; LB=late bilingual; CG=control group; SD=standard deviation; LOR=length of residence; AaO=age at onset of bilingualism

The LBs were selected mainly on the basis of their age of arrival in the host country (AaO>12, $M=22.35$) to ensure full acquisition of the L1 in a monolingual environment prior to emigration, and on their length of residence (LOR>8, $M=18.7$) (Schmid, 2011). The current age was limited to 65 to prevent advancing age effects on language abilities.

Table 3.2: Educational background of the participants

		university		high school		secondary school	
	TOTAL	n	%	n	%	n	%
HS	31	23	0.74	8	25.81	0	0.00
LB	31	17	0.55	13	41.94	1	0.03
CG	44	25	0.57	16	36.36	3	0.07

HS=heritage speaker; LB=late bilingual; CG=control group

3.5.2 Instruments

3.5.2.1 Sociolinguistic Questionnaire

(Socio)linguistic information about the participants was collected via two versions of an SQ adapted from Yilmaz (2013) with minor modifications, which was developed based on the test battery proposed by Schmid (languageattrition.org). The language input/output questions in the HS version were developed based on the extensive parental questionnaires in R. Jia and Paradis (2014) and Unsworth (2016).

3.5.2.2 Semi-structured interview

Evidential forms were captured naturally by creating special evidential contexts that required participants to tell stories related to their past experiences in the semi-structured interview (INT). The interview consisted of seven questions, the first three of which were designed as warm-up questions, and the next four to elicit evidential forms.

To elicit Dexp, the participants were asked to tell a story they experienced/witnessed in the recent past. For repE, they were asked to talk about specific childhood stories that they did not directly recall but were told of by their parents. They were additionally asked to tell a

story they did not witness but heard recently in the news or from their acquaintances/friends. As exemplified by the data below, stories the participants told as a response to these questions might refer to a non-specific time, as in 3.1a and 3.1b, or a specific time, as in 3.2a and 3.2b. Note that in all these contexts, the verbal suffixes *-DI* and *-mİş* mark the described event as something that happened in the past, and the information source is either visual evidence/participation (3.1a, 3.1b) or verbal reports (3.2a, 3.2b).

3.1

a. Bir defa uçak-ta başüstü dolap-ları açıl-dı.

once plane-LOC overhead cabinet-3PL.POSS open-D.PAST

“Once on the plane, the overhead cabinets were opened”.

b. Dün Türkiye bilet-ler-imiz-i al-dı-k.

yesterday Turkey ticket-PL-3PL.POSS-ACC buy-D.PAST-3PL

“Yesterday, we purchased our tickets to Turkey”.

3.2

a. Bir kere yatak-tan düş-müş-üm.

once bed-ABL fall-M.PAST-1SG

“They say, I fell off the bed once”.

b. Dün sınav-dan sonra çok ağla-mış kızı-m.

yesterday test-ABL after a lot cry-M.PAST daughter-1SG.POSS

“Apparently, my daughter cried a lot after the test yesterday”.

InfE forms were elicited as a response to a hypothetical theft scenario. In the scenario, a thief broke into their house and left a mess everywhere when they were on vacation. Their job was to call and give details to the police (the investigator) about the situation in the house. This question is expected to elicit infE as there is no witnessing of the event by the participant. It can only be inferred from resultative states, such as a broken window, relocated sofas and so on, as in 3.3.

3.3

Cam-1 kır-mış, dolap-lar-1 karıştır-mış, koltuk-lar-1 çek-miş.

window-ACC break-M.PAST, wardrobe-PL-ACC disorganize-M.PAST, sofa-PL-ACC pull-M.PAST

“Apparently, s/he broke the window, disorganized the wardrobe and relocated the sofas”.

3.5.2.3 *Picture Description Task*

The picture description task (PD) was designed to elicit infE forms only. Participants were shown 5 real pictures of incidents/events in coloured A4 size form collected from online versions of the Turkish newspapers *Milliyet* and *Hürriyet*. All the pictures show resultative states of what happened, allowing the inference of the event. Picture one (“Gaziantep’te sel felaketi,” 2014) depicts a flooded village where people are trying to collect remains after the flood that harmed their houses and animals. Picture 2 (Çoban, 2014) shows a crane which rolled over a building and damaged different parts of the building. In Picture 3 (“Yürürken üzerine duvar yıkıldı,” 2014), there is an elderly lady wounded, and she is being offered first aid and emergency care. Picture 4 (Tafolar, 2014) shows cutting down of a big, old tree on a busy street and its removal by a team of workers. Finally, Picture 5 (“Meriç suyunun hapsediği mahalle: Karaağaç,” 2014) shows some physical damage to vehicles and a bridge over a river presumably caused by excessive rainfall and rise in the water level. Each participant was asked to describe them, as in 3.4, and their performance was audio-recorded.

3.4

Bu resim-de sel ol-muş, insan-lar-ın hayvan-ları öl-müş.

this picture-LOC flood occur-M.PAST, person-PL-GEN animal-3PL.POSS die-M.PAST

“In this picture, it seems that a flood occurred and those people's animals died”.

3.5.3 **Transcription and Coding**

The data consists of 155,471 words (33.63 hours). Transcription of the data (INT+PD) was done according to CHAT conventions (MacWhinney, 2000) using conventional orthography and spelling. No task differentiation was made in data coding, as the PD was used as a supplementary task to the INT to collect infE forms only. Individual recordings lasted 10–35 minutes (M=19.04). The data was coded for Tense-Aspect-Modality (TAM) by using the

simplified version of the framework¹¹ used in Aksu-Koç (1994, p. 339), shown below. Context-appropriate usages and substitutions were of interest in this respect.

Table 3.3: TAM data coding framework

Verb form	
present tense	existentials (substantives) present (<i>-Iyor</i>) habitual (<i>-Er</i>)
dpast tense	verbal suffix <i>-DI</i> , and auxiliary <i>ol-</i> for nominal predicates)
mpast tense	verbal suffix <i>-mİş</i> , and auxiliary <i>ol-</i> for nominal predicates)
future tense	future (<i>-AcAk</i>)

Following this schema, each inflected verb¹² (n=20,181) was coded for the main anchored tense (e.g. dpast) according to the suffix (e.g. *-DI*) used to inflect the verb, and for its evidentiality status (zero versus Dexp/INDexp). For the purposes of the current study, all *non-past* usages were coded as “zero” in terms of their evidentiality status. For past¹³ usages, evidentiality was either coded as *eviddi* (n=5424) or *evidmis* (n=3224). *Evidmis*¹⁴ was further

¹¹ Note that the coding table was used to achieve consistency in the coding of the TAM markers relevant for the current analysis only. It is thus not exhaustive and does not reflect the entire TAM system of the Turkish language. For exhaustive lists and explanations, see (Göksel & Kerslake, 2005; E. Sezer, 2001)

¹² Note that auxiliary *ol-* (“to be”, “to become”) “displays the formal structure of the inflection of complete verbs with the Tense suffixes it hosts” (E. Sezer, 2001, p. 15). Given this, nominal entities followed by *ol-*, as in “*ameliyat olmuş*” (“Apparently/They say, she had an operation”), have been treated as complete verb forms and coded for tense and evidentiality status.

¹³ As the main focus of the indirect evidential investigation was reportative and inferential contexts in references to past events, other contexts that the indirect evidential marker *-mİş* creates, such as assumption and fairy tale contexts, counterfactual contexts (Csato, 2000) and other usages of the same marker without evidential readings included in Bacanlı (2006, 2008) and Johanson (2000), were not counted as *evidmis*. Similarly, well-recognised and common historical events described by direct evidential forms, despite being indirect and not referring to any first-hand experience (Johanson, 2006; Schroeder, 2000) or present meanings of the same form when used with psychological verbs (see E. Sezer, 2001, p. 10 for details) were also not included in direct evidential counts. All these usages were coded as “other markers” and were excluded from the counts. There were 41 cases of the former (*-mİş*) as opposed to 235 cases of the latter (*-DI*).

¹⁴ The information source marked by the INDexp marker is proposed to be “limited to main clauses with a stated, contradictable content” and thus does not extend to subordinate clauses in Turkish (Johanson, 2006, p. 81). There is, however, meaningful evidence showing that the INDexp marks the information source in certain types of finite clauses, such as bare finite subordinate clauses, finite clauses constructed with *ki* and *diye* (Coşkun, 2010), and bare subordinate clauses of the verb *de-* (Şener, 2011). Following these studies, the INDexp form that marks the information source in such clauses was also considered as *evidmis* and further labelled as inferential or reportative on the basis of the context.

coded as inferential¹⁵ (n=2036) or reportative (n=1188) depending on the discourse context created in the interview questions and picture description task.

Each context-appropriately used evidential was coded as accuracy=0. Indirect evidentials substituted with direct evidentials were coded as accuracy=1. If it was reversed, this was coded as accuracy=2. There was only one (0.01 %) case of the latter, as opposed to 197 (6.11 %) cases of the former. There were no omissions or substitutions with other markers. This data file, with the errors coded as described above, was then used to carry out statistical analyses on the accuracy performance of the groups in the R statistical platform (see the Result section).

3.5.4 Predictive Variables

The following predictive input/output variables were calculated from the SQs.

3.5.4.1 *Current L1 contact*

Following Schmid and Dusseldorp (2010), a principal component analysis (PCA) with varimax (25) rotation was conducted on the items that related to frequency of language use. Three new L1 contact variables below (Table 3.4) were established, whose composite scores were computed for each participant as the means of the variables¹⁶ included in each component. Internal consistency was established by conducting a reliability analysis (Cronbach's alpha)¹⁷.

¹⁵ The indirect evidential contexts that have been shown to have inferential reading when used together with auxiliary *ol-* in necessity modality *-mali* (Şener, 2011) were considered as inferential.

¹⁶ The choice was made on high loadings of the items on one component. The individual variables that each composite variable included are provided in parentheses below:

-Interactive L1 use: (L1 use with children, siblings, parents, grandparents in Turkey, other relatives in the UK, L1 use while writing to relatives in the UK and in Turkey)

-L1 passive exposure: (non-interactive L1 use (exposure) through TV, radio and music)

-L1 use outside home: (cultural preferences for friends and L1 use with friends and neighbours)

¹⁷ Note that a scale is usually considered reliable when the Cronbach's Alpha values are between 0.7-0.8 and thus scales with values below 0.7 are generally considered to have low reliability (Field, 2005). However, values below 0.7 can be expected for social data constructs especially if they measure abilities, beliefs and the like or if the items in a scale cover diverse themes (Kline 1999 as cited in Field, 2005). Regarding the data of the current study, some caution is warranted as the reliability values of some of the newly established components are on the low side (alpha<0.7). It is very likely that this outcome is something expected because of the nature of the data as suggested above. We acknowledge, however, that this needs further investigation and confirmation.

3.5.4.2 *Input Quantity*

This study made use of some of the calculations of BILEC (Unsworth, 2016; Unsworth et al., 2014 for details about calculations). In order to account for domain-specific (e.g. home or school) language exposure for individual years, BILEC’s calculations included the proportion of time spent in each domain by taking the age-specific waking hours of children into consideration. This was to assess the exact time spent with input providers during the time a child was awake in each domain and to calculate how much language exposure the child received during this time. These domain-specific language exposure measures were then incorporated into one exposure variable. The cumulative amount of exposure is the sum of the language exposure the child has had over the individual years.

We adapted¹⁸ this approach to account for “past L1 experience” of the HSs between the ages of 0 and 18. This allowed us to achieve relatively reliable measures. This age range was divided into four periods corresponding to UK educational stages. These calculations resulted in four exposure and four use variables.

Table 3.4: Current L1 contact variables

		interactive L1 use	L1 passive exposure	L1 use outside home
heritage speakers	mean	0.77	0.55	0.43
	range	0.42–1.00	0.00–1.00	0.13–1.00
	SD	0.14	0.28	0.14
late bilinguals	mean	0.92	0.59	0.66
	range	0.75–1.00	0.17–1.00	0.18–0.95
	SD	0.08	0.22	0.2
reliability	alpha	0.789	0.649	0.603

¹⁸ Based on participants’ answers, for each linguistic domain ((1) home, (2) school and (3) outside home and school, i.e. extracurricular activities), two kinds of domain-specific variables were derived in percentages for each age period: L1 exposure and L1 use. Average approximations of waking hours for each age period were achieved based on reported findings of medical articles on sleep durations of children growing up in Europe (Iglowstein, Jenni, Molinari, & Largo, 2003; Mindell, Sadeh, Wiegand, How, & Goh, 2010; Olds, Blunden, Petkov, & Forchino, 2010). This way, we were able to calculate the proportion of time spent in each domain. This allowed us to incorporate the domain-specific exposure and use percentages mentioned above into one “exposure” and one “use” variable for each age category.

3.5.4.3 L1 and L2 Richness (Input quality)

Adapting R. Jia and Paradis' (2014) calculations¹⁹, a variable called “richness” was derived from the “activities” section of the questionnaire. Please note that despite some quantification involved in its calculations, this variable has been proposed as being more quality-oriented (J. Paradis, 2011) as it refers to the diversity of the linguistic environment in terms of L1/L2. Calculations resulted in one L1 and one L2 richness score, for each one of the four age periods, per participant.

In later stages, due to highly significant correlations (Pearson) between variables for the ages 0–3 and 3–5, composite variables were created for the ages 0–5 for exposure, use and L1/L2 richness. Following this, significant correlations between each age-specific exposure and use variable resulted in three age-specific compound “exposure + use” variables calculated as the mean value. The new compound variables were called “L1 experience”, as shown in Table 3.5. These values are assumed to be the most reliable in the absence of real observations and longitudinal studies.

Table 3.5: Input quantity and quality variables

age category		mean	range	SD
0–5	L1 experience	0.72	0.25–0.96	0.18
	L1 richness	1.2	0.00–2.84	0.61
	L2 richness	0.97	0.1–2.89	0.73
5–11	L1 experience	0.39	0.16–0.65	0.13
	L1 richness	0.83	0.00–2.02	0.55
	L2 richness	1.68	0.6–3.47	0.61

¹⁹ In the first stage of calculating this variable, the reported amount of time by the participants for the activities was multiplied by the reported L1 versus L2 percentage involved in it. This would give us the total number of hours of Turkish/English involved in that activity for each individual. The separate L1 and L2 richness score for each participant and each activity category was determined according to the largest value derived as a result of this multiplication. This value simply reflects the largest number of hours spent doing that particular activity in Turkish and English respectively. All the other scores were divided by this value. This method of data normalisation allowed us to evaluate each participant according to a common base. As a result, each participant received a richness score out of 1 in each category for each age period. Since there are five categories in the “activities” section (see Appendix 9 and 10), the scores each participant received from each category out of 1 were added up. This means that the highest possible L1 and L2 richness score is 5. Note that the richness scores were calculated separately for L1 and L2 and thus an L1 richness score of 4 does not mean that the score for L2 richness equals to 1.

	L1 experience	0.34	0.04–0.57	0.15
11–18	L1 richness	1.02	0.00–2.82	0.7
	L2 richness	2.01	0.63–4.00	0.82

3.6 Results

Speakers in the CG produced 1,616 words on average, while the LBs produced 1,441 and the HSs 1,278. All verb counts were calculated per 1,000 words per individual (see Schmid, 2011). Past usages were coded as either *dpast* or *mpast*, while all finite non-past verb forms, except present *–(I)yor*, were classified as “other”. Present *–(I)yor* was included separately because it is an alternative form in Turkish narratives (narrative present) to *dpast* and/or *mpast* (Aksu-Koç, 1994; Karakoç, 2007). This was to reflect the possibility that some participants might have told their stories using the narrative present, which might have led to *dpast* and *mpast* distribution inequalities across the groups. Grammatically, the present *–(I)yor* “presents a situation as ongoing, at a particular point in time” (Göksel & Kerslake, 2005, p. 329) but its use in a past narrative discourse context fulfills a communicative role and makes the narrative “more lively” (Karakoç, 2007, p. 207). In 3.5, for example, the participant retells a nonwitnessed past story in the narrative present which makes it more lively and shows his emotional involvement in the story.

3.5

Bir gün abla-m bir café-de otur-uyor ve yan-ı-na bir adam yaklaş-ıyor.

one day sister-1SG.POSS one café-LOC sit-IMPF and side-3SG.POSS-DAT one man approach-IMPF

“One day, my sister is sitting at a café and a man approaches her.”

As Figure 3.1 shows, the HSs produced a slightly larger number of finite verbs than the other two groups. A one-way ANOVA and Tukey tests confirmed that this difference between groups was not significant ($F(2,103)=1.176, p=0.313$). The groups differed significantly in the amount of *infE* ($F(2,103)=4.907, p=0.009$) and the difference in the amount of *repE*²⁰ approached significance ($F(2,97)=2.827, p=0.064$). No significant differences were revealed for the *dpast* and non-past usages (all $ps>0.05$).

²⁰ Four LBs and two HSs did not use any reportative *–mİş* forms. All relevant calculations concerning *repE* forms (e.g. accuracy) were carried out for 27 LBs and 29 HSs.

The HSs produced more infE than both the LBs ($p=0.028$) and the CG ($p=0.014$). Surprisingly, both the HSs and the CG used repE forms more frequently than the LBs but only the difference between the LBs and the CG approached significance (Tukey $p=0.072$). There were no other significant differences ($ps > 0.05$).

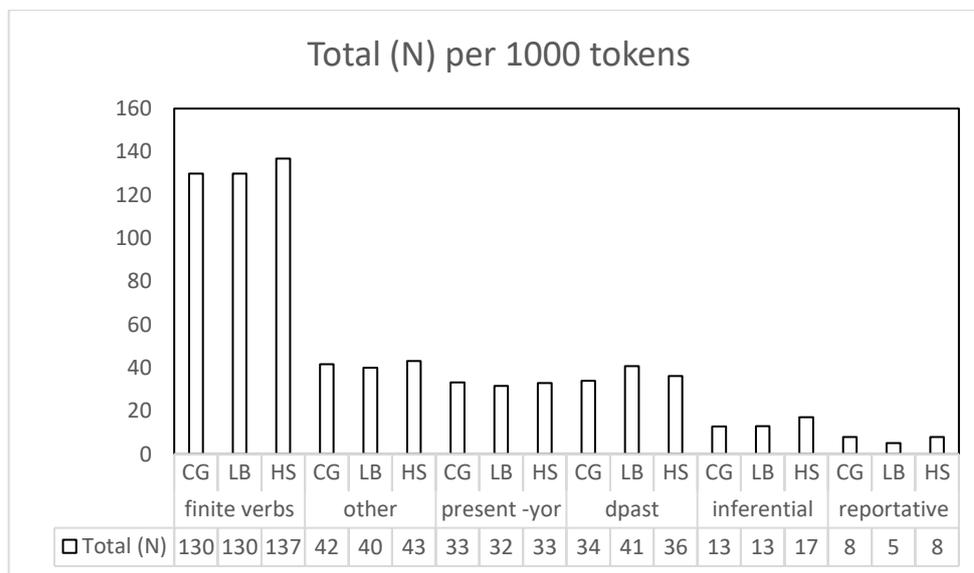


Figure 3.1: Mean distribution of the tenses across the groups (in N)

CG=control group; LB=late bilingual; HS=heritage speaker; other=other tenses; present -yor=present tense; dpast=direct experience/-DI past; inferential=inferential past; reportative=reportative past

3.6.1 Evidential Accuracy

Substitution errors were calculated for the evidentials only. The groups showed a tendency to substitute the direct evidential in contexts requiring the indirect evidential. In 3.6 for example, a participant talks about a conversation between her dad and her sister that she did not witness herself but heard from her sister on the phone. According to this story, the sister arrives home drunk. Her father is not happy with this situation and tells her that they are going to talk about this in the morning. Interestingly, the participant reported the whole story in the direct evidential form as if she witnessed the event. Table 3.6 displays some descriptive information on the evidentiality performance of the groups.

3.6

Ev-in iç-i-ne gir-ince tabi ki baba-m hemen anla-**DI**, de-**DI** “yarın konuş-ur-uz”.

house-GEN inside-3SG.POSS-DAT enter-CV of course father-1SG.POSS immediately understand-DPAST*, say-DPAST* tomorrow talk-AOR-3PL

“as soon as she entered the house, he immediately understood and said ‘we will talk tomorrow’.”

Table 3.6: Evidential accuracy

Group	direct experience			inferential			reportative		
	total target mean (M)	total replacement with indirect (M)	accuracy %	total target mean (M)	total replacement with indirect (M)	accuracy %	total target mean (M)	total replacement with indirect (M)	accuracy %
CG	54.70	0.00	100.00	19.45	0.00	100.00	12.36	2.00	99.22
LB	57.84	0.00	100.00	17.81	0.00	100.00	7.64	2.40	95.39
HS	39.55	0.03	99.96	20.26	1.64	95.04	13.87	6.17	69.40

CG=control group; LB=late bilingual; Hs=heritage speaker

Statistical group comparisons on evidential accuracy were made by calculating a number of generalised linear mixed effects regression models (GLMM) with the *lme4* package (D. Bates, Mächler, Bolker, & Walker, 2015) for R version 3.2.4 (R Core Team, 2016). The main motivation behind this choice over traditional ANOVAs was the fact that mixed effects models are very powerful in dealing with unbalanced corpus data (Gries, 2015). What is meant by unbalanced data in the context of the current study is that some errors made might come from a limited number of sources (participants) in the entire group, or there might not be an equal number of observations (errors) for each evidentiality type per participant (e.g. inferential versus reportative). Mixed effect models are suitable in these situations and take the variability caused by participant characteristics described above into consideration as well (Baayen, Davidson, & Bates, 2008). For this reason, the variable “participant” is included as a random intercept in the analysis. The model took the accuracy performance of the CG and the performance in the DexP as the baseline.

We included “group” (three levels: CG, LB and HS) and “evid type” (three levels: DexP, infE and repE) as fixed effects with the evidential accuracy (two levels: accurate versus inaccurate) as the dependent variable. The estimates of the model showed that, in general, both the group ($\beta=-1.895$, $SE=0.27$, $z=-6.82$, $p<0.001$) and the evid type ($\beta=-3.387$, $SE=0.23$, $z=-14.49$, $p<0.001$) were significant predictors. As revealed by post Hoc Tukey tests, the HSs were significantly less accurate than both the CG ($\beta=-4.79$, $SE=0.71$, $z=-6.69$, $p<0.001$) and the LBs ($\beta=-3.36$, $SE=0.58$, $z=-5.75$, $p<0.001$), but there were no differences in the

overall accuracy performance between the LBs and the CG (Tukey $p=0.146$). The performance in both the infE ($\beta=-4.556$, $SE=1.02$, $z=-4.46$, $p<0.001$) and repE ($\beta=-7.928$, $SE=1.02$, $z=-7.632$, $p<0.001$) were less target-like than in the Dex, and it was less target-like in the repE ($\beta=-3.272$, $SE=0.27$, $z=-12.02$, $p<0.001$) than in infE. In summary, the evidential accuracy performance displayed a rank order as follows: repE<infE<Dex.

A number of similar analyses were run separately on the Dex and INDexps across groups. The ceiling performance in the Dex did not make it possible to carry out a group comparison, but the HSs were significantly less accurate than the CG ($\beta=-4.896$, $SE=0.77$, $z=-6.32$, $p<0.001$) and the LBs ($\beta=-3.272$, $SE=0.64$, $z=-5.05$, $p<0.001$) in indirect evidential contexts. Both the CG and the LBs were equally accurate in using these forms (Tukey $p=0.12$).

Given these results, the input available to the HSs seems to be native-like. The individual variability in the performance of the CG and the LBs below confirms this finding. Given that Dex and infE performance was at the ceiling in both groups, Figure 3.2 below shows individual variation only for the repE.

Only two (7.04 %) out of 27 (see Footnote 20) LBs were outside the range of the accuracy achieved by the CG, with accuracy percentages of 63.63 and 44.44. For the rest (92.96 %), the accuracy ranged from 80.00 % to 100.00 %. The CG accuracy range was also 80.00 %–100.00 %.

The individual variability in the HSs' performance was greater. As Figure 3.3 demonstrates, the performance in the Dex was at the ceiling. Seventeen (54.84 %) HSs performed at the ceiling (in the control range) in the infE. The accuracy of the rest (45.16 %) ranged from 60 % to 96.55 %. The least accurate two participants were 60 % and 73.33 % target-like.

For the repE, on the other hand, 100 % target-like performance was achieved by only seven out of 29 participants (24.13 %). For the rest (75.87 %), the performance ranged from 6.66 % to 94.11 %. Overall, 14 (48.27 %) participants remained below the control range in the repE. The least accurate participants had accuracy percentages of 6.66, 10.00, 10.52 and 30.00. Nine participants (29.03 %) performed within the control range in the indirect evidentials overall.

In sum, the HSs' performance in the INDexps clearly diverges from that of the monolinguals. This variability cannot be explained by any qualitatively modified input conditions.

Nonetheless, differences in input quantity, L1/L2 richness and current L1 contact might prove informative in this respect.

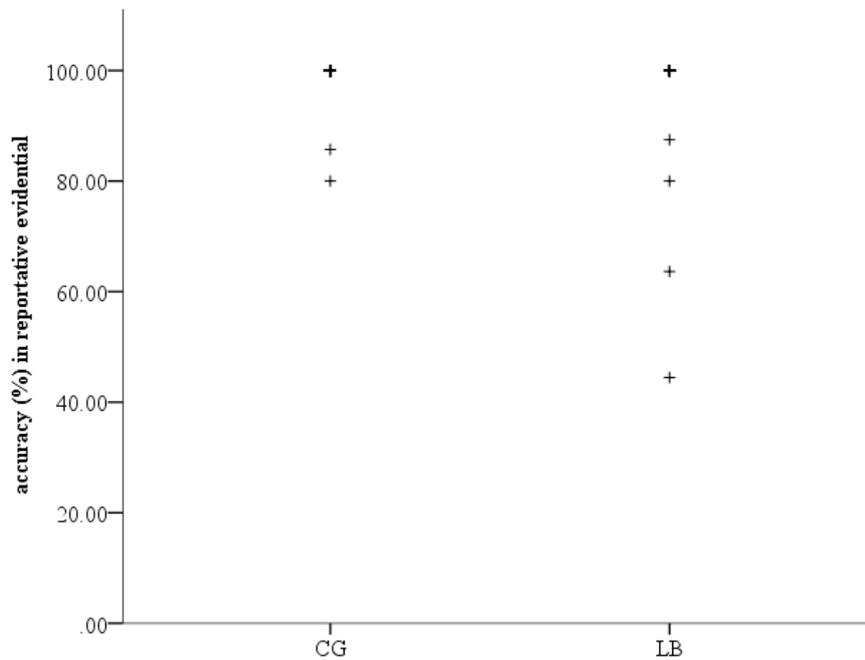


Figure 3.2: Individual variation in *repE* accuracy

repE=reportative evidential; CG=control group; LB=late bilingual

3.6.2 Sources of variability in the development of the heritage language

In order to see which predictive variables explain this variability, another mixed effects regression model was calculated. We entered “participant” and “evidentiality type” as random variables in the baseline model, as the previous analyses above already showed the effect of evidentiality type within and between groups.

While building the complete model, each predictor was entered individually first. This included the previously mentioned age-specific L1/L2 richness, L1 experience and current L1 contact variables. The predictors that reached significance alone or in interaction were then entered one by one to see whether they would improve the simpler model. This decision was made based on the decrease in the Akaike Information Criterion (AIC) levels, and p-values were obtained by likelihood ratio tests (Baayen et al., 2008).

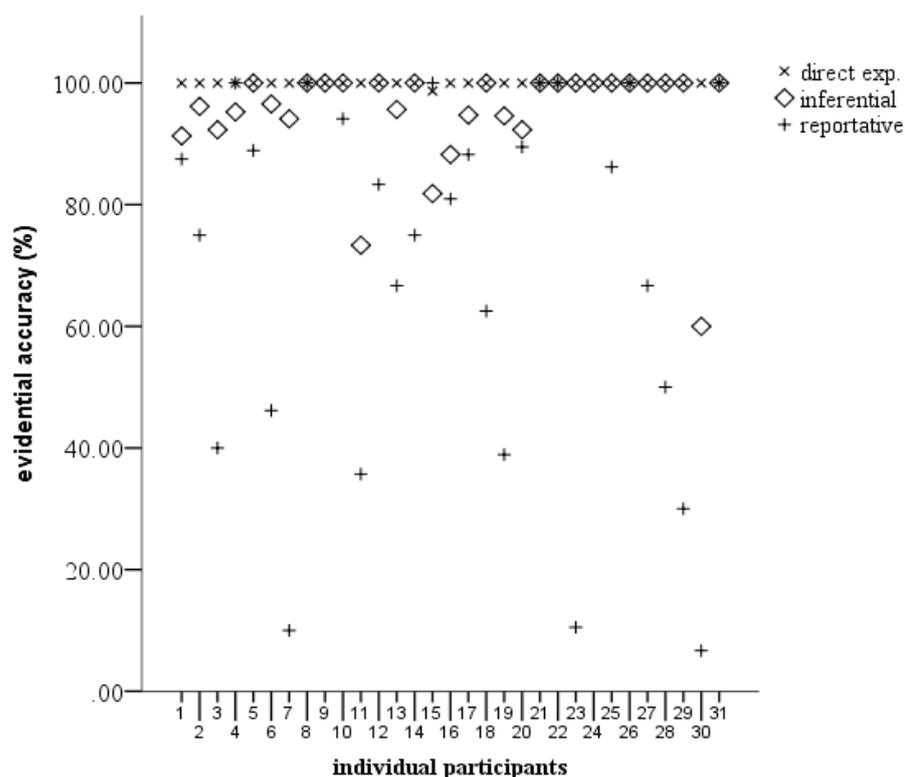


Figure 3.3: Individual variability in the performance of the heritage speakers

The model was based on 2,285 observations. Table 3.7 shows the coefficients for the fixed effect factors in the final model.

Table 3.7: Factors accounting for individual variability in the evidentiality accuracy

	estimate	SE	z	p	
(intercept)	6.071478	3.04095	1.996573	0.0459	*
L2 richness (0–5)	-2.57136	1.070205	-2.40268	0.016276	*
L1 experience (0–5)	2.698724	2.882012	-0.9364	0.349066	
L2 richness (0–5):L1 experience (0–5)	4.625606	1.827925	2.530523	0.011389	*

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1; SE=standard error

According to Table 3.7, as the negative estimate shows, HSs with a rich L2 English environment between the ages of 0 and 5 ($\beta = -2.57$, $z = -2.40$) showed a higher tendency to use the Dexp in INDexp contexts. The effect of “L1 experience (0–5)” was not significant. However, as the positive estimate of the interaction between L2 richness and L1 experience in the model ($\beta = 4.62$, $z = 2.53$) indicates, the negative effect of L2 richness was compensated

for by the effect of past L1 experience (0–5). More precisely, for those whose L2 environment was rich, this factor seems to be a strong moderator in that an increase in their L1 experience (input and output) decreased the effect of the L2 richness.

None of the other predictive L1/L2 variables or their interaction with other variables contributed significantly to the model. Given this, in the following sections, all references to past L1 experience and L1/L2 richness factors will pertain to this age range (0–5) unless specified otherwise.

3.6.3 Individual analysis

Given the large amount of variability between the HSs, we divided them into two groups: one that performed within the control range (native-like performers, henceforth NPs, $n=10$) and those who fell outside that range (non-native-like performers, NNPs, $n=21$).

As Table 3.8 below shows, the individual examination of the NPs showed that they had been exposed to a slightly larger amount of L1 input ($M=83\%$) during the ages 0–5, had had a slightly richer L1 environment ($M=1.43$) during the same period, and were using their L1 interactively more frequently ($M=82\%$) in comparison to the NNPs. Despite its lack of contribution to the model, interactive L1 use (with parents and relatives) was a significant predictor alone ($\beta=5.55$, $SE=2.05$, $z=2.71$, $p=0.006$). In contrast, the L2 environment of the NNPs during the ages 0–5 had been slightly richer ($M=1.03$), and they were using their L1 interactively slightly less frequently ($M=75\%$) with their parents etc., but more frequently with their own HS friends ($M=49\%$) in comparison to the NPs. The “L1 use with friends” variable, however, was not a statistically explanatory variable.

Table 3.8: Descriptives of the individual analysis

age range		NP			NNP		
		mean	range	SD	mean	range	SD
0–5	L1 experience (%)	0.83	0.67–0.93	0.09	0.68	0.25–0.96	0.2
	L1 richness (out of 5)	1.43	0.84–2.1	0.39	1.1	0.00–2.84	0.68
	L2 richness (out of 5)	0.81	0.23–1.91	0.56	1.03	0.1–2.89	0.8
	L1 experience (%)	0.41	0.27–0.57	0.12	0.38	0.16–0.65	0.14

5–11	L1 richness (out of 5)	0.86	0.00–2.02	0.64	0.81	0.00–1.59	0.52
	L2 richness (out of 5)	1.87	1.48–2.29	0.28	1.59	0.6–3.47	0.71
	L1 experience (%)	0.35	0.13–0.54	0.14	0.34	0.04–0.57	0.16
11–18	L1 richness (out of 5)	1.07	0.00–2.82	0.81	1.01	0.00–2.38	0.66
	L2 richness (out of 5)	2.25	1.24–3.35	0.66	1.9	0.63–4.00	0.87
	interactive L1 use (%)	0.82	0.65–0.90	0.08	0.75	0.42–1.00	0.16
current	L1 passive exposure (%)	0.55	0.08–0.83	0.28	0.56	0.00–1.00	0.29
	L1 use with friends (%)	0.33	0.13–0.53	0.13	0.48	0.13–1.00	0.26

All the rest of the variables' mean scores after the age of 5 were similar across the groups, as can be seen in Table 3.8. One exception to this was L2 richness (5–11) and (11–18), interestingly in favour of the NPs. This would explain why these variables did not contribute to the regression model above.

3.7 Discussion

The present study aimed to investigate whether the potential divergent L1 grammar of adult Turkish HSs in the UK can be explained by qualitatively modified input conditions. With a widely accepted assumption that the L1 would be transmitted to the next generation (HSs) via the first generation of immigrants, the L1 performance of a group of first generation Turkish immigrants (LBs) in the UK and that of monolinguals in Turkey (CG) was compared to see whether L1 input transmitted to the HSs was attrited. A further interest was whether the HSs' overall accuracy in evidentiality would relate to quantity and quality of their past and/or current L1 contact.

The first step was to look at the total number of finite verbs and the distribution of past/non-past usages across groups. The HSs used a slightly larger number of finite verbs than both the LBs and the CG (per 1,000 words). Although this difference was not significant ($F(2,103)=1.176, p=0.313$), this is not surprising given that previous findings have shown a tendency among HSs to avoid complex embedded clauses in Turkish (Treffers-Daller et al.,

2007), which might have caused an increase in the number of simple finite sentences or finite clauses (Onar-Valk, 2015).

As for the frequency distribution of tenses, no significant differences were revealed for the marker of direct experience (dpast). The distribution of the inferential and reportative marker (mpast), however, was slightly in favour of the HSs (they used more mpast, which was a somewhat surprising finding). Although four LBs and two HSs did not use any repE forms at all and preferred the narrative present marker instead, this marker was not responsible for this inequality at the group level, an indication that none of the populations systematically avoided using indirect evidentials (mpast). The only remaining explanation seems to be the nature of the interview questions and different participant reactions.

For the repE, for example, all participants were asked to report childhood events as told by their parents. Given the HSs' younger ages and that a great majority of them were still living with their parents at the time of testing, it was easy for them to talk about these fresh memories immediately. The same question elicited fewer memories from the LBs and older monolinguals, as in most cases, they did not remember such memories and had nothing to tell. Similarly, the "theft scenario" elicited longer reactions and more infE from the HSs, as it was more appealing to the younger participants than the older ones. The LBs and many CG participants were less reluctant to role play with the investigator and thus produced fewer infE. Future studies should take these effects into consideration when designing their elicitation tasks.

While the CG and the LBs performed at the ceiling for all types of evidentials, this was not the case for the HSs. The error analysis determined that the HSs made a significant number of contextually inappropriate substitutions, indicating a non-target-like L1 grammar, similar to what has often been found among HSs (e.g. Montrul, 2008, 2016c).

Based on Rothman's model, the deviant forms found among HSs should mirror a non-target-like L1 performance of the LBs (due to attrition). This would have indicated that the HSs had complete acquisition of an attrited variety (Pascual y Cabo & Rothman, 2012). In the present study, this was not found to be the case: there was no difference between the LBs and CG speakers at the group level, and only three LBs fell outside the control range. This indicates that the L1 input provided by this group of LBs can be considered qualitatively native-like in terms of the evidential structures. Our findings, therefore, do not support the qualitatively modified input claim (Rothman, 2009), at least for this property.

This finding brings us back to a critical question: what are the sources of this divergent L1 grammar if the input is qualitatively native-like? This might be better approached with a more detailed look at the nature of the divergences. As evidenced by the analyses, the HSs substituted the repE more than they substituted the infE with the Dexp. However, with one single exception, no substitutions were made the other way. None of the participants replaced any evidentials with any non-past tense markers, indicating awareness of the anteriority for both direct and indirect evidentials.

It is striking that even the least target-like speakers managed to use INDexps context-appropriately (to some limited degree) and did not avoid the forms by overusing the narrative present marker. This shows their awareness of how the indirect evidentials' semantic requirements apply to certain contexts. Nevertheless, the large number of replacements with the Dexp suggests that the notion of tense was maintained to a greater degree than the notion of evidentiality in the L1 of these HSs. This agrees with the observations that Spanish HSs maintained the notion of tense and aspect more than they did the modal categories (Montrul, 2009), and that Turkish HSs were less sensitive to evidentiality violations than they were to time reference violations in non-evidential contexts (Arslan, De Kok, et al., 2015).

As also proposed by Arslan and Bastiaanse (2014 as cited in Arslan, Bastiaanse, et al., 2015), the replacement tendencies show that the evidentiality status (visual access) of the direct evidential is affected in a way that enables the participants to extend its meaning to nonwitnessed contexts. Allowing the Dexp in nonwitnessed contexts additionally indicates that the special context requirements of the indirect evidentials are also affected. This is perfectly compatible with what Arslan, de Kok et al. (2015) revealed for decreased sensitivity to indirect evidential (repE) violations in Turkish-Dutch adult HSs. However, it is opposite to what Arslan and Bastiaanse et al. (2015) found in their study where the online processing of indirect evidentials (infE) was intact in the grammar of Turkish-German adult HSs. The latter shows participants' passive command (underlying representation) of the infE that does not necessarily lead to context-appropriate production. An investigation of the processing of the repE, which seems to be affected more than the infE in the current study and that of Arslan, de Kok et al. above, might yield different results.

In light of this previous work, the fact that the HSs in the current study never replaced direct evidentials with indirect evidentials does not necessarily indicate that the semantic components of the indirect evidentials were all retained. Rather, it points to "unstable

knowledge” of the witnessed versus nonwitnessed distinction in the Turkish past tense system.

Whether this could be an outcome of incomplete acquisition or attrition (as it is not of qualitatively different input) is open to discussion. Evidentiality is a relatively late-acquired property which does not stabilise before the ages of 5-6 (Aksu-Koç, 1988; Ozturk & Papafragou, 2008a among them). Given the average AaO of the participants (2.8 years) which is just around the time indirect evidentials start “appearing”, input interruptions due to an early AaO might have caused a failure in developing age-appropriately. This might have resulted in incomplete L1 knowledge in adulthood due to insufficiency of the continuous L1 input (Montrul, 2008).

In addition to the non-target-like speakers, one-third of the participants managed to achieve and maintain native-like proficiency in the indirect evidentials despite an “early AaO” and “interrupted L1 input”. Given this, attrition might be at play as well. Some participants might have acquired the property despite the interrupted input and experienced attrition in later stages. Based on the revealed acquisition order of the evidentials, the HSs seem to have shown a reverse order of acquisition in their maintenance reminiscent of Jakobson’s Regression Hypothesis (1941). The regression hypothesis would imply a complete acquisition of the evidentials, which then might have started attriting. As discussed below, our data might not be able to fully answer whether this was the case unless the same property is examined longitudinally.

The lack of a longitudinal design in the current study would not fully allow us to disentangle incomplete acquisition from attrition. However, given the detailed past and current L1 contact data, both the statistical and the individual analysis results allow us to examine this distinction in more detail. These analyses revealed that the participants with a rich L2 environment were less accurate in evidentials. However, an increased amount of L1 exposure counteracted this L2 richness effect leading to more accurate usages.

As the individual analyses unveiled, after the age of 5, L1 experience and L1 richness mean scores (age range 5–18) did not differ much between the native-like performers (NPs) and the non-native-like performers (NNPs). It is thus likely that the NNPs’ less frequent early L1 experience, along with the slightly richer L2 environment, hindered them from developing age-appropriate forms. Their continuous L1 experience was presumably not sufficient for this development after this age either. It is therefore likely that the NNPs did

not attrite between the ages of 5–18, as their development was presumably never age-appropriate.

The NPs maintained this property even if their environment during the school years (5–18) was much richer in terms of the L2 compared to that of the NNPs. This underlines the importance of L1 experience in particular during the early years of linguistic development, both to acquire (Unsworth et al., 2014) and maintain the L1 long-term (Kondo–Brown, 2005). It seems that the ultimate attainment, which looks “incomplete” at the surface level, is not a result of an early “AaO” or “interrupted L1 input”. It rather appears to result from the fact that the amount of L1 experience remained insufficient to resist the effect of a rich L2 environment. It seems that there is a critical amount of input/output (Aksu-Koç et al., 2014) of around 83 % (see Table 3.8) necessary to acquire the property during the primary years and resist the effect of the L2 richness, which was reached by the NNPs neither during the early years nor later.

Given the NNPs’ increased current L1 contact (48 %) with other HSs in comparison to that of the NPs (33 %), interaction with less proficient HSs might have triggered some sort of attrition in later stages resulting in even less-target-like L1 grammar than they had until the age of 18 (Montrul, 2016b). However, this variable did not predict the outcome. It seems that neither incomplete acquisition nor attrition alone is enough to fully account for the findings.

At this point, a relatively recent model proposed by Putnam and Sánchez (2013) might be more explanatory. According to this model²¹, the HL acquisition is not interrupted or incomplete (see also Pascual y Cabo and Rothman, 2012), but a continuum involving exposure shifts to L1 and L2 lexical items. These exposure shifts result in different levels of activation of functional features (FFs) depending on language use and processing patterns (rather than the amount of exposure) in both the L1 and L2. Lower activation levels for production purposes (infrequent language use) would result in the features’ becoming less

²¹ In this model, the main focus is on the process of language acquisition as a whole, rather than the outcome only, unlike incomplete acquisition and attrition accounts. Adopting a generative perspective for the role of input in acquisition, they reject the dependency of HL acquisition solely on the quantity and quality of input. This partly contradicts the main assumptions and findings of the current study about the role of input quantity for HL acquisition/maintenance. Nevertheless, some premises of the approach seem to be promising in order to explain the development of the L1 over the years, as well as the degree of maintenance observed.

available to retrieve, and thus might be responsible for some L1 features being replaced by FFs that are more activated in the L2, leading to a feature reassembly (Lardiere, 2008).

If we consider our data from this perspective, access to L1 lexical items with L1 use on a more frequent basis than the L2 in the early years would result in activation of L1 formal features. Continued L1 activation after this age (5–18), even if on a less frequent basis than the L2, would contribute to the maintenance of the L1 FFs, long-term. In that sense, this approach is promising to account for the variability in the performance of our participants. For example, as acknowledged by the authors as well, it is very likely for repE FFs, being the last to be acquired, not to have ever been activated enough in the case of the NNPs as a result of more intense L2 use and activation from early on. This would be in agreement with what we have concluded above about the role of early L1 experience (access and activation) in acquiring the property.

As the L1 use continued for the NNPs at almost an equal amount to the NPs, perhaps it was not intense enough (especially if the L1 experience involved code-switching) (Putnam & Sánchez, 2013) to keep the FFs activated. Similarly, more frequent interactive current L1 use by the NPs (see Table 3.8) might have contributed to FF activation in adulthood. For the NNPs, on the other hand, increased L1 use with other HS friends would encourage code-switching and L1 use in a bilingual mode (Schmid, 2007). This may have affected the availability of the features. Features that become less available in time might have caused failure in form-meaning mappings, leading to a dissociation and reassembly by the features in the L2²².

Both Turkish and English have the functional category [+/-past]. The Turkish past tense, however, additionally includes evidentiality morphology distinguishing between witnessed and nonwitnessed past events. From a feature reassembly point of view, the replacement

²² As pointed out by one of the reviewers, the way the Putnam and Sánchez model explains how L1 grammar is changed ultimately due to the effect of a more activated L2 resembles how language change, in general, is approached by usage-based accounts. While the former describes this outcome as *feature reassembly*, it would be described as *contact-induced grammaticalisation* by the latter (e.g. Heine & Kuteva, 2005). Although these two accounts are clearly distinguished in terms of how they explain language acquisition in the first place (innate versus domain-general learning mechanisms) and the role of input quantity in language development, a detailed comparison between the premises of these accounts on how they account for L2-induced changes might inform our understanding more in the future. Note that the main reason why the current study consulted the Putnam and Sánchez model rather than other contact-induced explanations is primarily because the former has been explicitly developed as a reaction to the term “incomplete acquisition” and has specific predictions for non-convergent HL grammars, which the current study was designed to address.

errors observed would be a result of mapping L2 English [-evidentiality] values (because it is more dominant and accessed, Putnam & Sánchez, 2013) onto L1 items, causing them to undergo a dissociation and restructuring of [+evidentiality] values.

This evaluation closely matches the conclusions derived before about the changes in the past tense system in the L1 of the HSs. Summarising these findings together, the extension of the meaning of the Dexp to nonwitnessed contexts highlights two points:

(1) The evidential meaning of the Dexp was reassembled, while its anteriority meaning was preserved. The reassembly was presumably due to its surface similarity to the English past tense marker and lower levels of L1 activation.

(2) This lower level of activation affected the availability of the indirect evidential values to be used in required contexts leading to a failure in form-meaning mappings. It is also likely that they were not activated enough during the linguistic development due to fluctuations in the activation levels of L1 and L2 FFs.

As claimed by Putnam and Sánchez (2013, p. 481), grammatical features that are considered to be a result of incomplete acquisition or attrition in the grammar of HSs are indeed a result of a failure in “mapping these features together in ways that are expected/predicted in monolingual variants of the heritage language”.

In summary, the Putnam and Sánchez (2013) model looks at the phenomenon from a wider perspective and provides a more detailed explanation to HL divergences in comparison to the incomplete acquisition and attrition accounts. In line with one of the premises of this model, the detailed past and current L1 experience data allowed us to confirm that HL divergences were not due to “interrupted input”. One thing that this model does overlook, but the current study captures, however, is that some L1 FFs might have remained underspecified, not only because of more activated FFs in the L2 but also due to a reduced amount of L1 input in the first place, as emphasised by the incomplete acquisition and attrition accounts.

3.8 Conclusion

The distinction between different sources of information in the Turkish past tense seems to be unstable in HL grammars due to a more activated L2 and insufficient input received during the primary linguistic development stage, leading to a reassembled L1 grammar. Not supporting the qualitatively different input explanation (Rothman, 2007) for a possible cause of this, the results have been discussed from other approaches' points of view.

Interaction between two languages is indeed very complex. None of these approaches proposed to account for HL divergences are in fact capable of explaining this outcome alone, as it seems more likely that “all have some role to play in the ultimate answer” (Bayram et al., *forthc*, p. *forthc*). For example, not being able to provide evidence for the qualitatively different input claim does not mean that it is not a contributing factor to HL divergences for other properties or for the performance of subsequent generations.

In fact, the role of heritage speakers in diachronic change and appearance of new varieties has been the centre of focus in contact linguistics, as these speakers seem to lead the change (Onar Valk & Backus, 2013). To what extent this reassembly process, which includes features from both the L1 and L2 described above, or contact-induced grammaticalisation (as contact linguistics would describe it, e.g. Heine & Kuteva, 2005) leads to a new variety (permanent changes) is yet to be determined. Future research should focus on the L1 performance of subsequent generations in terms of evidentiality to see whether this new simplified L1 past tense would be reflected in the performance of children of these HSs and perhaps become the norm in immigrant Turkish over the years.

Chapter 4 L1 attrition as a function of age at onset of bilingualism: L1 attainment of Turkish-English bilinguals in the UK

Abstract

The current investigation aims to provide insights into the controversial debate on the nature of the role ‘age at onset of bilingualism’ (AaO) plays in human language capacity with a focus on what it entails for L1 attrition. L1 performance of a group of Turkish immigrants (n=57) in the UK with AaO range 7–34 was compared to that of monolingual controls (n=29) across two linguistic properties: structural complexity and L1 accent. Regarding L1 accent development, we propose AaO be taken as a proxy for L1 entrenchment instead of the maturational state of the speaker. In the case of structural complexity, full retention of proficiency prevents us from establishing a relationship with AaO. We suggest that attrition data needs to be better accommodated within such theoretical accounts by emphasizing that not all areas of linguistic competence are affected by AaO and by detailing the underlying factors in such cases.

4.1 Background to the study

The non-pathological deterioration of the previously acquired native language, i.e. first language (L1) attrition (Köpke & Schmid, 2004) is strongly influenced by the age at which the speaker becomes bilingual, and the impact of this factor appears to be quite pronounced in both production (Bylund, 2009a; Montrul, 2008) and perception (Ahn et al., 2017) across various linguistic levels. Research on native language change is usually carried out in one of two settings, with little overlap: language development among heritage speakers (HSs) on the one hand and among late bilinguals (LBs, speakers who left their native language environment post-puberty, usually in early adulthood) on the other. There is a notable dearth of studies attempting to fill the gap in the age at onset (AaO) between adult HSs (AaO usually between 0–6 years) and LBs (AaO>12), as well as investigations directly comparing the L1 development between adult HSs and LBs (e.g. Montrul & Sánchez-Walker, 2013).

In heritage language (HL) development there are two important observations. First, HSs often show much greater variability in their use of the HL. While some of them typically score within the range of monolingual speakers (and of native speakers who learned another language later in life), others show accuracy levels below chance, even on features which monolingual children master before the age at which these speakers have become bilingual (Cuza & Pérez-Tattam, 2016; Montrul et al., 2014). This non-target-like performance is usually observed in the form of simplifications, and reductions especially in morphosyntactic categories such as inflectional morphology (Montrul, 2016c) as well as complex syntactic phenomena or properties at the interfaces (e.g. Montrul, 2004; Treffers-Daller et al., 2007). Both judgments and the oral performance of Hindi HSs, for example, have been found to be eroded regarding the case system in Hindi in comparison to the performance of late bilinguals in the US (the first generation) included as a control group (Montrul et al., 2012).

Second, the level of L1 proficiency HSs may eventually retain has proven extremely difficult to account for. Some HSs ultimately become native-like while others end up with rudimentary skills, and this ultimate success might relate to a combination of factors, such as quantity/quality of input and heritage language instruction (Kupisch & Rothman, 2016; Montrul, 2016c; Rothman, 2009; Unsworth, 2013). Studies tracing HSs' L1 development longitudinally provide further evidence for the rate and degree of structural erosion experienced by these speakers which can be quite severe (especially in the case of international adoption) even if the property under investigation had stabilized before the immigration took place (Altenberg, 1991; Isurin, 2000; Montrul, 2008; Schmitt, 2004; Zaretsky & Bar-Shalom, 2007).

Zaretsky and Bar-Shalom (2007), for instance, tested whether AaO and frequency of L1 use would prevent morphosyntactic categories in L1 Russian from attrition in children and adults. They investigated error rates in the narrative and grammaticality judgment task (GJT) performance of ten Russian-English children (aged 4–13) with AaO range 0–6 and ten adults (aged 19–53) with AaO range 4–37. While later AaOs predicted fewer errors in both groups, an increased amount of L1 use did so only in children. Yet, in the case of a Russian-American child whose L1 exposure was reduced considerably after she was adopted at the age of nine, the attrition set in very quickly in the first year of adoption and the participant started to refuse to communicate in the L1 (Isurin, 2000). There is strong evidence suggesting that by adulthood, this knowledge can be completely erased from the brain, indicating the paramount role played by continuous input in maintaining the previously acquired L1

proficiency (Pallier et al., 2003; but see Pierce et al., 2014 for counterevidence obtained from a fMRI study showing long-lasting effects of early exposure on the maintenance of the perception of Chinese lexical tone contrasts among Chinese adoptees, despite being deprived of continuous L1 input).

It appears, however, that even in such severe cases of L1 loss or incomplete acquisition (as observed in child over-hearers), early exposure might be advantageous in relearning it in adulthood in comparison to second language (L2) learners. These advantages seem to be limited to phonological categories rather than structural ones and are evident in both perception (differentiation of minimal pairs) (Hyltenstam et al., 2009) and production (VOT, pronunciation) (Au et al., 2002; but see Ventureyra et al., 2004 for null results). Despite these long-lasting advantages over L2 learners, HSs are usually perceived as sounding less native-like in comparison to monolinguals (Kupisch, Lein, et al., 2014) and the voice onset time (VOT) of certain sounds they produce are not always native-like (Hrycyna et al., 2011; Lein et al., 2015).

One likely cause of the changes in the L1 VOT values has been suggested to be cross-linguistic influence (CLI), a process which might lead to the development of an accented L1 (Lein et al., 2015). There is also some evidence showing that the accented speech developed alongside that of an L2 from early on cannot be reversed even after having lived in the home country for more than 8 years, and this seems to be predominantly determined by the post-puberty ages of return to the home country (Flores & Rato, 2016).

To summarize, findings from these studies conducted with HSs suggest a complex interaction of factors but do point to one straightforward conclusion: early exposure in itself does not constitute a sufficient criterion for becoming target-like in the L1, and neither does age-appropriate development up to puberty. L1 knowledge that was acquired before puberty is unstable and can regress when another language becomes more dominant.

Late bilinguals, on the other hand, differ from HSs in two respects when it comes to their native language. Firstly, AaO ceases to play a role around puberty. Most studies investigating attrition in LBs adopt a minimum threshold for AaO of 15–17 years (following recommendations by De Bot, Gommans, & Rossing, 1991), but even in populations with AaOs below this threshold, – but above or around the onset of puberty – no age effect has been found (Schmid, 2002).

Secondly, the L1 of LBs appears to be much more stable. While the scores attained by

attriting populations on virtually any measure of L1 proficiency are almost invariably distributed over a wider range than those of monolingual control populations, with some attriters scoring lower than the worst-performing controls, this does not appear to indicate any systematic impairment to L1 knowledge: error rates usually remain below 5 % on any grammatical structure (Montrul, 2008; Schmid, 2013). There is also evidence which shows that such attrition effects in LBs can be reversed by L1 re-exposure through visits to the home country, indicating that attrition does not affect the underlying language system (Chamorro, Sorace, et al., 2016). Unlike in HL development, it has been difficult to obtain a comprehensive picture of the predictors driving language attrition (e.g. de Leeuw et al., 2010). Even in extreme cases of traumatic experiences accompanied with prolonged lack of continuous L1 contact (for around 50 years), an investigation carried out on the structural complexity and morphosyntactic accuracy in the L1 German of the Holocaust survivors with adolescent AaOs (11–17) showed no AaO effect or erosion exceeding this error rate (Schmid, 2012).

Interestingly, however, phonological categories have been found to be more vulnerable to CLI even in late bilingualism (Bergmann et al., 2017; de Leeuw et al., 2012, 2010; Hopp & Schmid, 2013). Although in these studies the performance of L1 attriters was usually not different from the controls at the group level, a good percentage of bilinguals (up to 40 %) remained well outside the control range. This suggests that the L1 may be susceptible to the effects of an L2 leading to bidirectional transfer. Although some studies showed that maintenance of the L1 accent might be linked to the effects of external factors, such as professional L1 use (de Leeuw et al., 2010), and linguistic aptitude (Hopp & Schmid, 2013), the extent of the contribution of these factors as well as of AaO to this performance is still unclear.

Echoing the above findings obtained from studies conducted with HS or LBs, a handful of studies that attempted to fill the AaO gap between adult HSs and LBs demonstrated that L1 proficiency-AaO slope shows a discontinuity around puberty. While participants with AaO over 10-12 were found to be indistinguishable from monolinguals in L1 pronunciation (Yeni-Komshian et al., 2000), perception of L1 speech sounds (Ahn et al., 2017), general proficiency (Hakuta & D'Andrea, 1992), verbal morphology (Silva-Corvalán, 1994), and conceptualization patterns of goal-oriented events (Bylund, 2009a), those with AaO below

this range were reported to show more variability with majority of them performing outside the control range.

Taken together, it seems that there is a qualitative change in the stability of the L1 around puberty (age 12). This seems to lead to restructuring in the L1 of the speakers whose first exposure to L2 was before this age, leaving the performance of those with AaO past this age comparatively mildly affected. L1 phonological categories, however, seem to be flexible even beyond this age (e.g. Hopp & Schmid, 2013). Why this should be the case, what exactly happens around this age, to what extent the L1 remains flexible beyond it, and whether there are different outcomes of AaO across linguistic levels are a few of the most important questions for bilingualism research to address.

In a recent theoretical review, Schmid and Köpke (2017) provided a discussion about the relevance of L1 attrition research to theories of bilingualism. As they underline, the fact that the acquired linguistic knowledge might change alongside the development of another language in the brain is not usually acknowledged in theoretical models of bilingual development. Championing an integrated approach to bilingualism, the authors thus argue that “in order to fully understand the nature of bilingual development and to resolve important and fundamental questions about the human capacity for language learning, processing and use, we need to arrive at a better understanding of how the mechanisms that drive and constrain L2 acquisition may also affect already established linguistic knowledge, both in the immediate and in the longer term” (Schmid & Köpke, 2017, p. 5). It follows from this that more L1 attrition studies need to be conducted looking at the impact of AaO which has been shown previously to be an important factor constraining L2 acquisition. This will allow us to see to what extent this phenomenon is accounted for by relevant previous theoretical approaches to bilingualism.

4.2 Theoretical background to age effects in bilingualism

The effect of AaO on language learning has long been a topic of controversial debate, especially in second language acquisition (SLA) research. To date, this has been predominantly addressed by two competing accounts.

The first account relates to the maturational state of the learner. Both human and animal developmental behaviour is acknowledged to be sensitive to environmental stimuli, the timing of which is crucial for a proper physiological development (Bornstein, 1989). Early

exposure is claimed to be a prerequisite for successful language development as well (Newport, 1990). Studies reporting ultimate attainment in a L2 as a function of AaO are thus often framed within the Critical Period Hypothesis (CPH) beside other maturational explanations (see DeKeyser, 2013; Kinsella & Singleton, 2014 for reviews). The traditional view of the CPH in SLA research predicts loss of capacity for language acquisition past a critical period (usually around puberty) due to gradual maturation in the neural substrates responsible for language learning. This loss of plasticity, in turn, prevents post-puberty learners from attaining native-like proficiency in the L2 (DeKeyser, 2013; Kinsella & Singleton, 2014).

One of the very strong arguments against maturational age effects is the L1 entrenchment view. Proponents of this approach argue that the consistently observed AaO effect that the previous literature reported on L2 learning is not necessarily an indication of an irreversible biological constraint but is a disguised form of the entrenchment of the L1 which causes stabilization in the neural substrates and provides a filter to L2 learning (Pallier, 2007; Pallier et al., 2003). This view thus holds that stronger L1 links (due to increased proficiency with age) entail less strong L2 representations, indicating an inverse relationship between the L1 and L2 proficiency (Yeni-Komshian et al., 2000). As entailed by this inverse relationship, native-like success in the L2 can only be achieved as a result of losing the L1 completely (Pallier, 2007). Studies conducted with adult Korean adoptees to France with the AaO range 3–10 evidenced that if L1 exposure stops completely up to age 10, it is possible to reverse its filtering effects on the L2, and the L2 can override the L1 as a result of a complete reset of the neural substrates (Pallier et al., 2003; Ventureyra et al., 2004 but see Norrman & Bylund, 2016; Schmid, 2012).

Closely related to this, the main L2 performance differences between early and late bilinguals are suggested to be natural consequences of age-related factors rather than of irreversible maturational ones (see Muñoz & Singleton, 2011 for a review). Early learners, for example, might lack a strong sense of the L1 being a component of their identity and thus might show intrinsic motivations towards adapting to the L2 environment more quickly (Köpke, 2007). Furthermore, being enrolled in compulsory education inevitably makes their L2 environment richer than that of the LBs (G. Jia & Aaronson, 2003). This, in turn, might result in using the L1 less and the L2 more leading to a shift in language dominance (G. Jia & Aaronson, 1999) and thus to loosened L1 links in the neural substrates, facilitating the learning of an L2 (Pallier et al., 2003).

Given the competing nature of these two accounts and conflicting empirical evidence provided, testing their premises in a similar group of bilingual speakers but this time for what happens to their L1 might help resolve the fundamental issue of how to conceptualize age effects. As argued by Schmid and Köpcke (2017), a theoretical approach to bilingual development should be capable of predicting both attrition and the acquisition phenomena in that “if the framework fails to predict patterns which can be shown to occur in attrition, this should invalidate the theory in the same manner as would counterevidence from language acquisition studies” (p. 36).

In line with this argument, some L1 attrition researchers investigating age effects interpreted their findings within the premises of the two age accounts mentioned above, which were originally developed for L2 acquisition. In the current study, we follow the perspectives taken by these researchers and use the implications of these accounts on L1 attrition they proposed in order to evaluate our findings. The implication of the CPH on L1 attrition, for example, centres around the idea that while the chances to become native-like in the L2 before the so-called *critical period* (CP) are increased, this will have inevitable consequences for the degree of L1 attrition/maintenance (Bylund, 2009b; Montrul, 2008). During the CP, L1 knowledge is highly susceptible to attrition. This susceptibility declines gradually due to maturation in the neural connections and starts to plateau around the onset of puberty (Bylund, 2009b, 2009a).

Evidence comes from a study conducted with adult Korean adoptees in Sweden with the AaO range 1–10 and Swedish late learners of Korean (see Hyltenstam et al., 2009). The main aim was to trace whether some of the L1 remnants could be recovered by a relearning methodology in the adoptee participants. Both groups of participants were enrolled in a foreign language classroom at a university, learning Korean for an average of three years. As the results showed, while the adoptees were outperformed by the L2 learners in a GJT in Korean, there was no statistical significance between the two groups in the VOT perception test. The individual analysis, however, showed that the performance of some of the adoptees was better than the best-performing L2 learners. Additionally, the best regaining performance belonged to the adoptees with the oldest AaOs.

Based on this, Bylund (2009b) proposes that L1 ultimate attainment of late bilinguals is mainly constrained by maturational age effects (as their AaO is past the CP) which play a determining role over other factors such as L1 contact. In the case of early learners, in line

with what Montrul (2008) claims, Bylund sees differences in input conditions and other non-maturational cognitive factors, e.g. language aptitude (see Bylund et al., 2010) resulting in great variability in the linguistic knowledge of early bilinguals within the CP. In a way, these factors are suggested to compensate for the degree of loss that is proposed to occur due to maturational effects in the first place.

The Interference Hypothesis (IH) or the L1 entrenchment view on the other hand, to date, has usually been applied to severe cases of L1 loss and thus underscores the important role played by continuous L1 exposure upon immigration in maintaining the L1 (Pallier, 2007). Its implications for less severe cases of L1 attrition seem to be most clearly observed in phonetic categories as predicted by the Speech Learning Model (SLM, compatible with the IH). The SLM was originally proposed to account for observed difficulties in the pronunciation of individual sounds experienced by L2 learners, which by default also has predictions for L1 speech production and perception (Flege, 1995; Flege, Schirru, & MacKay, 2003). In this model, both L1 and L2 sounds are assumed to exist in a common phonological space and influence each other (Flege, 1995). Interaction between the languages is proposed to lead to a bidirectional transfer between L1 and L2 sounds, which over time might result in articulation of both L1 and L2 sounds differently from the monolingual norms (Flege et al., 2003).

Although the SLM does not predict a direct relationship between modifications of this sort and a global foreign accent in the L1 and/or L2, the possibility that changes in the production of L1 and L2 sound categories lead to accented speech in both of the languages has been previously tested and evaluated from the combined perspectives of both the IH and SLM by Yeni-Komshian et al. (2000). In view of their reasoning, advanced L2 learning would predict more changes in the L1 articulatory system, and these changes might cause the L1 to be produced with a foreign accent. In this view, the degree of L2-induced changes is determined by factors such as L1/L2 proficiency levels and amount of L1/L2 use rather than biological age effects (Yeni-Komshian et al., 2000).

It is, however, acknowledged that early bilinguals (with AaO up to puberty), unlike late bilinguals, are more likely to establish new categories for the new L2 sounds because the representation of the L1 sounds, i.e. the filtering effect of the L1 on the L2 in their case is not as strong (Yeni-Komshian et al., 2000). For this reason, early bilinguals are considered to be more likely to experience L2-induced sound modifications and develop an accented

L1, while this might be observed to a lesser degree in the case of older bilinguals. In the current study, we follow this reasoning.

Hoping to contribute to what we know so far about age effects on language learning capacity and maintenance, the current study first aims to provide an overall picture of L1 proficiency in an immigrant context as a function of AaO by investigating the L1 performance of Turkish-English adult bilinguals in the UK across a wide AaO range (7–34). Secondly, it aims to investigate how well the role, if any, played by AaO can be evaluated within the premises of the theoretical accounts of bilingualism reviewed. Finally, in order to address the underlying sources of the observed asymmetry in the degree of vulnerability to attrition between phonological and structural properties as a function of AaO, we carried out an investigation of two different linguistic skills (structural complexity and global L1 pronunciation) pertaining to these two domains. Given that previous literature linked both L1 and L2 ultimate attainment in similar properties to the impact of additional factors as well, we also tested the effects of L1 proficiency, amount of L1 contact, linguistic identification and cultural affiliation.

4.3 The focus of the study

Carrying out this investigation in Turkish is particularly relevant as it has a variety of structures (e.g. complex morphology) which have been previously shown to be the potential loci for erosion and age effects in other languages. Moreover, although previous findings point to a deterioration in the knowledge and use of Turkish spoken in Europe across generations (Arslan, De Kok, et al., 2015; Gürel & Yılmaz, 2011; Huls & van de Mond, 1992; Onar Valk & Backus, 2013; Yılmaz, 2011 among them), we know very little about the role played by AaO in this. This role can only be revealed by looking at the AaO effect in similar features/properties previously shown to be eroded.

One such feature is structural complexity. Turkish is an agglutinative language with complex morphology and employs a variety of complex subordination structures through synthetic processes (Huls & van de Mond, 1992). One way attrition manifests itself is simplifications/reductions in the overall complexity of the linguistic system either because L1 is not activated enough or because of contrastive differences between L1 and L2 (Andersen, 1982; Schmid, Köpke, & Bot, 2012; Seliger & Vago, 1991). Due to its

agglutinative nature Turkish allows such tendencies to be observed very easily (Huls & van de Mond, 1992).

This might manifest itself first in word formation. As hypothesized by Huls and van de Mond (1992), instead of relying on suffixation—a costly process with each suffix having their own morphological function—one might develop an analytical tendency towards using free morphemes instead. They tested this using a measure called *agglutination index* (AI) based on Lyons (1969 as cited in Huls and van de Mond, 1992) in a small scale study in the L1 performance of two Turkish families (parents and children) in the Netherlands. This measure was calculated as the ratio of the number of morphemes over words per each sentence produced and proven to be a reliable measure in revealing differences between generations.

Similarly, Treffers-Daller et al. (2007) and Onar-Valk and Backus (2013) confirmed that adult HSs avoided complex non-finite clauses and relied on more analytical means by using finite subordination which also structurally resembles the subordination formation in the L2s tested (Dutch or German). Such tendencies, however, were not observed in the performance of late Turkish-Dutch bilinguals (Yılmaz, 2011). As revealed by Treffers-Daller et al. (2007), HSs showed a tendency to avoid relative clauses and three types of verbal complements (*-mA*, *-DIK*, *-AcAK*) due to costly functional operations required for their formation (see Treffers-Daller et al., 2007 for details). The authors acknowledged, however, that this might be a result of incomplete acquisition rather than attrition as subordination is a relatively late-acquired phenomenon. Monolingual acquisition of relative clauses was reported not to stabilise before the ages around 4–5 (Slobin, 1986) and verbal complements around 5–6 (Aksu-Koç, 1994). These facts are taken into consideration in the selection of our participants.

Another category that we investigate is global L1 accent. To our knowledge, the only study looking at this in L1 Turkish is the one conducted by Stangen, Kupisch, Proietti Ergün, & Zielke (2015). This research looked at whether being bilingual entails sounding less native-like in one or both of the languages of Turkish-German bilinguals as a function of AaO. The AaO range included in the study was 0–9 divided into two groups: one with the AaO range 0–3 and the other with 4–9. As the results showed, the majority of the speakers were perceived as sounding less native-like in either language, and only 3 out of 21 speakers were perceived as sounding native-like in both. AaO, however, did not play a deterministic role in the outcome. Given that the raters linked intonation and pronunciation of some vowels to the degree of accentedness, the authors attributed their findings to bidirectional transfer.

There is no direct evidence on the L1 pronunciation of late Turkish bilinguals. It is, therefore, difficult to derive conclusions on what constraints the L1 accent. By including a wide AaO range in the current study, we thus aim to provide some answers to this question.

4.3.1 Hypotheses

Acknowledging the difficulty of disentangling the nature of the role played by AaO in language acquisition and retention as predicted by the CPH and IH, recent SLA investigations suggested controlling for possible confounding factors such as amount of language use and language proficiency either statistically (e.g. Veríssimo, Heyer, Jacob, & Clahsen, 2017) or by establishing a control group that matches the experimental group in terms of confounding factors (e.g. Hopp & Schmid, 2013; Schmid, 2014). In the current study, we control for the effects of confounding factors statistically and take the range of scores delimited by the monolingual controls as the baseline. This means that bilinguals scoring lower than the worst-performing controls in the L1 measures used are considered to have remained below the “control range” and thus experienced some degree of attrition. In view of the logic applied in the studies mentioned above and the implications of the theoretical age accounts for L1 attrition which have been reviewed in the previous sections, we address the following hypotheses:

1. L1 maintenance is constrained by maturational age effects

If maturational age effects determine the degree of L1 maintenance, AaO should be the primary determining factor accounting for the variability in the L1 performance when the impact of the confounding factors such as L1 contact and proficiency are controlled for. We can, however, only confirm that this role is of a maturational nature, should we find the L1 performance of all bilinguals whose AaO past a certain period (age 12 based on previous reports) to be resistant to attrition (Bylund, 2009b). Additionally, the speakers whose AaO remains below this cut-off point should show greater variation in the degree of their L1 maintenance with many of them potentially remaining outside the control range, and AaO should still make a significant contribution within this group presumably in addition to the effects of other compensatory variables, e.g. L1 use (Bylund, 2009). This should apply to both structural complexity and global L1 accent performance.

2. The degree of L1 maintenance is determined by the degree of L1 entrenchment

If on the other hand, age effects are disguised as other factors, such as the degree of L1 entrenchment, frequency of L1 use, and attitudes, some or all of these factors should explain the outcome across the entire AaO range included. In view of the predictions of the SLM and IH for L1 attrition as reviewed above, the L1 accent of bilinguals is expected to show a tendency to deviate from the monolingual norm at the group level. The extent of the deviations, however, might differ between early and late learners due to their differing levels of L1 entrenchment and L2 proficiency (Yeni-Komshian et al., 2000). There is no direct empirical evidence pointing to the degree of L1 attrition on structural properties in traditional cases of attrition from an IH perspective. That notwithstanding, assuming an inverse relationship between L1 and L2 proficiency (Pallier et al., 2003), reduced frequency of L1 use and speaking another language should also result in loosened links in the degree of the L1 entrenchment regarding the structural complexity performance of some of the bilinguals.

4.3.2 Participants

The L1 performance of 57 adult Turkish-English immigrant bilinguals (IBs) with the AaO range 7–34, and of 29 monolinguals as a control group (CG) in Turkey was investigated. Although AaO was considered as a continuous variable, we should note that our sample typically represents two AaO groups (AaO<12 or AaO>12) with a roughly equal number of participants in each based on the previous literature which considers age twelve as a cutoff point between early and late bilinguals (e.g. Bylund, 2009b). All bilinguals were born in Turkey and acquired Turkish as their L1²³. The length of residence (LOR) was set to a minimum of 8 years. Contacts have been made through various Turkish clubs in London and via the snowball technique. Individuals have either been visited in their homes or in public cafes of their choice.

The main criterion of participant selection was their AaO taken as the age of arrival in the UK. As pointed out by Flores, Santos, Jesus, & Marques (2017, p. 797), working with adult

²³ Effects of any other known native languages such as Kurdish were controlled. Nevertheless, in some cases this was inevitable. One participant learned some Kurdish from her grandmother at the age of 7 but lost the ability to speak the language upon immigration at age 8. Similarly, two participants stated they had a minimum level of Kurdish knowledge. One participant was born in Cyprus where she spent 13 years before her arrival in the UK. She reported not to have acquired/used Cypriot Turkish as she had parents from Turkey.

HSs “cannot distinguish effects of acquisition from effects of subsequent language attrition”. This is especially the case for late-acquired properties such as verbal complements and relative clauses which have been reported not to stabilise before the ages 5–6 in monolingual Turkish (Aksu-Koç, 1994; Slobin, 1986). Previous investigations of subordination confirmed that Turkish HSs might not have acquired these structures completely due to insufficient amount of input (Huls & van de Mond, 1992; Treffers-Daller et al., 2007). The problem this situation might create regarding the interpretation of the exact role of AaO in L1 attrition has repeatedly been pointed out (Bylund, 2009a; Bylund et al., 2010).

Based on the psycholinguistic literature consulted, our primary motivation behind setting the lowest AaO limit to age seven was thus to ensure these late-acquired properties had time to develop age-appropriately before the emigration took place. L1 accent, which is usually assumed to develop earlier than the set age limit (Yeni-Komshian et al., 2000), does not seem to pose any problems in this respect. This allowed us to mainly exclude the possibility that any age effect we could find was due to incomplete acquisition.

Personal and linguistic background information of the participants was obtained using a sociolinguistic questionnaire (SQ). This was adapted from Yılmaz (2013) which was constructed based on the test battery of Monika S. Schmid (<https://languageattrition.org/>). Following Schmid and Dusseldorp (2010), a principal component analysis (PCA) with varimax (25) rotation was conducted on the items that asked participants to report the frequency of current L1 contact and, linguistic and cultural preferences on a scale ranging between 0 and 1. Four new composite variables were calculated as the means of the variables included in each component below. Internal consistency was established by a reliability analysis (Cronbach alpha).

- Interactive L1 use (with children, siblings, parents, grandparents in Turkey, other relatives in the UK, in written communication with relatives in the UK and Turkey)
- L1 passive exposure (through TV, radio, and music).
- Linguistic identification (importance given to maintain their Turkish and that their children understand and speak Turkish)
- Cultural affiliation (cultural preferences for friends and L1 use with friends and neighbours)

Although participants were also asked to report on their past L1 use (during the first five years upon arrival), it was not possible to conduct a PCA for past L1 use due to either lack of variability in the answers given or a large number of missing values in some of the questions. Instead, Pearson correlations were checked for the variables that were answered by all participants. A mean value of these variables²⁴ was obtained to represent past L1 use. Table 4.1 below provides quantitative information on the newly-established variables.

Table 4.1: External variables

	interactive L1 use	L1 passive exposure	past L1 use	linguistic identification	cultural affiliation
alpha	0.789	0.649	0.573	0.779	0.603
mean	0.86	0.58	0.96	0.934	0.633
range	0.41–1.00	0.00–1.00	0.65–1.00	0.5–1.00	0.18–0.88
SD	0.125	0.96	0.084	0.115	0.175

SD=standard deviation

The CG was representative of the bilinguals regarding the city of birth, gender, age at testing, and educational background. The highest education level was calculated in years by taking into account the last education level completed either in Turkey or the UK. Table 4.2 provides basic background information about the participants

Table 4.2: Basic background information

		age at testing	AaO	length of residence	education in years
controls (n=29)	Mean	32	N/A	N/A	13.44
	SD	9.75	N/A	N/A	2.49
	range	21–51	N/A	N/A	8–15
	Mean	35.14	15.54	19.61	13.15

²⁴ Past L1 frequency of use with “siblings” and “parents” ($r=0.446$, $p=0.01$).

bilinguals (n=57)	SD	7.81	7.48	6.72	2.27
	range	19–58	7–34	9–40	8–15

AaO=age at onset of bilingualism; *SD*=standard deviation; *N/A*=not applicable

The general L1 proficiency was measured by a 40-item written cloze test (C-Test). An independent sample t-test did not reveal any group differences between bilinguals ($M=28.39$) and monolinguals ($M=31.34$) at the group level ($t(-2.499)=73.459$, $p=0.17$), although the performance of five bilinguals was not within the control range (see Figure 4.1 below).

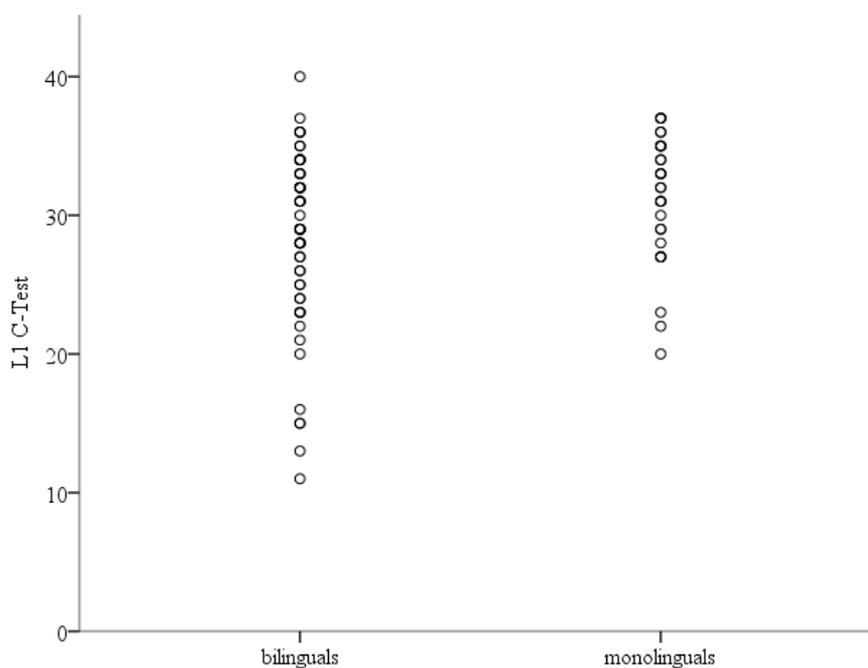


Figure 4.1: C-Test performance across groups

4.3.3 Semi-structured interviews

The most suitable data to capture attrition effects in a group of bilinguals with differing AaOs has been suggested to be free speech data (Schmid et al., 2012). This is because it allows “every speaker to employ the full range of her language knowledge” without applying too much cognitive pressure and thus prevents any observations of ceiling effect in the performance of late bilinguals, or of failures in completing the task because it is too demanding for early bilinguals (Schmid et al., 2012, p. 678). Based on this, the current study relied on spoken data collected through a semi-structured interview to naturally detect reductions, if any, in the overall complexity and degree of accentedness in the L1.

In addition to asking participants to share their views on daily topics (see L1 attrition test battery <https://languageattrition.org/>), four questions, which were originally designed for an

earlier investigation of past tense usage in Turkish (Karayayla, *forthc.*) asked them to tell stories personally experienced or heard from other people that they found interesting, horrifying or amusing. All conversations were, therefore, very spontaneous and rich regarding subordination and many other grammatical structures. Individual recordings lasted from 10 to 35 minutes ($M=19.04$).

The transcription was done according to CHAT conventions (MacWhinney, 2000). The transcribed data was segmented into AS-Units (Foster et al., 2000). Additional criteria were adapted from Berman and Slobin (1994), and Young (1995). Among the principled criteria of data exclusion proposed by Foster et al. (2000), exclusion was carried out at level three. This means that only the AS-Units that included finite or non-finite subordinate clauses together with a main clause, and simple independent clauses were included in the total count to analyse, while other units such as repetitions and errors were excluded. Subordinate clauses were coded by their type and sub-type. Since the number of non-target-like subordination was extremely low, accuracy was not investigated. There were overall 18,351 AS-Units consisting of 25,146 clauses. The pruned speech data consisted of 96,564 words. This data was used to approximate structural complexity and conduct a foreign accent rating experiment.

4.3.3.1 *Structural complexity*

Following findings of previous research, we calculated the ratio of total number of morphemes²⁵ over words (the agglutination index by Huls and van de Mond, 1992) and counted the number of non-finite relative clauses and three types of verbal complements (-*mA*, -*DIK* and -*AcAK*) per AS-Unit per participant. These non-finite clauses were revealed to be the most problematic in heritage Turkish by Treffers-Daller et al. (2007). Adapting recent SLA methodologies that used similar sub-measures to approximate structural complexity (Lahmann et al., 2016), we Z-transformed the sub-scales and then incorporated them into one single measure of structural complexity by using the reshape package in R. We standardised the final scale by Z-transforming it one more time. A higher score in each sub-component and thus an overall higher score reflected that the speaker did not develop a preference towards using more analytical means or less simple language.

²⁵ The morpheme counts were obtained automatically with the aid of a Turkish morphological parser and a disambiguator developed by Sak et al. (2009) with 96.7 % success rate.

4.3.3.2 *Global foreign accent ratings*

In order to detect changes in the L1 accent as a function of AaO, we conducted a FAR experiment. Following the procedure and criteria used in de Leeuw et al. (2010), short speech samples ($M=16.49$ seconds) from the spoken performance of each bilingual and CG speaker (as a response to the same question) were extracted. Particular attention was given to include fully-finished utterances without any code-switching or grammatical mistakes.

Twenty-eight judges with Turkish as their only native language (age range 19–23, $M=19.78$) were recruited among the first year university students studying foreign language education at the Middle East Technical University in Turkey²⁶. The original experiment²⁷ lasted 52 minutes to complete and took place in a quiet room in the department where the judges listened to the samples through laptop speakers and were asked to rate the degree of the foreign accent of each speaker during the 7 second-long pauses after each sample. The scale used was the final 6-point Likert Scale used in Hopp and Schmid (2013) and ranged between 1=native accent and 6=strong foreign accent. The judges were informed not to confuse the regional accent with a foreign accent during the practice session employed before the experiment²⁸.

²⁶ An anonymous reviewer pointed out that using monolingual raters instead of raters with L2 English background would have been more appropriate. Our choice of bilinguals, however, was a deliberate one: various studies have found that familiarity with the language background and language combinations of the speakers to be rated can improve inter-reliability and also leads to raters being somewhat more lenient (e.g. Carey, Mannell, & Dunn, 2011), and that even non-native speakers are able to rate speakers reliably (e.g. Xi & Mollaun, 2011). In order to give all of our speakers the ‘best’ chance of being perceived as natives, we felt that the choice of bilingual raters would be better than choosing speakers entirely unfamiliar with the language that our speakers use in daily life.

²⁷ This investigation was originally designed for a larger project and thus included speech samples of an additional group of UK-born adult HSs ($n=31$) who were not included here in this study due to concerns about their incomplete attainment.

²⁸ The same anonymous reviewer also suggested that the raters should ideally have had the same region of origin as with the participants in the sample because their choices of rating an accent as “foreign” might be confounded with that participant’s heavy “regional accent”. The reviewer is, indeed, correct that familiarity with regional accents can affect the accuracy of ratings (e.g. Flege, Frieda, & Nozawa, 1997). This is why we very carefully matched the experimental and the control speakers for region of origin. We can thus assume that regional dialects occur to the same degree in the monolingual and the bilingual groups, and the fact that all monolinguals were unambiguously rated as L1 speakers strongly suggests the absence of a confound as suggested by the reviewer.

The final score that each speaker had was calculated as the mean value of the ratings given by 28 judges. A higher FAR was an indication that the speaker was perceived to sound less native-like²⁹.

4.3.4 Analysis of the Data

For each L1 measure we used in the current study, there were multiple responses per subject, which would violate the independence assumption of traditional linear models. Mixed effect models are considered suitable in such cases (Baayen et al., 2008). Given this, we analysed the data by using a linear mixed effects regression modelling with the *lme4* package (D. Bates et al., 2015) for the R statistical platform version 3.2.4 (R Core Team, 2016).

We ran separate models for each measure and considered ‘participant’ and ‘rater’ (in FAR models) as random factors in order to control for the variability. We log-transformed the dependent variable (FAR) to achieve a normal distribution (see online materials Figure 5, 6 and 7 for the distribution of residuals of the models built). In order to provide a reliable answer to the nature of the role played by AaO and test our hypotheses, it was necessary to statistically control for the effects of external/confounding variables such as L1 contact, education level, and L1 proficiency.

In order, however, not to overfit the data by including too many predictors (Wurm & Fisičaro, 2014), in the final models we only included the ones that predicted the outcome significantly when tested alone. Given that we were particularly interested in the explanatory power of each fixed effect while holding other variables constant, following the suggestions in Wurm and Fisičaro (2014) and the methodology employed by Verissimo et al. (2017), we included the predictors simultaneously in the final models. The use of this method is also justified if one wishes to control for the correlations between the fixed effects (if any) included as covariates (e.g. Verissimo et al., 2017).

P-values were obtained by using the *lmerTest* package (Luke, 2017). A comparison of the AIC values of the models showed that addition of random slopes was not justified (Barr, Levy, Scheepers, & Tily, 2013).

²⁹ Note that being perceived as sounding “non-native” does not entail that that speaker is a non-native speaker of Turkish.

4.4 Results

4.4.1 Structural complexity

According to Table 4.3 below, unlike hypothesised, group means do not seem to diverge from each other in any of the sub-components used to approximate the structural complexity score. The statistical model that we conducted on the merged structural complexity Z-score confirmed that the bilinguals did not diverge significantly from the reference group ($\beta=0.016$, $SE=0.02$, $t=0.82$).

Table 4.3: Mean values of structural complexity sub-variables across groups

	groups	mean	std. dev
agglutination	controls	0.8253	0.04611
index	bilinguals	0.8293	0.05315
number of <i>-mA</i>	controls	0.0484	0.02555
per AS Unit	bilinguals	0.0508	0.0323
number of <i>-DIK</i>	controls	0.032	0.02054
per AS Unit	bilinguals	0.0363	0.0298
number of <i>-AcAK</i>	controls	0.0073	0.00916
per AS Unit	bilinguals	0.0069	0.00809
number of relative clauses	controls	0.0817	0.03653
per AS Unit	bilinguals	0.0689	0.05514

As plotted in Figure 4.2, there was no significant relationship between AaO and the structural complexity ($F(1, 59203)=2.322$, $p=0.127$, $\beta=-0.00009$, $t= -1.524$). Only three bilinguals remained outside the control range. High scores were obtained at all ages. While the lowest scores were obtained by participants with AaOs 8, 9, and 14, the highest scores belonged to participants with AaOs 7, 10, and 13.

Given that participants showed full retention of proficiency regarding the overall structural complexity of their native language within the AaO range investigated here, no further analyses were conducted.

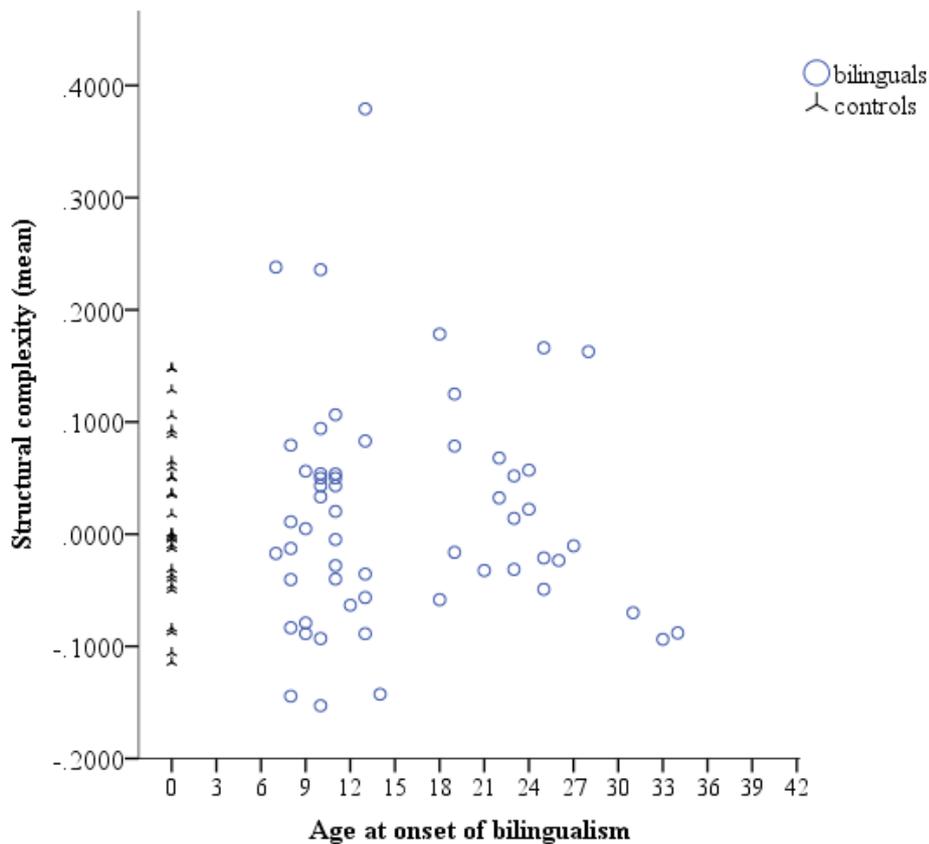


Figure 4.2: Structural complexity as a function of AaO

4.4.2 Foreign accent ratings

According to Figure 4.3 below, all monolinguals and a great majority (71.92 %) of bilinguals fell within the range of unambiguous L1 speakers. In the case of the bilingual group, however, there was a much wider distribution with 16 participants (28.07 %) falling into the non-native range. Four of these were outliers, with one of them being perceived as unambiguously non-native by all raters and the rest having a FAR over four. The AaOs of these outliers were 8, 9, 10 and 13.

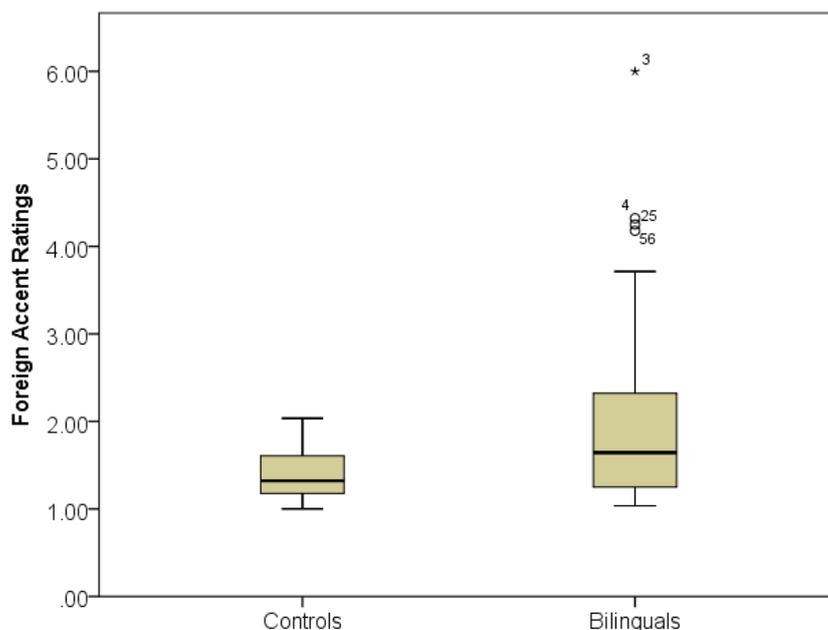


Figure 4.3: Foreign accent ratings across groups (1=no accent, 6=strong foreign accent)

In order to prevent the influence of the outliers on the dependent measure, the statistical model was conducted without the outlier data points ($n=53$). This model evidenced that the judges had a tendency to perceive the bilingual participants to sound less native-like in comparison to the monolinguals at the group level (monolinguals $M=1.378$, bilinguals $M=1.733$, $\beta=0.355$, $SE=0.12$, $t=2.79$). This model accounted for 35.5 % of the variance.

There was a significant relationship between AaO and FAR ($F(1, 1482)=138.6$, $p<0.001$, $\beta=-0.05$, $t=-11.77$), which is captured in Figure 4.4 below. As the fitted line of a high order polynomial function demonstrates, the relationship between AaO and FAR is quite linear until around ages 13–14, and then starts levelling off where the foreign accent is not a function of AaO anymore.

AaO, however, accounted for only 8.5 % of the variance in the outcome. In the next step, we thus tested which other variables besides AaO contributed to the explained variance. The coefficients of the final model, which accounted for 31.7 % of the variance, are provided in Table 4.4. According to this, the participants with older AaOs ($\beta=-0.013$, $SE=0.004$, $t=-2.66$), those with higher scores in L1 C-Test ($\beta=-0.014$, $SE=0.004$, $t=-2.94$), those with more L1 passive exposure ($\beta=-0.287$, $SE=0.133$, $t=-2.16$) and those who were older at the time of testing ($\beta=-0.009$, $SE=0.005$, $t=-2.14$) were perceived to sound more native-like. None of the other variables including the background education level predicted the outcome.

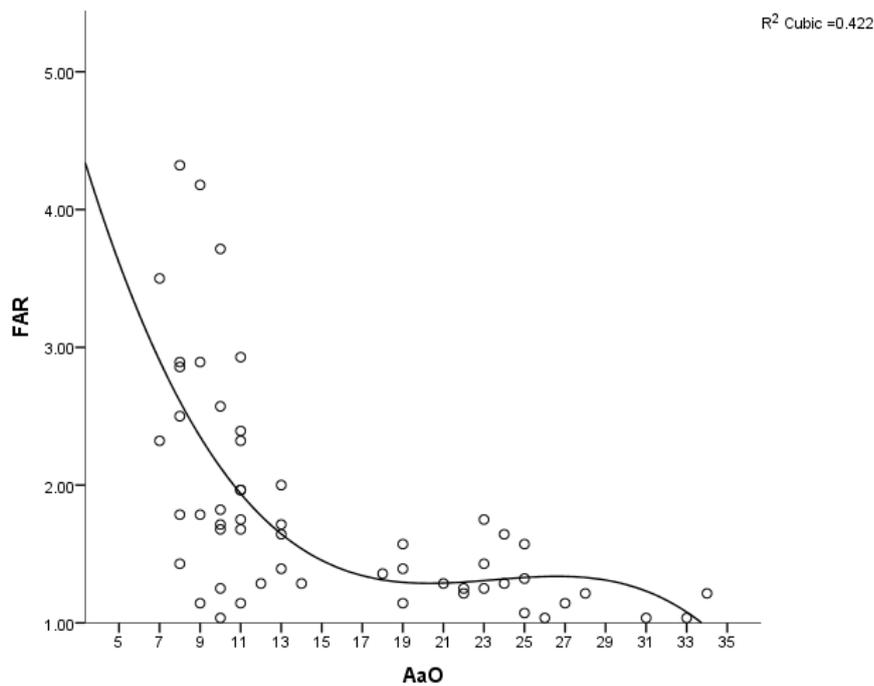


Figure 4.4: Foreign accent ratings as a function of AaO

Based on the function of the slope in Figure 4.3 above, we created two subsets of bilinguals with $AaO < 14$ ($n=30$) and with $AaO > 13$ ($n=23$). We will call them the early bilinguals (EBs) and the late bilinguals (LBs) respectively. This was crucial to test our hypotheses and see if the reported role played by AaO above remained significant and independent when the effects of the confounding predictors were controlled for. The final model accounting for 29.7 % of the variance showed that the EBs with increased L1 proficiency (C-Test, $\beta=-0.015$, $SE= 0.007$, $t=-2.118$) and more L1 passive exposure ($\beta=-0.502$, $SE= 0.206$, $t=-2.438$) sounded more native-like, while AaO ($\beta=-0.019$, $SE= 0.029$, $t=-0.663$) ceased to contribute to the explained variance.

Table 4.4: Predictors of Foreign accent ratings across bilingual groups

	estimate	SE	t-value	
(Intercept)	1.487366751	0.18921	7.86104	***
AaO	-0.01306183	0.00491	-2.6602	*
C-Test	-0.01360869	0.00463	-2.9407	**
L1 pass exp.	-0.28758268	0.13312	-2.1603	*
age at testing	-0.00991208	0.00463	-2.1426	*

AaO=age at onset of bilingualism; L1 pass exp=L1 passive exposure

For the LBs, on the other hand, the only variable that came back as significant was age at testing ($\beta=-0.012$, $SE=0.005$, $t=-2.441$): older participants were perceived as sounding more native-like. To unravel whether the role played by age at testing was attrition-specific, we checked whether it predicted the variability in the performance of the CG as well. A simple linear regression analysis revealed that older monolinguals were also perceived as sounding more native-like ($F(1, 9)=810$, $p=0.002$, $\beta=0.009$, $t=3.00$). Why this should be the case deserves further empirical scrutiny, but regarding our data, it is safe to say that it is not an attrition-specific variable and the L1 accent of the bilinguals whose AaO is over 13 is resistant to attrition.

4.5 Discussion

Overall, our findings showed that while the bilinguals as a group managed to attain a target-like level of proficiency regarding the overall structural complexity of their L1, this was not the case regarding the degree of sounding native-like. While the performance of only three participants (5.2 %) remained below the control range in the former measure with the rest performing target-like, sixteen participants (28.07 %) fell into the non-native range which significantly distinguished their accent from that of the controls at the group level.

The full retention of proficiency did not allow us to establish a relationship between AaO and the structural complexity scores obtained. The AaO–FAR slope, on the other hand, dropped linearly until it levelled off after AaO 13. In other words, it showed a clear discontinuity with all participants (except for one with AaO=18) past this age falling into the control range. The investigation of this participant showed that he had a heavy regional accent. Although the judges were informed about this, some variability in this participant's grammatical/lexical choices due to the regional accent might have misled their judgment (de Leeuw et al., 2010). In the group whose AaO remained below this cut-off point (AaO<14, $n=34$ including the four outliers), there was much more variability and the FAR of fifteen participants (44.11 %) fell outside the control range. This part of our observation thus seems to corroborate our first hypothesis, which would predict that the degree of L1 retention is primarily determined by maturational constraints.

We found, however, that AaO was not the only significant predictor explaining the variability in the scores. The outcome was instead a result of an interplay of AaO, amount of passive exposure to L1, level of general L1 proficiency, and biological age. Furthermore, the individual explanatory power of AaO was not any better than that of the other covariates

(see the Results). This seems to run contrary to the expectations about an independent or more significant role played by AaO and thus prevents us from ascribing our findings “fully” to maturational age effects.

The non-native traces in the L1 accent of the bilinguals might rather be a result of the reorganization of the L1 phonetic system under the influence of the L2 assuming that L1 and L2 sound categories exist in a shared system interacting with each other and that the same speech learning mechanisms are active throughout the lifespan (Flege, 1995). In line with the predictions of the SLM, our statistical findings thus appear promising in showing that L1 sound categories were adaptive even in adulthood presumably under the influence of L2 sound categories and the degree of this influence was not constrained by AaO only, but also by L1 proficiency, frequency of L1 exposure, and biological age. Later, we showed that biological age here did not play an attrition-specific role because older monolinguals were also perceived as sounding more native-like.

The role played by passive exposure is remarkable which relates to what Schmid (2007) suggests about the role played by the quality of L1 contact in attrition. Getting exposed to qualitatively native-like input in adulthood on a frequent basis might have helped distinguish between phonetic characteristics of L1 and L2 sounds and prevent L1 sound categories from being modified. This finding parallels previous reports about the protective role of L1 contact in maintaining L1 accent in adulthood (Yeni-Komshian et al., 2000). It is thus plausible to assume that the role played by AaO we reported was quantitative rather than qualitative unlike what the CPH proposes (Flege, 1995). More precisely, as stated in our second hypothesis, the individual contribution of AaO to the explained variance seems to be a result of differing degrees in the L1 entrenchment of our speakers rather than irreversible neurological changes.

The fact all the bilinguals in our study (except for the one that we already discussed above) past AaO 13 were perceived as sounding unambiguously native-like still poses a significant challenge to this explanation. Interference accounts assume an inverse relationship between L1 and L2 proficiency, which should result in at least some of the late bilinguals' L1 accent being perceived as divergent as well. That notwithstanding, these accounts, in general, acknowledge that L2 interference on the L1 might be limited in late bilingualism due to deeply entrenched L1 representations (Pallier, 2007; Yeni-Komshian et al., 2000). Based on our findings, we can speculate that being monolingual at least for this much amount of time

results in the representation of L1 categories being deeply entrenched and this makes it quite resistant to external factors and L2 interference.

In our view, this does not necessarily indicate irreversibility or that no interaction between L1 and L2 took place. Phonological drifts might have happened as a result of interactions between L1 and L2 sounds (that our experiment would not capture). Yet, these changes might not have led to deteriorations in the L1 accent if, for example, certain conditions related to frequency and intensity of L1 and/or L2 contact were not met (Chang, 2012).

In general, late immigrants tend to continue using their L1 on a frequent basis and remain mostly L1-dominant (G. Jia & Aaronson, 1999). It is thus plausible to assume that there might be a certain threshold of L1 use/exposure necessary for the established L1 links not to be weakened upon immigration and this threshold might have been already reached in the case of our late bilinguals. This would explain the null effects of the external variables in this group. In a similar vein, a certain level of intense L2 experience going beyond typical daily L2 use might be necessary for the L2 to affect the deeply entrenched L1. Previous investigations of L1 accent conducted with late German bilinguals, who were reported to be very proficient L2 users and using their L1 less frequently than our participants, provide some support to this explanation (e.g. Bergmann et al., 2017; de Leeuw et al., 2010). As a result, the high levels of L1 retention in this group could be due to availability of the L1 upon immigration rather than age-related reduced susceptibility to attrition.

Distinguishing between the effects of maturational constraints and L1 entrenchment in a group like this is indeed very difficult. In theory, one solution could be to investigate the L1 performance of an additional group of LBs whose L1 contact ceased completely upon immigration (see Schmid, 2012 for details). If the main cause of high levels of L1 retention among late bilinguals (as observed in this study) is due to reduced susceptibility to attrition, which is predicted to be an irreversible process, then no group differences should be obtained and L1 should be retained to a considerable degree even in the group with no prolonged L1 contact. In practice, however, it is extremely difficult to find such comparable groups.

To our knowledge, the only investigation to date has been Schmid's (2012) investigation of age effects in two groups of post-puberty bilinguals (the Holocaust survivors with AaO range 11-15) with and without continuous L1 contact upon immigration. This research demonstrated that the degree of L1 loss in morphosyntactic properties, which was found to

be minimal, was better predicted by AaO rather than availability of the L1 upon emigration. It is however not easy to see how this finding can be taken as a direct counter-evidence to our argument above regarding the L1 accent of our participants. This would require further investigations of L1 accent with a similar profile of bilingual participants. Until proven otherwise, we therefore argue that our findings, in general, are “more compatible” with an L1 entrenchment view than with a maturational view. We, however, acknowledge that more detailed reports on L1/L2 use and proficiency should be obtained and additional analyses, e.g. acoustic analyses should be carried out to arrive at a more definitive answer.

The picture for the L1 performance in structural complexity was quite different from what we observed in L1 accent as all participants performed fully target-like. Although this is an outcome which was not predicted in our hypotheses, these findings are entirely in line with what Kupisch, Lein, et al. (2014) found in the performance of adult French-German simultaneous bilinguals (2L1s) who acquired French either in a minority or majority context. While all participants regardless of the context performed native-like in a variety of morphosyntactic categories in controlled tasks, those who acquired French in the minority context had an accented L1 and drifted VOT values. The authors discussed that even if they investigated the morphosyntactic performance in free speech rather than in controlled tasks, their participants would still perform native-like. This is because, as the authors evaluate, speakers are in control of how to express things and might avoid certain structures by compensating for them through other means. The same, however, would be less accurate in pronunciation as it would not be possible to find alternative ways of pronouncing a sound (Kupisch, Lein, et al., 2014).

This explanation might account for the asymmetry we found across our linguistic measures to some extent. Although we counted the number of different types of non-finite clauses which were previously reported to be used infrequently in immigrant Turkish (Treffers-Daller et al., 2007), we did not look at the finite/non-finite clause distribution in general or in specific contexts. In Onar-Valk and Backus' (2013) study, for example, adult HSs compensated for the non-finite clauses by using finite-clauses in reported speech contexts more than they did in other contexts. In that sense, as raised by one of the reviewers as well, we acknowledge that our measure might not have been sensitive enough to detect such compensatory tendencies.

On the other hand, our participants showed full retention of L1 proficiency in the second component that we included in the structural complexity measure as well: the agglutination index. This indicates that none of the participants avoided synthetic costly processes by relying on more analytic means. It follows from this that not all linguistic measures are subject to age effects. It is widely acknowledged in the SLA literature that age effects do not modulate the ultimate attainment in an L2 across the entire range of linguistic domains or even across the properties within the same domain, which is called the selectivity of age effects (e.g. Veríssimo et al., 2017). We can argue that the same holds for L1 attrition and general structural complexity might be something that is not selected by age effects.

Selectivity phenomenon is, in fact, not new to L1 attrition research. Previous research demonstrated external interface-governed structures such as the distribution of subject pronouns and differential object marking as potential loci for erosion (Chamorro, Sturt, & Sorace, 2016), which is often framed within the Interface Hypothesis as formulated by Sorace (2011). There is also evidence showing that structures which are not in competition between the L1 and L2 would be fully retained (Gürel, 2004). As Gürel's investigation of L1 attrition in long-term Turkish late bilinguals in Canada exemplified, only the pronoun *o*, the binding domain of which is in competition with the English pronoun *s/he*, was affected. The binding domains of the other two Turkish pronouns were fully retained. By analogy, high levels of L1 retention across the entire AaO range in the current study might thus relate to the lack of a direct competition between the L1 and L2 structures under investigation (e.g. agglutination, non-finite clauses), and also to the fact that these properties are not governed by external interfaces.

Unlike what Gürel's study revealed above, a recent study investigating the role of AaO in a group of Korean-English pre- and post-puberty learners showed that pre-puberty learners (with AaO up to age 12) failed to perceive L1-specific phonemic contrasts, but did not have problems with the contrasts that are similar to the L2 sounds (Ahn et al., 2017). It, therefore, appears that even phonological competence might be subject to an AaO-determined selective process, but how the level of cross-linguistic similarity/competition between the L1 and L2 influences this outcome might vary based on the language pairs and the linguistic domain. If this is the case, it remains to be seen in the future to what extent there is an overlap between the selectivity of attrition and age effects across different linguistic properties with differing

levels of competition between L1 and L2. It is also important to employ different methodologies to see whether task demands also play a role in this selectivity.

4.6 Conclusion

The present investigation set out to explore the relationship, if any, between AaO and the degree of L1 attrition in the overall structural complexity and the perceived accent. The spoken performance of adult Turkish immigrants in the UK (n=57) with a wide AaO range (7–34) was compared to that of a group of controls (n=29). We formulated our hypotheses based on the premises of two competing accounts: the CPH and the L1 entrenchment view, with a hope that testing these models' capacities in accounting for L1 attrition phenomena might help resolve the fundamental issue of how to conceptualise age effects.

Overall, our findings suggest that L1 accent is sensitive to the effects of external factors and AaO, which we propose to be taken as a proxy for the level of L1 entrenchment instead of the maturational state of the speaker. However, given that we did not have detailed reports on the L2 use or obtained any measures of L2 proficiency, these findings should be taken as preliminary and tentative. It is difficult to claim something similar for the structural complexity performance as all participants performed target-like. One possible explanation for the asymmetry found in the degree of attrition across the two linguistic measures could be the differing levels of competition between the L1 and L2. Even if this was the case, neither of the accounts makes an explicit claim for this and therefore remains insufficient to account for the findings.

Taken together, if Schmid and Köpke (2017, p. 2) are right in their proposal that L1 attrition findings can “be used to inform, challenge, and validate theoretical approaches of bilingual development”, we believe that our findings, despite being preliminary, should be used to inform implications of these models for L1 attrition to accommodate the phenomena such as selectivity and degree of competition between L1 and L2 structures.

Without any doubt, more research needs to be carried out in order to arrive at more definitive answers. We suggest that future researchers should investigate age effects in a number of other properties with differing levels of competition between L1 and L2 by including participants with younger AaOs and a greater variety of language use. This could be achieved using an additional group with a profile similar to that of adoptees whose L1 exposure ceases

completely upon immigration either in post or pre-puberty ages. Based on our findings, this is crucial to see these models' limits in accounting for L1 attrition data.

Chapter 5 A usage-based approach to morphological productivity in adult Turkish heritage speakers in the UK: Convergence on the immigrant variety

Abstract

The present study assesses the ability of adult Turkish heritage speakers (HSs) in the UK to employ formulaic nominal and verbal word formation devices productively in free speech and explores input-related predictors of this performance. The HS (n=31) performance is compared to that of immigrant bilinguals (IBs, n=61) and matched monolinguals (n=44). The results show that overall, the bilinguals use nominal word formation devices less productively and rely on more familiar nominal lemmas than the monolinguals do, while their verbal productivity performance remains intact. This change in the immigrant variety reflects on the HS performance, indicating HSs' sensitivity to the frequency of the linguistic elements in the input provided by these immigrant speakers. However, this performance is independent of the amount of past L1 exposure. Further details and implications are discussed from the perspective of usage-based approaches.

5.1 Background to the Study

Heritage speakers (HSs) constitute a particular bilingual population regarding the nature of their bilingualism and the context of this development (Montrul, 2016c; Rothman, 2009). Typically, these speakers are children of immigrants who acquire and speak another language at home (henceforth L1) which is not the same as the language spoken by the majority in the country of residence (L2) (Rothman, 2009). Often, the bilingualism achieved is unbalanced, and the home language projects a different development compared to monolingual attainment with a considerable amount of variability. One of the aims of the heritage language (HL) bilingualism research has thus been to account for this variability in ultimate L1 proficiency that HSs retain across different linguistic abilities and factors contributing to this outcome (Benmamoun et al., 2013). While there has been a considerable amount of research to date exploring the ultimate L1 attainment of HSs and its predictors in various domains, investigations of lexical abilities have remained understudied.

The (scarce) existing research investigating lexical abilities of HSs looked at the phenomenon from a wide perspective in different HLs. These studies reveal that HSs do not have as large and diverse vocabulary as monolinguals (Gharibi, 2016; Montrul, 2016c; Polinsky, 2005), have unstable word formation knowledge (Gal, 1989), are slower and less accurate in lexical naming and retrieval in comparison to previous generations (Ammerlaan, 1996; Hulsen, 2000). Many of the HSs, however, have a speed advantage regarding accessing and/or maintaining frequently occurring words (Ammerlaan, 1996; Hulsen, 2000), early learned vocabulary (Montrul & Foote, 2014) and verbs over nouns and adjectives at least in L1 Russian (Polinsky, 2005).

While language experience, i.e. acquisition conditions, frequency of occurrences and amount of input/output has been suggested as the main source of lexical processing (Montrul & Foote, 2014), factors such as age of bilingualism (Ammerlaan, 1996) and generation descent (Hulsen, 2000) have also been considered. Similarly, one of the earliest lexical investigations revealed that Hungarian HSs in Austria seem to have lost productivity regarding some word formation devices that were infrequent in the input available to them through the first generation of immigrants (Gal, 1989).

Gal (1989) looked at the maintenance and productivity of word formation through affixation: three types of causatives, the general verbalizer suffix, and the prefix that forms compound verbs. The investigation was carried out on the spoken performance of late bilinguals (LBs) as well as HSs. The results showed that the HSs relied more on the German-type causative structure and avoided the L1 causative marking by inappropriately using noncausative verbs or by using other analytic means. Although none of these strategies was observed in the LBs' performance, these three types of causatives were the least frequently occurring devices in their performance. The author thus attributed the HS performance partly to the frequency of these forms in the input. The other two devices, which were very frequent in the performance of the input providers, on the other hand, were also used very frequently by the HSs. One difference was that the HSs used these devices even more productively and derived words that did not exist in Hungarian. The unconventional nature of these neologisms has been attributed to the lack of pressure to conform to conventional uses in the immigrant community (Gal, 1989).

A few studies compared the lexical proficiency of HSs to that of second language speakers. Such comparisons contribute to the current discussions on the native status of HSs in the literature (Rakhilina et al., 2016; Rothman & Treffers-Daller, 2014). Some word association

strategies employed by Korean HSs, particularly the ones showing strong conceptual links and some innovative patterns that are also found in the production of Russian HSs, for example, revealed that HSs' lexical performance was more similar to monolingual performance than L2 learner performance (Kim, 2013; Rakhilina et al., 2016). The similarities notwithstanding, there were also large differences between HSs and native speakers. In Kim's (2013) study, for instance, which was conducted with low proficiency adult Korean HSs in the US, the HSs' less active networks regarding their collocation-based associations suggested that HSs "learn and store the words individually rather than in connection with other words" (Kim, 2013, p. 29). The researcher also acknowledges that this is likely to be caused by low proficiency levels of the HSs whose L1 exposure/use conditions might not have been adequate to trigger production of such native-like associations.

Such findings pose important questions. Would it be possible, for example, for these low proficiency speakers to develop native-like word association networks even in adulthood if their input conditions improve? Alternatively, should they be classified as "incomplete learners" due to their different L1 behaviour as it is usually assumed? (Montrul, 2008).

A recent investigation by Treffers-Daller, Daller, Furman, and Rothman (2016) contributes to this understanding. The study was conducted with Turkish HSs in Germany, monolinguals, and "returnees", i.e. former HSs who went back to Turkey as young adolescents and continued their education in Turkish institutions. Adopting a usage-based account, Treffers-Daller et al. investigated the effect of the input environment and the time spent in this environment on the use of light verb collocations formed with the verbs *yap-* ("do") and *et-* ("do"). Participants in each population were subdivided into a group of adolescents aged 14–16 and a group of young adults aged 20–21. The younger returnee group had been residing in Turkey only for a year, whereas the older group had been back for seven years. Elicited free speech data was investigated for the contextually appropriate use of these collocations.

The findings revealed that while both HS groups diverged from the monolinguals, the young returnee group had started developing conventional usages. This was noted in the form of clear avoidance of collocations constructed with *yap-* (the marked option in the monolingual variety) even at the expense of overusing the forms with *et-* (the unmarked option). The older returnees with a longer LOR, on the other hand, performed fully native-like.

As the authors evaluate, this is an indication of these speakers' sensitivity to input to acquire the conventional uses of the original variety even after puberty because this was what they have been hearing in their environment. Accordingly, they propose that this sensitivity to input should be visible in HSs as children too and that their development should be L1-convergent when considered within the norms of the immigrant community. The current study tests these claims in the performance of adult Turkish HSs in the UK.

Following Gal (1989)'s approach to productivity on word formation, the main focus will be on the ability of the HSs to productively employ word formation devices (across the entire range of their vocabulary) and the predictors of this performance. We aim to reveal how this attainment, termed *morphological productivity*, remains sensitive to the amount of past L1 experience and the input available to these speakers through other immigrants in the same community. More precisely, we will investigate how morphological productivity performance (henceforth, MPP) of UK-born HSs with age at onset of bilingualism (AaO) range 0–5 converges on the variety spoken by other immigrants with a wider AaO range (7–42) and in what ways this performance differs from that of monolinguals.

The fact that there is a dearth of studies investigating lexical abilities of HSs in general and morphological productivity in particular is our main motivation behind this choice. With its agglutinative nature, Turkish is a good candidate for this investigation. Our second reason relates to previous lexical attrition studies' findings which have shown that L1 lexical accessibility can be compromised under the effect of an L2 even in late bilingualism. This can be observed in the form of slower reactions in naming tasks, less diverse and sophisticated vocabulary usage, increases in hesitation markers, and semantic changes in low frequency vocabulary (Ammerlaan, 1996; Bergmann, Sprenger, & Schmid, 2015; Olshtain & Barzilay, 1991; Schmid & Fägersten, 2010; Schmid & Jarvis, 2014; Yılmaz & Schmid, 2012). By analogy, the ability of Turkish immigrants in the UK to use word formation devices productively and the frequency of these devices and the lemmas they use in daily life might have all been compromised due to attrition. If HSs are sensitive to input available to them, this should be visible in the way they converge on this variety rather than the monolingual variety with which they are mostly not in prolonged contact.

5.2 Usage-based approaches and their implications for the HL development

Usage-based approaches explain how a complex human language system emerges from interactions of different cognitive mechanisms with linguistic input (Behrens, 2009; Bybee,

2011; Ellis, 1998, 2002; O'Grady, 2008; Tomasello, 2003). Proponents of these approaches consider even the smallest linguistic elements such as morphemes to consist of form-function mappings (Behrens, 2009; Bybee, 1988, 1998, 2007). Unlike nativist accounts, this view assumes that “lexical items cannot be clearly separated from the structural frames they occur in” (Langacker, 2011, p. 79). Language users know how lexical items behave in various contexts, such as how often a verb appears in the past tense form (Ellis, 2002), which requires the storage of lexical items together with their syntactic or semantic information (Bybee, 1988). Given this, both lexis and grammar are proposed to emerge from linguistic experience through reasonings and rule abstraction. This, in the end, shapes how language is cognitively organized and represented (E. Bates & Goodman, 2001; Bybee, 1998, 2001; Ellis, 2002; Tomasello, 2003).

The transparency/opaqueness of the form function mappings and the frequency of the linguistic elements in the input are of paramount importance regarding this emergence (Gathercole, 2007; O'Grady et al., 2011). High-frequency forms and transparent mappings are suggested not to pose any difficulties. Opaque forms with low type/token frequency, however, might be more difficult as they require a larger amount of input to be acquired (Gathercole, 2007). The fact that bilingual children receive less input in both of their languages makes the role played by input quantity and quality even more deterministic especially in the development of low-frequency opaque forms (Gathercole, 2007).

Usage-based approaches are also in line with the concept of language change and have implications for attrition research. Frequency of linguistic items and their repetitive use have an impact on how the language is cognitively organised, processed, and/or resists change (Bybee, 2001, 2007; Langacker, 2011; The “Five Graces Group” et al., 2009). In cases where the linguistic experience changes within an individual or a linguistic community, the cognitive organisation of the language is likely to be affected (Bybee, 2007; The “Five Graces Group” et al., 2009). Recently, MacWhinney extended the implications of the Unified Competition Model—originally proposed to account for adult L2 acquisition—to L1 attrition research (MacWhinney, *forthc*). As underlined by Schmid and Köpke (2017), among the predictions of this model, the effect of language disuse leading to loosened L1 links as well as competition between the L1 and L2 leading to negative transfer appear promising.

5.3 Word formation in Turkish

Word formation in Turkish is achieved through suffixation (Göksel & Kerslake, 2005). The word *anlayamadıklarım* ('the things that I am/was not able to understand') decomposed into its morphemes below exemplifies the complexity of Turkish morphology³⁰.

anla[Verb]+*YAmA*[Able+Neg]+*DHk*[Noun+PastPart]+ *lAr*[A3pl]+*Hm* [P1sg]

While nominals (nouns, adjectives, adverbs, pronouns) can be inflected for case, number and possessives, verbals can be followed by voice, negation, tense-aspect-modality (TAM), agreement and subordination suffixes (Göksel & Kerslake, 2005). Derivational suffixes attach to either verbals or nominals and form new dictionary entries. Many of these suffixes, however, are not being used anymore by native speakers to derive new dictionary entries and are thus considered unproductive (Göksel & Kerslake, 2005).

Inflectional morphology has been reported to appear very early (Aksu-Koç & Ketrez, 2003; Ketrez & Aksu-Koç, 2009). At around age two, Turkish children produce words with both verbal and nominal morphology mostly error-free and inflectional variation shows a stabilization at this age (Ketrez & Aksu-Koç, 2009). Here, inflectional variation refers to the appearance of a word in different inflected forms. The regularity of the Turkish morphological system, saliency of the cues and the transparency of the form-function mappings have been reported to contribute to this early development (Ketrez & Aksu-Koç, 2009). This development seems to be compatible with usage-based accounts showing a positive correlation between morphological variation and repetitions in the Child-Directed-Speech (CDS) and the Child-Speech (CS) (Aksu-Koç et al., 2014; Dressler, Kilani-Schoch, & Klampfer, 2003; Küntay & Slobin, 2001; Saygın, 2011; Xanthos et al., 2011). In the end, this variation facilitates the mappings of multifunctional forms in the CS (Aksu-Koç et al., 2014). In line with this view, children's construction of morphology has been reported to be closely related to their lexical development (Dressler et al., 2003).

Echoing these findings on acquisition, recent corpora and psycholinguistic research showed that high frequency of occurrences might lead to the entrenchment and the storage of some Turkish suffixes together in the form of formulaic sequences in the mental lexicon of native speakers (Bilgin, 2016; Durrant, 2013). Durrant's (2013) investigation is based on Goldberg's

³⁰ The morphological representation is based on the output of the automatic morphological parser developed by Sak, Güngör and Saraçlar (2008; 2009). The description of the complete tagset can be found in Oflazer, Say, Hakkani-Tür and Tür (2003).

(2006 as cited in Durrant, 2013) claim that sequences of linguistic units with high rates of repetition can lead to formulaic storage of these forms, as this would make the access and representation cognitively more efficient. Supporting this claim, Durrant's analyses of different inflectional forms of the 20 most frequently occurring verbs in a newspaper corpus consisting of 374,690 words showed that verbal morphological formulaicity in Turkish could be realised in the form of frequently occurring suffix sequences of up to four adjacent individual suffixes attaching to different verbs. These conclusions were drawn from calculations of frequencies of not only different inflected forms of these verbs and/or suffix sequences that attach to these verbs but also from the frequency analysis of the individual suffixes based on their position in a suffix sequence. Given that he found many unique sequences as well, Durrant speculated that native speakers of Turkish have access to both individual suffixes to form novel combinations and very high frequently occurring suffix sequences to attach to words as formulas (see Özel, Bektaş, & Yilmazer, 2016 for similar findings).

Bilgin (2016) investigated whether native speakers of Turkish have indeed a separate mental representation for high frequently occurring suffix sequences that Durrant's analyses suggested. He employed two lexical decision tasks to see how frequency affects the speed and accuracy of recognition of simple words on the one hand and complex words that include these suffix sequences on the other. Frequencies of both the lemmas and suffix sequences for the experimental stimuli were obtained based on a computational analysis of the largest corpus available in Turkish, the TScopus consisting of 283 million words³¹ (see T. Sezer & Sever Sezer, 2013 for more information). Bilgin's (2016) analysis of the TScopus revealed that there were 23,346 suffix sequences. 7,733 of them were nominal sequences and the 200 most frequently occurring of these nominal sequences accounted for the 99.3 % of all the nominal tokens. The experiment then tested suffix templates selected from both the high-frequency and the low-frequency spectrum attached to lemmas of the same frequency.

The analyses showed that more frequently occurring simple words were recognized faster. Given that the recognition of complex words with high-frequency suffix combinations was faster than those with low-frequency combinations as well, Bilgin (2016) confirmed that in

³¹ The TScopus is the largest morphologically annotated corpus in Turkish which is publicly available (Sezer & Sever Sezer, 2013). It consists of 491 million tokens including punctuation marks. Bilgin (2016) reports the number of actual words as 283 million. The TScopus has two components; a part compiled from Turkish news portals and another compiled from web pages.

addition to storing suffixes individually, native speakers of Turkish have a separate mental representation for frequently occurring nominal suffix sequences in the form of templates/formulas. Following the findings of the experiments, the 200 most frequently occurring nominal suffix sequences obtained from the corpus were published as a frequency list (available at st2.zargan.com).

5.4 The current study

We address the following questions:

- Is the ability of adult Turkish-English bilinguals to employ suffix templates productively different from that of monolinguals and how do overall suffix template and lemma frequency contribute to this performance?
- Does the morphological productivity performance (MPP) of the HSs converge on what they have been hearing as input assumed to be available through other immigrant bilinguals within the same community?
- How does the amount of past L1 experience further relate to the MPP of the HSs?

If high frequency of occurrences leads to the entrenchment of linguistic elements, suffix template frequency as a continuous variable is expected to affect how productively these templates are used with different lemmas. Also, based on previous literature reviewed above, lemma frequency is expected to play a role in the MPP of all groups. Immigrant bilinguals have been reported to rely on more frequently occurring lemmas in their L1s (e.g. Schmid & Jarvis, 2014; Yılmaz & Schmid, 2012). If some lemmas attract or repel certain suffix templates³² in Turkish (Durrant, 2013), the lack of less frequently occurring lemmas at their disposal might affect the productive use of some templates, which might be different from how they are used by monolinguals. This, in turn, is very likely to have had an impact on the frequency, entrenchment and use of certain lemmas and suffix templates by the HSs. Assuming that the amount of input affects the entrenchment of linguistic elements, we hypothesise that HSs who were exposed to more input and used the language on a more

³² Attraction or repulsion of some suffix sequences to/by certain lemmas is in line with the usage-based models that assume inseparation between lexicon and morphology (e.g. Bybee, 1988, 1998; Langacker, 2011). The degree of this tie between schemas and forms, however, seems to vary in that “the schema that applies to fewer forms shows more evidence of being tied to the lexicon than the schema that applies to a large number of forms” (Bybee, 1988, p. 135). Schema here is used to refer to recurring morphological patterns.

frequent basis in the past will use suffix templates more productively and converge on the performance of the other immigrants the most.

5.5 Methodology

5.5.1 Participants

A total of 92 bilingual speakers with Turkish as their native language in the UK and 44 monolinguals resident in Turkey participated in this study. We aimed to cover a wide AaO range (0-42 years) in the participant selection to represent the Turkish immigrant population in the UK in general and the group with which the UK-born HSs are mostly in contact in particular. The minimum LOR was set to 8 years to ensure that the L1 was in contact with the L2 long enough for attrition to occur. In order to make the future references easier we will call the UK-born generation “heritage speakers” (HSs) and the group representing previous immigrant generations “immigrant bilinguals” (IBs).

All HSs were UK-born adults (mean age=23.35, one participant arrived at the age of 3), who were exposed to Turkish from birth. The first contacts with English usually start with the onset of preschooling at around the age of three. This was the case for 26 speakers (83.8 %). L2 exposure started at the age of five for two participants (6.45 %), and three participants (9.67 %) stated that they had simultaneous exposure to both languages from birth.

All IBs (n=61) started their L2 acquisition upon arrival in the UK ($6 < \text{AaO} < 43$). This group constitutes the L1-speaking community that the HSs are in contact with either within the family sphere (e.g. parents, siblings, relatives) or their acquaintances within their community (e.g. people at Turkish clubs).

All groups reported using both languages on a daily basis at the time of testing. While Turkish was kept mostly to communication with relatives and family members, English was the language of school and work. For the HSs, the amount of daily Turkish usage was more limited in comparison to the IBs. Still, they preferred Turkish to communicate with family members and older relatives in the UK but preferred English to communicate with younger relatives. Interestingly, however, the majority of the HSs reported sticking to Turkish even with their peers in occasions such as weddings or religious gatherings.

Background information (e.g. education level, the amount of L1 contact, LOR) was gathered through a sociolinguistic questionnaire (SQ). It was adapted from Yılmaz (2013), which was developed based on the test battery proposed by Schmid (<https://languageattrition.org/>), but the detailed language input/output questions in the HS version were developed based on the

extensive parental questionnaires in Jia R. and Paradis (2014) and BILEC (Bilingual Language Exposure Calculator) (Unsworth, 2016). A baseline for comparison was established through a matching monolingual group (n=44) regarding age at testing, education level, birthplace and gender. This was achieved by creating a proportions sample based on the distributions of these variables across the bilingual groups. Table 5.1 provides basic background information.

Table 5.1: Basic background information

	HSs	IBs	CG
group size (number)	31	61	44
age (mean)	23.35	36.03	33.81
age range	18–43	19–65	18–66
age SD	5.88	8.8	11.8
AaO (mean)	2.8	15.88	N/A
AaO range	0–5	7–42	N/A
AaO SD	1.07	8.1	N/A
LOR (mean)	23.35	20.16	N/A
LOR (range)	18–43	9–40	N/A
LOR SD	5.88	6.96	N/A

HSs=heritage speakers; IBs=immigrant bilinguals; CG=control group; SD=standard deviation; AaO=age at onset of bilingualism; LOR=length of residence

5.5.2 The corpus

The corpus consists of naturally occurring spoken data collected via a semi-structured interview. The questions were originally designed for past tense investigation in an earlier study where participants were asked to share witnessed or nonwitnessed events occurred in the past (see Karayayla, *forthc.*). Although the questions were the same, each participant told a different story. There were also three questions designed as warm-up questions intended

to get to know the participant, and obtain their views on the health and education system in the UK and Turkey. The interview was audio-recorded.

The transcription of the recorded data (37.4 hours) was done according to CHAT conventions (MacWhinney, 2000). Individual recordings ranged between 10–40 minutes ($M=19.84$). The pruned speech, which was cleared from proper nouns, errors, code-switches, reformulations, repetitions, and disfluency markers, totalled to 153,175 tokens. This included lexical (noun, adverb, adjective, verb) and function words (pronouns, interjections, conjunctions, post positions, determiners). There were overall 111,932 lexical words and 41,262 function words. Given that we were interested in morphological productivity, we only analysed complex lexical words ($n=64,469$) which were either nominals (excluding adverbs, $n=30,236$) or verbals ($n=34,233$), as these were the types that occurred together with the biggest number of suffixes. This can be seen in Table 5.2.

Table 5.2: Distribution of lexical words in the corpus (total $n=153,175$)

	simple words	complex words	Total
nominal (noun+adjective)	29,690	30,236	59,926
verbal	957	34,233	35,190
nominal (adverb)	16,491	325	16,816
total	47,138	64,794	111,932

The morphological parsing of the words was carried out automatically on the pruned data with the aid of the morphological parser and the disambiguator developed by Sak et al. (2008, 2009). The authors report the performance success of the parser as 96.7 % and the disambiguator as 97.05 % (Sak et al., 2009). However, as noticed by Bilgin (2016), the disambiguator confuses the homophonous accusative case suffix with the third person singular possessive suffix. Since this would have affected our analyses, after the automatic disambiguation, each parsed word was also manually checked by the researcher, a native speaker of Turkish, for any occurrences of this kind (or any other) and, where necessary, corrected manually.

5.5.3 Morphological productivity

Following Gal (1989), productivity was measured by calculating the type frequency of a suffix template per person, i.e. the frequency of occurrences of a particular suffix template with different lemmas, found in our corpus. This is compatible with the usage-based view which assumes that “the productivity of a pattern, expressed in a schema, is largely, though not entirely, determined by its type frequency: the more items encompassed by a schema, the stronger it is, and the more available it is for application to new items” (Bybee, 2001, p. 13).

We acknowledge that not all suffix sequences produced are stored as templates in the mental lexicon. Indeed, this applies to only a small number of sequences as revealed by Bilgin's (2016) computational analysis of the 423 million-word Turkish corpus. It would have thus been ideal to use the published frequency list obtained from this corpus. This, however, would run a few risks regarding our findings. First, the TScopus and our corpus are very different, and there is no guarantee that a suffix sequence that was revealed to be highly frequent in the TScopus would also occur very frequently in our corpus or occur at all.

Second, since we aim to reveal whether the HSs converge on the immigrant variety, obtaining frequencies from what is actually spoken around these speakers would yield more accurate findings. As noted by Durrant (2013, pp. 7–8), “the natural skew inherent in an individual’s experience with the language is likely to be an important factor in increasing the formulaicity of their input”; it is, therefore, crucial that “the corpus investigated is representative of the input experienced by language users”. This means that we can use our own corpus to establish formulaic occurrences. A similar approach employed in recent attrition research revealed that lexical diversity and sophistication measures give more reliable results when they are obtained from the researcher’s own corpus on the condition that the corpus is big enough (Schmid & Jarvis, 2014). The corpus size of 153,175 tokens comparable to that of the corpora used in other studies is sufficient to obtain suffix template and lemma frequencies.

A total of 1528 (nominal $n=527$; verbal $n=1001$) different suffix sequences occurred in our corpus, and 590 (nominal $n=224$; verbal $n=366$) of these occurred only once. This forced us to make some decisions because treating all of these sequences as templates will not yield reliable findings regarding productivity. In order to satisfy the formulaic occurrence of a suffix sequence for the purposes of the study, we decided to take the sequences that occurred

at least once in the performance of each group. By so doing, we ensured that the template under investigation occurred at least three times in our corpus and we allowed the productivity measure to vary as a function of frequency as this was revealed to have a significant impact on lexical accessibility (Bilgin, 2016).

After this elimination, 386 templates remained (nominal n=125; verbal n=261). Following this, for each suffix template produced by each speaker, information was obtained on its word class (nominal/verbal), its frequency of occurrence in the entire corpus (see below), the lemmas that it was used with and the frequency of occurrence of these lemmas (see below). This allowed us to calculate the type frequency of each suffix template used by each speaker separately for the nominals and verbals.

5.5.4 Predictors

5.5.4.1 *Suffix template frequency*

Following Yılmaz and Schmid (2012), initially, how many times each suffix template occurred in the entire corpus was calculated. After the trimming process described above, these templates were then ranked separately for nominals and verbals by assigning the first position (rank 1) to the most frequently occurring suffix template, the second one (rank 2) to the second most frequent, and so on. This allowed us to establish both a frequency measure and a position for each suffix template each speaker used.

5.5.4.2 *Lemma Frequency*

The same procedure above was followed to establish the position and the frequency of each lemma (the root words) that each participant used based on the frequencies and ranks in the entire corpus of lexical words (n=111,932).

5.5.4.3 *Text length*

All lexical diversity measures to date are reported to be subject to text length (e.g. Schmid & Jarvis, 2014). The productivity measure employed in this study, namely the type frequency of recurring patterns, is no exception. Although a mixed effect modelling was used to control for the variability caused by participant differences and their choice of particular suffix templates, the number of tokens produced by each participant was included as a covariate in the models to control for its effect.

5.5.4.4 *Other nonlinguistic factors*

Due to variability in the participant backgrounds, the effects of current age, education level, gender, AaO, and LOR were also tested where necessary during the model building process. These variables were kept only if they contributed to the model significantly.

5.5.4.5 *L1 experience*

Past L1 experience was approximated based on the approach employed in BILEC (see Unsworth, 2016 for details). BILEC is an extensive parental questionnaire which includes detailed questions about bilingual language exposure and use patterns and incorporates a measure to approximate the quantity/quality of this experience from birth up to age 18 (Unsworth, 2016). It allows the researcher to assess the exact time spent with input providers in different domains (e.g. home) and approximate the amount of L1 experience in each domain by taking age-specific waking hours of children into consideration. The proportion of time spent in each domain is then integrated into the calculations to incorporate these domain-specific exposure measures into one variable. The cumulative L1 exposure is calculated as the sum of these language exposure estimations during different phases of development over the years.

We adapted these calculations to approximate cumulative past L1 experience for the period of 0–18 years, which we divided into four sub-intervals, which correspond to different educational stages in the UK until the university level. The measures we obtained for each sub-domain (home, school, activities) were incorporated into one L1 use and one L1 exposure variable for each age period (0–3, 3–5, 5–11, and 11–18). The age-specific sleep measures were derived from medical reports on sleep durations of children and adolescents in Europe (Iglowstein et al., 2003; Mindell et al., 2010; Olds et al., 2010) and were incorporated into our analyses as described in BILEC to derive the cumulative measures given in Table 5.3.

Table 5.3: Cumulative input measures

	mean	min	max	SD
cumulative L1 exposure	0.44974	0.181	0.658	0.115846

cumulative	0.47354	0.159	0.753	0.137279
L1 use				

min=minimum; max=maximum; SD=standard deviation

5.5.5 Analysis of the data

We conducted a number of linear mixed effects analyses with the *lme4* package (D. Bates et al., 2015) for the R statistical platform version 3.2.4 (R Core Team, 2016). Our choice of this particular analysis was motivated by the fact that mixed effect models are very effective when it comes to handling unbalanced corpus data where the number of observations for a certain unit is not always the same and/or does not always come from the same source (Barr et al., 2013; Gries, 2015). In our corpus, for example, each template had a different frequency, and not all participants used the same suffix combinations. This analysis further allowed us to control for the variation caused by participant background characteristics and their choices to use a particular suffix template by including random intercepts for ‘*participant*’ and ‘*suffixes*’ (Baayen et al., 2008; Gries, 2015).

While the dependent variable (morphological productivity) was normalized using the logarithm transform method, the continuous variables were centred around their means. The decision whether a random slope provides a better fit to the data was made based on the AIC comparisons between two models with and without the effect of the random slope and the likelihood ratio test (Baayen et al., 2008; Barr et al., 2013). P-values in the model were obtained with the help of the *lmerTest* package (Luke, 2017).

5.6 Results

The estimates of the model showing the predictors of the morphological productivity performance (MPP) of the groups (monolinguals versus bilinguals) are provided in Table 5.4. In addition to the random intercepts for ‘*participant*’ and ‘*suffixes*’, we added *by-participant* random slopes for the effects of 1) suffix template frequency (*suffreq*), 2) lemma frequency (*lemmafreq*), and 3) word class (*wordclass*) as well as a *by-suffixes* random slope for the effect of *lemmafreq*. The model took group 1 (monolinguals) as the baseline. This means that the intercept shows the mean MPP score of the monolinguals for the nominals and the other three continuous variables also predict the monolingual MPP. The model explained 74 % of the variance.

As the negative estimate ($\beta=-0.08$, $t=-2.85$) for the level of the factor 'group' (groupBilinguals) shows, the bilinguals used the nominal templates less productively than the monolinguals. The verbals, in general, were used more productively than the nominals. As revealed by the lack of a significant effect of the interaction between *wordclass* and *group*, groups did not differ regarding the effect of the *wordclass* variable. This means that both groups used verbal suffixes more productively than nominal suffixes and that the groups did not differ in their verbal productivity performance (henceforth, VPP).

Table 5.4: Estimates of the morphological productivity across groups

	estimate	SE	t-value	p-value	
(Intercept)	1.640323	0.041759	39.2806	<0.001	***
groupBilinguals	-0.08884	0.031086	-2.85781	0.005198	**
wordclassVerbal	0.672582	0.026017	25.85179	<0.001	***
lemmafreq	-0.04973	0.009588	-5.18676	<0.001	***
suffreq	0.826062	0.015468	53.40338	<0.001	***
tokens	0.144	0.016036	8.979756	<0.001	***
groupBilinguals:verbal	0.046408	0.030817	1.50594	0.134524	
groupBilinguals:lemmafreq	0.0285	0.009805	2.906642	0.004315	**
groupBilinguals:suffreq	-0.03816	0.017997	-2.12057	0.035883	*
groupBilinguals:tokens	0.020554	0.018236	1.12713	0.261918	

suffreq=suffix frequency; *lemmafreq*=lemma frequency; *tokens*=number of tokens; *SE*=standard error

All other continuous variables were good predictors of the monolingual MPP in general. The same variables also predicted the bilingual MPP, but as shown by the interaction variables, some predictors affected the bilingual performance differently. There were no group differences regarding the effect of *tokens* (text length), i.e. participants who produced more words were more productive. However, as the signs of the estimates of the other interaction

predictors pointed out, the reported effects of the frequency-related predictors on the monolingual MPP seem to be weakened in the case of the bilinguals.

We checked whether this was due to the possibility that suffix templates and lemmas used by the bilinguals were not as sophisticated as those used by the monolinguals. To confirm this, we compared the group means by treating *lemmafreq* and *suffreq* as dependent variables in two different models with *by-participant* random intercepts. Overall, the bilinguals ($M=776.59, \beta=50.50, t=2.77$) clearly relied on more high-frequency lemmas than the monolinguals ($M=726.09$). The separate comparisons carried out for the nominals and verbals revealed that bilinguals relied on less sophisticated nominal lemmas ($M=273.966, \beta=32.586, t=4.49$), but did not show any significant divergence regarding the verbal lemmas ($M=1207.67, \beta=3.90, t=0.13$). Similarly, there were no group differences in terms of suffix template sophistication between the monolinguals ($M=1159.114$) and bilinguals ($M=1163.192, \beta=4.078, t=0.24$). This finding did not change when the analysis was carried out separately for the nominals and verbals.

In sum, it appears that the immigrant variety, in general, is compromised regarding the nominal productivity performance (henceforth, NPP) and the degree it is affected by the frequency measures, showing a different trend than the monolingual performance. If bilinguals are indeed found to be forming a homogeneous group regarding this performance, this might be an indication that Hs converge on what they hear around them and are not necessarily incomplete learners.

For this purpose, we ran a similar separate analysis within the bilingual group for the nominals and verbals. We used AaO as a continuous variable instead of the factor 'group' as the bilingual participants have a wide AaO range. The nominal model (Table 5.5) explained 82 % of the variance and included *by-participant* random slopes for the effects of *lemmafreq* and *suffreq*. It seems that an older AaO led to an improved NPP. This effect was, however, only marginally significant ($\beta=0.025, t=1.74$), a sign that the bilingual NPP showed a relatively similar pattern across the AaO range.

Table 5.5: Predictors of bilingual nominal productivity performance

estimate	SE	t-value	p-value
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(Intercept)	1.4521	0.0576	25.23	<0.001	***
AaO	0.0025	0.0014	1.73	0.087	.
lemmafreq	-0.0358	0.0166	-2.16	<0.05	*
suffreq	1.0988	0.0548	20.07	<0.001	***
tokens	0.243	0.0135	17.96	<0.001	***

AaO=age at onset of bilingualism; suffreq=suffix frequency; lemmafreq=lemma frequency; tokens=number of tokens; SE=standard error

While nominal templates were interestingly used ‘less productively’ when they attached to ‘high-frequency lemmas’ (*lemmafreq* $\beta=-0.03$, $t=-2.16$), an increase in the *suffreq* resulted in an improved NPP, as predicted ($\beta=1.09$, $t=20.07$). Finally, the NPP improved as the text length increased ($\beta=0.27$, $t=17.96$). Assuming that there might be an attraction/repulsion relationship between certain suffix templates and lemmas (Durrant, 2013)—which could have caused the reported *lemmafreq* effect—we had a closer look at some individual cases in the data to gain insights into this hypothetical relationship.

The combination of the third person possessive marker *-SI* and the locative case marker *-DA* (3sgposs+Loc), for example, occurred relatively frequently in the entire corpus ($f=1200$, rank (r) =6) and was used very productively. Among the 232 different nominal lemmas this suffix template attached to (with the highest $f=950$), 177 occurred with a frequency of 100 or lower. Among those lemmas are *hal* (“situation”, $f=87$), *kere* (“times”, $f=72$), *süreç* (“duration”, $f=36$), *talep* (“request”, $f=9$), and *evvel* (“formerly”, $f=4$). Among the other ones ($f>100$) are more concrete, simpler lemmas such as *yol* (“road”, $f=134$), *el* (“hand”, $f=138$), *okul* (“school”, $f=358$), *ev* (“house”, $f=781$), and *zaman* (“time”, $f=950$). The average bilingual NPP in the former category was 3.56 words, while this was 3.01 in the latter. From this follows that high-frequency nominal suffix templates might be more attracted to low-

frequency lemmas than they are attracted to high-frequency (common) ones, which might potentially explain the *lemmafreq* effect observed.

A similar model that was fit with the same random slopes on the verbal data showed no effect of AaO ($\beta=0.0008$, $t=0.48$) but all the other frequency measures and text length affected the VPP the same way as the NPP. This model explained 81 % of the variance in the bilingual VPP.

Taken together, it is safe to conclude that the effect of AaO (range 0–42) on the bilingual MPP is minimal. This relationship is plotted in Figure 5.1 below. The monolinguals were randomly placed to AaO 55. It seems that the UK-born HSs with AaO range 0–5 have, in general, managed to achieve a similar level of proficiency as the other bilinguals with older AaOs. This can be taken to indicate that HSs converge on what they hear around them and are sensitive to the characteristics of the input (frequency) spoken around them. This is further evident in the sophistication level of the lemmas and suffix templates produced by the HSs and IBs. As revealed by separate analyses with *by-participant* random intercepts, the HSs used as sophisticated lemmas ($M=762.93$, $\beta=-20.08$, $t=-0.83$) and suffix templates ($M=1164.369$, $\beta=4.077$, $t=0.18$) as the IBs. This outcome did not change when the analyses were run separately on the verbals and nominals.

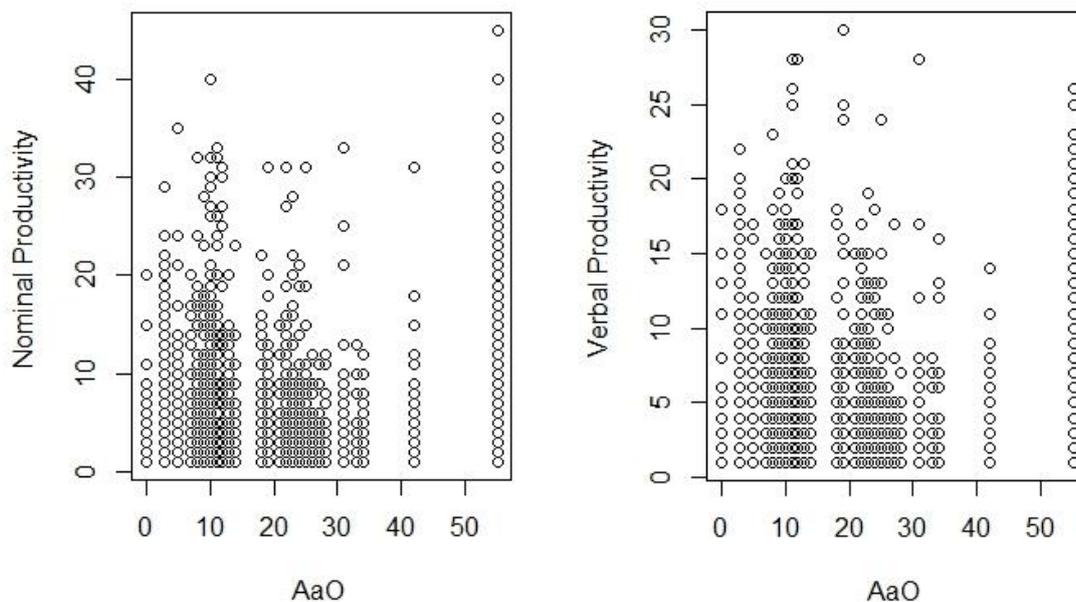


Figure 5.1: The relationship between AaO and bilingual productivity performance

Evidently, however, AaO affected the NPP to some extent, i.e. participants with younger AaOs (presumably the HSs) performed slightly less well. From a usage-based perspective, this might relate to the amount of input these speakers received as children and adolescents. There was a significant correlation between the cumulative past L1 exposure and past L1 use variables derived from the questionnaire ($r=0.88$, $p<0.001$). We created a new variable called ‘cumulative L1 experience’ by taking the mean of these variables per HS. A model we fit (Table 5.6 below) to the HS nominal data along with the same predictors, random intercepts and slopes used in the bilingual models above did not show any significant contribution of cumulative L1 experience ($\beta=0.014$, $t=0.82$). All the other variables affected the HS performance the same way except that the effect of *lemmafreq* alone did not reach significance.

Table 5.6: Predictors of HS nominal productivity performance

	estimate	SE	t-value	p-value	
(Intercept)	1.50904	0.0629509	23.9718	<0.001	***
lemmafreq	-0.0323	0.0331575	-0.9732	0.33791	
suffreq	0.99287	0.0580755	17.0963	<0.001	***
tokens	0.31237	0.0245242	12.7372	<0.001	***
cumulative L1 experience	0.01427	0.0173831	0.82091	0.41931	

suffreq=suffix frequency; *lemmafreq*=lemma frequency; *tokens*=number of tokens; *SE*=standard error

It seems that the ability to use nominal suffix sequences was independent of how much L1 has been heard or used over the past years.

5.7 Discussion

Our first research question asked whether the immigrant variety, in general, was compromised regarding the MPP and to what extent the MPP of the groups was predicted by the lemma (*lemmafreq*) and suffix template frequency (*suffreq*). The expectation would be high frequency of occurrences of word formation devices to lead to the entrenchment of these elements. This, in turn, would affect their availability to retrieve/produce, possibly

easing their application to a large number of lemmas, i.e. an improved MPP. Changes in the language experience (e.g. disuse, code-switching) due to an extended period of immigration, however, might result in changes in the frequencies (availability) and thus in the degree of entrenchment, representation and productive use of these elements (Bybee, 2001, 2007; Langacker, 2011; MacWhinney, *forthc*; The “Five Graces Group” et al., 2009). Our data seem to support some of these predictions.

Overall, the findings showed that although the bilinguals used the nominal templates less productively compared to the monolingual baseline, their VPP remained intact. Furthermore, the MPP of the groups was predicted by both the *lemmafreq* and *suffreq* obtained from the corpus. This justifies the reliability of using our own corpus to obtain frequencies as suggested by Schmid and Jarvis (2014). While high-frequency templates appeared in combinations with a larger number of different lemmas, –an indication of an improved productivity– there was a negative relationship between the *lemmafreq* and the MPP. This means that the groups tended to use suffix templates “less productively” when they attached to high-frequency lemmas. Although both frequency measures affected the performance of the groups the same way, their explanatory power was weakened regarding the bilingual performance. Presumably, this was because the bilinguals relied on more frequently occurring nominal lemmas in their production compared to the monolinguals. This may have affected the way the nominal templates attached to these lemmas, as hypothesised.

As surprising as it seems, the observation about the *lemmafreq* echoes Durrant's (2013) findings that there is likely to be a repulsion/attraction relationship between certain lemmas and certain suffix templates in Turkish. Durrant (2013) used Fisher's exact test to see whether the ten most frequently occurring verbal suffix templates found in the newspaper corpus were equally attracted to every verbal lemma (across a wide frequency range) with which they were used. Although Durrant (2013) does not comment on how the lemma frequency played a role in this, the data tables he provided in the manuscript clearly show that this was not the case. The most frequently occurring template, for example, was significantly attracted to the lemma *ol-* (“be”) —the most frequently occurring one among all lemmas (n=20) under investigation— but at the same time was significantly repelled by the next four most frequently occurring lemmas *et-* (“do/make”), *yap-* (“do/make”), *ver-* (“give”), *de-* (“say”).

As much as this explanation might be partly responsible for the *lemmafreq* effect that our analyses revealed, i.e., some high-frequency suffix combinations might be more attracted to

low-frequency lemmas, it remains tentative not only because we did not employ the Fisher Exact Test, but also because it does not fully justify the persistent negative impact of the *lemmafreq* on the MPP. Alternatively, from a mathematical point of view, the negative relationship between the *lemmafreq* and the MPP seems to be indeed an expected outcome. Recall that an increased MPP entails that a suffix template attaches to a large number of “different” lemmas. Among all the available lemmas that are distributed across a wide range of frequency (the Zipfian distribution), one would expect that as the number of different lemmas used with a particular suffix template increases, the probability that a good number of these lemmas will have lower frequency increases as well. As the example provided from the data in the results section showed, this in turn inevitably causes the average frequency of the lemmas used with this particular suffix template to decrease and affect the MPP as reported.

Taken together, the answer to the first RQ is that the immigrant variety, in general, was compromised regarding the NPP, the mean frequency of the nominal lemmas produced and the degree the frequency measures affected this performance. The fact that none of these was observed for the verbals indicates that the verbal class was immune to attrition/change, which will be discussed further below. This finding is not surprising given that attrition is reported to affect the lexicon first (Schmid & Köpke, 2009). Turkish spoken in this community is likely to be reduced to topics of everyday speech, where more sophisticated items presumably remain unactivated in daily L1 use, as reported by many previous studies even in the performance of late bilinguals (e.g. Schmid & Jarvis, 2014; Yılmaz & Schmid, 2012). Assuming that words do not occur in complete isolation from their suffixes and that speakers are aware of the lemma-specific grammatical information of lexical items (Ellis, 2002), the reduced size of the lexicon we observed is likely to have affected the availability and productivity of the suffix templates used with these lemmas.

Our second RQ asked whether these sort of modifications would reflect on how the knowledge of the word formation developed in the HSs. We did not find any differences in the VPP across the entire AaO range (0–42), but an older AaO was slightly associated with a better NPP. This means that the VPP of the HSs' and IBs showed similar patterns. The NPP of the HSs, however, was slightly reduced compared to that of the IBs which was already L1-divergent. In a way, altered input seems to have resulted in a performance which clearly diverged from that of the monolinguals but converged on the immigrant variety. In answer to our second RQ, while these findings were considered as an indication of the sensitivity of

the HSs to the input they heard/hear every day (Treffers-Daller et al., 2016), their slightly lower NPP still requires some further elaboration.

Given that the frequency variables affected the HS performance the same way as they did the performance of the other groups, and that the groups did not differ regarding the mean frequency of the nominal lemmas, it is plausible to think that this slight difference might have originated from the use of the less frequently occurring suffixes. As hypothesized, from a usage-based perspective, it is more likely for the low-frequency forms to pose problems in bilingualism. Assuming that hearing the L1 on a more frequent basis as a child/adolescent might have increased the chances of hearing these low frequently occurring forms in the input (Gathercole, 2007), we tested the impact of past input quantity on the NPP. Interestingly, however, this measure did not predict the outcome. As far as our third RQ is concerned, the ability to use nominal suffix sequences productively appears to be independent of how much L1 input the HSs were exposed to in the past.

This does not necessarily indicate that the past input did not contribute to the word formation development. The amount of input might have been enough to trigger the development of the lexicon and the target-like productive uses in the first place. As the findings showed, however, the availability/frequency of some lemmas and suffixes have presumably changed over the years in the immigrant variety. Low-frequency schemas are strongly tied to their lexis (Bybee, 1988; Ellis, 2002). Given that these templates and the lemmas they attach to do not occur in the variety spoken around the HSs frequently enough, the strength of the connections between the templates and lemmas might have been affected, resulting in a reduced NPP. In a way, this finding could be the outcome of an interplay between the frequency and recency of the HSs' experience rather than past L1 experience. Collecting data on recent L1 use might give more definitive answers.

The methodology employed here, however, does not allow us to anticipate when precisely this change in the immigrant variety took place. This might correspond to a time when the HSs were still children or when they were much older, as we assumed above. Note that the frequency-based explanation above still holds even if they were children when the input modifications happened. Their cumulative input may have abounded, but perhaps it was not varied and repetitive enough especially regarding the low-frequency forms to trigger their fully target-like development (here, full convergence on the immigrant variety). More precisely, our input variable might have failed to capture the variability of the structures and their repetition rate in the input. This would explain both the null input effect and the HSs'

lower NPP compared to that of the IBs. As underlined by O'Grady et al. (2011), perhaps input quantity investigations in the future should focus on counting the exact occurrences of specific form-function mappings for the elements under investigation.

If the frequency explanation is on the right track, a more prominent question arises regarding the asymmetry we found between the NPP and the VPP. Why do HSs use even the infrequently occurring verbal templates problem-free but not the nominal ones? This echoes what Polinsky (2005) called "the verb bias" when she reported selective control of verbs over nouns and adjectives in Russian HSs' speech as evident in their accuracy and reaction times performance. Accordingly, we agree with Polinsky's explanation that the verb bias we found arises because losing verbs is more costly than losing nouns, verbs being the stepping-stones for processing and communication due to their conceptual complexity and syntactic functions. This is especially true for verb-oriented languages like Turkish (Aksu-Koç & Ketrez, 2003; Küntay & Slobin, 2001). In Turkish, finite verbs are obligatorily inflected for TAM and agreement and can stand for a whole sentence (Ketrez & Aksu-Koç, 2009; Küntay & Slobin, 2001). This means that even if some nominals are inaccessible, a speaker can still carry out a simple conversation in Turkish as long as they have access to verbs. Besides, inaccessible nouns can always be compensated for by using deictics or generic placeholders which does not apply to inaccessible verbs (Polinsky, 2005).

Moreover, as demonstrated in the previous literature, the fact that Turkish allows subject eliding and nominal ellipsis makes the nominal CDS input much less varied and repeated compared to the verbal input (Küntay & Slobin, 2001). This, in the end, seems to lead to an early verb bias in the CS and a quite adult-like performance regarding the verbal morphology from early on (Küntay & Slobin, 2001). By analogy, the fact that Turkish verbs are more inflected compared to nouns (Göksel & Kerslake, 2005), and that both subject eliding and nominal ellipsis are allowed is likely to have affected the repetition/use rate of different nominal forms compared to that of verbal forms in the immigrant speech. Potentially, this would argue in favour of a verb bias in the MPP of the bilinguals in general and the HSs in particular.

In summary, our findings showed that usage-based approaches are promising to predict both L1 attrition phenomena and the heritage language development at least regarding the use of recurring word formation devices. This was evident in the form of a change in the nominal lemma frequencies available to produce and reductions in the productive use of nominal suffix templates in the L1 performance of the Turkish-English bilinguals in the UK. The

convergent L1 performance of the HSs to the immigrant variety evidenced that HSs are sensitive to the frequency of the elements in the input that is available to them. Given this, there is no reason not to expect these speakers to show the same sensitivity to the other properties if these properties have been quantitatively or qualitatively modified in the HL input (Rothman, 2009). Accordingly, we agree with Pascual y Cabo and Rothman (2012) that in order to drive firm conclusions on the HL ultimate attainment, future researchers should consider inclusion of a bilingual group (preferably a group of late bilingual immigrants) to control for the input effects. Based on the current findings we have, we believe that this would inform our understanding of the heritage language development and what it looks like in its ultimate state.

5.8 Limitations and future directions

A few final remarks need to be made regarding the limitations of the current study and future directions. First, given that text length turned out to be a significant predictor in all statistical analyses carried out, these findings should be taken as preliminary and supported by controlled experiments and/or replicated with equal-sized samples. Second, it should be noted here that these findings by no means present a complete picture of HL lexical proficiency as we focused on only one aspect of it. These results, therefore, cannot be directly generalised to derive conclusions on the speed of lexical retrieval, lexical diversity, morphological processing and so on. Nevertheless, they can be used as a departure point to explore how these suffix sequences are processed and whether they are indeed represented as formulas in the minds of these speakers.

Crucially, the frequencies of formulaic suffix sequences to include in such experiments should be obtained from a corpus which reflects the input experience of the HSs under investigation (as in the current study). This corpus, however, should ideally be more balanced regarding the distribution of the morphemes. In the current study, for example, verbal suffix sequences were biased towards the past tense usage due to the nature of the interview questions. Moreover, the formulaic occurrence of a suffix sequence should be supported by further analyses which do not only focus on the token frequency of a sequence in the entire corpus but also the frequency of the n-gram suffixes based on their position in a sequence (see Durrant, 2013).

Finally, as indicated by Bybee (2011), the development of storage and access units is gradual, and it does not entail anything as to whether speakers can still identify the individual

components of the formula or their meaning. Our findings do not tell us anything specific as to whether the use of a certain verb formation device in a formula (e.g. voice suffixes) has changed in the immigrant variety not only regarding its frequency of use but also its semantics leading to innovative usages and/or L2-induced changes. We, therefore, strongly suggest that future research should address this presumably in a more qualitative fashion. Similarly, in the current study, the formulaic occurrence of a suffix sequence was satisfied based on a specific criterion, and the ones that did not conform to this criterion were eliminated. Among those, there were both novel sequences and sequences that were preferred quite frequently by a particular group, but not by other groups. Investigation of the novelty and/or complexity of these sequences as well as different preferences across groups might inform our understanding about the capabilities of HSs better in the future.

Chapter 6 Conclusion

The purpose of the research carried out in this study was to provide a comprehensive picture of L1 proficiency, and its predictors, in an immigrant context. Knowledge and production of Turkish as an immigrant and heritage language in the UK was investigated across a wide AaO range (0–42) in a total of 92 bilinguals and 44 monolinguals.

One of the starting points in this thesis was to consider the recent approach taken towards the correct use and meaning of the term “incomplete acquisition” which is commonly used in the HL literature to describe the level of ultimate proficiency attained by (many) heritage speakers which is often times L1-divergent (Montrul, 2008, 2016c; Polinsky, 2006). According to this view, although heritage speakers are predominantly exposed to their first language at home during the first years of life, this exposure becomes interrupted and reduced with the start of extensive exposure to the societal language (usually at around the ages of 3–5). Given this, heritage speakers do not master some L1 linguistic properties age-appropriately and show delayed development during the school years. In the following years, this pattern shows persistence and results in an incomplete grammar in adulthood (Montrul, 2016c). This level of attainment in HSs has been claimed to resemble that of late L2 learners in some respects, something similar to fossilization (Benmamoun et al., 2013; Montrul, 2008, 2010; Polinsky, 2006).

The term has recently been questioned as it implies serious restrictions on the potential of the development of the heritage language beyond a certain level. The alternative proposition is that the HL development is unique (rather than being incomplete) and shaped through the unique language learning environment of its speakers (Pascual y Cabo & Rothman, 2012; Pires & Rothman, 2009; Putnam & Sánchez, 2013; Rothman, 2007; Rothman & Treffers-Daller, 2014). The findings obtained from this thesis support this view and additionally allow us to argue that L1 acquisition/development in this context is subject to a constant change along the continuum of bilingualism. The findings also showed that the degree of this change is affected differentially by different factors. In this thesis, we considered the quantity/quality of input and age at onset of bilingualism (AaO) factors.

These two factors were mainly investigated separately from each other in the research studies given in Chapters 3, 4 and 5; here in this section, we will look at the broader picture. Based on the findings of these studies, we argue that there is a dynamic and nonlinear interaction between these factors, with L1 development remaining malleable in a bilingual context.

6.1 Summary of the findings

In Chapter 3, we compared the spoken performance of the HSs and LBs regarding the distribution of evidentiality encoded in the past tense system. This approach allowed us to test whether ultimate proficiency was related to qualitatively distinctive input conditions that the HSs might have been exposed to (Rothman, 2007), an account which has been suggested as an alternative to the incomplete acquisition explanation. Evidentiality is a relatively late-acquired property which does not stabilise before the ages of 5–6 (Aksu-Koç et al., 2009). Depending on whether the speaker is a direct witness of the past event or not, he or she will be forced to choose between two different past tense markers. Furthermore, the choice of one particular marker (*-DI* and *-mİş*) over the other requires the control of complex semantic and pragmatic components differentiating between different sources of information (visual, verbal reports, inference).

As revealed by the error analysis, while the LBs performed largely within the range delimited by the controls in all types of evidentials, the HSs had a considerable proportion of inaccuracies especially regarding the use of the reportative evidential. We found that the HSs tended to inappropriately extend the use of the direct evidential (*-DI*), the default form, to indirect evidential (*-mİş*) contexts and to tell the reported stories and/or inferred events as if they were directly witnessed. This was taken to indicate that the HSs encountered some difficulties in differentiating between different sources of information in past references, while this ability was intact in the LBs' performance. This means that there were no qualitative changes in the HL input assumed to be available through the LBs, but the L1 performance of the HSs was still less target-like in comparison to that of both the LBs and the CG.

In order to identify the sources of the divergences, the HL performance was then tested against quantity and quality components of the input received during different phases of development over the years and adult language use. We found that the HSs with a rich L2 English environment between the ages 0-5 showed a higher tendency to use the direct evidential inappropriately in indirect evidential contexts. This negative effect of L2 richness, however, was compensated for by the amount of L1 input received during the same period. More precisely, an increased amount of L1 exposure cancelled out the detrimental effects of the L2 richness on the accuracy performance, ultimately leading to more target-like usage. In a way, it was possible to achieve native-like levels of proficiency despite “early ages of bilingualism” and “input interruptions” as long as the input received during the primary years

of the linguistic development was sufficient to counteract the L2 interference. It seems that for those whose L1 input was insufficient for this, the evidentiality system was reassembled under the effect of a more activated L2.

Previous reports claim that bilingual children with a reduced amount of input might reach the required proficiency levels later because the accumulation of the input in the long run might be sufficient for the target-like development of the property (see Flores, Santos, et al., 2017 for a review of studies). In the case of our participants, however, the fact that the evidentiality is a late-acquired phenomenon and that the indirect evidential form is multifunctional seem to have caused extra difficulties in acquiring and maintaining it in adulthood at target-like level. This was despite the fact that the group who performed less target-like (non-native-like performers) continued using their L1 during the school period and in adulthood. The critical mass of input might not have been reached because the input was presumably still insufficient and/or was not intense enough for a target-like level of achievement, e.g. due to code-switching behaviour and/or frequent interaction with other HSs in adulthood (i.e. lower quality of L1 contact on the assumption that they are usually not target-like).

This can be evaluated from the perspective of the Putnam and Sánchez (2013) model as well, which does not consider HL development as interrupted or incomplete but as a continuum. The availability of the L1 [+evidentiality] features might have been affected by insufficient levels of activation of the L1 features, both in the early years and the school period due to code-switching and a more activated L2, and during interaction with other HSs in adulthood (if they were also less proficient). As these features became less available with time due to fluctuations in the L1 and L2 use patterns, this probably resulted in a weakening of form-meaning mappings. This might have led to a disassociation of [+evidentiality] features and their reassembly by the [-evidentiality] features in the L2 past tense system (Putnam & Sánchez, 2013). This is likely to be one of the reasons why the participants used the direct evidential in indirect evidential contexts. We argue that this outcome which looks “incomplete” at the surface level does not necessarily point to a stagnation of the development. Instead, it indicates the uniqueness of the HL development leading to a reassembled grammar under fluctuations in the L1 and L2 exposure and use patterns over the lifespan.

While this finding suggests a prominent role played by the quantity and quality of L1 input in heritage language bilingualism, it does not necessarily disqualify any roles that might have

been played by AaO. Recall that all the LBs' AaO was over 12 and the fact that their L1 performance did not diverge from that of the monolingual norm suggests a qualitative change in the stability of the L1 taking place around puberty. While a certain amount of input during the early phase of the language development increased the chances to attain native-like levels of proficiency in HSs, being monolingual for the first 12 years of life seems to have guaranteed it and made the L1 robust to effects of bilingualism and external factors. This, however, is something which cannot be fully answered based on the data of this particular study and would thus need a more thorough analysis as in Chapter 4.

In Chapter 4, we had a closer and more critical look at the nature of this role by comparing the performance of a group of our bilingual participants with AaO range 7–34 to that of a group of monolinguals across two linguistic abilities: structural complexity and L1 pronunciation. We found that the bilinguals as a group did not diverge from the monolinguals in any of the sub-measures which were used to derive the structural complexity score. There were only three bilinguals with AaOs 8, 9 and 14 who remained below the range delimited by the controls, but in general none of the participants relied on more analytical means or avoided costly synthetic structures in Turkish. The target-like performance achieved by the bilingual participants thus did not allow us to establish a relationship between AaO and the structural complexity performance.

As for the degree of foreign accent, on the other hand, there was a greater variability within the bilingual group and 28 % of the speakers were perceived as sounding non-native-like. There was a linear drop in the degree of the foreign accentedness as a function of AaO until around age 13, after which the slope levelled off. This means that participants with older AaOs up until age 13 were perceived as sounding more native-like, while all the participants past this age (except for one participant with AaO 18) fell into the unambiguous native range. As we found, however, AaO was not the only significant predictor accounting for this variability in the outcome. Statistical analyses showed that the degree of L1 accent in this context of bilingualism was an interplay of AaO, amount of current passive exposure to L1 via the media, level of general L1 proficiency and biological age (see Chapter 4 for explanations about biological age). This finding was thus promising in showing that the L1 phonetic system was presumably still adaptive in adulthood under the influence of the L2 and the above factors played protective roles and prevented the L1 sounds from being reorganised.

Our findings were, therefore, more compatible with the accounts that attribute the role played by AaO to differing degrees of L1 entrenchment rather than to biologically determined restrictions. In this vein, these findings seem to bring a more explicit explanation to our previous observation above that the qualitative change in the stability of the L1, which seems to take place around age 12, might be an indication of a deeply entrenched L1 which makes it quite resistant to attrition. Note that this does not necessarily entail irreversibility which will be expanded on further below.

Interestingly, the overall L1 structural complexity findings showed a different picture than this regarding the cut-off AaO as all participants with $AaO > 6$ performed entirely native-like. We suggested that the bilinguals' using their L1 on a very frequent basis, and presumably the typological distance between their L1 and L2 were helpful in this respect. This was found to be a less likely scenario in the case of pronunciation possibly due to a more direct competition between similar L1 and L2 sounds as predicted by the SLM (see Chapter 4). It should be noted, however, that the current study did not carry out any acoustic analyses to detect any phonological drifts as possible sources of the degree of accentedness. This explanation thus remains tentative until the relationship between the degree of accentedness and phonological drifts is empirically proven (see Bergmann et al., 2017 for an attempt which failed to establish such a relationship). It is also possible that being monolingual for the first seven years of life is enough for the deep L1 entrenchment regarding this category while L1 accent remains malleable if bilingualism occurs before the ages of 12–13.

After all, if a certain amount of input received between birth up until age 5 was enough to compensate for an early rich L2 environment and prevent L2 interference on evidentiality accuracy in UK-born HSs, it is not that surprising that 7 years (and possibly less) of “monolingual experience” was enough for the L1 to be deeply entrenched and become impervious to attrition in adulthood regarding the structural complexity measure.

Note that these measures (structural complexity and degree of foreign accentedness) were originally not calculated for the UK-born group, as this was not in the scope of the study carried out in Chapter 4. Similarly, the evidentiality accuracy was not calculated for the group with AaO range 7–11 either. In order to support our claim and extend the scope of the discussion here in this chapter, we calculated these variables for all participants including the HSs to look at the outcome across the entire AaO range and conducted further analyses on some of these measures (where necessary). As shown in Figure 6.1, all the HSs with AaO range 0–5 managed to obtain a structural complexity score within the range delimited by the

controls. Given that most of the scores obtained by the HSs were in the middle to low end of the spectrum, this seems to have slightly lowered the mean score at the group level.

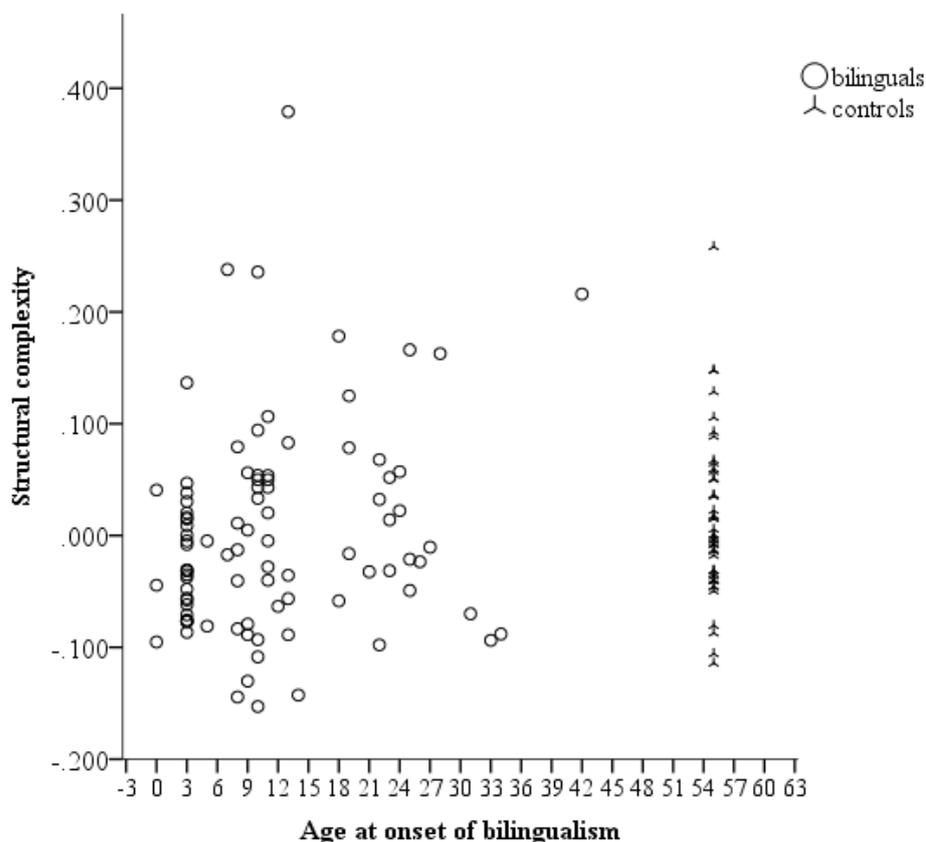


Figure 6.1: Structural complexity versus age at onset of bilingualism (AaO)

A mixed effect regression model run on the entire data with *by-participant* random intercept showed that it was only the HS group that diverged significantly from the reference group ($\beta=-0.039$, $SE=0.019$, $t=-2.01$). As shown by a second model built on the bilingual data, AaO as a continuous variable played only a marginally significant role ($\beta=0.001$, $SE=0.001$, $t=1.91$), an indication that the HSs attained a good level of bilingual proficiency regarding the overall structural complexity of their native language regardless of their early AaOs. Although we constructed other models to see how much cumulative L1 input would be necessary (or be equal to seven years of monolingual exposure) to achieve a native-like level of proficiency, no significant effects were found. This might be because there was not enough variability in the outcome and that all HSs performed fairly well.

This can be taken to indicate that the overall structural complexity of the L1 can be acquired and maintained under reduced L1 exposure and use conditions as the accumulation of the input over the years is probably enough to attain a good level of proficiency in this property.

Similarly, based on the findings in Chapter 3, the evidentiality performance of the group with AaO range 7–11 would be expected to be also native-like similar to the performance of the UK-born HSs who managed to obtain a critical mass of L1 experience between the ages 0–5. As it can be seen in Figure 6.2, with a few exceptions this hypothesis was confirmed.

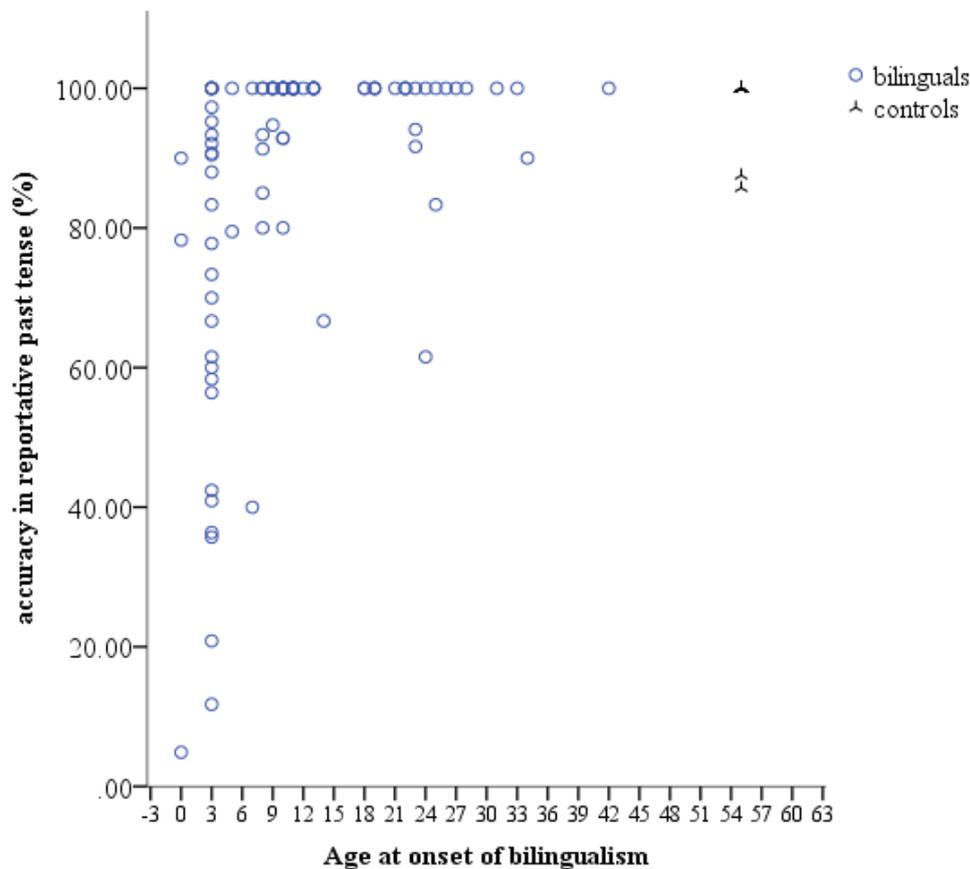


Figure 6.2: Accuracy in reportative past tense versus age at onset of bilingualism (AaO)

Taken together, the role played by AaO is something that cannot be denied in ultimate morphosyntactic development of the L1. Based on our findings discussed above, it seems to play more of a quantitative role in determining the critical mass necessary for the deep entrenchment (Gathercole, 2007). Evidently, HSs can achieve the same amount of critical mass despite their very early AaOs and interrupted input, but this might take longer in their case, and is probably less guaranteed due to the interference of many other factors (e.g. an early L2, fluctuations in their exposure and use patterns over the lifespan).

In this context, the role of continuous L1 use/exposure should not be ignored either. As discussed above, it appears that L1 accent, in addition to AaO (see Figure 6.3 for the FAR-AaO relationship), requires a certain amount and quality of continuous L1 exposure even in

adulthood in order to resist L2 interference. Recall that being exposed to qualitatively native-like input through the media in adulthood helped the speakers with AaOs of 7–11 years maintain their L1 accent. Our statistical analyses did not capture any such contribution of continuous L1 contact neither on the evidentiality accuracy nor on the structural complexity performance of the HSs.

In a bilingual context, especially regarding heritage language development, it is not unrealistic to assume that a certain threshold of continuous L1 contact might need to be reached for these properties to be maintained (or to continue to be acquired) in later stages of the development too. Our analyses might not have revealed the explanatory value of these predictors statistically, as in the case of our participants this threshold might have been already reached. The reason why all HSs obtained and maintained target-like levels of proficiency regarding the structural complexity, for instance, was presumably because the input they received throughout the lifespan was already over a certain threshold and unlike evidentiality, this property did not require a certain amount of input during the early years or was subject to L2 interference. This is presumably because evidentiality involves more complex semantics. Future research needs to confirm this by including participants with a wider range of L1 use, and if possible by carrying out the investigation across the entire AaO range on a number of different properties with different degrees of complexity (transparent/opaque form-function mappings) with and/or without equivalent forms in the L2.

In Chapter 5, we looked into the effects of input quantity and quality more holistically on word formation and included all bilinguals and monolinguals in the same analysis. The primary interest was on the ability of the HSs to employ frequently occurring (formulaic) word formation devices productively (across the entire range of their vocabulary) and the extent to which this performance was predicted by the frequency of the linguistic elements spoken around them by the other immigrants and the cumulative past L1 experience. Although AaO was not a variable of interest here, this approach still allowed us to trace its role in addition to input quality and quantity.

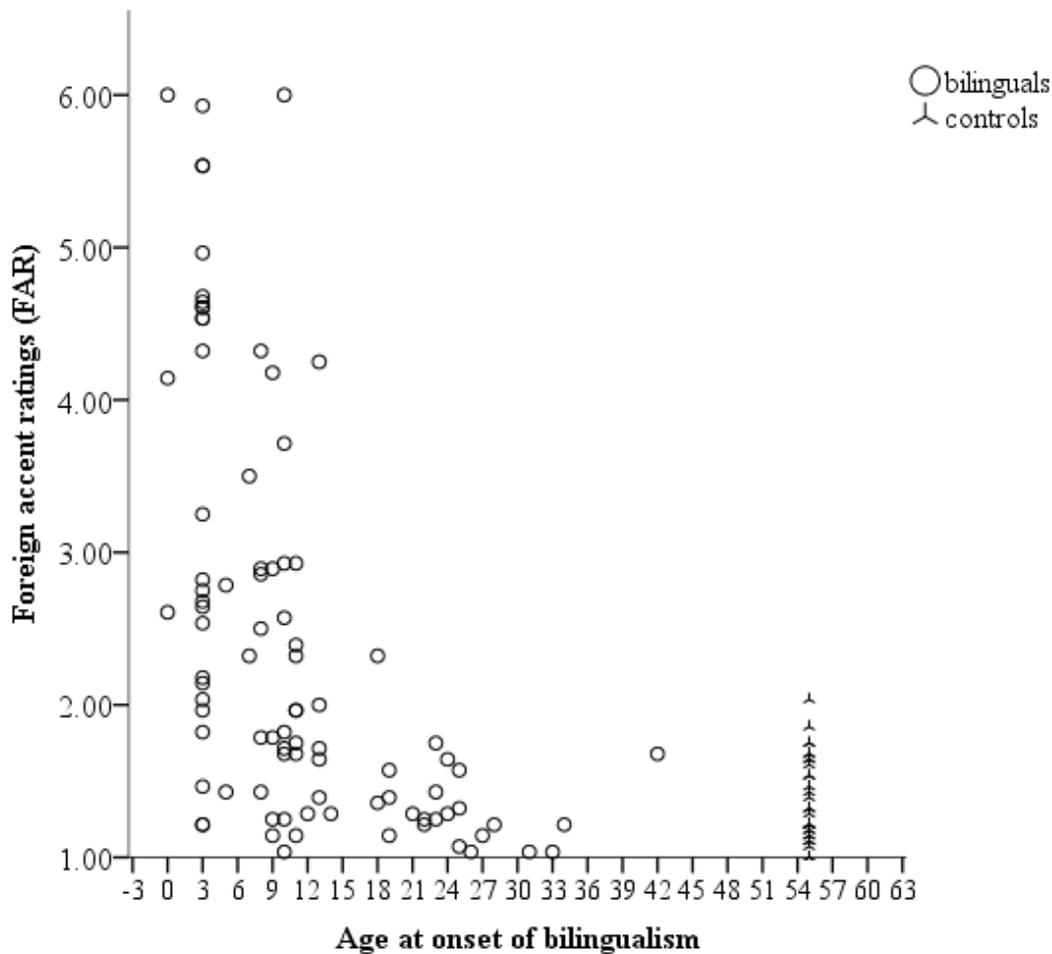


Figure 6.3: FAR versus age at onset of bilingualism (AaO)

Our findings showed that the immigrant variety was in general compromised regarding the nominal productivity performance (which can be seen below in Figure 6.4), the level of sophistication of the lemmas available to use in real time, and the degree to which this was predicted by the lemma and suffix template frequency measures. Verbal productivity, however, remained intact (see Chapter 5 for a discussion on why verbal productivity performance was not affected). This was likely because daily L1 use in this community is limited to contexts that would not require frequent activation and use of sophisticated words. This, in time, might have resulted in difficulties in accessing these words which possibly affected the availability of some suffix templates to use with these lemmas and led to reductions in how productively they were used and how much they were affected by frequency measures.

It was remarkable that this was reflected in the HS performance. We found that all bilinguals across the entire AaO performed similarly regarding the verbal productivity performance,

but an older AaO was slightly associated with a better nominal productivity performance. In other words, the HSs performed slightly less well in comparison to the other bilinguals whose nominal productivity performance was already compromised. In a way, qualitatively and quantitatively modified input seems to have resulted in a performance which apparently diverged from that of the monolinguals but converged on the immigrant variety, indicating HSs' sensitivity to the frequency of the linguistic elements in the input even in adulthood (Treffers-Daller et al., 2016)

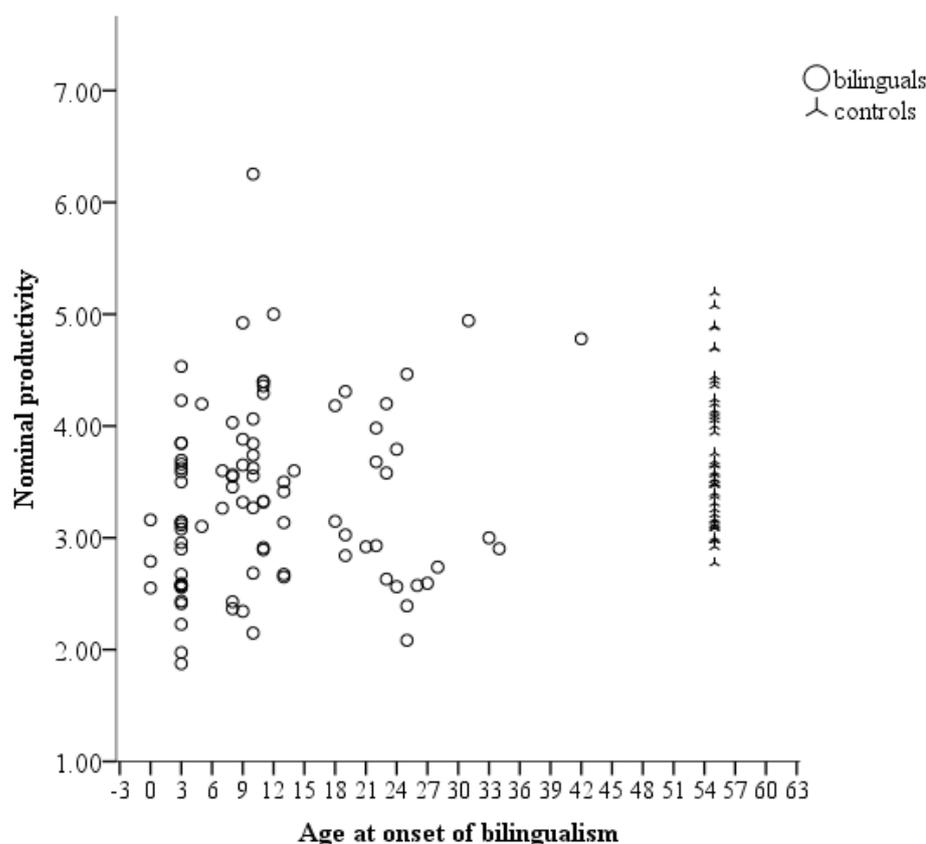


Figure 6.4: Nominal morphological productivity versus age at onset of bilingualism (AaO)

Assuming that the slightly lower productivity performance of the HSs originated from how low frequently occurring suffix templates were used, we attempted to establish a link between the amount of past L1 experience and nominal productivity performance. This was mainly motivated by the idea that a larger amount of input received would increase the chances of hearing these forms, thus explaining individual variability. However, our analyses did not reveal any relationship between the two. We attributed the lack of a relationship between the cumulative amount of input and ultimate attainment to the interplay of frequency and recency of experience (see Chapter 5 for other possible explanations).

Given that the HSs have not been hearing low-frequency forms in the input spoken around them as frequently enough, this potentially resulted in some sort of weakening in the strength of the connections between the low-frequency templates and lemmas. Overall, the findings obtained from this study showed that HL lexical development was indeed L1-convergent when considered within the norms of the immigrant community, supporting the account proposed by Treffers-Daller et al. (2016) and this performance was largely independent of the AaO and the amount of past L1 input.

6.2 General discussion and suggestions for future research

The approach taken in this study did not only allow us to represent the entire linguistic community and thus control for the quality of input available to these speakers within this community but also test the impact of AaO and see whether these factors remain equally deterministic of L1 knowledge across a wide range of linguistic abilities including past tense (evidentiality), overall structural complexity, foreign accentedness, and productivity in word formation. The above synthesis of the findings confirmed that this was not the case.

The productivity in word formation in real time, for example, was largely independent of AaO effect and past L1 experience, while both factors were at play in the rest of the properties showing a dynamic and nonlinear interaction between the two. While in older bilinguals the transfer from the L2 to L1 was mostly subtle (presumably owing to the strong influence of their late AaO), for younger bilinguals, L1 development seems to be complex, variable and affected by a range of additional factors. These factors include (but are not limited to) the amount of input received (especially during the early years of linguistic development), quality of continuous L1 use, the qualitative and quantitative modifications in the input (such as changes in frequency), and the inherent properties of the grammatical structures (such as early/late phenomenon, transparency/opaqueness).

It appears that being born in an L2 environment with limited opportunities to acquire and use the first language (mostly limited to the family contexts) leads to a unique language development across different linguistic abilities which might not always result in monolingual-like attainment. According to our findings, this does not necessarily show that these speakers stopped developing and stagnated at this level as implied by the term “incomplete acquisition”. The findings presented in this thesis are meaningful in showing that bilingual L1 development is variable, quite unpredictable and subject to effects of many factors. The fact that the HSs were found to show sensitivity to qualitative and quantitative

components of the L1 experience and modifications in the input available to them even in adulthood (in word formation) points to two important conclusions. First of all, given the HSs' sensitivity to input modifications, there is no reason not to expect these speakers to show the same sensitivity to the other properties if these properties in the HL input have been quantitatively or qualitatively modified (Rothman, 2007). Although such an attempt failed to support this theory in the morphosyntactic category investigated in Chapter 3, it is essential to test this for other grammatical properties, and most importantly in the performance of subsequent generations. Second of all, this observation indirectly indicates that if L1 input conditions improve, the ultimate state development which appears stagnated in adulthood in some properties might show an entirely different picture.

The fact that the change and/or variability was observed to a lesser degree in bilinguals with AaO>12 underlines that AaO plays an undeniable role in the degree of erosion. This, however, does not necessarily entail irreversibility or that L1 will not be subject to any changes if the L1 and L2 contact conditions change. We have shown that some sort of change has already started to take place in the use of word formation devices in line with how usage-based approaches explain language change. Whether and under which conditions this also works in other linguistic domains regarding the late bilingual performance is something that would require more research presumably with participants who have been using their L1 on a much less frequent basis than the participants of the current study.

It is very likely that word formation was affected because daily L1 use does not require the activation of sophisticated vocabulary despite the abounded contact of our participants with the L1. Perhaps in this context, quality of the L1 contact is something that matters more than its quantity (Schmid, 2007). What is responsible for high rates of L1 maintenance regarding morphosyntactic categories might thus relate to the fact that the speakers in this group usually code-switch relatively less and are in contact with the relatives in the L1 country on a more frequent basis than the HSs. This means that the L1 contact they have is still native-like quality. This is presumably less true in the case of HSs.

I believe approaching these phenomena from a usage-based perspective—which does not only take into account how much a property was heard or used but also quality of the contact and other factors that relate to the inherent properties of the structures in the input—has the potential to bring clear explanations to what happens to the L1 in a dual language context. Recently, MacWhinney extended the implications of the Unified Competition Model which he initially proposed to account for adult L2 acquisition in line with a usage-based

perspective to L1 attrition research, but to the best of my knowledge it has not been applied to attrition contexts as yet (MacWhinney, *forthc*). Any future study that is carried out within the premises of this approach should aim to reveal for how long L1 contact needs to be reduced, how extensive the code-switching should be and how much competition is required between L1 and L2 categories for the established L1 links to be loosened in late bilingualism across different linguistic levels. This would require the inclusion of at least two linguistic properties preferably with differing levels of complexity and one in direct competition with the L2 and the other without.

Similarly, in the case of the HSs, investigations carried out with returnees are limited but seem to provide insights into the nature of age effects as well as the role of input quality/quantity in heritage language development. These designs have the potential to resolve the true nature of age effects in human language making capacity and of incomplete acquisition by investigating whether there is resistance to change in the ultimate attainment of some properties even if input conditions improve (e.g. Flores & Rato, 2016; Treffers-Daller et al., 2016). It could be found that some linguistic properties might be subject to biological constraints while for some others the degree of L1 loss might be determined by linguistic experience.

Recently, Flores (*forthc*) proposed that returnee studies should be designed in a way that would allow the investigation of properties that are already known to be divergent in HL grammars. It appears that the current study provides such a property: evidentiality. Investigation of evidentiality in a follow-up study in the performance of returnees in comparison to that of HSs might prove useful in providing more definitive answers with respect to the effects of input and AaO. It is, however, also important to note here that the erosion we found in this property was mainly L2-induced. It is thus plausible to test bilinguals whose L1 and L2 both grammaticalise evidentiality the same way to see the extent of erosion and the underlying factors behind it.

6.3 Limitations of the study

A few further remarks need to be made regarding the limitations of the current study which also need to be considered in the future. First, since first contacts with participants were made through a number of Turkish organisations and clubs who share similar ideological views and possibly similar attitudes and thoughts towards the Turkish culture and the language, the experimental sample might not be representative of the entire Turkish

immigrant community in London. This has possibly affected the L1 use patterns of the participants which might explain why it was not possible to reach out to participants with very limited L1 use. Similarly, the distribution of the educational background was in favour of the university and high school graduates. This was most likely because more educated immigrants are usually more interested in participating in research studies that relate to their origin and the first language. Future research should consider these observations.

Second, the current study was interested in the production of Turkish and therefore relied on spoken data only. This means that the findings cannot be used to evaluate whether the L1 was affected at the representational level. The findings, therefore, need to be supported with more online psycholinguistic tasks to see if the HSs have experienced any restructuring in the underlying grammatical representation of the affected properties. This is important to study the limits of the theoretical models included in this study. Similarly, the methodology employed could benefit from integrating more controlled tasks or other techniques such as acoustic analyses to reveal the sources of the affected properties.

Finally, there are some factors that we could not consider here which are known to influence heritage language development. One such factor is literacy and HL instruction. Although all HSs included in the current study were literate in Turkish (due to transferring their literacy skills from their L2), there were only eight participants who had attended Turkish Sunday schools at some point in their lives. This did not allow us to investigate its effect thoroughly. Being schooled in Turkish did not predict the L1 performance of the HSs in Chapter 3 or 5, therefore it was not reported. It might be the case that HL instruction effects are rather short-term (Bylund & Díaz, 2012) as none of the HSs in our sample were attending these schools at the time of the testing. It would be interesting to know in the future whether this was indeed the case for this community and to what extent current HL instruction would play roles in the affected properties.

6.4 Implications of the findings

The findings of the current study have a number of implications regarding methodological designs and family and educational language policies. First of all, the baseline of comparison is a matter of much debate in heritage language bilingualism research. The findings of the current study contribute to these debates. If the baseline of comparison in the current study was taken as the monolingual group only (as it is usually done in heritage language research) instead of the additional comparison groups of other immigrant bilinguals in the same

linguistic community, the less target-like morphological productivity performance of the HSs in Chapter 5, for example, could have been evaluated as incomplete. From our analyses, however, we conclude that this is unlikely to be the case. The fact that the HSs managed to use as sophisticated lemmas and suffix sequences as the other immigrants, and that their productivity performance showed sensitivity to the inherent properties in the input they have been hearing from these speakers, shows that the HSs converged on what was available to them. Describing this performance as incomplete or L1-divergent would thus not reflect their lexical capabilities fully. We therefore submit that the development of a heritage language should not be studied in isolation from the L1 development of the other bilinguals within the same immigrant community. Accordingly, we agree with Pascual y Cabo and Rothman (2012) that in order to drive firm conclusions on the HL ultimate attainment and the sources of this attainment, future researchers should consider the inclusion of a bilingual control group (preferably a group of late bilingual immigrants) at least to control for the input effects.

Second, our findings that point towards the need for providing a certain amount of input during the early years of linguistic development to give L1 a chance to resist the detrimental effects of an early developing L2 have significant implications for family language policies. Immigrant parents are often confused and concerned about the L2 development of their children and thus regularly opt out for L1 input and instead create opportunities to enhance second language development. Based on our findings this might have detrimental effects on the L1 development and is perhaps unnecessary.

Although in the current research we did not use any comparable L2 measures for the investigated properties in the L1 but only a measure tapping to the general L2 proficiency (L2 C-Test), it appears that it is possible for HSs to attain reasonable levels of proficiency in both L1 and L2—multicompetence in Cook's (2003) terminology— even if the introduction with the L2 starts at birth. This is of course on the condition that parents do their best to provide as rich and variable L1 input as possible from early on (alongside creating a diverse L2 environment if they wish). It is also essential that a certain amount of quality L1 input should continue in the following years at least to keep the L1 linguistic features active. The quality of this continuous contact seems to be especially crucial for the maintenance of L1 accent. Language policymakers and/or language therapists may find these findings useful to inform and educate immigrant families on different ways of implementing available language sources to enrich the language learning experience of their children.

Finally, although it was not possible to include institutional support as a variable within the scope of the current study, our findings can be useful for teachers working in Turkish community schools (Sunday schools) and language program administrators who design materials to implement in these schools. As argued by Wright and Bayram (2016, p. 92) “a better pedagogical practice for heritage learners would require taking into account their existing linguistic knowledge, alongside a greater awareness of the varied psycholinguistic and sociolinguistic factors that also contributed to their heritage language learning and maintenance”. From this we surmise that new materials can be developed based on the students' needs and capabilities as shown by the current findings with an aim to promote literacy and higher quality language development.

To conclude, the current study brought two fields of enquiry together for an in-depth exploration of effects of age at onset of bilingualism and quantity/quality of L1 input on bilingual L1 development in an immigrant context. Despite its limitations as stated above, I hope to have contributed to what we already know about the impact of these factors on first language development and have extended the scope of the research carried out in these two fields.

References

- Aalberse, S., & Hulk, A. (2016). Introduction to the special issue – Heritage language studies and early child bilingualism research: Understanding the connection. *International Journal of Bilingualism*, 1367006916654351. <https://doi.org/10.1177/1367006916654351>
- Aalberse, S., & Muysken, P. (2013). Perspectives on Heritage Languages (pp. 1–25). Presented at the Workshop “Structural Changes in Heritage Languages,” de Leeuwenhorst. Retrieved from http://www.ru.nl/linc/news_and_events/events/workshop-’structural/
- Aarssen, J. (2001). Development of temporal relations in narratives by Turkish-Dutch bilingual children. In L. Verhoeven & S. Strömqvist (Eds.), *Narrative development in a multilingual context* (Vol. 23, pp. 209–232). John Benjamins Publishing.
- Abrahamsson, N., & Hytlenstam, K. (2009). Age of Onset and Nativelikeness in a Second Language: Listener Perception Versus Linguistic Scrutiny. *Language Learning*, 59(2), 249–306. <https://doi.org/10.1111/j.1467-9922.2009.00507.x>
- Ågren, M., Granfeldt, J., & Thomas, A. (2014). Combined effects of age of onset and input on the development of different grammatical structures: A study of simultaneous and successive bilingual acquisition of French. *Linguistic Approaches to Bilingualism*, 4(4), 462–493. <https://doi.org/10.1075/lab.4.4.03agr>
- Ahn, S., Chang, C. B., DeKeyser, R., & Lee-Ellis, S. (2017). Age Effects in First Language Attrition: Speech Perception by Korean-English Bilinguals. *Language Learning*, 67(3), 694–733. <https://doi.org/10.1111/lang.12252>
- Aikhenvald, A. Y. (2004). *Evidentiality*. Oxford; New York: Oxford University Press.
- Akıncı, M. (2003). Temporal anchoring of texts in Turkish of first and second generation Turkish immigrants in France. In S. Ozsoy, D. Akar, M. Nkipoglu-Demiralp, E.

- Erguvanli-Taylan, & A. Aksu-Koc (Eds.), *Studies in Turkish linguistics* (pp. 289–297). Boğaziçi University Press.
- Aksu-Koç, A. (1988). *The Acquisition of Aspect and Modality: The Case of Past Reference in Turkish*. Cambridge University Press.
- Aksu-Koç, A. (1994). Development of Linguistic Forms: Turkish. In R. A. Berman & D. I. Slobin (Eds.), *Relating Events in Narrative: A Crosslinguistic Developmental Study* (pp. 329–385). Lawrence Erlbaum Associates.
- Aksu-Koç, A. (2000). Some aspects of the acquisition of evidential in Turkish. In L. Johanson & B. Utas (Eds.), *Evidentials: Turkic, Iranian and Neighbouring Languages* (pp. 15–28). Berlin, Boston: DE GRUYTER. Retrieved from <http://www.degruyter.com/view/books/9783110805284/9783110805284.15/9783110805284.15.xml>
- Aksu-Koç, A. (2009). Evidentials: An Interface between Linguistic and Conceptual Development. In J. Guo, E. Lieven, N. Budwig, S. Ervin-Tripp, K. Nakamura, & Ş. Özçalışkan (Eds.), *Crosslinguistic Approaches to the Psychology of Language: Research in the Tradition of Dan Isaac Slobin* (pp. 531–542). Taylor & Francis.
- Aksu-Koç, A., & Ketrez, F. N. (2003). Early verbal morphology in Turkish: Emergence of inflection. In D. Bittner, W. U. Dressler, & M. Kilani-Schoch (Eds.), *Development of verb inflection in first language acquisition: a cross-linguistic perspective* (pp. 27–52). Berlin; New York: Mouton de Gruyter. Retrieved from <http://site.ebrary.com/lib/universityofessex/Doc?id=10597798>
- Aksu-Koç, A., Ogel-Balaban, H., & Alp, I. E. (2009). Evidentials and source knowledge in Turkish. *New Directions for Child and Adolescent Development*, 2009(125), 13–28.

- Aksu-Koç, A., Terziyan, T., & Erguvanlı-Taylan, E. (2014). Input offers and child uptakes Acquiring mood and modal morphology in Turkish. *Language Intraction and Acquisition*, 5(1), 62–81.
- Albirini, A., Benmamoun, E., & Saadah, E. (2011). Grammatical features of Egyptian and Palestinian Arabic heritage speakers' oral production. *Studies in Second Language Acquisition*, 33, 273–303.
- Altenberg, E. P. (1991). Assessing first language vulnerability to attrition. In H. W. Seliger & R. M. Vago (Eds.), *First language attrition* (pp. 189–206). Cambridge: Cambridge University Press.
- Ammerlaan, T. (1996). 'You get a bit wobbly...'. *Exploring bilingual lexical retrieval processes in the context of First Language Attrition* (PhD dissertation). University of Nijmegen, Netherlands. Retrieved from <http://www.let.rug.nl/languageattrition/Papers/Ammerlaan%201996.pdf>
- Andersen, R. W. (1982). Determining the linguistic attributes of language attrition. In R. D. Lambert & B. F. Freed (Eds.), *The Loss of language skills* (pp. 83–117). Rowley, Mass: Newbury House Publishers.
- Antonova Ünlü, E., & Wei, L. (2016). Examining the effect of reduced input on language development: The case of gender acquisition in Russian as a non-dominant and dispreferred language by a bilingual Turkish–Russian child. *International Journal of Bilingualism*, 1367006916666390. <https://doi.org/10.1177/1367006916666390>
- Arslan, S., Bastiaanse, R., & Felser, C. (2015). Looking at the evidence in visual world: eye-movements reveal how bilingual and monolingual Turkish speakers process grammatical evidentiality. *Language Sciences*, 1387. <https://doi.org/10.3389/fpsyg.2015.01387>

- Arslan, S., De Kok, D., & Bastiaanse, R. (2015). Processing grammatical evidentiality and time reference in Turkish heritage and monolingual speakers. *Bilingualism: Language and Cognition*, *FirstView*, 1–16. <https://doi.org/10.1017/S136672891500084X>
- Au, T. K., Knightly, L. M., Jun, S.-A., & Oh, J. S. (2002). Overhearing a Language During Childhood. *Psychological Science*, *13*(3), 238–243. <https://doi.org/10.1111/1467-9280.00444>
- Baayen, R. H., Davidson, D. J., & Bates, D. M. (2008). Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language*, *59*(4), 390–412. <https://doi.org/10.1016/j.jml.2007.12.005>
- Bacanlı, E. (2006). Türkçedeki Dolaylılık İşaretleyicilerin Pragmatik Anlamları. *Modern Türklül Araştırmaları Dergisi*, *1*(3), 35–47.
- Bacanlı, E. (2008). Türkiye Türkçesindeki -miş Ekinin Dolaylılık ve Dolaylılık-Dışı Kullanımlarında Zamansal Atıf. *Bilig*, (44), 1–24.
- Backus, A. (2012). Turkish as an Immigrant Language in Europe. In T. K. Bhatia & W. C. Ritchie (Eds.), *The Handbook of Bilingualism and Multilingualism* (pp. 770–790). John Wiley & Sons, Ltd. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/9781118332382.ch31/summary>
- Backus, A., & van der Heijden, H. (2002). Language mixing by young Turkish children in the Netherlands. *Psychology of Language and Communication*, *6*(1), 55–73.
- Bamyacı, E. (2015). *Competing Structures in the Bilingual Mind: A Psycholinguistic Investigation of Optional Verb Number Agreement*. Springer.
- Barr, D. J., Levy, R., Scheepers, C., & Tily, H. J. (2013). Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language*, *68*(3), 255–278. <https://doi.org/10.1016/j.jml.2012.11.001>

- Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models using lme4. *Journal of Statistical Software*, 67(1), 1–48. <https://doi.org/doi:10.18637/jss.v067.i01>
- Bates, E., & Goodman, J. C. (2001). On the inseparability of grammar and the lexicon: Evidence from acquisition. In M. Tomasello & E. Bates (Eds.), *Language development: The essential readings* (pp. 134–162). Malden: Blackwell Publishing.
- Bayram, F., Pascual y Cabo, D., & Rothman, J. (forthc). Cross-generational Attrition Contributions to Heritage Speaker Competence. In M. S. Schmid, B. Köpke, M. Cherciov, E. De Leeuw, T. Karayayla, M. Keijzer, & T. Mehotcheva (Eds.), *The Oxford Handbook of Language Attrition*. Oxford University Press.
- Bayram, F., Rothman, J., Iverson, M., Kupisch, T., Miller, D., Puig-Mayenco, E., & Westergaard, M. (2017). Differences in use without deficiencies in competence: passives in the Turkish and German of Turkish heritage speakers in Germany. *International Journal of Bilingual Education and Bilingualism*, 0(0), 1–21. <https://doi.org/10.1080/13670050.2017.1324403>
- Behrens, H. (2009). Usage-based and emergentist approaches to language acquisition. *Linguistics*, 47(2), 383–411.
- Benmamoun, E., Albirini, A., Montrul, S. A., & Saadah, E. (2014). Arabic plurals and root and pattern morphology in Palestinian and Egyptian heritage speakers. *Linguistic Approaches to Bilingualism*, 4(1), 89–123. <https://doi.org/10.1075/lab.4.1.04ben>
- Benmamoun, E., Montrul, S., & Polinsky, M. (2013). Heritage languages and their speakers: Opportunities and challenges for linguistics. *Theoretical Linguistics*, 39(3–4), 129–181. <https://doi.org/10.1515/tl-2013-0009>
- Ben-Rafael, M., & Schmid, M. S. (2007). Language attrition and ideology: Two groups of immigrants in Israel. In B. Köpke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.),

- Language Attrition Theoretical Perspectives* (Vol. 33, pp. 205–226). Amsterdam/Philadelphia: John Benjamins.
- Bergmann, C., Meulman, N., Stowe, L. A., Sprenger, S. A., & Schmid, S. M. (2015). Prolonged L2 immersion engenders little change in morphosyntactic processing of bilingual natives. *Neuroreport*, *26*(17), 1065–1070.
- Bergmann, C., Nota, A., & Schmid, S. M. (2017). L2 immersion causes non-native-like L1 pronunciation in German attriters. *Journal of Phonetics*, *(58)*, 1–23. <https://doi.org/10.16/j.wocn.2016.07.001>
- Bergmann, C., Sprenger, S. A., & Schmid, M. S. (2015). The impact of language co-activation on L1 and L2 speech fluency. *Acta Psychologica*, *161*, 25–35. <https://doi.org/10.1016/j.actpsy.2015.07.015>
- Berman, R. A., & Slobin, D. I. (1994). *Relating Events in Narrative: A Crosslinguistic Developmental Study*. Lawrence Erlbaum Associates.
- Bilgin, O. (2016). *Frequency effects in the processing of morphologically complex Turkish words* (Master Thesis). Boğaziçi University, Istanbul. Retrieved from http://st2.zargan.com/public/resources/turkish/frequency_effects_in_turkish.pdf
- Bornstein, M. H. (1989). Sensitive periods in development: Structural characteristics and causal interpretations. *Psychological Bulletin*, *105*(2), 179–197.
- Bot, K. de, & Clyne, M. (1994). A 16-year longitudinal study of language attrition in Dutch immigrants in Australia. *Journal of Multilingual and Multicultural Development*, *15*(1), 17–28. <https://doi.org/10.1080/01434632.1994.9994554>
- Bybee, J. L. (1988). Morphology as Lexical Organization. In M. Hammond & M. Noonan (Eds.), *Theoretical morphology: approaches in modern linguistics* (pp. 119–141). San Diego: Academic Press.

- Bybee, J. L. (1998). The Emergent Lexicon. In M. C. Gruber, D. Higgins, K. S. Olson, & T. Wysocki (Eds.), *Papers from the panels: The status of constraints; the acquisition of spoken language; acquisition and the lexicon* (pp. 421–435). Chicago: Chicago Linguistic Society. Retrieved from <https://www.sil.org/resources/archives/4797>
- Bybee, J. L. (2001). *Phonology and language use*. Cambridge: Cambridge University Press.
- Bybee, J. L. (2007). From Usage to Grammar: The Mind's Response to Repetition. *Language*, 82(4), 711–733. <https://doi.org/10.1353/lan.2006.0186>
- Bybee, J. L. (2011). Usage-based theory and grammaticalization. In H. Narrog & B. Heine (Eds.), *The Oxford Handbook of Grammaticalization* (pp. 69–78). Madison Avenue, New York: Oxford University Press. Retrieved from <http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199586783.001.0001/oxfordhb-9780199586783-e-6>
- Bylund, E. (2009a). Effects of age of L2 acquisition on L1 event conceptualization patterns. *Bilingualism: Language and Cognition*, 12(03), 305–322. <https://doi.org/10.1017/S1366728909990137>
- Bylund, E. (2009b). Maturation Constraints and First Language Attrition. *Language Learning*, 59(3), 687–715. <https://doi.org/10.1111/j.1467-9922.2009.00521.x>
- Bylund, E., Abrahamsson, N., & Hyltenstam, K. (2010). The Role of Language Aptitude in First Language Attrition: The Case of Pre-Pubescent Attriters. *Applied Linguistics*, 31(3), 443–464. <https://doi.org/10.1093/applin/amp059>
- Bylund, E., Abrahamsson, N., & Hyltenstam, K. (2012). Does first language maintenance hamper nativelikeness in a second language? *Studies in Second Language Acquisition*, 34(Special Issue 02), 215–241. <https://doi.org/10.1017/S0272263112000034>

- Bylund, E., & Díaz, M. (2012). The effects of heritage language instruction on first language proficiency: a psycholinguistic perspective. *International Journal of Bilingual Education and Bilingualism*, 15(5), 593–609. <https://doi.org/10.1080/13670050.2012.676620>
- Bylund, E., & Jarvis, S. (2011). L2 effects on L1 event conceptualization*. *Bilingualism: Language and Cognition*, 14(1), 47–59. <https://doi.org/10.1017/S1366728910000180>
- Bylund, E., & Ramírez-Galan, P. (2014). Language Aptitude in First Language Attrition: A Study on Late Spanish-Swedish Bilinguals. *Applied Linguistics*, amu055. <https://doi.org/10.1093/applin/amu055>
- Carey, M. D., Mannell, R. H., & Dunn, P. K. (2011). Does a rater's familiarity with a candidate's pronunciation affect the rating in oral proficiency interviews? *Language Testing*, 28(2), 201–219. <https://doi.org/10.1177/0265532210393704>
- Chamorro, G., Sorace, A., & Sturt, P. (2016). What is the source of L1 attrition? The effect of recent L1 re-exposure on Spanish speakers under L1 attrition. *Bilingualism: Language and Cognition*, 19(3), 520–532. <https://doi.org/10.1017/S1366728915000152>
- Chamorro, G., Sturt, P., & Sorace, A. (2016). Selectivity in L1 Attrition: Differential Object Marking in Spanish Near-Native Speakers of English. *Journal of Psycholinguistic Research*, 45(3), 697–715. <https://doi.org/10.1007/s10936-015-9372-4>
- Chang, C. B. (2012). Rapid and multifaceted effects of second-language learning on first-language speech production. *Journal of Phonetics*, 40(2), 249–268. <https://doi.org/10.1016/j.wocn.2011.10.007>

- Charsley, K., Storer-Church, B., Benson, M., & Van Hear, N. (2012). Marriage-Related Migration to the UK. *International Migration Review*, 46(4), 861–890. <https://doi.org/10.1111/imre.12003>
- Cherciov, M. (2013). Investigating the impact of attitude on first language attrition and second language acquisition from a dynamic systems theory perspective. *International Journal of Bilingualism*, (6), 1–18.
- Çoban, C. (2014, November 30). İstanbul'da bir binanın üzerine vinç devrildi. *Hürriyet*. Retrieved from <http://www.hurriyet.com.tr/istanbulda-bir-binanin-uzerine-vinc-devrildi-27670596>
- Cook, V. (2003). Introduction: The changing L1 in the L2 user's mind. In V. Cook (Ed.), *Effects of the second language on the first* (pp. 1–18). Clevedon/Buffalo/Toronto/Sydney: Multilingual matters.
- Coşkun, H. (2010). Embedding indirective (evidential) utterances in Turkish. In G. Diewald, E. Smirnova, & ebrary, Inc (Eds.), *Linguistic realization of evidentiality in European languages* (pp. 187–221). Berlin : New York: De Gruyter Mouton. Retrieved from <http://site.ebrary.com/lib/universityofessex/Doc?id=10435759>
- Crul, M., & Doornik, J. (2003). The Turkish and Moroccan Second Generation in the Netherlands: Divergent Trends between and Polarization within the Two Groups1. *International Migration Review*, 37(4), 1039–1064. <https://doi.org/10.1111/j.1747-7379.2003.tb00169.x>
- Csato, E. A. (2000). Turkish MIş- and IMIş- items. Dimensions of a functional analysis. In L. Johanson & B. Utas (Eds.), *Evidentials: Turkic, Iranian and Neighbouring Languages* (pp. 29–44). Berlin, Boston: DE GRUYTER. Retrieved from <http://www.degruyter.com/view/books/9783110805284/9783110805284.15/9783110805284.15.xml>

- Cuza, A., & Pérez-Tattam, R. (2016). Grammatical gender selection and phrasal word order in child heritage Spanish: A feature re-assembly approach. *Bilingualism: Language and Cognition*, 19(01), 50–68. <https://doi.org/10.1017/S1366728914000893>
- De Bot, K. (2007). Dynamic systems theory, lifespan development and language attrition. In B. Köpcke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language Attrition Theoretical Perspectives* (Vol. 33, pp. 53–68). Amsterdam/Philadelphia: John Benjamins.
- De Bot, K., Gommans, P., & Rossing, C. (1991). L1 loss in an L2 environment: Dutch immigrants in France. In H. W. Seliger & R. M. Vago (Eds.), *First language attrition* (pp. 87–98). Cambridge: Cambridge University Press.
- De Houwer, A. (2007). Parental language input patterns and children's bilingual use. *Applied Psycholinguistics*, 28(03), 411–424. <https://doi.org/10.1017/S0142716407070221>
- De Houwer, A. (2009). *An Introduction to Bilingual Development*. Multilingual Matters.
- de Leeuw, E. de, Mennen, I., & Scobbie, J. M. (2011). Singing a different tune in your native language: first language attrition of prosody. *International Journal of Bilingualism*, 16(1), 101–116. <https://doi.org/10.1177/1367006911405576>
- de Leeuw, E. de, Mennen, I., & Scobbie, J. M. (2012). Dynamic systems, maturational constraints and L1 phonetic attrition. *International Journal of Bilingualism*, 1367006912454620. <https://doi.org/10.1177/1367006912454620>
- de Leeuw, E., Schmid, M. S., & Mennen, I. (2010). The effects of contact on native language pronunciation in an L2 migrant setting. *Bilingualism: Language and Cognition*, 13(Special Issue 01), 33–40. <https://doi.org/10.1017/S1366728909990289>
- de Leeuw, E., Tusha, A., & Schmid, M. S. (2017). Individual phonological attrition in Albanian–English late bilinguals. *Bilingualism: Language and Cognition*, 1–18. <https://doi.org/10.1017/S1366728917000025>

- DeKeyser, R. M. (2013). Age Effects in Second Language Learning: Stepping Stones Toward Better Understanding. *Language Learning*, 63, 52–67. <https://doi.org/10.1111/j.1467-9922.2012.00737.x>
- DeLancey, S. (2001). The mirative and evidentiality. *Journal of Pragmatics*, 33(3), 369–382. [https://doi.org/10.1016/S0378-2166\(01\)80001-1](https://doi.org/10.1016/S0378-2166(01)80001-1)
- Demir, I. (2012). Battling with Memleket in London: The Kurdish Diaspora's Engagement with Turkey. *Journal of Ethnic and Migration Studies*, 38(5), 815–831. <https://doi.org/10.1080/1369183X.2012.667996>
- Doğruöz, A. S., & Backus, A. (2009). Innovative constructions in Dutch Turkish: An assessment of ongoing contact-induced change. *Bilingualism: Language and Cognition*, 12(01), 41–63. <https://doi.org/10.1017/S1366728908003441>
- Dressler, W. U., Kilani-Schoch, M., & Klampfer, S. (2003). How does a child detect morphology? Evidence from production*. In R. Harald Baayen & R. Schreuder (Eds.), *Morphological structure in language processing* (pp. 391–425). Berlin: Mouton de Gruyter.
- Durrant, P. (2013). Formulaicity in an agglutinating language: the case of Turkish. *Corpus Linguistics and Linguistic Theory*, 9(1), 1–38. <https://doi.org/10.1515/cllt-2013-0009>
- Dussias, P. E. (2004). Parsing a first language like a second: The erosion of L1 parsing strategies in Spanish-English Bilinguals. *International Journal of Bilingualism*, 8(3), 355–371. <https://doi.org/10.1177/13670069040080031001>
- Ellis, N. C. (1998). Emergentism, Connectionism and Language Learning. *Language Learning*, 48(4), 631–664.
- Ellis, N. C. (2002). FREQUENCY EFFECTS IN LANGUAGE PROCESSING: A Review with Implications for Theories of Implicit and Explicit Language Acquisition.

- Studies in Second Language Acquisition*, 24(2), 143–188.
<https://doi.org/10.1017/S0272263102002024>
- Ersanilli, E., & Koopmans, R. (2011). Do Immigrant Integration Policies Matter? A Three-Country Comparison among Turkish Immigrants. *West European Politics*, 34(2), 208–234. <https://doi.org/10.1080/01402382.2011.546568>
- Field, A. (2005). *Discovering statistics using SPSS*. London/Thousand Oaks/New Delhi: SAGE publications.
- Flege, J. E. (1995). Speech perception and linguistic experience: Issues in cross-language research. In W. Strange (Ed.), *Second language speech learning: theory, findings, and problems* (pp. 233–272). Baltimore:MD: York Press.
- Flege, J. E., Frieda, E. M., & Nozawa, T. (1997). Amount of native-language (L1) use affects the pronunciation of an L2. *Journal of Phonetics*, 25(2), 169–186.
<https://doi.org/10.1006/jpho.1996.0040>
- Flege, J. E., Schirru, C., & MacKay, I. R. A. (2003). Interaction between the native and second language phonetic subsystems. *Speech Communication*, 40(4), 467–491.
[https://doi.org/10.1016/S0167-6393\(02\)00128-0](https://doi.org/10.1016/S0167-6393(02)00128-0)
- Flores, C. (forthc). Language development of bilingual returnees. In S. M. S. Schmid & B. Köpke (Eds.), *The Oxford Handbook of Language Attrition*. Oxford: OUP.
- Flores, C., & Rato, A. (2016). Global accent in the Portuguese speech of heritage returnees. *Heritage Language Journal*, 13(2), 161–183.
- Flores, C., Rinke, E., & Rato, A. (2017). Comparing the outcomes of early and late acquisition of european portuguese: an analysis of morpho-syntactic and phonetic performance, 14(2), 124–149.

- Flores, C., Santos, A. L., Jesus, A., & Marques, R. (2017). Age and input effects in the acquisition of mood in Heritage Portuguese. *Journal of Child Language*, *44*(4), 795–828. <https://doi.org/10.1017/S0305000916000222>
- Foster, P., Tonkyn, A., & Wigglesworth, G. (2000). Measuring spoken language: a unit for all reasons. *Applied Linguistics*, *21*(3), 354–375. <https://doi.org/10.1093/applin/21.3.354>
- Gal, S. (1989). Lexical innovation and loss: The use and value of restricted Hungarian. In N. C. Dorian (Ed.), *Investigating obsolescence: studies in language contraction and death* (pp. 313–335). Cambridge: Cambridge University Press.
- Gathercole, V. C. M. (2007). Miami and North Wales, So Far and Yet So Near: A Constructivist Account of Morphosyntactic Development in Bilingual Children. *International Journal of Bilingual Education and Bilingualism*, *10*(3), 224–247. <https://doi.org/10.2167/beb442.0>
- Gaziantep'te sel felaketi. (2014, October 15). *Milliyet*. Retrieved from <http://www.milliyet.com.tr/gaziantep-te-sel-felaketi-gaziantep-yerelhaber-425385/>
- Gharibi, K. (2016). *Incomplete Acquisition, Attrition and Maintenance of Heritage Speakers' Family Language: Iranians in New Zealand* (PhD dissertation). Victoria University of Wellington, New Zealand. Retrieved from <http://hdl.handle.net/10063/5561>
- Gharibi, K., & Boers, F. (2017). Influential factors in lexical richness of young heritage speakers' family language: Iranians in New Zealand. *International Journal of Bilingualism*, 1367006917728395. <https://doi.org/10.1177/1367006917728395>
- Göksel, A., & Kerslake, C. (2005). *Turkish a comprehensive grammar* (Third reprint 2010).

- Gollan, T. H., Starr, J., & Ferreira, V. S. (2014). More than use it or lose it: The number-of-speakers effect on heritage language proficiency. *Psychonomic Bulletin & Review*, 1–9. <https://doi.org/10.3758/s13423-014-0649-7>
- Granena, G., & Long, M. H. (2013). Age of onset, length of residence, language aptitude, and ultimate L2 attainment in three linguistic domains. *Second Language Research*, 29(3), 311–343. <https://doi.org/10.1177/0267658312461497>
- Gries, S. (2015). The most under-used statistical method in corpus linguistics: multi-level (and mixed-effects) models. *Corpora*, 10(1), 95–125. <https://doi.org/10.3366/cor.2015.0068>
- Gürel, A. (2002). Attrition in L1 competence: The case of Turkish. In M. S. Schmid, B. Köpke, M. Keijzer, & L. Weilemar (Eds.), *First Language Attrition interdisciplinary perspectives on methodological issues* (Vol. 28, pp. 225–242). Amsterdam/Philadelphia: John Benjamins.
- Gürel, A. (2004). Selectivity in L2-induced L1 attrition: a psycholinguistic account. *Journal of Neurolinguistics*, 17(1), 53–78. [https://doi.org/10.1016/S0911-6044\(03\)00054-X](https://doi.org/10.1016/S0911-6044(03)00054-X)
- Gürel, A. (2007). (Psycho)linguistic determinants of L1 attrition. In B. Köpke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language Attrition Theoretical Perspectives* (Vol. 33, pp. 99–120). Amsterdam/Philadelphia: John Benjamins.
- Gürel, A. (2015). First language attrition of constraints on wh-scrambling: Does the second language have an effect? *International Journal of Bilingualism*, 19(1), 75–91. <https://doi.org/10.1177/1367006913506131>
- Gürel, A., & Yılmaz, G. (2011). Restructuring in the L1 Turkish grammar. Effects of L2 English and L2 Dutch. *Language, Interaction and Acquisition*, 2(2), 221–250. <https://doi.org/10.1075/lia.2.2.03gur>

- Gutierrez-Clellen, V. F., & Kreiter, J. (2003). Understanding child bilingual acquisition using parent and teacher reports. *Applied Psycholinguistics*, *24*(02), 267–288. <https://doi.org/10.1017/S0142716403000158>
- Hakuta, K., & D'Andrea, D. (1992). Some Properties of Bilingual Maintenance and Loss in Mexican Background High-School Students. *Applied Linguistics*, *13*(1), 72–99. <https://doi.org/10.1093/applin/13.1.72>
- Heine, B., & Kuteva, T. (2005). *Language contact and grammatical change*. Cambridge.
- Herdina, P., & Jessner, U. (2002). *A Dynamic Model of Multilingualism: Perspectives of Change in Psycholinguistics*. Multilingual Matters.
- Herschensohn, J. (2009). FUNDAMENTAL AND GRADIENT DIFFERENCES IN LANGUAGE DEVELOPMENT. *Studies in Second Language Acquisition*, *31*(2), 259–289. <https://doi.org/10.1017/S0272263109090305>
- Hoff, E. (2006). How social contexts support and shape language development. *Developmental Review*, *26*(1), 55–88. <https://doi.org/10.1016/j.dr.2005.11.002>
- Hoff, E., & Core, C. (2013). Input and Language Development in Bilingually Developing Children. *SEMINARS IN SPEECH AND LANGUAGE*, *34*(4), 215–226.
- Hoff, E., Core, C., Place, S., Rumiche, R., Señor, M., & Parra, M. (2012). Dual language exposure and early bilingual development. *Journal of Child Language*, *39*(01), 1–27. <https://doi.org/10.1017/S0305000910000759>
- Hopp, H., & Putnam, M. T. (2015). Syntactic restructuring in heritage grammars: Word order variation in Moundridge Schweitzer German. *Linguistic Approaches to Bilingualism*, *5*(2), 180–214. <https://doi.org/10.1075/lab.5.2.02hop>
- Hopp, H., & Schmid, M. S. (2013). Perceived foreign accent in first language attrition and second language acquisition: The impact of age of acquisition and bilingualism.

Applied Psycholinguistics, 34(02), 361–394.
<https://doi.org/10.1017/S0142716411000737>

Hrycyna, M., Lapinskaya, N., Kochetov, A., & Nagy, N. (2011). VOT drift in three generations of heritage language speakers in Toronto. *Canadian Acoustics*, 39(3), 165–168.

Huls, E., & van de Mond, A. (1992). Some Aspects of Language Attrition in Turkish Families in the Netherlands. In W. Fase, K. Jaspaert, S. Kroon, & ebrary, Inc (Eds.), *Maintenance and loss of minority languages* (pp. 99–117). Amsterdam ; Philadelphia: J. Benjamins.

Hulsen, M. E. H. (2000). *Language loss and language processing : three generations of Dutch migrants in New Zealand*. [S.l. : s.n.]. Retrieved from <http://repository.ubn.ru.nl/handle/2066/18901>

Hyltenstam, K., Bylund, E., Abrahamsson, N., & Park, H.-S. (2009). Dominant-language replacement: The case of international adoptees. *Bilingualism: Language and Cognition*, 12(02), 121–140. <https://doi.org/10.1017/S1366728908004008>

Iglowstein, I., Jenni, O. G., Molinari, L., & Largo, R. H. (2003). Sleep Duration From Infancy to Adolescence: Reference Values and Generational Trends. *Pediatrics*, 111(2), 302–307. <https://doi.org/10.1542/peds.111.2.302>

Isurin, L. (2000). Deserted island or a child's first language forgetting. *Bilingualism: Language and Cognition*, 3(2), 151–167. <https://doi.org/null>

Iverson, M. (2012, July 1). *Advanced language attrition of Spanish in contact with Brazilian Portuguese*. The University of Iowa, Iowa. Retrieved from <http://ir.uiowa.edu/etd/3316>

Jakobson, R. (1941). *Kindersprache, Aphasie, and allgemine Lautgesetze*. Uppsala: Almqvist and Wiksell.

- Jarvis, S. (2002). Short texts, best-fitting curves and new measures of lexical diversity. *Language Testing*, 19(1), 57–84. <https://doi.org/10.1191/0265532202lt220oa>
- Jia, G., & Aaronson, D. (1999). Age differences in second language acquisition: The dominant language switch and maintenance hypothesis. In *Proceedings of the 23rd annual Boston University conference on language development* (Vol. 23, pp. 301–312).
- Jia, G., & Aaronson, D. (2003). A longitudinal study of Chinese children and adolescents learning English in the United States. *Applied Psycholinguistics*, 24(01), 131–161. <https://doi.org/10.1017/S0142716403000079>
- Jia, R., & Paradis, J. (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, FirstView*, 1–16. <https://doi.org/10.1017/S1366728914000728>
- Johanson, L. (2000). Turkic Indirectives. In L. Johanson & B. Utas (Eds.), *Evidentials: Turkic, Iranian and Neighbouring Languages* (pp. 61–88). Berlin, Boston: DE GRUYTER. Retrieved from <http://www.degruyter.com/view/books/9783110805284/9783110805284.15/9783110805284.15.xml>
- Johanson, L. (2006). Indirective sentence types. *Turkic Languages*, 10, 73–89.
- Kaltsa, M., Tsimpli, I. M., & Rothman, J. (2015). Exploring the source of differences and similarities in L1 attrition and heritage speaker competence: Evidence from pronominal resolution. *Lingua*, 164, Part B, 266–288. <https://doi.org/10.1016/j.lingua.2015.06.002>
- Karahan, L. (1996). *Anadolu Ağızlarının Sınıflandırılması*. Ankara: Türk Dil Kurumu Yayınları.

- Karakoç, B. (2007). Connectivity by means of finite elements in monolingual and bilingual Turkish discourse. In J. Rehbein, C. Hohenstein, & L. Pietsch (Eds.), *Connectivity in Grammar and Discourse* (Vol. 5, pp. 199–228). Amsterdam/Philadelphia: John Benjamins Publishing.
- Karayayla, T. (forthc.). Effects of first language attrition on heritage language input and ultimate attainment: two generations of Turkish immigrants in the UK. In B. Brehmer, J. Treffers-Daller, & D. Berndt (Eds.), *Lost in Transmission: The role of attrition and input in heritage language development*. John Benjamins.
- Kasparian, K., & Steinhauer, K. (2017). When the Second Language Takes the Lead: Neurocognitive Processing Changes in the First Language of Adult Attriters. *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.00389>
- Kaufman, D., & Aronoff, M. (1991). Morphological disintegration and reconstruction in first language attrition. In H. W. Seliger & R. M. Vago (Eds.), *First language attrition* (pp. 175–188). Cambridge: Cambridge University Press.
- Keijzer, M. (2007, January 1). *Last in First Out?: An investigation of the regression hypothesis in Dutch emigrants in Anglophone Canada* (PhD thesis). Vrije Universiteit Amsterdam, Amsterdam.
- Ketrez, F. N., & Aksu-Koç, A. (2009). Early nominal morphology in Turkish: Emergence of case and number. In U. Stephany & M. D. Voeikova (Eds.), *Development of Nominal Inflection in First Language Acquisition: A Cross-Linguistic Perspective* (pp. 15–48). Berlin : New York: Walter de Gruyter.
- Kim, M. S. (2013). The Mental Lexicon of Low-Proficiency Korean Heritage Learners. *Heritage Language Journal*, 10(1), 17–35.

- King, R., Thomson, M., Mai, N., & Keles, Y. (2008a). 'Turks' in London: Shades of Invisibility and the Shifting Relevance of Policy in the Migration Process. *Sussex Centre for Migration Research, University of Sussex, Working Papers*(51), 2–24.
- King, R., Thomson, M., Mai, N., & Keles, Y. (2008b). 'Turks' in the UK: Problems of Definition and the Partial Relevance of Policy. *Journal of Immigrant & Refugee Studies*, 6(3), 423–434. <https://doi.org/10.1080/15362940802371895>
- Kinsella, C., & Singleton, D. (2014). Much More Than Age. *Applied Linguistics*, 35(4), 441–462. <https://doi.org/10.1093/applin/amu032>
- Kondo–Brown, K. (2005). Differences in Language Skills: Heritage Language Learner Subgroups and Foreign Language Learners. *The Modern Language Journal*, 89(4), 563–581. <https://doi.org/10.1111/j.1540-4781.2005.00330.x>
- Köpke, B. (2007). Language attrition at the crossroads of brain, mind, and society. In B. Köpke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language Attrition Theoretical Perspectives* (Vol. 33, pp. 9–38). Amsterdam/Philadelphia: John Benjamins.
- Köpke, B., & Schmid, M. S. (2004). Language attrition: The next phase. In M. S. Schmid, B. Köpke, M. Keijzer, & L. Weilemar (Eds.), *First Language Attrition interdisciplinary perspectives on methodological issues* (Vol. 28, pp. 1–45). Amsterdam/Philadelphia: John Benjamins.
- Küntay, A. C., & Slobin, D. I. (2001). Discourse Behavior of Lexical Categories in Turkish Child Directed Speech: Nouns vs. Verbs. In M. Almgren, A. Barrena, aria-J. Ezeizaberrana, I. Idiazabar, & B. McWhinney (Eds.), *Research on Child Language Acquisition Proceedings of the 8th Conference of the International Association for the Study of Child Language* (Vol. 2, pp. 928–946). Somerville, MA: Cascadilla Press.

- Kupisch, T., Hailer, K., Klaschik, E., & Stangen, I. (2014). Foreign Accent in Adult Simultaneous Bilinguals. *Heritage Language Journal*, 11(2), 123–150.
- Kupisch, T., Lein, T., Barton, D., Schröder, D. J., Stangen, I., & Stoehr, A. (2014). Acquisition outcomes across domains in adult simultaneous bilinguals with French as weaker and stronger language. *French Language Studies*, 24, 347–376. <https://doi.org/doi:10.1017/S0959269513000197>
- Kupisch, T., & Rothman, J. (2016). Terminology matters! Why difference is not incompleteness and how early child bilinguals are heritage speakers. *International Journal of Bilingualism*, 1367006916654355. <https://doi.org/10.1177/1367006916654355>
- La Morgia, F. (2011). *Bilingual first language acquisition: the nature of the weak language and the role of the input* (doctoral). Dublin City University. School of Applied Language and Intercultural Studies. Retrieved from <http://doras.dcu.ie/16056/>
- Lahmann, C., Steinkrauss, R., & Schmid, M. S. (2016). Factors Affecting Grammatical and Lexical Complexity of Long-Term L2 Speakers' Oral Proficiency. *Language Learning*, 66(2), 354–385. <https://doi.org/10.1111/lang.12151>
- Langacker, R. W. (2011). Grammaticalization and Cognitive Grammar. In H. Narrog & B. Heine (Eds.), *The Oxford Handbook of Grammaticalization* (pp. 79–91). Madison Avenue, New York: Oxford University Press. Retrieved from <http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199586783.001.0001/oxfordhb-9780199586783-e-6>
- Lardiere, D. (2008). Feature-assembly in second language acquisition. In J. Liceras, H. Zobl, & H. Goodluck (Eds.), *The role of formal features in second language acquisition* (pp. 106–140). New York: Lawrence Erlbaum Associates.

- Lazard, G. (2001). On the grammaticalization of evidentiality. *Journal of Pragmatics*, 33(3), 359–367. [https://doi.org/10.1016/S0378-2166\(00\)00008-4](https://doi.org/10.1016/S0378-2166(00)00008-4)
- Lein, T., Kupisch, T., & Weijer, J. van de. (2015). Voice onset time and global foreign accent in German–French simultaneous bilinguals during adulthood. *International Journal of Bilingualism*, 1367006915589424. <https://doi.org/10.1177/1367006915589424>
- Leseman, P. P. M., Scheel, A. F., Mayo, A. Y., & Messer, M. H. (2009). Bilingual development in early childhood and the languages used at home: competition for scarce resources? *Streitfall Zweisprachigkeit - the Bilingualism Controversy*, 289.
- Llama, R., & López-Morelos, L. P. (2016). VOT production by Spanish heritage speakers in a trilingual context. *International Journal of Multilingualism*, 13(4), 444–458. <https://doi.org/10.1080/14790718.2016.1217602>
- Lohndal, T., & Westergaard, M. (2016). Grammatical Gender in American Norwegian Heritage Language: Stability or Attrition? *Frontiers in Psychology*, 7. <https://doi.org/10.3389/fpsyg.2016.00344>
- Long, D., & Rothman, J. (2014). Some caveats to the role of input in the timing of child bilingualism. *Linguistic Approaches to Bilingualism*, 4(3), 351–356. <https://doi.org/10.1075/lab.4.3.09lon>
- Luke, S. G. (2017). Evaluating significance in linear mixed-effects models in R. *Behavior Research Methods*, 49(4), 1494–1502. <https://doi.org/10.3758/s13428-016-0809-y>
- Lytra, V. (2012). Discursive constructions of language and identity: parents' competing perspectives in London Turkish complementary schools. *Journal of Multilingual and Multicultural Development*, 33(1), 85–100. <https://doi.org/10.1080/01434632.2011.638076>
- MacWhinney, B. (forthc). Attrition and the competition model. In S. M. S. Schmid & B. Köpke (Eds.), *The Oxford Handbook of Language Attrition*. Oxford: OUP.

- MacWhinney, B. (2000). *The CHILDES Project: Tools for Analyzing Talk* (3rd ed.). Mahwah NJ: Lawrence Erlbaum Associates.
- Malvern, D., Richards, B., Chipere, N., & Durán, P. (Eds.). (2004). *Lexical diversity and language development: quantification and assessment*. Basingstoke: Palgrave Macmillan.
- McCarthy, P. M., & Jarvis, S. (2007). vocd: A theoretical and empirical evaluation. *Language Testing*, 24(4), 459–488. <https://doi.org/10.1177/0265532207080767>
- McCarthy, P. M., & Jarvis, S. (2010). MTLT, vocd-D, and HD-D: A validation study of sophisticated approaches to lexical diversity assessment. *Behavior Research Methods*, 42(2), 381–392. <https://doi.org/10.3758/BRM.42.2.381>
- Meriç suyunun hapsettiği mahalle: Karaağaç. (2014, December 9). *Milliyet*. Retrieved from <http://www.milliyet.com.tr/meric-suyunun-hapsettigi-mahalle--gundem-1981678/>
- Mindell, J. A., Sadeh, A., Wiegand, B., How, T. H., & Goh, D. Y. T. (2010). Cross-cultural differences in infant and toddler sleep. *Sleep Medicine*, 11(3), 274–280. <https://doi.org/10.1016/j.sleep.2009.04.012>
- Montrul, S. (2002). Incomplete Acquisition and Attrition of Spanish Tense/Aspect Distinctions in Adult Bilinguals. *Bilingualism: Language and Cognition*, 5(1), 39–68.
- Montrul, S. (2004). Subject and object expression in Spanish heritage speakers: A case of morphosyntactic convergence. *Bilingualism: Language and Cognition*, 7(02), 125–142. <https://doi.org/10.1017/S1366728904001464>
- Montrul, S. (2008). *Incomplete Acquisition in Bilingualism: Re-examining the Age Factor*. John Benjamins Publishing.

- Montrul, S. (2009). Knowledge of tense-aspect and mood in Spanish heritage speakers. *International Journal of Bilingualism*, 13(2), 239–269. <https://doi.org/10.1177/1367006909339816>
- Montrul, S. (2010). Current Issues in Heritage Language Acquisition. *Annual Review of Applied Linguistics*, 30, 3–23. <https://doi.org/10.1017/S0267190510000103>
- Montrul, S. (2016a). Heritage language development: Connecting the dots. *International Journal of Bilingualism*, 1–17. <https://doi.org/10.1177/1367006916654368>
- Montrul, S. (2016b). *Language Attrition and Language Transmission*. Presented at the Third International Conference on Language Attrition (ICLA3), Colchester, UK. Retrieved from <https://languageattrition.org/conference-program/>
- Montrul, S. (2016c). *The acquisition of heritage languages*. Cambridge: Cambridge University Press.
- Montrul, S., Bhatt, R. M., & Bhatia, A. (2012). Erosion of case and agreement in Hindi heritage speakers. *Linguistic Approaches to Bilingualism*, 2(2), 141–176. <https://doi.org/10.1075/lab.2.2.02mon>
- Montrul, S., Davidson, J., Fuente, I. D. L., & Foote, R. (2014). Early language experience facilitates the processing of gender agreement in Spanish heritage speakers. *Bilingualism: Language and Cognition*, 17(1), 118–138. <https://doi.org/10.1017/S1366728913000114>
- Montrul, S., & Foote, R. (2014). Age of acquisition interactions in bilingual lexical access: A study of the weaker language of L2 learners and heritage speakers. *International Journal of Bilingualism*, 18(3), 274–303. <https://doi.org/10.1177/1367006912443431>

- Montrul, S., & Sánchez-Walker, N. (2013). Differential Object Marking in Child and Adult Spanish Heritage Speakers. *Language Acquisition*, 20(2), 109–132. <https://doi.org/10.1080/10489223.2013.766741>
- Muñoz, C., & Singleton, D. (2011). A critical review of age-related research on L2 ultimate attainment. *Language Teaching*, 44(1), 1–35. <https://doi.org/10.1017/S0261444810000327>
- Newport, E. L. (1990). Maturation Constraints on Language Learning. *Cognitive Science*, 14(1), 11–28. https://doi.org/10.1207/s15516709cog1401_2
- Oflazer, K., Say, B., Hakkani-Tür, D. Z., & Tür, G. (2003). Building a Turkish Treebank. In *Treebanks* (pp. 261–277). Springer, Dordrecht. https://doi.org/10.1007/978-94-010-0201-1_15
- O’Grady, W. (2008). The emergentist program. *Lingua*, 118(4), 447–464. <https://doi.org/10.1016/j.lingua.2006.12.001>
- O’Grady, W., Lee, M., & Choo, M. (2001). The Acquisition of Relative Clauses by Heritage and Non-Heritage Learners of Korean as a Second Language: A Comparative Study. *Journal of Korean Language Education*, 12, 283–294.
- O’Grady, W., Lee, O.-S., & Lee, J.-H. (2011). Practical and Theoretical Issues in the Study of Heritage Language Acquisition. *Heritage Language Journal*, 8(3), 23–40.
- Olds, T., Blunden, S., Petkov, J., & Forchino, F. (2010). The relationships between sex, age, geography and time in bed in adolescents: A meta-analysis of data from 23 countries. *Sleep Medicine Reviews*, 14(6), 371–378. <https://doi.org/10.1016/j.smr.2009.12.002>
- Olshtain, E., & Barzilay, M. (1991). Lexical retrieval difficulties in adult language attrition. In H. W. Seliger & R. M. Vago (Eds.), *First language attrition* (pp. 139–150). Cambridge: Cambridge University Press.

- Onar Valk, P., & Backus, A. (2013). Syntactic change in an immigrant language: from non-finite to finite subordinate clauses in Turkish. *Eesti Ja Soome-Ugri Keeleteaduse Ajakiri. Journal of Estonian and Finno-Ugric Linguistics*, 4(2), 7–29. <https://doi.org/10.12697/jeful.2013.4.2.01>
- Onar-Valk, P. (2015). *Transformation in Dutch Turkish subordination? : Converging evidence of change regarding finiteness and word order in complex clauses* (PhD thesis). Tilburg University, Utrecht. Retrieved from [https://pure.uvt.nl/portal/en/publications/transformation-in-dutch-turkish-subordination\(6fde9f98-96bf-4765-ad8d-53909dd72f68\).html](https://pure.uvt.nl/portal/en/publications/transformation-in-dutch-turkish-subordination(6fde9f98-96bf-4765-ad8d-53909dd72f68).html)
- Opitz, C. (2004). Language attrition and language acquisition in a second-language setting. *International Journal of Bilingualism*, 8(3), 395–398. <https://doi.org/10.1177/13670069040080030301>
- Özel, S. A., Bektaş, Y., & Yılmaz, H. (2016). Formulaicity in Turkish: Evidence from the Turkish National Corpus. *Mersin Üniversitesi Dil ve Edebiyat Dergisi MEUDED*, 13(2), 1–33.
- Ozturk, O., & Papafragou, A. (2008a). The Acquisition of Evidentiality and Source Monitoring. In *Proceedings from the 32nd Annual Boston University Conference on Language Development*. Somerville, MA: Cascadilla Press.
- Ozturk, O., & Papafragou, A. (2008b). The acquisition of evidentiality in Turkish. *University of Pennsylvania Working Papers in Linguistics*, 14(1), 297–309.
- Ozturk, O., & Papafragou, A. (2016). The Acquisition of Evidentiality and Source Monitoring. *Language Learning and Development*, 12(2), 199–230. <https://doi.org/10.1080/15475441.2015.1024834>
- Pallier, C. (2007). Critical periods in language acquisition and language attrition. In B. Köpcke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language Attrition*

- Theoretical Perspectives* (Vol. 33, pp. 155–168). Amsterdam/Philadelphia: John Benjamins.
- Pallier, C., Dehaene, S., Poline, J.-B., LeBihan, D., Argenti, A.-M., Dupoux, E., & Mehler, J. (2003). Brain Imaging of Language Plasticity in Adopted Adults: Can a Second Language Replace the First? *Cerebral Cortex*, *13*(2), 155–161. <https://doi.org/10.1093/cercor/13.2.155>
- Paradis, J. (2011). Individual differences in child English second language acquisition: Comparing child-internal and child-external factors. *Linguistic Approaches to Bilingualism*, *1*(3), 213–237. <https://doi.org/10.1075/lab.1.3.01par>
- Paradis, J., & Genesee, F. (1996). Syntactic Acquisition in Bilingual Children. *Studies in Second Language Acquisition*, *18*(01), 1–25. <https://doi.org/10.1017/S0272263100014662>
- Paradis, M. (2007). L1 attrition features predicted by a neurolinguistic theory of bilingualism. In B. Köpcke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language Attrition Theoretical Perspectives* (Vol. 33, pp. 121–134). Amsterdam/Philadelphia: John Benjamins.
- Pascual y Cabo, D. (2013). *Agreement reflexes of emerging optionality in heritage speaker Spanish* (Ph.D.). Ann Arbor, United States. Retrieved from <http://search.proquest.com/docview/1521060739/abstract/BE4FD3FCCBB64266PQ/1>
- Pascual y Cabo, D., & Gómez Soler, I. (2015). Preposition Stranding in Spanish as a Heritage Language. *Heritage Language Journal*, *12*(2), 186–209.
- Pascual y Cabo, D., & Rothman, J. (2012). The (Il)logical Problem of Heritage Speaker Bilingualism and Incomplete Acquisition. *Applied Linguistics*, *33*(4), 450–455. <https://doi.org/10.1093/applin/ams037>

- Pelc, L. (2001). *L1 lexical, morphological and morphosyntactic attrition in Greek-English bilinguals*.
- Pérez Leroux, A. T., Cuza, A., & Thomas, D. (2011). From parental attitudes to input conditions: A look at Spanish-English bilingual development in Toronto. In K. Potowski & J. Rothman (Eds.), *Bilingual youth: Spanish in English-speaking societies* (pp. 149–176). John Benjamins Publishing.
- Pfaff, C. W. (1991). Turkish in contact with German: Language maintenance and loss among Immigrant children in Berlin (West). *International Journal of the Sociology of Language*, 1991(90), 97–129.
- Pfaff, C. W. (1993). Turkish Language Development in Germany. In G. Extra & L. T. Verhoeven (Eds.), *Immigrant Languages in Europe* (pp. 119–146). Multilingual Matters.
- Pierce, L. J., Klein, D., Chen, J.-K., Delcenserie, A., & Genesee, F. (2014). Mapping the unconscious maintenance of a lost first language. *Proceedings of the National Academy of Sciences*, 111(48), 17314–17319.
<https://doi.org/10.1073/pnas.1409411111>
- Pires, A., & Rothman, J. (2009). Disentangling sources of incomplete acquisition: An explanation for competence divergence across heritage grammars. *International Journal of Bilingualism*, 13(2), 211–238.
<https://doi.org/10.1177/1367006909339806>
- Polinsky, M. (2005). Word Class Distinctions in an Incomplete Grammar. In *Perspectives on Language and Language Development* (pp. 419–434). Springer, Boston, MA.
https://doi.org/10.1007/1-4020-7911-7_30
- Polinsky, M. (2006). Incomplete Acquisition: American Russian. *Journal of Slavic Linguistics*, 14(2), 191–262.

- Polinsky, M. (2008). Gender under Incomplete Acquisition: Heritage Speakers' Knowledge of Noun Categorization. *Heritage Language Journal*, 6(1), 40–71.
- Polinsky, M. (2011). Reanalysis in adult heritage language. *Studies in Second Language Acquisition*, 33(Special Issue 02), 305–328. <https://doi.org/10.1017/S027226311000077X>
- Polinsky, M. (2015). Heritage languages and their speakers: state of the field, challenges, perspectives for future work, and methodologies. *Zeitschrift Für Fremdsprachenforschung*, 26(1), 7–27.
- Prescher, P. (2007). Identity, immigration and first language attrition. In B. Köpcke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language Attrition Theoretical Perspectives* (Vol. 33, pp. 189–204). Amsterdam/Philadelphia: John Benjamins.
- Putnam, M. T., & Sánchez, L. (2013). What's so incomplete about incomplete acquisition?: A prolegomenon to modeling heritage language grammars. *Linguistic Approaches to Bilingualism*, 3(4), 478–508. <https://doi.org/10.1075/lab.3.4.04put>
- R Core Team. (2016). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. Vienna Austria. Retrieved from <https://www.R-project.org/>.
- Rakhilina, E., Vyrenkova, A., & Polinsky, M. (2016). Linguistic creativity in heritage speakers. *Glossa: A Journal of General Linguistics*, 1(1), 1–29. <http://www.glossa-journal.org/articles/abstract/10.5334/gjgl.90/>
- Rothman, J. (2007). Heritage speaker competence differences, language change, and input type: Inflected infinitives in Heritage Brazilian Portuguese. *International Journal of Bilingualism*, 11(4), 359–389.

- Rothman, J. (2009). Understanding the nature and outcomes of early bilingualism: Romance languages as heritage languages. *International Journal of Bilingualism*, 13(2), 155–163. <https://doi.org/10.1177/1367006909339814>
- Rothman, J., & Treffers-Daller, J. (2014). A Prolegomenon to the Construct of the Native Speaker: Heritage Speaker Bilinguals are Natives Too! *Applied Linguistics*, 35(1), 93–98. <https://doi.org/10.1093/applin/amt049>
- Sak, H., Güngör, T., & Saraçlar, M. (2008). Turkish language resources: Morphological parser, morphological disambiguator and web corpus. In B. Nordström & A. Ranta (Eds.), *Advances in natural language processing GoTAL 2008* (2008 ed., Vol. 5221, pp. 417–427). Berlin, Germany: Springer. Retrieved from http://link.springer.com/chapter/10.1007/978-3-540-85287-2_40
- Sak, H., Güngör, T., & Saraçlar, M. (2009). A stochastic finite-state morphological parser for Turkish. In *Proceedings of the ACL-IJCNLP 2009 Conference short papers* (pp. 273–276). Suntec Singapore: Association for Computational Linguistics. Retrieved from <http://dl.acm.org/citation.cfm?id=1667667>
- Salt, J. (2015). *International Migration and the United Kingdom* (Report of the United Kingdom SOPEMI Correspondent to the OECD) (pp. 1–142). London: University College London Migration Research Center. Retrieved from <http://www.geog.ucl.ac.uk/research/research-centres/migration-research-unit>
- Sánchez, L. (2004). Functional convergence in the tense, evidentiality and aspectual systems of Quechua Spanish bilinguals. *Bilingualism: Language and Cognition*, 7(02), 147–162. <https://doi.org/10.1017/S136672890400149X>
- Saygın, A. P. (2011). A Computational Analysis of Interaction Patterns in the Acquisition of Turkish. *Research on Language and Computation*, 8(4), 239–253. <https://doi.org/10.1007/s11168-011-9072-7>

- Schaufeli, A. (1993). Turkish Language Development in the Netherlands. In G. Extra & L. T. Verhoeven (Eds.), *Immigrant Languages in Europe* (pp. 147–179). Multilingual Matters.
- Scheele, A. F., Leseman, P. P. M., & Mayo, A. Y. (2010). The home language environment of monolingual and bilingual children and their language proficiency. *Applied Psycholinguistics*, 31(01), 117–140. <https://doi.org/10.1017/S0142716409990191>
- Schmid, M. S. (2002). *First Language Attrition, Use and Maintenance : The Case of German Jews in Anglophone Countries*. Amsterdam: J. Benjamins Pub.
- Schmid, M. S. (2004). A new blueprint for language attrition research. In M. S. Schmid, B. Köpke, M. Keijzer, & L. Weilemar (Eds.), *First Language Attrition interdisciplinary perspectives on methodological issues* (Vol. 28, pp. 349–364). Amsterdam/Philadelphia: John Benjamins.
- Schmid, M. S. (2007). The Role of L1 Use for L1 Attrition. In B. Köpke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language Attrition Theoretical Perspectives* (Vol. 33, pp. 135–153). Amsterdam/Philadelphia: John Benjamins.
- Schmid, M. S. (2008). Defining language attrition. *Babylonia*, 2(08), 9–12.
- Schmid, M. S. (2010). Languages at play: The relevance of L1 attrition to the study of bilingualism. *Bilingualism: Language and Cognition*, 13(1), 1–7. <https://doi.org/10.1017/S1366728909990368>
- Schmid, M. S. (2011). *Language attrition*. Cambridge: Cambridge University Press.
- Schmid, M. S. (2012). The impact of age and exposure on bilingual development in international adoptees and family migrants: A perspective from Holocaust survivors. *Linguistic Approaches to Bilingualism*, 2(2), 177–208. <https://doi.org/10.1075/lab.2.2.03sch>

- Schmid, M. S. (2013). First language attrition. *Wiley Interdisciplinary Reviews: Cognitive Science*, 4(2), 117–123. <https://doi.org/10.1002/wcs.1218>
- Schmid, M. S. (2014). The Debate on Maturation Constraints in Bilingual Development: A Perspective from First-Language Attrition. *Language Acquisition*, 21(4), 386–410. <https://doi.org/10.1080/10489223.2014.892947>
- Schmid, M. S. (2016). How does age of onset affect attrition in bilinguals? Presented at the Heritage Language Acquisition: Breaking New Ground in Methodology and Domains of Inquiry, Tromsø, Norway.
- Schmid, M. S., & Dusseldorp, E. (2010). Quantitative analyses in a multivariate study of language attrition: the impact of extralinguistic factors. *Second Language Research*, 26(1), 125–160. <https://doi.org/10.1177/0267658309337641>
- Schmid, M. S., & Fägersten, K. B. (2010). Disfluency Markers in L1 Attrition. *Language Learning*, 60(4), 753–791. <https://doi.org/10.1111/j.1467-9922.2010.00575.x>
- Schmid, M. S., & Hopp, H. (2014). Comparing foreign accent in L1 attrition and L2 acquisition: Range and rater effects. *Language Testing*, 31(3), 367–388. <https://doi.org/10.1177/0265532214526175>
- Schmid, M. S., & Jarvis, S. (2014). Lexical access and lexical diversity in first language attrition. *Bilingualism: Language and Cognition*, 17(04), 729–748. <https://doi.org/10.1017/S1366728913000771>
- Schmid, M. S., & Köpcke, B. (2007). Bilingualism and Attrition. In B. Köpcke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language Attrition Theoretical Perspectives* (Vol. 33, pp. 1–8). Amsterdam/Philadelphia: John Benjamins.
- Schmid, M. S., & Köpcke, B. (2009). L1 Attrition and the Mental Lexicon. In A. Pavlenko (Ed.), *The bilingual mental lexicon: interdisciplinary approaches* (pp. 209–238). Bristol: Multilingual Matters.

- Schmid, M. S., & Köpke, B. (2017). The relevance of first language attrition to theories of bilingual development. *Linguistic Approaches to Bilingualism*.
<https://doi.org/10.1075/lab.17058.sch>
- Schmid, M. S., Köpke, B., & Bot, K. de. (2012). Invited contribution: Language attrition as a complex, non-linear development. *International Journal of Bilingualism*, 1367006912454619. <https://doi.org/10.1177/1367006912454619>
- Schmid, M. S., Köpke, B., & Bot, K. de. (2013). Language attrition as a complex, non-linear development. *International Journal of Bilingualism*, 17(6), 675–682.
<https://doi.org/10.1177/1367006912454619>
- Schmid, M. S., Köpke, B., Keijzer, M., & Weilemar, L. (Eds.). (2004). *First Language Attrition interdisciplinary perspectives on methodological issues* (Vol. 28). Amsterdam/Philadelphia: John Benjamins.
- Schmitt, E. (2004). No more reductions!- To the problem of evaluation of language attrition data. In M. S. Schmid, B. Köpke, M. Keijzer, & L. Weilemar (Eds.), *First Language Attrition interdisciplinary perspectives on methodological issues* (Vol. 28, pp. 299–316). Amsterdam/Philadelphia: John Benjamins.
- Schmitt, E. (2010). When boundaries are crossed: Evaluating language attrition data from two perspectives. *Bilingualism: Language and Cognition*, 13(Special Issue 01), 63–72. <https://doi.org/10.1017/S1366728909990381>
- Schmitt, E. (2016). The role of L1 literacy in language maintenance among immigrant adolescence. Presented at the Third International Conference on Language Attrition (ICLA3), Colchester, UK.
- Schroeder, C. (2000). Between resultative, historical and inferential:non-finite -mİş forms in Turkish. In B. Utas & L. Johanson (Eds.), *Evidentials: Turkic, Iranian and Neighbouring Languages* (pp. 115–143). Berlin, Boston: DE GRUYTER. Retrieved

from

<http://www.degruyter.com/view/books/9783110805284/9783110805284.15/9783110805284.15.xml>

Seliger, H. W. (1991). Language attrition, reduced redundancy, and creativity. In Herbert W. Seliger & R. M. Vago (Eds.), *First language attrition* (pp. 227–240). Cambridge: Cambridge University Press.

Seliger, H. W., & Vago, R. M. (1991). The study of first language attrition: An overview. In H. W. Seliger & R. M. Vago (Eds.), *First language attrition* (pp. 3–16). Cambridge: Cambridge University Press.

Şener, N. (2011). *Semantics and Pragmatics of Evidentials in Turkish* (Ph.D.). Ann Arbor, United States. Retrieved from <http://search.proquest.com/docview/909527119/abstract?accountid=13014>

Sezer, E. (2001). Finite Inflection in Turkish. In E. Erguvanlı-Taylan (Ed.), *The Verb in Turkish* (Vol. 44, pp. 1–45). Amsterdam/Philadelphia: John Benjamins.

Sezer, T., & Sever Sezer, B. (2013). TS Corpus: Herkes için Türkçe Derlem. In *Proceedings of the 27th National Linguistics Conference* (pp. 217–225). Retrieved from https://www.researchgate.net/publication/263973811_TS_Corpus_Herkes_icin_Turkce_Derlem

Sharwood Smith, M. S., & Van Buren, P. (1991). First language attrition and the parameter setting model. In H. W. Seliger & R. M. Vago (Eds.), *First language attrition* (pp. 17–30). Cambridge: Cambridge University Press.

Silva-Corvalán, C. (1994). The gradual loss of mood distinctions in Los Angeles Spanish. *Language Variation and Change*, 6(03), 255–272. <https://doi.org/10.1017/S095439450000168X>

- Silva-Corvalán, C. (2016). Simultaneous bilingualism: Early developments, incomplete later outcomes? *International Journal of Bilingualism*, 1367006916652061. <https://doi.org/10.1177/1367006916652061>
- Slobin, D. I. (1986). The acquisition and use of relative clauses in Turkic and Indo European languages. In D. I. Slobin & K. Zimmer (Eds.), *Studies in Turkish linguistics* (pp. 273–294). Amsterdam; Philadelphia: J. Benjamins Pub. Co. Retrieved from <http://site.ebrary.com/lib/universityofessex/Doc?id=10509647>
- Slobin, D. I. (2001). Form-function relations: How do children find out what they are? In M. Bowerman & S. C. Levinson (Eds.), *Language Acquisition and Conceptual Development* (pp. 406–449). Cambridge University Press.
- Slobin, D. I., & Aksu, A. (1982). Tense, Aspect, And Modality in the Use of the Turkish Evidential. In P. J. Hopper (Ed.), *Tense-aspect: Between Semantics & Pragmatics : Containing the Contributions to a Symposium on Tense and Aspect, Held at UCLA, May 1979* (pp. 185–200). Amsterdam: John Benjamins Publishing.
- Sorace. (2011). Pinning down the concept of “interface” in bilingualism. *Linguistic Approaches to Bilingualism*, 1(1), 1–33. <https://doi.org/10.1075/lab.1.1.01sor>
- Sorace, A. (2000). Syntactic optionality in non-native grammars. *Second Language Research*, 16(2), 93–102.
- Sorace, A. (2014). Input, timing, and outcomes in a wider model of bilingualism. *Linguistic Approaches to Bilingualism*, 4(3), 377–380. <https://doi.org/10.1075/lab.4.3.14sor>
- Stangen, I., Kupisch, T., Proietti Ergün, A. L., & Zielke, M. (2015). Foreign accent in heritage speakers of Turkish in Germany. In H. Peukert (Ed.), *Transfer effects in multilingual language development* (pp. 87–107). Amsterdam: John Benjamins Publishing Company.

- Steinkrauss, R., & Lahmann, C. (2014). Transcription Guidelines: main tier. University of Groningen. Retrieved from <http://www.let.rug.nl/languageattrition/Codingfreespeech/GuidelinesTranscription.pdf>
- Steinkrauss, R., Lahmann, C., & Schmid, S. M. (2016). L1 attrition: accuracy and age of emigration. Presented at the Third International Conference on Language Attrition (ICLA3), Colchester, UK.
- Stoehr, A., Benders, T., van Hell, J. G., & Fikkert, P. (2017). Second language attainment and first language attrition: The case of VOT in immersed Dutch–German late bilinguals. *Second Language Research*, 33(4), 483–518. <https://doi.org/10.1177/0267658317704261>
- Tafolar, M. (2014, December 1). CHP, Yalova'daki ağaç kesimini incelemeye aldı. *Milliyet*. Retrieved from <http://www.milliyet.com.tr/chp-yalova-daki-agac-kesimini-gundem-1977458/>
- Tez, M. (2014). Sevimli hayvan resimleri paylaşmanın yan etkileri. *Milliyet*. Retrieved from <http://www.milliyet.com.tr/sevimli-hayvan-resimleri/mehmet-tez/pazar/yazardetay/26.10.2014/1960137/default.htm>
- The “Five Graces Group,” Beckner, C., Blythe, R., Bybee, J., Christiansen, M. H., Croft, W., Schoenemann, T. (2009). Language Is a Complex Adaptive System: Position Paper. *Language Learning*, 59, 1–26. <https://doi.org/10.1111/j.1467-9922.2009.00533.x>
- Tomasello, Michael. (2003). *Constructing a language: a usage-based theory of language acquisition*. Cambridge, Mass: Harvard University Press.
- Treffers-Daller, J., Daller, M., Furman, R., & Rothman, J. (2016). Ultimate attainment in the use of collocations among heritage speakers of Turkish in Germany and Turkish–

- German returnees. *Bilingualism: Language and Cognition*, 19(3), 504–519.
<https://doi.org/10.1017/S1366728915000139>
- Treffers-Daller, J., Ozsoy, A. S., & van Hout, R. (2007). (In)Complete Acquisition of Turkish among Turkish-German Bilinguals in Germany and Turkey: An Analysis of Complex Embeddings in Narratives. *International Journal of Bilingual Education and Bilingualism*, 10(3), 248–276. <https://doi.org/10.2167/beb443.0>
- Tsimpli, I. M. (2014). Early, late or very late: Timing acquisition and bilingualism: A reply to peer commentaries. *Linguistic Approaches to Bilingualism*, 4(3), 393–402.
<https://doi.org/10.1075/lab.4.3.17tsi>
- Tsimpli, I. M., Sorace, A., Heycock, C., & Filiaci, F. (2004). First language attrition and syntactic subjects: A study of Greek and Italian near-native speakers of English. *International Journal of Bilingualism*, 8(3), 257–277.
<https://doi.org/10.1177/13670069040080030601>
- Turian, D., & Altenberg, E. P. (1991). Compensatory strategies of child first language attrition. In H. W. Seliger & R. M. Vago (Eds.), *First language attrition* (pp. 207–226). Cambridge: Cambridge University Press.
- Ünal, E., & Papafragou, A. (2013). Linguistic and Conceptual Representations of Inference as a Knowledge Source. In *37th Annual Boston University Conference on Language Development*. Boston MA: Cascadilla Press.
- Ünal, E., & Papafragou, A. (2016). Production–comprehension asymmetries and the acquisition of evidential morphology. *Journal of Memory and Language*, 89, 179–199. <https://doi.org/10.1016/j.jml.2015.12.001>
- Unsworth, S. (2013). Assessing the role of current and cumulative exposure in simultaneous bilingual acquisition: The case of Dutch gender. *Bilingualism: Language and Cognition*, 16(01), 86–110. <https://doi.org/10.1017/S1366728912000284>

- Unsworth, S. (2016). *Bilingual Language Exposure Calculator (BILEC)* (Manual). Radboud University. Retrieved from <https://www.iris-database.org>
- Unsworth, S., Argyri, F., Cornips, L., Hulk, A., Sorace, A., & Tsimpli, I. (2014). The role of age of onset and input in early child bilingualism in Greek and Dutch. *Applied Psycholinguistics*, 35(04), 765–805. <https://doi.org/10.1017/S0142716412000574>
- Uyar, M. (2014). Doğru beslenin, iyi uyuyun, egzersiz yapın! *Milliyet*. Retrieved from <http://www.milliyet.com.tr/dogru-beslenin-iyi-uyuyun-/metin-uyar/cumartesi/yazardetay/11.10.2014/1952830/default.htm>
- van Osch, B., & Sleeman, P. (2016). Spanish heritage speakers in the Netherlands: Linguistic patterns in the judgment and production of mood. *International Journal of Bilingualism*, 1367006916654365. <https://doi.org/10.1177/1367006916654365>
- Ventureyra, V. A. G., Pallier, C., & Yoo, H.-Y. (2004). The loss of first language phonetic perception in adopted Koreans. *Journal of Neurolinguistics*, 17(1), 79–91. [https://doi.org/10.1016/S0911-6044\(03\)00053-8](https://doi.org/10.1016/S0911-6044(03)00053-8)
- Verhoeven, L. (2004). Bilingualism and narrative construction. In S. Strömquist & L. Verhoeven (Eds.), *Relating events in narrative: Typological and contextual perspectives* (pp. 435–454). Mahwah, NJ: Lawrence Erlbaum Associates. Retrieved from <http://repository.uibn.ru.nl/handle/2066/63895>
- Veríssimo, J., Heyer, V., Jacob, G., & Clahsen, H. (2017). Selective Effects of Age of Acquisition on Morphological Priming: Evidence for a Sensitive Period. *Language Acquisition*, 0(0), 1–12. <https://doi.org/10.1080/10489223.2017.1346104>
- Wright, C., & Bayram, F. (2016). The future for teaching community languages- a research perspective. *The ESOL Journal, Language Issues*, 92–94.

- Wright, S., & Kurtoğlu-Hooton, N. (2006). Language maintenance: the case of a Turkish-speaking community in Birmingham. *International Journal of the Sociology of Language*, 2006(181), 43–56. <https://doi.org/10.1515/IJSL.2006.050>
- Wurm, L. H., & Fisičaro, S. A. (2014). What residualizing predictors in regression analyses does (and what it does not do). *Journal of Memory and Language*, 72(Supplement C), 37–48. <https://doi.org/10.1016/j.jml.2013.12.003>
- Xanthos, A., Laaha, S., Gillis, S., Stephany, U., Aksu-Koç, A., Christofidou, A., ... Dressler, W. U. (2011). On the role of morphological richness in the early development of noun and verb inflection. *First Language*, 31(4), 461–479. <https://doi.org/10.1177/0142723711409976>
- Xi, X., & Mollaun, P. (2011). Using Raters From India to Score a Large-Scale Speaking Test. *Language Learning*, 61(4), 1222–1255. <https://doi.org/10.1111/j.1467-9922.2011.00667.x>
- Yağmur, K. (1997). *First language attrition among Turkish speakers in Sydney. ?*
- Yağmur, K. (2009). Language use and ethnolinguistic vitality of Turkish compared with the Dutch in the Netherlands. *Journal of Multilingual and Multicultural Development*, 30(3), 219–233. <https://doi.org/10.1080/01434630802369445>
- Yağmur, K., & Akıncı, M.-A. (2003). Language use, choice, maintenance, and ethnolinguistic vitality of Turkish speakers in France: intergenerational differences. *International Journal of the Sociology of Language*, 2003(164), 107–128.
- Yağmur, K., Bot, K. D., & Korzilius, H. (1999). Language Attrition, Language Shift and Ethnolinguistic Vitality of Turkish in Australia. *Journal of Multilingual and Multicultural Development*, 20(1), 51–69. <https://doi.org/10.1080/01434639908666369>

- Yeni-Komshian, G. H., Flege, J. E., & Liu, S. (2000). Pronunciation proficiency in the first and second languages of Korean–English bilinguals. *Bilingualism: Language and Cognition*, 3(02), 131–149. <https://doi.org/null>
- Yılmaz, G. (2011). Complex embeddings in free speech production among late Turkish-Dutch bilinguals. *Language, Interaction and Acquisition*, 2(2), 251–275. <https://doi.org/10.1075/lia.2.2.04yil>
- Yılmaz, G. (2013). *Bilingual Language Development among the First Generation Turkish Immigrants in the Netherlands*. University of Groningen, Groningen. Retrieved from <http://www.let.rug.nl/languageattrition/Papers/Yilmaz%20dissertation%202013.pdf>
- Yılmaz, G., & Schmid, M. S. (2012). L1 accessibility among Turkish-Dutch bilinguals. *The Mental Lexicon*, 7(3), 249–274. <https://doi.org/10.1075/ml.7.3.01yil>
- Young, R. (1995). Conversational Styles in Language Proficiency Interviews. *Language Learning*, 45(1), 3–42. <https://doi.org/10.1111/j.1467-1770.1995.tb00961.x>
- Yürürken üzerine duvar yıkıldı. (2014, November 28). *Hürriyet*. Retrieved from <http://www.hurriyet.com.tr/yururken-uzerine-duvar-yikildi-27671396>
- Zaretsky, E., & Bar-Shalom, E. G. (2007). Is selective attrition possible in Russian-English bilinguals? In *BUCLD Online Proceedings Supplement* (Vol. 32).

Appendix 1 Ethical approval to work with human participants



University of Essex

Application for Ethical Approval of Research Involving Human Participants

This application form should be completed for any research involving human participants conducted in or by the University. 'Human participants' are defined as including living human beings, human beings who have recently died (cadavers, human remains and body parts), embryos and foetuses, human tissue and bodily fluids, and human data and records (such as, but not restricted to medical, genetic, financial, personnel, criminal or administrative records and test results including scholastic achievements). Research should not commence until written approval has been received (from Departmental Research Director, Faculty Ethics Committee (FEC) or the University's Ethics Committee). This should be borne in mind when setting a start date for the project.

Applications should be made on this form, and submitted electronically, to your Departmental Research Director. A signed copy of the form should also be submitted. Applications will be assessed by the Research Director in the first instance, and may then passed to the FEC, and then to the University's Ethics Committee. A copy of your research proposal and any necessary supporting documentation (e.g. consent form, recruiting materials, etc) should also be attached to this form.

A full copy of the signed application will be retained by the department/school for 6 years following completion of the project. The signed application form cover sheet (two pages) will be sent to the Research Governance and Planning Manager in the REO as Secretary of the University's Ethics Committee.

1.

Title of project: Turkish spoken as an immigrant and a heritage language in the UK
--

2. The title of your project will be published in the minutes of the University Ethics Committee. If you object, then a reference number will be used in place of the title.
Do you object to the title of your project being published? Yes / No

3. This Project is: Staff Research Project Student Project

4. Principal Investigator(s) (students should also include the name of their supervisor):

Name:	Department:
Tugba Karayayla	Language and Linguistics
Monika Schmid	Language and Linguistics

5.

Proposed start date: 25.10.2014
--

6.

Probable duration: 31.03.2016

7. Will this project be externally funded? Yes / No
If Yes,

8.

What is the source of the funding?
Turkish government PhD grant

9. If external approval for this research has been given, then only this cover sheet needs to be submitted
External ethics approval obtained (attach evidence of approval) Yes / No

Declaration of Principal Investigator:

The information contained in this application, including any accompanying information, is, to the best of my knowledge, complete and correct. I/we have read the University's *Guidelines for Ethical Approval of Research Involving Human Participants* and accept responsibility for the conduct of the procedures set out in this application in accordance with the guidelines, the University's *Statement on Safeguarding Good Scientific Practice* and any other conditions laid down by the University's Ethics Committee. I/we have attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my/our obligations and the rights of the participants.

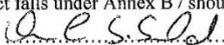
Signature(s): 

Name(s) in block capitals: TUGBA KARAYAYLA

Date: 10.2014

Supervisor's recommendation (Student Projects only):

I recommend that this project falls under Annex B / should be referred to the FEC (delete as appropriate).

Supervisor's signature: 

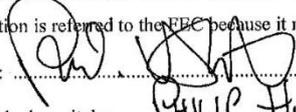
Outcome:

The Departmental Director of Research (DoR) has reviewed this project and considers the methodological/technical aspects of the proposal to be appropriate to the tasks proposed. The DoR considers that the investigator(s) has/have the necessary qualifications, experience and facilities to conduct the research set out in this application, and to deal with any emergencies and contingencies that may arise.

This application falls under Annex B and is approved on behalf of the FEC

This application is referred to the FEC because it does not fall under Annex B

This application is referred to the FEC because it requires independent scrutiny

Signature(s): 

Name(s) in block capitals: PHILIP Hofmeister

Department: LANS & UNB

Date: 28/10/2014

The application has been approved by the FEC

The application has not been approved by the FEC

The application is referred to the University Ethics Committee

Signature(s):

Name(s) in block capitals:

Faculty:

Appendix 2 Ethical approval to recruit judges

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
 APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
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Sayı: 28520816/224 6 Mayıs 2015

Gönderilen: Tuğba Karayayla
 Essex Üniversitesi Dil ve Dİblimi Bölümü

Gönderen : Prof. Dr. Canan Sümer 
 İAK Başkan Vekili

İlgili : Etik Onayı

"İngilterede'de Konuşulan Türkçe (Turkish spoken as an immigrant and a heritage language in the UK)" isimli araştırmanız "İnsan Araştırmaları Komitesi" tarafından uygun görülerek gerekli onay vermiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı
 Uygundur
 06/05/2015


 Prof.Dr. Canan Sümer
 Uygulamalı Etik Araştırma Merkezi
 (UEAM) Başkan Vekili
 ODTÜ 06531 ANKARA

Translation:

Your research study entitled "Turkish spoken as an immigrant and heritage language in the UK" has been considered by the 'Human Research Committee' and the necessary approval has been given.

Appendix 3 Participant Information Sheet and Consent Form

Project: Turkish spoken in the UK

What is the project about?

My name is Tuğba Karayayla, a PhD student at the University of Essex in the Department of Language and Linguistics. I work with Prof Monika Schmid who is the supervisor of the project. The project is about the change in the Turkish language spoken in the UK by the Turkish immigrants and their adult children. It has long been established by linguistic science that all human languages are undergoing a constant process of change. For many languages, this change has been speeded up considerably over the past years by technological innovations such as the internet. We investigate this in the Turkish language. Thank you for your help and participation.

What does participation involve?

Participation in the project requires you to complete the tests mentioned below.

Sociolinguistic questionnaire: You are expected to answer background information questions like your language development, your arrival date to the UK, your age, the importance of maintaining and speaking Turkish, how often you speak Turkish and with who, other known foreign languages, your educational background and so on.

C-Test in English and Turkish: In this task, you are expected to fill in the gaps in the English and Turkish texts given to you based on the context.

Verbal fluency task: In this task, you will be asked to name as many words that start with specific letters as possible in the allocated time of 60 seconds. Additionally, you will be asked to name as many animals as possible again in 60 seconds.

Semi-structured interview: In this interview, you are expected to respond to questions that ask your views on and experiences of daily topics.

Picture description task: You are expected to describe the pictures given to you and tell the researcher the event depicted in the pictures.

Sentence completion task: You are expected complete some sentences based on the videos, pictures, and audio clips provided.

The verbal fluency task, semi-structured interview and picture description task will be audio-recorded. In total, participation will take about 1.5 hours.

Please tick the appropriate boxes **Yes** **No**

Taking Part

I have read and understood the project information given above.

I have been given the opportunity to ask questions about the project.

I agree to take part in the project. Taking part in the project will include being interviewed and audio-recorded.

I understand that my taking part is voluntary; I can withdraw from the study at any time and I do not have to give any reasons for why I no longer want to take part.

Use of the information I provide for this project only

I understand my personal details such as name, email address and phone number will not be revealed to people outside the project.

I understand that my words may be quoted in publications, reports, web pages, and other research outputs.

Use of the information I provide beyond this project

I agree for the data I provide to be archived at the UK Data Archive.

I understand that other genuine researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.

I understand that other genuine researchers may use my words in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.

Name of participant [printed] Signature Date

Researcher [printed] Signature Date

Project contact details for further information:

Researcher's name: [Tuğba Karayayla]

Email: [tkaray@essex.ac.uk]

Researcher's name: [Monika S. Schmid]

Email: [mschmid@essex.ac.uk]

Appendix 4 Katılımcılar için bilgi ve izin formu

Proje: İngiltere’de konuşulan Türkçe

Proje ne hakkında?

İsmim Tuğba Karayayla. Essex Üniversitesi Dil ve Dilbilimi bölümünde doktora yapıyorum. Prof. Dr. Monika Schmid ve benim tarafımdan yürütülen bu proje İngiltere’de yaşayan Türk göçmenleri ile İngiltere’de doğup büyümüş şu an 18 yaş üzerinde olan Türk asıllı bireyler tarafından konuşulan Türkçe ile ilgilidir. Bilindiği gibi son yıllarda yaşanan teknolojik gelişmeler, internet v.s. günlük konuşma dilinde değişikliklere yol açmaya başlamıştır. Bazı diller için bu değişim diğer dillere göre daha da hızlı seyretmektedir. Biz de bu değişimi Türkçe dilinde incelemek istiyoruz. Yardımlarınız ve katılımınız için çok teşekkür ediyoruz.

Katılımınız ne gerektiriyor?

Projeye katılım aşağıda adı geçen testleri tamamlamanızı gerektirmektedir.

Sosyolinguistik anket: Bu ankette sizi tanımaya yönelik olan dil gelişiminiz, buraya geliş tarihiniz, yaşınız, Türkçe'ye verdiğiniz önem, Türkçe'yi kimlerle ne sıklıkta konuştuğunuz, bildiğiniz başka diller, eğitim geçmişiniz v.s. gibi sorulara yanıt vermeniz gerekmektedir.

Türkçe ve İngilizce boşluk doldurma testi: Bu testte, size verilecek olan İngilizce ve Türkçe metinlerdeki boşlukları parçanın anlamına göre doldurmanız beklenmektedir.

Akıcılık testi: Bu testte sizlere 60 saniye içinde belli harflerle başlayan olabildiğince çok kelime üretmeniz ve buna ek olarak yine 60 saniye içinde sayabildiğiniz kadar çok hayvan ismi söylemeniz istenmektedir.

Sohbet: Bu görüşmede size günlük bazı konulardaki düşünceleriniz ve deneyimleriniz ile ilgili yöneltilecek olan sorulara sohbet eder gibi yanıt vermeniz beklenmektedir.

Resim betimleme: Bu testte sizlere verilen resimleri betimlemeniz ve resimlerdeki olayı anlatmanız istenmektedir.

Cümle tamamlama: Bu testte sizlere gösterilen video, ses klipleri ve resimlere bakarak verilen cümleleri tamamlamanız beklenmektedir.

Akıcılık testi, sohbet ve resim betimleme testlerinde ses kaydı yapılacak olup deneyin yaklaşık tamamlanma süresi 1.5 saattir.

Lütfen uygun kutucuğu işaretleyiniz.

Katılım	EVET	HAYIR
Proje hakkında verilen bilgiyi okudum ve anladım.	<input type="checkbox"/>	<input type="checkbox"/>
Araştırmacıya proje ile ilgili sormak istediklerim olur ise rahatlıkla sorabilirim.	<input type="checkbox"/>	<input type="checkbox"/>
Projeye katılmayı kabul ediyorum. Yukarıda belirtilen testlerde sesimin kaydedileceğini biliyorum.	<input type="checkbox"/>	<input type="checkbox"/>
Katılımımın gönüllülük esasına dayalı olduğunu, herhangi bir neden vermeksizin projeden istediğim zaman çekilebileceğimi biliyorum.	<input type="checkbox"/>	<input type="checkbox"/>
Verilen bilgilerin bu proje için kullanımı		
Tarafıma ait isim, e-mail adresi, telefon gibi özel bilgilerin proje dışında kişilerle paylaşılmayacağını biliyorum.	<input type="checkbox"/>	<input type="checkbox"/>
Kullandığım cümlelerin ve kelimelerin farklı web sayfaları, dergi yayınları ve proje raporlarında yer alabileceğinin farkındayım.	<input type="checkbox"/>	<input type="checkbox"/>
Verilen bilgilerin bu proje dışında kullanımı		
Sağladığım dil verilerinin UK data arşivinde arşivlenmesini kabul ediyorum.	<input type="checkbox"/>	<input type="checkbox"/>
Kişisel bilgilerimin gizliliğini korumak şartıyla, başka araştırmacıların da sağladığım dil verisine erişim hakkına sahip olacağımı biliyorum	<input type="checkbox"/>	<input type="checkbox"/>

Diğer arařtırmacıların verdiđim kiřisel bilgilerin gizliliđini korumak řartı
ile bana ait dil verisini çeřitli rapor, arařtırma makalesi ya da çeřitli web
sayfalarında yayınlatabileceđini biliyorum

_____	_____	_____
Katılımcının ismi	İmza	Tarih
_____	_____	_____
Arařtırmacı	İmza	Tarih

Proje iletiřim bilgileri:

Arařtırmacının ismi: [Tuđba Karayayla]

Email: [tkaray@essex.ac.uk]

Proje danıřmanının ismi: [Monika Schmid]

Email: [mschmid@essex.ac.uk]

Appendix 5 Call for linguistic experiment

Participants wanted for linguistic experiment!

It has long been established by linguistic science that all human languages are undergoing a constant process of change. For many languages, this change has been speeded up considerably over the past years by technological innovations such as the internet. We would like to investigate this in the Turkish language. If you qualify for all of the characteristics in either (1) or (2), we would like to invite you to participate in our research.

participants must

(1)

- be of Turkish descent who arrived in the UK either between ages 7-11 or after 12
- have been living in the UK for at least the past 8 years (or longer)
- currently be younger than 65
- speak only Turkish as their native language
- be literate in Turkish and English
- must have intermediate knowledge of English

(2)

- have born in the UK
- be literate in Turkish and English
- age over 18
- speak Turkish and English as their only native languages
- have both parents Turkish

The experiment will take around 1.5 hours and will take place at a location of your choice and be recorded.

If you are interested, please contact:

tkaray@essex.ac.uk

Tuğba Karayayla

Thank you for your help

Appendix 6 Deneye çağrı

Türkçe'de deęişim çalıřması deneye çağrı!

Bilindięi gibi son yıllarda yařanan teknolojik geliřmeler, internet v.s. günlük konuřma dilinde deęiřikliklere yol açmaya bařlamıřtır. Bazı diller için bu deęiřim dięer dillere göre daha da hızlı seyretmektedir. Biz de bu deęiřimi Türkçe dilinde incelemek istiyoruz. Eęer (1) ya da (2) den herhangi birindeki özelliklerin tamamını saęlıyorsanız, sizi çalıřmamıza davet ediyoruz.

katılım kořulu

(1)

- 7-12 yařları arasında ya da 12 yař sonrası Türkiye'den İngiltere'ye gelmiř olmak
- An itibariyle en az 8 yıldır İngiltere'de yařıyor olmak
- 65 yařını doldurmamıř olmak
- Türkçe dıřında herhangi bir dili (Ermenice, Arapça, Kürtçe, Rumca gibi) anadil olarak öğrenmemiř/konuřmuyor olmak
- Türkçe ve İngilizce okur-yazar olmak
- Günlük ihtiyaçları karřılayacak seviyede İngilizce konuřuyor olmak

(2)

- İngiltere'de doğup-büyümüř olmak
- Türkçe ve İngilizce okur-yazar olmak
- 18 yařın üzerinde olmak
- Türkçe ve İngilizce dilleri dıřında herhangi bir dili (Ermenice, Arapça, Kürtçe, Rumca gibi) anadili olarak öğrenmemiř/konuřmuyor olmak
- Türk anne-babaya sahip olmak

Yaklařık 1.5 saat süreceğ olan görüřme sizin tercih ettięiniz yerde yapılacaktır ve kaydedilecektir. Lütfen çalıřmaya katılma istedięinizi ařaęıdaki e-mail adresine bildiriniz.

Yardımsverlięiniz için řimdiden çok teřekkürler.

tkaray@essex.ac.uk

Tuęba Karayayla

Appendix 7 Sociolinguistic Questionnaire (attriters)

1)

Name:

Gender:

Profession:

Birth date:

Age:

Nationality:

2) Where were you born?

Place:

Region:

County:

Country:

3) What is the highest level of education you have completed?

a. in Turkey

primary school, secondary school level, higher education (college), namely:

no vocational training, apprenticeship, university, namely:

b. in the UK

primary school, secondary school level, higher education (college), namely:

no vocational training, apprenticeship, university, namely:

4)

a. Birthplace of father: Country:

b. Highest level of father's education completed and country:

5)

a. Birthplace of mother: Country:

b. Highest level of mother's education completed and country:

6)

a. When did you come to the UK (year)?

b. What was the reason?

job, job of partner, partner, other:

7) How old were you when you came to the UK?

8) Apart from England, have you ever lived in a country other than Turkey for a longer period of time (that is, more than 6 months)?

none, less than 1 year, 1 year or more

Place: Country:

9) What language(s) did you acquire before starting school (in your family, from your parents)?

Turkish, Turkish and other:

10) Did you attend English language courses in the UK or before coming to the UK?

no, less than 1 month, less than 3 months, less than 6 months, less than 1 year,
more than 1 year

11) Which other languages do you speak and at what level? How and where did you learn them?

Please rate your proficiency

1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good

Language A:

How and where

Language B:

How and where

Language C:

How and where

12)

a. Have you ever been back to Turkey since leaving for the UK?

1=once in 10 years or never, 2=once every 5-10 years, 3=once every 3-5 years, 4=every 2 years, 5= 1-2
every year

b. How long did you stay each time you went there?

1=less than 2 weeks, 2=2-4 weeks, 3=4-6 weeks, 4=6 weeks-3 months, 5=more than 3 months

13) Do you ever go to mosque/cemevi in the UK?

never, sometimes, regularly

14) If you have indicated you go to mosque/cemevi, could you please indicate in which language the services
are held?

TR, ENG, TR & ENG, other:

15) Are you a member of a Turkish club?

Yes since

No

16)

a) If you are a member of this club please indicate

How often do you get involved in the activities in this club?

1 = never, 2= sometimes, 3= regularly

b) Which language do you use in this club?

TR, ENG, TR & ENG, other:

17) How often do you speak Turkish?

rarely, a few times a year, monthly, weekly, daily

18) Do you consider it important to maintain your Turkish?

unimportant, relatively unimportant, not very important, important, very important

19) Do you consider it important that your children can speak and understand Turkish?

unimportant, relatively unimportant, not very important, important, very important

20) In general, do you have more Turkish or English friends in the UK?

only English, more English, equal, more Turkish, only Turkish

- 21) Do you feel more at home with Turkish or with English culture?
only English, more English, equal, more Turkish, only Turkish
- 22) Do you feel more comfortable speaking Turkish or English?
English, Turkish, no difference
- 23) What is your current marital status?
married, divorced, widowed, with partner, single
- 24) With what language(s) was your (ex)partner brought up (the language learnt from the parents)?
TR, ENG, other
- 25) If your (ex)partner was not born in the UK, what were the reasons that he or she came to the UK?
job, job of partner, partner, other:
- 26) When you first came to the UK what was the language you mostly used when talking to your (ex)partner?
only English, more English, equal, more Turkish, only Turkish, other:
- 27) What language(s) do you mostly use with your (ex)partner now?
- 28) If the language(s) differ in item 27 and 28, when did this change?
- 29) Have you ever attended Turkish heritage classes while living in the UK?
yes, in (year): 19.....for the period of:months,.....hours a week
no
- 30) Do you have children? no, yes, number:
their names are
they are.....years old
they were raised in (country, city)
- 31) How long had you been living in the UK when you had your first child?.....
- 32) What language or languages do you mostly use when talking to your children?
only English, more English, equal, more Turkish, only Turkish, other:
- 33) What language or languages do your children mostly use when talking to you?
only English, more English, equal, more Turkish, only Turkish, other:
- 34) Do you encourage your children to speak Turkish? never, sometimes, often
- 35) Did your children ever follow Turkish heritage classes (Saturday/Sunday classes for example)?
yes, no
- 36) Did /do you ever correct your children's Turkish?
never, seldom, sometimes, often, very often
- 37) If your children do not speak or understand Turkish, do you regret that?
not at all, no, don't care, a bit, very, n.a.
- 38) Are you in frequent contact with relatives and friends in Turkey?
never, seldom, sometimes, often, very often
- 39) Could you, in the following tables, please indicate to what extent you use Turkish and/or English now and during the first 5 years upon your arrival in the domains provided? You may simply provide percentages. Ex:

with parents- 40% T, 60% E. If some of the options are not applicable please put a – sign to indicate that they do not apply to you (if for example you do not go to school anymore).

estimate of how much Turkish/English you speak	currently (%)	during the first 5 years upon your arrival (%)
in the family		
a. parents		
b. children		
c. grandparents		
d. siblings		
e. uncles, aunts etc.		
with friends/neighbours		
e-mails to relatives in England		
e-mails to relatives in Turkey		
at work		
at school		
in mosque/cemevi		
in shops		
at clubs/organizations		

40) Do you ever listen to Turkish songs?

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

41) Do you ever listen to Turkish radio programs?

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

42) Do you ever read Turkish newspapers, books or magazines?

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

43) Do you ever watch Turkish television programs?

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

44) If you have indicated that you do not listen to Turkish songs or radio programs, and that you do not watch Turkish television programs and do not read Turkish newspapers and books, could you indicate why you think that is?

.....

45) Do you think your Turkish language proficiency has changed since you moved to the UK?

1 = it became a lot worse, 2 = it became worse, 3 = it did not change, 4 = it became better, 5 = it became a lot better

Reason:

46) Do you think you use more or less Turkish since you moved to the UK and why?

yes, less, no, yes, more

Reason:

47) To what extent do you feel uncomfortable when speaking Turkish with a Turkish person who has never spent a considerable amount of time in an English-speaking country?

1 = very uncomfortable, 2 = uncomfortable, 3 = neutral, 4 = comfortable, 5 = very comfortable

48) If you ever do feel uncomfortable in such a situation, could you indicate whether this is also the case when you speak Turkish with someone who, like you, has lived in the UK for a long time?

yes, no

49) Do you see yourself as bilingual? How proficient are you at both languages?

English 1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good

Turkish 1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good

50) Do you ever intend to move back to Turkey?

1 = definitely not, 2 = no, 3 = not sure, 4 = yes, 5 = definitely yes

51) Reason:

52) What was the language you were speaking 2 hours before our meeting (or yesterday around this time)?

.....

53) You have come to the end of this questionnaire. Is there anything you would like to add?

This can be anything from language-related comments to remarks about the questionnaire or this research itself:

Thank you very much for your time and cooperation!

Appendix 8 Sosyolinguistik Görüşme

1)

İsim:

Cinsiyet:

Meslek:

Doğum tarihiniz:

Yaşınız:.....

Milliyetiniz:.....

2) Nerede doğdunuz?

Yer:

Bölge:

Eyalet:

Ülke:

3) Tamamladığınız en yüksek okul derecesi nedir?

a. Türkiye’de

ilkokul, orta okul, lise, açıklama:

mesleki eğitim almadım, çıraklık, üniversite, açıklama:

b. İngiltere’de

ilkokul, orta okul, lise, açıklama:

mesleki eğitim almadım, çıraklık, üniversite, açıklama:

4)

a. Babanızın doğum yeri: Ülke:

b. Babanızın tamamlandığı en yüksek okul derecesi ve ülke:

5)

a. Annenizi doğum yeri: Ülke:

b. Annenizin tamamlandığı en yüksek okul derecesi ve ülke:

6)

a. İngiltere’ye hangi yılda geldiniz?

b. Geliş sebebiniz neydi?.....

iş, eşinin işi eş/partner, diğerse belirtin:

7) İngiltere’ye geldiğinizde kaç yaşındaydınız?.....

8) İngiltere’den başka, Türkiye dışında başka bir ülkede uzun bir süre yaşadınız mı (yani, 6 aydan fazla)?

hiç, 1 yıldan az, 1 yıl veya daha çok

Yer: Ülke:

9) Okula başlamadan önce ailenizde anne-babanızdan hangi dilleri öğrendiniz?

Türkçe, Türkçe ve diğer:

10) İngiltere'ye gelmeden önce veya İngiltere'de İngilizce dil kurslarına gittiniz mi?

hayır, 1 aydan az, 3 aydan az, 6 aydan az, 1 yıldan az, 1 yıldan fazla

11) Hangi dilleri hangi seviyede biliyorsunuz ve bu dilleri nerede öğrendiniz?

1 = çok kötü, 2 = kötü, 3 = orta, 4 = iyi, 5 = çok iyi

Dil A:

Nasıl ve nerede öğrendiniz?

Dil B:

Nasıl ve nerede öğrendiniz?

Dil C:

Nasıl ve nerede öğrendiniz?

12)

a. İngiltere'ye geldiğinizden beri Türkiye'ye hiç gittiniz mi?

1 = hiç veya 10 yılda bir, 2 = 5-10 yılda bir, 3 = 3-5 yılda bir, 4 = her 2 yılda bir,

5 = yılda bir iki defa

b. Her gidişinizde ne kadar kaldınız?

1 = 2 haftadan az, 2 = 2-4 hafta, 3 = 4-6 hafta, 4 = 6 hafta ile 3 ay arasında, 5 = 3 aydan fazla

13) İngiltere'de camiye/cemevine gider misiniz?

hiç, bazen, düzenli olarak

14) Eğer camiye/cemevine gidiyorsanız, oralardaki hizmetlerin/servislerin hangi dilde verildiğini belirtir misiniz?

TR, ENG, TR & ENG, diğer:

15) İngiltere'de üyesi olduğunuz bir Türk derneği var mı?

evet Yılından beri

Hayır

16)

a)Eğer bir sosyal derneğe üye iseniz, lütfen bu derneğin düzenlediği aktivitelere ne kadar sıklıkla katıldığınızı belirtiniz.

1 = hiç, 2= bazen, 3= düzenli olarak

b)Bu dernekte hangi dili kullanıyorsunuz?

TR, ENG, TR & ENG, diğer:

17) Ne sıklıkta Türkçe konuşuyorsunuz?

nadiren, yılda birkaç kez, aylık bazda, haftalık bazda, gündelik bazda

18) Türkçenizi unutmamak, dilinizi korumak sizin için önemli mi?

önemsiz, pek önemli değil, biraz önemli, önemli, çok önemli

19) Çocuklarınızın Türkçe konuşması ve anlaması sizce önemli mi?

önemsiz, pek önemli değil, biraz önemli, önemli, çok önemli

20) Genel olarak daha çok Türk mü İngiliz mi arkadaşlarınız var İngiltere'de?

sadece İngiliz, daha çok İngiliz, eşit, daha çok Türk sadece Türk

21) Türk kültürünü mü yoksa İngiliz kültürünü mü kendinize yakın hissediyorsunuz? (Nerede kendinizi daha çok evinizde hissediyorsunuz?)

sadece İngiliz kültürü, daha çok İngiliz kültürü, eşit, daha çok Türk kültürü, sadece Türk kültürü

22) Türkçe mi İngilizce mi konuşurken kendinizi daha rahat hissediyorsunuz?

Türkçe, İngilizce, fark yok

23) Şu andaki medeni durumunuz ne?

evli, boşanmış, dul, partneri var, bekar

24) Şu andaki eşiniz (veya eski eşiniz) hangi dil ile büyütüldü? (çocukken ailesinden öğrendiği ve konuştuğu dil)?

TR, ENG, diğerse belirtin:

25) Eğer (eski) eşiniz İngiltere’de doğmadıysa, hangi sebeplerden dolayı İngiltere’ye geldi?

iş, eşinin işi eş/partner, diğerse belirtin:

26) İlk evlendiğinizde (eski) eşinizle en çok konuştuğunuz dil hangisiydi?

sadece İngilizce, daha çok İngilizce, eşit, daha çok Türkçe, sadece Türkçe,

diğerse belirtin:

27) Şu anda (eski) eşinizle konuşurken en çok hangi dili kullanıyorsunuz?

28) 26. ve 27. sorulardaki diller farklı ise bunun ne zaman değiştiğini belirtiniz.....

29) İngiltere’de hiç Türkçe dil kursuna/okuluna gittiniz mi?

evet, 19..... yılındaaylığına, haftada saat

hayır

30) Çocuğunuz var mı? hayır, evet, sayısı:

isimleri:

yaşları:

büyüdükleri yer: (ülke, şehir)

31) İlk çocuğunuz dünyaya getirdiğinizde kaç senedir İngiltere’de yaşıyordunuz?.....

32) Çocuklarınızla konuşurken en çok hangi dili(dilleri) kullanıyorsunuz?

sadece İngilizce, daha çok İngilizce, eşit, daha çok Türkçe, sadece Türkçe,

diğerse belirtin :

33) Çocuklarınız sizinle konuşurken en çok hangi dili (dilleri) kullanıyor?

sadece İngilizce, daha çok İngilizce, eşit, daha çok Türkçe, sadece Türkçe,

diğerse belirtin:

34) Çocuklarınızın Türkçe konuşması için onları teşvik ediyor musunuz?

hiçbir zaman, bazen, sık sık

35) Çocuklarınız herhangi bir Türkçe dil kursuna/okuluna devam etti mi? (Cumartesi okulu gibi mesela)

evet, hayır

36) Çocuklarınızın Türkçesini hiç düzelttiniz mi, düzeltir misiniz?

hiçbir zaman, nadiren, bazen, sık sık, çok sık

37) Eğer çocuklarınız Türkçe konuşmazsa veya anlamazsa buna üzülür ve bundan pişmanlık duyar mısınız?

hiç, hayır, benim için farketmez, biraz, çok, geçerli değil

38) Türkiye'deki akraba ve arkadaşlarınızla sık sık kontak kurar mısınız?

hiçbir zaman, nadiren, bazen, sık sık, çok sık

39) Lütfen aşağıdaki tabloda şu an ve İngiltere'ye gelişinizin ilk 5 yılında verilen ortamlardaki kişilerle ne kadar Türkçe ve/veya İngilizce kullandığınızı belirtiniz. Lütfen yüzde şeklinde belirtiniz. Örn: anne ve baba ile %40 Türkçe, %60 İngilizce. Eğer bazı seçenekler uygun değilse (Örneğin şu an okula gitmiyorsanız) ilgili yere lütfen – işareti koyunuz.

Tablo 1: Şu andaki ve geçmişteki dil kullanımı

tahmini kullanılan Türkçe ya da İngilizce	şu anda (%)	İngiltere'ye gelişinizin ilk 5 yılı boyunca (%)
ailede		
a. ebeveynler ile		
b. çocuklar ile		
c. büyük anne ve büyük baba ile		
d. kardeşler ile		
e. teyze, dayı, amca, hala, kuzenler v.s. ile		
arkadaşlar ve komşular ile		
İngiltere'de oturan akrabalara yazılan mesajlarda ve e-mailerde		
Türkiye'de oturan akrabalara yazılan mesajlarda ve e-mailerde		
işte		
okulda		
camide ya da cemevinde		
alışverişte		

kulüp ve organizasyonlarda		
----------------------------	--	--

40) Türkçe şarkılar dinliyor musunuz?

1 =hiçbir zaman, 2 = nadiren, 3 = bazen, 4 = sık sık, 5 = her zaman

41) Türkçe radyo programları dinliyor musunuz ?

1 =hiçbir zaman, 2 = nadiren, 3 = bazen, 4 = sık sık, 5 = her zaman

42) Türkçe gazete, dergi ve kitap okur musunuz?

1 =hiçbir zaman, 2 = nadiren, 3 = bazen, 4 = sık sık, 5 = her zaman

43) Türk televizyon programlarını izliyor musunuz?

1 =hiçbir zaman, 2 = nadiren, 3 = bazen, 4 = sık sık, 5 = her zaman

44) Eğer Türkçe radyo, televizyon programlarını takip etmiyorsanız, müzik dinlemiyorsanız ve gazete dergi okumuyorsanız sizce bunun sebebi nedir?

.....

45) İngiltere'ye geldiğinizden beri sizce Türkçenizde bir değişim oldu mu?

1= çok kötüleşti, 2 = kötüleşti, 3 = değişmedi, 4 = daha iyi oldu, 5 = çok daha iyi oldu

Sebebi:

46) İngiltere'ye geldiğinizden beri sizce daha çok mu yoksa daha az mı Türkçe kullanıyorsunuz?

evet daha az, değişmedi, evet daha çok

Sebebi:

47) İngilizce konuşulan bir ülkede pek vakit geçirmemiş bir Türk ile konuşurken kendinizi ne derece rahatsız hissediyorsunuz?

1 = çok rahatsız, 2 = rahatsız, 3 = nötr, 4 = rahat, 5 = çok rahat

48) Eğer böyle bir durumda rahatsız hissediyorsanız, acaba bu rahatsızlık sizin gibi İngiltere'de uzun süre yaşamış bir Türkle konuşurken de söz konusu mu sizin için?

evet, hayır

49) Kendinizi iki dilli olarak görüyor musunuz? Her iki dildeki seviyenizi belirtiniz?

İngilizce 1 = çok kötü, 2 = kötü, 3 = yeterli, 4 = iyi, 5 = çok iyi

Türkçe 1 = çok kötü, 2 = kötü, 3 = yeterli, 4 = iyi, 5 = çok iyi

50) Hiç ilerde bir gün Türkiye'ye geri dönmeye niyetiniz var mı?

1= kesinlikle hayır, 2 = hayır, 3 = emin değilim, 4 = evet, 5 = kesinlikle evet

51) Sebep:

52) Bu görüşmeden 2 saat önce veya dün bu saatlerde hangi dilde konuşuyordunuz?

53) Bu görüşmenin sonuna geldik. Ekleme istediğiniz başka ne gibi birşey var? Bu, dil konusunda yorumlarınız veya araştırma ve bu görüşme hakkında herşeyle ilgili bir yorum olabilir.

.....

Zaman ayırdığınız için ve projeye değerli katkılarınızdan dolayı çok teşekkür ederim!

Appendix 9 Sociolinguistic Questionnaire (Heritage Speakers)

1)

Name:

Gender:

Profession:

Birth Date:.....

Age:.....

Nationality:.....

2) Where were you born?

Place:

Region:

County:

Country:

3) City of residence Since

4) What is the highest level of education you have completed?

primary school, secondary school level, higher education (college), namely:

no vocational training, apprenticeship, university, namely:

5) Background information of father

a. Birthplace of father:

b. Age of father:

c. Father's profession:.....

d. Native language(s) of father:

e. Highest level of father's education completed and country:

f. How old was your father when he first came to the UK?.....

g. What is the English proficiency level of your father?

1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good

6) Background information of mother

a. Birthplace of mother:

b. Age of mother:

c. Mother's profession:.....

d. Native language(s) of mother:

e. Highest level of mother's education completed and country:

f. How old was your mother when she first came to the UK?.....

g. What is the English proficiency level of your mother?

1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good

7) When did your parents come to the UK (year)?

a. When did your father come to the UK?

b. When did your mother come to the UK?.....

8) How long had they been living in the UK when you were born?

a. Father.....

b. Mother.....

9) Do you have any siblings?

no

yes

If yes,

What are their names, ages, and birth places?

	Name	Age	Birth Place
Sibling 1			
Sibling 2			
Sibling 3			
Sibling 4			

10) Apart from England, have you ever lived in a country other than Turkey for a longer period of time (that is, more than 6 months)?

none, less than 1 year, 1 year or more

Place: Country:

11) What language(s) did you acquire before starting daycare/school (in your family, from your parents)?

Turkish, Turkish and other:

12) Where did you learn English?

in daycare

at primary school

in my family

13) At what age did you learn English?

14) At what age did you start daycare?.....

15) Could you, in the following table, please indicate to what extent you used English and/or Turkish given in the domains provided? You may simply provide percentages. While giving percentages please indicate the type of language. Ex: 60% Turkish; half half= 50% of each language; 20% English etc.

Table1: Language exposure at school/daycare

	daycare	primary education	secondary education and college	Turkish Sunday schools
age range (ex: ages 3-5)				
days per week, for how many hours (ex:3 days per week, 5 hours a day)				
Medium of instruction (ex: English)				
%TL (Target Language) your friends at school spoke to you (ex: 60% Turkish)				
%TL spoken by teacher(s) at school (ex: 80% English)				
%TL you spoke to the other children/friends at school				
%TL you spoke to the teacher at school				

16) Could you, in the following table, please indicate to what extent you have been spoken to and responded in Turkish and/or English at home by/to each person given during the specific time periods provided? You may simply provide percentages.

Table 2: Language exposure at home

	0-3		3-5		5-11		11-18	
	spoken to you (%)	you respond to (%)	spoken to you (%)	you respond to (%)	spoken to you (%)	you respond to (%)	spoken to you (%)	you respond to (%)
	Tur-Eng.	Tur-Eng.	Tur-Eng.	Tur-Eng.	Tur-Eng.	Tur-Eng.	Tur-Eng.	Tur-Eng.
mother								
father								
sibling 1								
sibling 2								
sibling 3								
grandmother								
grandfather								

17) Could you, in the following table, please indicate to what extent you used Turkish and/or English during the different time periods given in the domains provided? You may simply estimate how much you spoke each language by providing percentages.

Table 3: Activities outside home and school

	0-3	3-5	5-11	11-18
hours per week spent on the given activity	Tur-Eng (%)	Tur-Eng (%)	Tur-Eng (%)	Tur-Eng (%)
sports/clubs				
friends/neighbours outside daycare/school				
watching TV				
reading/being read to (books, newspapers)				
using computer (typing etc.)				

18)

18) Could you, in the following table, please indicate to what extent you currently use Turkish and/or English with different people in the domains provided? Ex: with parents- 40% T, 60% E.

Table 4: Current L1 contact

estimate of how much Turkish/English you speak	currently (%)
in the family	
a. parents	
b. children	
c. grandparents	
d. siblings	
e. uncles, aunts etc.	
with friends/neighbours	
e-mails to relatives in England	
e-mails to relatives in Turkey	
at work	
at school	
in mosque/cemevi	
in shops	
at clubs/organizations	

19) Which other languages do you speak and at what level? How and where did you learn them?

Please rate your proficiency.

1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good

Language A:

How and where

Language B:

How and where

Language C:

How and where

20)

a. Do you visit Turkey at all (for vacations etc)?

1=once in 10 years or never, 2=once every 5-10 years, 3=once every 3-5 years, 4=every 2 years, 5= 1-2 every year

b. How long did you stay each time you went there?

1=less than 2 weeks, 2=2-4 weeks, 3=4-6 weeks, 4=6 weeks-3 months, 5=more than 3 months

21) Do you ever go to mosque/cemevi in the UK?

1 = never, 2= sometimes, 3=regularly

22) If you have indicated you go to mosque/cemevi, could you please indicate in which language the services are held?

TR, ENG, TR & ENG, other:

23) Are you a member of a Turkish club?

Yes

No

24) If you are a member of this club please indicate

How often do you get involved in the activities in this club?

a. 1 = never, 2= sometimes, 3=regularly

b. Which language do you use in this club?

TR, ENG, TR & ENG, other:

25) How often do you speak Turkish?

rarely, a few times a year, monthly, weekly, daily

26) Do you consider it important to maintain your Turkish?

unimportant, relatively unimportant, not very important, important, very important

27) Do you consider it important that your children can speak and understand Turkish?

unimportant, relatively unimportant, not very important, important, very important

28) In general, do you have more Turkish or English friends in the UK?

only English, more English, equal, more Turkish, only Turkish

29) Do you feel more at home with Turkish or with English culture?

only English, more English, equal, more Turkish, only Turkish

30) Do you feel more comfortable speaking Turkish or English?

English, Turkish, no difference

31) What is your current marital status?

married, divorced, widowed, with partner, single

32) With what language(s) was your (ex)partner brought up (the language learnt from the parents)?

TR, ENG, other

33) If your (ex)partner was not born in the UK, what were the reasons that he or she came to the UK?

job, job of partner, partner, other:

34) What language(s) do you mostly use with your (ex)partner?

only English, more English, equal, more Turkish, only Turkish, other: ...

35) Are you in frequent contact with relatives and friends in Turkey?

never, seldom, sometimes, often, very often

36) Do you ever listen to Turkish songs?

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

37) Do you ever listen to Turkish radio programs?

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

38) Do you ever read Turkish newspapers, books or magazines?

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

39) Do you ever watch Turkish television programs?

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

40) If you have indicated that you do not listen to Turkish songs or radio programs, and that you do not watch Turkish television programs and do not read Turkish newspapers and books, could you indicate why you think that is?

.....

41) To what extent do you feel uncomfortable when speaking Turkish with a Turkish person who has never spent a considerable amount of time in an English-speaking country?

1 = very uncomfortable, 2 = uncomfortable, 3 = neutral, 4 = comfortable, 5 = very comfortable

42) If you ever do feel uncomfortable in such a situation, could you indicate whether this is also the case when you speak Turkish with someone who, like you, has lived in the UK for a long time?

yes, no

43) Do you see yourself as bilingual? How proficient are you at both languages?

English 1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good

Turkish 1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good

44) What was the language you were speaking 2 hours before our meeting (or yesterday around this time)?

.....

45) You have come to the end of this questionnaire. Is there anything you would like to add?

This can be anything from language-related comments to remarks about the questionnaire or this research itself:

.....

Thank you very much for your time and cooperation!

Appendix 10 Sosyolinguistik Görüşme

1)

İsim:

Cinsiyet:

Meslek:

Doğum Tarihiniz:.....

Yaşınız:

Milliyetiniz:.....

2) Nerede doğdunuz?

Yer:

Bölge:

Eyalet:

Ülke:

3) İkamet (yaşadığınız) ettiğiniz şehir yılından beri.

4) Tamamladığınız en yüksek okul derecesi nedir?

ilkokul, orta okul, yüksek okul (lise,kolej) , açıklama:

mesleki eğitim almadım, çıraklık, üniversite, açıklama:

5) Baba ile ilgili bilgiler

a. Doğum yeri: Ülke:

b. Yaşı:

c. Mesleği:.....

d. Anadil(ler)i

e. Tamamlandığı en yüksek okul derecesi ve ülke:

f. İngiltere'ye ilk geldiğindeki yaşı?.....

g. Şu anki İngilizce seviyesi? 1 = çok kötü, 2 = kötü, 3 = yeterli, 4 = iyi, 5 = çok iyi

6) Anne ile ilgili bilgiler

a. Doğum yeri: Ülke:

b. Yaşı:

c. Mesleği:.....

d. Anadil(ler)i:

e. Tamamlandığı en yüksek okul derecesi ve ülke:

f. İngiltere'ye ilk geldiğindeki yaşı?.....

g. Şu anki İngilizce seviyesi? 1 = çok kötü, 2 = kötü, 3 = yeterli, 4 = iyi, 5 = çok iyi

7) Aileniz İngiltere'ye ilk kaç yılında geldi? 7a. Baba..... 7b. Anne.....

8) Siz doğduğunuzda anne ve babanız kaç yıldır İngiltere'de yaşıyordu?

a. Baba.....

b. Anne.....

9) Kardeşleriniz var mı?

hayır

evet

Eğer evet ise

İsimleri, yaşları ve doğum yerleri nedir?

	İsim	Yaş	Doğum yeri
Kardeş 1			
Kardeş 2			
Kardeş 3			
Kardeş 4			

10) İngiltere'den'dan başka, Türkiye dışında başka bir ülkede uzun bir süre yaşadınız mı (yani, 6 aydan fazla)?

hiç, 1 yıldan az, 1 yıl veya daha çok

Yer:

Ülke:

11) Okula başlamadan önce ailenizde anne babanızdan hangi dilleri öğrendiniz?

Türkçe, Türkçe ve diğer:

12) İngilizceyi nerede öğrendiniz?

kreşte

ilkokulda

aile içinde

13) Kaç yaşında İngilizce öğrendiniz?

14) Kaç yaşında kreşe başladınız?.....

15) Lütfen aşağıdaki tabloda verilen ortamlarda ne kadar Türkçe ve/veya İngilizce kullandığınızı belirtiniz.

Lütfen yüzde şeklinde belirtiniz.

Tablo 1: Okul ve kreşte dil kullanımı (%)

	ortaöğretim			Türk
	kreş	ilköğretim	ve lise	okulları
Yaş aralığı (Ör: 3-5)				
Haftada kaç gün, günde kaç saat (Ör:Haftada 3 gün, günde 5 saat)				
Eğitim dili (Ör: İngilizce)				
Aynı okuldaki arkadaşlarınız tarafından sizinle konuşulan dilin yüzdesi (%) (Ör: 60% Türkçe)				
okuldaki öğretmen tarafından konuşulan yüzde (Ör: 60% Türkçe)				
Sizin okuldaki arkadaşlarınızla konuştuğunuz yüzde				
Sizin öğretmenle konuştuğunuz yüzde				

16) Lütfen aşağıdaki tabloda sol tarafta verilen kişilerin **belirlenmiş her bir yaş aralığı için** sizinle konuştuğu dil(ler)in ve sizin o kişilere cevap olarak kullandığınız dil(ler)in (Türkçe ve/veya İngilizce) miktarını yüzde şeklinde belirtiniz.

Tablo 2: Evde konuşulan diller

17) Lütfen aşağıdaki tabloda verilen aktiviteleri her bir yaş aralığında ne kadar Türkçe ve/veya İngilizce kullanarak yaptığınızı belirtiniz. Lütfen yüzde şeklinde belirtiniz. Bazı yaş aralıkları için bazı durumlar uygun olmayabilir. Böyle bir durumda ilgili boşluğa lütfen UD (Uygun Değil) yazınız.

Tablo 3: Okul dışı aktivitelerde dil kullanımı (%)

Her aktiviteye bir haftada harcanan süre (saat) Ör: haftada 3 saat	0-3	3-5	5-11	11-18
	Tür-İng (%)	Tür-İng (%)	Tür-İng (%)	Tür-İng (%)
spor/klüpler				
Arkadaşlar/Komşular (Okul dışı zamanlarda)				
TV izlemek				
Okumak/Masal okunması				
Bilgisayar kullanımı (internet, oyun, yazmak)				

18) Lütfen aşağıdaki tabloda verilen ortamlardaki kişiler ile ŞU AN ne kadar Türkçe ve/veya İngilizce kullandığınızı belirtiniz. Lütfen yüzde şeklinde belirtiniz. Bazı seçenekler şu an için uygun olmayabilir. Böyle bir durumda ilgili boşluğa UD (Uygun Değil) yazınız.

Tablo 4: Şu andaki dil kullanımı

tahmini Türkçe ve/veya İngilizce kullanımı	%
Ailede	
a) anne-babayla	
b) çocuklarla	
c) büyük anne- büyük babayla	
d) kardeşlerle	

e) amca, halı, dayı v.s. ile	
Arkadaşlarla/Komşularla	
İngilteredeki akrabalara yazılan e-maillerde/mesajlarda	
Türkiyedeki akrabalara yazılan e-maillerde/mesajlarda	
İşte	
Okulda	
Camide/Cemevinde	
Alışverişte	
Kulüp ve organizasyonlarda	

19) Hangi dilleri hangi seviyede biliyorsunuz ve bu dilleri nerede öğrendiniz?

1 = çok kötü, 2 = kötü, 3 = orta, 4 = iyi, 5 = çok iyi

Dil A:

Nasıl ve nerede öğrendiniz?

Dil B:

Nasıl ve nerede öğrendiniz?

Dil C:

Nasıl ve nerede öğrendiniz?

20)

a. Hiç Türkiye'ye gittiniz mi?

1 = hiç veya 10 yılda bir, 2 = 5-10 yılda bir, 3 = 3-5 yılda bir, 4 = her 2 yılda bir,

5 = yılda bir iki defa

b. Her gidişinizde ne kadar kaldınız?

1 = 2 haftadan az, 2 = 2-4 hafta, 3 = 4-6 hafta, 4 = 6 hafta ile 3 ay arasında, 5 = 3 aydan fazla

21) İngiltere'de camiye/cemevine gider misiniz?

hiç, bazen, düzenli olarak

22) Eğer camiye gidiyorsanız, camideki hizmetlerin/servislerin hangi dilde verildiğini belirtir misiniz?

TR, ENG, TR & ENG, diğer:

23) İngiltere'de üyesi olduğunuz bir Türk derneği var mı?

evet Yılından beri

Hayır

24)

a)Eğer bir sosyal derneğe üye iseniz, lütfen bu derneğin düzenlediği aktivitelere ne kadar sıklıkla katıldığınızı belirtiniz.

1 = hiç, 2= bazen, 3= düzenli olarak

b)Bu dernekte hangi dili kullanıyorsunuz?

TR, ENG, TR & ENG, diğer:

25) Ne sıklıkta Türkçe konuşuyorsunuz?

nadiren, yılda birkaç kez, aylık bazda, haftalık bazda, günelik bazda

26) Türkçenizi unutmamak, dilinizi korumak sizin için önemli mi?

önemsiz, pek önemli değil, biraz önemli, önemli, çok önemli

27) Çocuklarınızın Türkçe konuşması ve anlaması sizce önemli mi?

önemsiz, pek önemli değil, biraz önemli, önemli, çok önemli

28) Genel olarak daha çok Türk mü İngiliz mi arkadaşlarınız var İngiltere’de?

sadece İngiliz, daha çok İngiliz, eşit, daha çok Türk sadece Türk

29) Türk kültürünü mü yoksa İngiliz kültürünü mü kendinize yakın hissediyorsunuz? (Nerede kendinizi daha çok evinizde hissediyorsunuz?)

sadece İngiliz kültürü, daha çok İngiliz kültürü, eşit, daha çok Türk kültürü, sadece Türk kültürü

30) Türkçe mi İngilizce mi konuşurken kendinizi daha rahat hissediyorsunuz?

Türkçe, İngilizce, fark yok

31) Şu andaki medeni durumunuz ne?

evli, boşanmış, dul, partneri var, bekar

32) Eğer evli iseniz, şu andaki eşiniz (veya eski eşiniz) hangi dil ile büyütüldü? (çocukken ailesinden öğrendiği ve konuştuğu dil)?

TR, ENG, diğerse belirtin:

33) Eğer (eski) eşiniz İngiltere’de doğmadıysa, hangi sebeplerden dolayı İngiltere’ye geldi?

iş, eşinin işi eş/partner, diğerse belirtin:

34) (eski) Eşinizle konuşurken en çok hangi dili kullanıyorsunuz?

sadece İngilizce, daha çok İngilizce, eşit, daha çok Türkçe, sadece Türkçe,

diğerse belirtin:

35) Türkiye’deki akraba ve arkadaşlarınızla sık sık kontak kurar mısınız?

hiçbir zaman, nadiren, bazen, sık sık, çok sık

36) Türkçe şarkılar dinliyor musunuz?

1 =hiçbir zaman, 2 = nadiren, 3 = bazen, 4 = sık sık, 5 = her zaman

37) Türkçe radyo programları dinliyor musunuz ?

1 =hiçbir zaman, 2 = nadiren, 3 = bazen, 4 = sık sık, 5 = her zaman

38) Türkçe gazete, dergi ve kitap okur musunuz?

1 =hiçbir zaman, 2 = nadiren, 3 = bazen, 4 = sık sık, 5 = her zaman

39) Türk televizyon programlarını izliyor musunuz?

1 =hiçbir zaman, 2 = nadiren, 3 = bazen, 4 = sık sık, 5 = her zaman

40) Eğer Türkçe radyo, televizyon programlarını takip etmiyorsanız, müzik dinlemiyorsanız ve gazete dergi okumuyorsanız sizce bunun sebebi nedir?

.....

41) İngilizce konuşulan bir ülkede pek vakit geçirmemiş bir Türk ile konuşurken kendinizi ne derece rahatsız hissediyorsunuz?

1 = çok rahatsız, 2 = rahatsız, 3 = nötr, 4 = rahat, 5 = çok rahat

42) Eğer böyle bir durumda rahatsız hissediyorsanız, acaba bu rahatsızlık sizin gibi İngiltere'de uzun süre yaşamış bir Türk ile konuşurken de söz konusu mu sizin için?

evet, hayır

43) Kendinizi iki dilli olarak görüyor musunuz? Her iki dildeki seviyenizi belirtiniz?

İngilizce 1 = çok kötü, 2 = kötü, 3 = yeterli, 4 = iyi, 5 = çok iyi

Türkçe 1 = çok kötü, 2 = kötü, 3 = yeterli, 4 = iyi, 5 = çok iyi

44) Bu görüşmeden 2 saat önce veya dün bu saatlerde hangi dilde konuşuyordunuz?

45) Bu görüşmenin sonuna geldik. Ekleme istediğiniz başka ne gibi birşey var? Bu, dil konusunda yorumlarınız veya araştırma ve bu görüşme hakkında herşeyle ilgili bir yorum olabilir.

.....

Zaman ayırdığınız için ve projeye değerli katkılarınızdan dolayı çok teşekkür ederim!

Appendix 11 Interview guidance questions (Attriters)

1. Please tell me a little about yourself. When did you come to England? What were your reasons to emigrate to the UK?
2. What are your views on job opportunities and working conditions here in the UK? What do you think about your own working conditions here?
3. What are your views on health services here in the UK and how do you compare them to the ones in Turkey?
4. Can you please tell me something that you experienced personally very recently (which might be something sad, surprising, funny etc.)? Please start the sentence with "recently/a few days ago"
5. Can you tell me something that you did not witness but recently heard from a friend of yours/ your children/your spouse/your mum, read somewhere or heard in the news?
6. Please tell me something that your parents keep saying that you did when you were a child that you do not remember having done at all.
7. Now I would like you to suppose that a thief broke into your house when you were on vacation. You came back from your vacation and saw the mess in your house. You should call the police and report the missing stuff. I am a police officer now and you are going to describe me the incident. Please start telling what happened just from the beginning.

Appendix 12 Mülakat yönlendirme soruları (Attriters)

1. Sizi tanımakla başlayalım. İngiltere'ye kaç yılında geldiğinizi ve göç nedenlerinizi öğrenebilir miyim?
2. Buradaki iş imkanları ve çalışma şartları hakkında ne düşünüyorsunuz? Kendi çalışma şartlarınızı nasıl buluyorsunuz? İngiltere ve Türkiye'deki çalışma şartlarını kıyaslarsanız neler söylersiniz?
3. Buradaki sağlık imkanları hakkında ne düşünüyorsunuz? Türkiye'deki sağlık imkanlarıyla karşılaştırabilir misiniz?
4. Son zamanlarda bizzat yaşadığınız bir olayı (komik, üzücü, şaşırtıcı, garip v.s.) anlatabilir misiniz? Lütfen cümleye “geçenlerde” diye başlayınız
5. Son zamanlarda arkadaşlarınızdan/çocuklarınızdan/annenizden/eşinizden duyduğunuz ya da bir yerde okuduğunuz, televizyonda duyduğunuz bir olay/haber anlatabilir misiniz? Lütfen cümleye “geçenlerde...” diye başlayınız.
6. Ailenizin çocukken yaptığınızı anlattığı ancak sizin yaptığınızı hatırlamadığınız bir olayı (yaramazlığınızı) anlatınız.
7. Şimdi sizden siz tatildeyken evinize hırsız girdiğini farzetmenizi istiyorum. Tatilden eve geldiğinizde bakıyorsunuz ki evde hiç bir şey yerinde değil. Hemen polisi aramalısınız ve çalınan eşyalarınızın bilgisini vermelisiniz. Diyelim ki ben polisim ve bana olayı anlatıyorsunuz. Şimdi lütfen bana olayı en baştan detaylarıyla anlatın.

Appendix 13 Interview guidance questions (Heritage speakers)

1. Please tell me a little about yourself. When did your parents immigrate to the UK and what were their reasons?
2. Can you tell me a little bit about the education opportunities here and the education you receive currently? Can you compare the system here to that of Turkey?
3. As someone who was born in the UK, have you ever felt different from both English and Turkish people?
4. Can you please tell me something that you experienced personally very recently (which might be something sad, surprising, funny etc.)? Please start the sentence with "recently/a few days ago"
5. Can you tell me something that you did not witness but recently heard from a friend of yours/ your children/your spouse/your mum, read somewhere or heard in the news? This can be something sad, surprising, funny and so on.
6. Please tell me something that your parents keep saying that you did when you were a child that you do not remember having done at all.
7. Now I would like you to suppose that a thief broke into your house when you were on vacation. You came back from your vacation and saw the mess in your house. You should call the police and report the missing stuff. I am a police officer now and you are going to describe me the incident. Please start telling what happened from the beginning.

Appendix 14 Mülakat yönlendirme soruları (Heritage speakers)

1. Sizi tanımakla başlayalım. Ailenizin İngiltere'ye kaç yılında göç ettiğini ve göç nedenlerini öğrenebilir miyim?
2. Buradaki eğitim olanaklarından ve aldığınız eğitimden biraz bahseder misiniz? Buranın eğitim sistemini Türkiye'nin sistemi ile kıyaslayabilir misiniz?
3. İngiltere doğumlu bir Türk olarak hiç kendinizi hem İngilizlerden hem de Türklerden farklı hissettiğiniz oldu mu? Anlatınız.
4. Son zamanlarda bizzat yaşadığınız bir olayı (komik, üzücü, şaşırtıcı, garip v.s.) anlatabilir misiniz? Lütfen cümleye “geçenlerde
5. Son zamanlarda arkadaşlarınızdan/çocuklarınızdan/annenizden/eşinizden duyduğunuz ya da bir yerde okuduğunuz, televizyonda duyduğunuz bir olay/haber anlatabilir misiniz? Lütfen cümleye “geçenlerde...” diye başlayınız.
6. Ailenizin çocukken yaptığınızı anlattığı ancak sizin yaptığınızı hatırlamadığınız bir olayı (yaramazlığınızı) anlatınız.
7. Şimdi sizden siz tatildeyken evinize hırsız girdiğini farzetmenizi istiyorum. Tatilden eve geldiğinizde bakıyorsunuz ki evde hiç bir şey yerinde değil. Hemen polisi aramalısınız ve çalınan eşyalarınızın bilgisini vermelisiniz. Diyelim ki ben polisim ve bana olayı anlatıyorsunuz. Şimdi lütfen bana olayı en baştan detaylarıyla anlatın.

Appendix 15 Interview guidance questions (Controls)

1. Please tell me a little about yourself.
2. What are your views on job opportunities and working conditions here? Can you tell little bit about your own working conditions here?
3. What are your views on health services here in Turkey? Do you think Turkey provides good health service to its citizens? Do you have any complaints regarding the health service quality here?
4. Can you please tell me something that you experienced personally very recently (which might be something sad, surprising, funny etc.)? Please start the sentence with "recently/a few days ago"
5. Can you tell me something that you did not witness but recently heard from a friend of yours/ your children/your spouse/your mum, read somewhere or heard in the news? This can be something sad, surprising, funny and so on.
6. Please tell me something that your parents keep saying that you did when you were a child that you do not remember having done at all.
7. Now I would like you to suppose that a thief broke into your house when you were on vacation. You came back from vacation and saw the mess in your house. You should call the police and report the missing stuff. I am a police officer now and you are going to describe me the incident. Please start telling what happened just from the beginning.

Appendix 16 Mülakat yönlendirme soruları (Controls)

1. Sizi tanımakla başlayalım.
2. Buradaki iş imkanları ve çalışma şartları hakkında ne düşünüyorsunuz? Kendi çalışma şartlarınızı nasıl buluyorsunuz?
3. Buradaki sağlık imkanları hakkında ne düşünüyorsunuz? Sizce Türkiye yeterli ve kaliteli sağlık hizmeti veriyor mu? Bu konuda şikayetleriniz var mı?
4. Son zamanlarda bizzat yaşadığınız bir olayı (komik, üzücü, şaşırtıcı, garip v.s.) anlatabilir misiniz? Lütfen cümleye “geçenlerde” diye başlayınız
5. Son zamanlarda arkadaşlarınızdan/çocuklarınızdan/annenizden/eşinizden duyduğunuz ya da bir yerde okuduğunuz, televizyonda duyduğunuz bir olay/haber anlatabilir misiniz? Lütfen cümleye “geçenlerde...” diye başlayınız.
6. Ailenizin çocukken yaptığınızı anlattığı ancak sizin yaptığınızı hatırlamadığınız bir olayı (yaramazlığınızı) anlatınız.
7. Şimdi sizden siz tatildayken evinize hırsız girdiğini farzetmenizi istiyorum. Tatilden eve geldiğinizde bakıyorsunuz ki evde hiç bir şey yerinde değil. Hemen polisi aramalısınız ve çalınan eşyalarınızın bilgisini vermelisiniz. Diyelim ki ben polisim ve bana olayı anlatıyorsunuz. Şimdi lütfen bana olayı en baştan detaylarıyla anlatın.

Appendix 17 Pictures used in the picture description task



Gaziantep'te sel felaketi. (2014, October 15). *Milliyet*. Retrieved from

<http://www.milliyet.com.tr/gaziantep-te-sel-felaketi-gaziantep-yerelhaber-425385/>



Çoban, C. (2014, November 30). İstanbul'da bir binanın üzerine vinç devrildi. *Hürriyet*.

Retrieved from <http://www.hurriyet.com.tr/istanbulda-bir-binanin-uzerine-vinc-devrildi-27670596>



Yürürken üzerine duvar yıkıldı. (2014, November 28). *Hürriyet*. Retrieved from <http://www.hurriyet.com.tr/yururken-uzerine-duvar-yikildi-27671396>



Tafolar, M. (2014, December 1). CHP, Yalova'daki ağaç kesimini incelemeye aldı. *Milliyet*. Retrieved from <http://www.milliyet.com.tr/chp-yalova-daki-agac-kesimini-gundem-1977458/>



Meriç suyunun hapsettiği mahalle: Karaağaç. (2014, December 9). *Milliyet*. Retrieved from <http://www.milliyet.com.tr/meric-suyunun-hapsettigi-mahalle--gundem-1981678/>

Appendix 18 Turkish C-Test with the answers

Aşağıda Türkçe bazı kısa metinler okuyacaksınız. Her bir metin bazı kelimelerin tamamlanmadan bırakıldığı boşluklar içeriyor. Metni okurken boşlukları tamamlayınız. Kelime tamamlama için birden fazla seçenek mümkün olabilir bu nedenle doğru ya da yanlış cevap olmadığını aklınızda bulundurunuz. Katılımınız için teşekkürler.

Metin 1

Geçen gün kendimi “ulumayı öğrenen yavru buldog” videosu paylaşırken yakaladım. Sevimli hayvan videosu ve fotosu paylaşımının insanlar ve hayvanlar üzerindeki etkileri kesinlikle araştırılmalı. Konu tabii ki sevimli hayvan fotoları. Evet, bili _____, internetin ic _____ edildiği, Youtube’un çık _____ günden be _____ insanlık ke _____ ve kö _____ videosu payla _____ ve bun _____ gülüyor. Örn _____ Mehmet Tez bunu beğ _____, Mehmet Tez bunu arkad _____ duvarında payla _____. Evet ye _____ değil. İlk vi _____ ne za _____ yüklendi, ne zaman bu alışk _____ patlama ya _____ ve sos _____ bir many _____ halini al _____ bilemiyorum. Ama şunu biliyorum bugün olay çığırından çıkmak üzere.

Metin 2

Yrd. Doç. Dr. Ferahim Yeşilyurt (Acıbadem International Hastanesi uzman psikoloğu). Güneşi az gör _____, iş sorumlul _____ artması, okul _____ başlaması, hava _____ serinlemesi insan _____ birtakım ruh _____ değişimlere ne _____ oluyor. Yorg _____, halsizlik, gerg _____ ve stres da _____ sık görü _____, sonbahar depre _____ ortaya çık _____. Özellikle kır _____, duygusal, str _____ baş etm _____ zorlanan ve yaln _____ çeken kişi _____ sonbahar depre _____ tehlikeli bir ha _____ dönüşebiliyor. Mevsimsel geçiş dönemlerinden olumsuz

etkilenmek istemeyen kişilere uygun besinleri seçmelerini, düzenli uyumalarını ve egzersiz yapmalarını tavsiye ediyoruz.

Full text 1

Geçen gün kendimi “ulumayı öğrenen yavru buldog” videosu paylaşırken yakaladım. Sevimli hayvan videosu ve fotosu paylaşımının insanlar ve hayvanlar üzerindeki etkileri kesinlikle araştırılmalı

Konu tabii ki sevimli hayvan fotoları. Evet biliyorum, internetin icat edildiği, Youtube’un çıktığı günden beri insanlık kedi ve köpek videosu paylaşıyor ve bunlara gülüyor. Örneğin Mehmet Tez bunu beğendi, Mehmet Tez bunu arkadaşının duvarında paylaştı. Evet yeni değil. İlk video ne zaman yüklendi, ne zaman bu alışkanlık patlama yaptı ve sosyal bir manyaklık halini aldı bilemiyorum. Ama şunu biliyorum bugün olay çığırından çıkmak üzere. Bağımlı oluyor insan. Biraz araştırınca bu alanda uzmanlaşmış onlarca site olduğunu fark ettim. Kimileri sadece insan gibi giydirilmiş ev hayvanlarını paylaşıyor, kimileri sadece kedi üzerine uzman. Bazıları pet olmayan, pet olmasına alışık olmadığımız hayvanları da kapsıyor.

Full text 2

Yrd. Doç. Dr. Ferahim Yeşilyurt (Acıbadem International Hastanesi uzman psikoloğu). Güneşi az görmek, iş sorumluluklarının artması, okulların başlaması, havaların serinlemesi insanlarda birtakım ruhsal değişimlere neden oluyor. Yorgunluk, halsizlik, gerginlik ve stres daha sık görülüyor, sonbahar depresyonu ortaya çıkıyor. Özellikle kırılgan, duygusal, stresle baş etmekte zorlanan ve yalnızlık çeken kişilerde sonbahar depresyonu tehlikeli bir hale dönüşebiliyor. Mevsimsel geçiş dönemlerinden olumsuz etkilenmek istemeyen kişilere uygun besinleri seçmelerini, düzenli uyumalarını ve egzersiz yapmalarını tavsiye ediyoruz.

Appendix 19 English C-Test with the answers

Below you will see two short texts in total. Each text has some gaps where parts of some words have been left out. Please fill in the gaps. Please keep in mind that there are no right or wrong answers as sometimes there are several possibilities for the missing parts of the words. Thank you for your participation.

Text 1

We all live with other people's expectations of us. These are a refl_____ of th_____ trying to under_____ us; the_____ are predic_____ of wh_____ they th_____ we will think, d_____ and feel .Gene_____, we acc_____ the sta_____ quo, but these expec_____ can be ha_____ to han_____ when they co_____ from our fami_____ and can be diff_____ to ign_____, especially wh_____ they come from our par_____.

Text 2

The decision to remove soft drinks from elementary and junior high school vending machines is a step in the right direction to help children make better choices when it comes to what they eat and drink. Childhood obe_____ has bec_____ a ser_____ problem in th_____ country a_____ children cons_____ more sugar-based fo_____ and sp_____ less ti_____ getting the nece_____ exercise. Many par_____ have quest_____ schools' deci_____ to al_____ vending machines which disp_____ candy and so_____ drinks. Many schools, th_____, have co_____ to re_____ on the mo_____ these machines generate through agreements with the companies which makes soft drinks and junk food.

Full text 1

We all live with other people's expectations of us. These are a reflection of them trying to

understand us, they are predictions of what we will think, do and feel. Generally we accept the

status quo, but these expectations can be hard to handle when they come from our families and can be difficult to ignore, especially when they come from our parents.

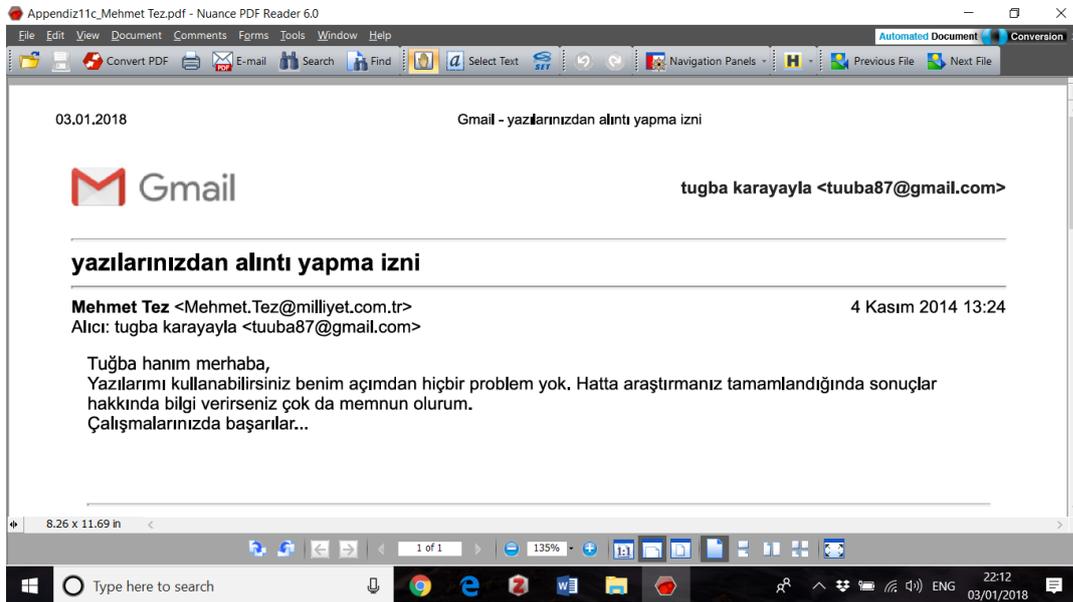
Full text 2

The decision to remove soft drinks from elementary and junior high school vending machines

is a step in the right direction to help children make better choices when it comes to what they

eat and drink. Childhood obesity has become a serious problem in this country as children consume more sugar-based food and spend less time getting the necessary exercise. Many parents have questioned schools' decisions to allow vending machines which dispense candy and soft drinks. Many schools, though, have come to rely on the money these machines generate through agreements with the companies which makes soft drinks and junk food.

Appendix 20 Written consent of the column writers

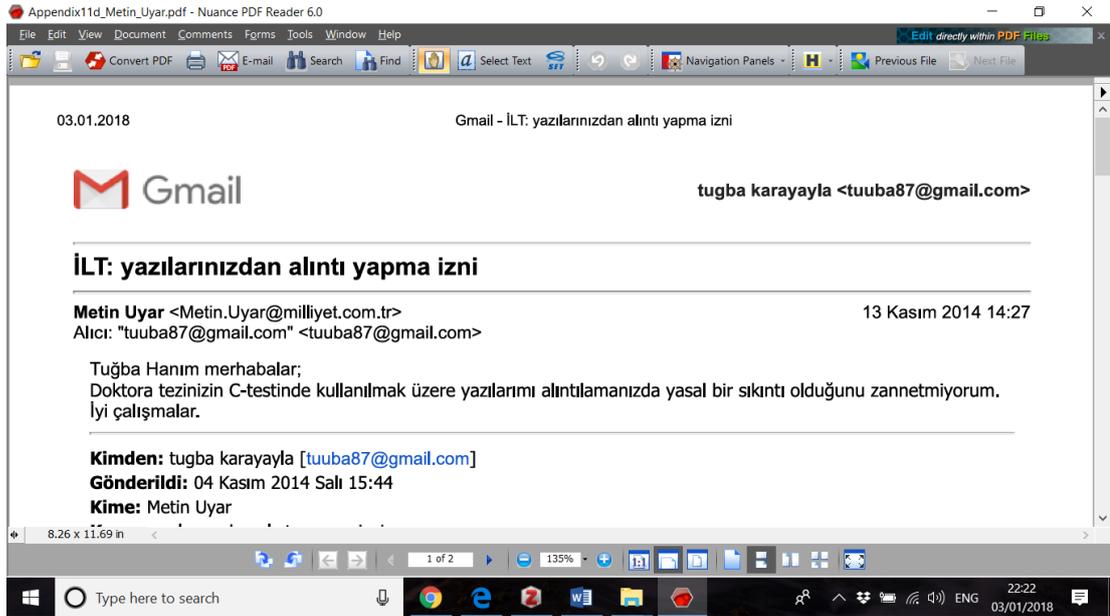


Translation:

Hi Tugba,

You can use my articles, there is no problem for me. Actually, I would be very happy if you inform me about your findings when your research is complete.

I wish you success.



Translation:

Hi Tugba,

I do not think that there are any legal issues in using my articles to create a C-Test in your PhD thesis.

keep up with good work

Appendix 21 Can-do scale in English

Listed below are a number of “can-do” scales. They consist of statements about your language proficiency in both Dutch and English. What I am interested in is how well or bad you perceive your current language proficiency in both languages to be. Please read each description carefully and circle the appropriate number to indicate whether, at the present time, you would be able to carry out each task in each language. Thus, you can only circle one number per language and per statement. Please use the following scale:

- 6 = I cannot do this at all
- 7 = I can do this, but with much difficulty
- 8 = I can do this, although with some difficulty
- 9 = I can do this fairly easily
- 10 = I can do this without any difficulty at all

	Listening comprehension	Dutch	English
1.	I can understand most TV news and current affairs programmes.	1 2 3 4 5	1 2 3 4 5
2.	I can understand the main points of many radio or TV programmes on current affairs or topics of personal or professional interest when the delivery is relatively slow and clear.	1 2 3 4 5	1 2 3 4 5
3.	I have no difficulty in understanding any kind of spoken language, whether live or broadcast, even when delivered at fast native speed, provided that I have some time to get familiar with the accent.	1 2 3 4 5	1 2 3 4 5
4.	I can understand extended speech even when it is not clearly structured and when relationships are only implied and not signalled explicitly.	1 2 3 4 5	1 2 3 4 5
5.	I can understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc.	1 2 3 4 5	1 2 3 4 5
6.	I can understand extended speech and lectures and follow even complex lines of argument provided the topic is reasonably familiar.	1 2 3 4 5	1 2 3 4 5
7.	I can understand the majority of films in standard dialects.	1 2 3 4 5	1 2 3 4 5
8.	I can understand television programmes and films without too much effort.	1 2 3 4 5	1 2 3 4 5
	Reading proficiency	Dutch	English
9.	I can understand long and complex factual and literary texts, appreciating distinctions of style.	1 2 3 4 5	1 2 3 4 5
10.	I can read articles and reports concerned with contemporary problems in which the writers adopt particular attitudes or viewpoints.	1 2 3 4 5	1 2 3 4 5
11.	I can read with ease virtually all forms of the written language, including abstract, structurally or linguistically complex texts such as manuals, specialised articles and literary works.	1 2 3 4 5	1 2 3 4 5
12.	I can understand the description of events, feelings and wishes in personal letters.	1 2 3 4 5	1 2 3 4 5

13.	I can understand texts that consist mainly of high frequency everyday or job-related language.	1 2 3 4 5	1 2 3 4 5
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		Dutch	English
14.	I can understand specialised articles and longer technical instructions, even when they do not relate to my field.	1 2 3 4 5	1 2 3 4 5
15.	I can understand contemporary literary prose.	1 2 3 4 5	1 2 3 4 5
	Speaking ability	Dutch	English
16.	I can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible.	1 2 3 4 5	1 2 3 4 5
17.	I can present a clear, smoothly flowing description or argument in a style appropriate to the context and with an effective logical structure which helps the recipient to notice and remember significant points.	1 2 3 4 5	1 2 3 4 5
18.	I can use language flexibly and effectively for social and professional purposes.	1 2 3 4 5	1 2 3 4 5
19.	I can enter unprepared into conversation on topics that are familiar, of personal interest or pertinent to everyday life (e.g. family, hobbies, work, travel, current events).	1 2 3 4 5	1 2 3 4 5
20.	I can take part effortlessly in any conversation or discussion and have a good familiarity with idiomatic expressions and colloquialisms.	1 2 3 4 5	1 2 3 4 5
21.	I can narrate a story or relate the plot of a book or film and describe my reactions.	1 2 3 4 5	1 2 3 4 5
22.	I can deal with most situations likely to arise whilst travelling in an area where the language is spoken.	1 2 3 4 5	1 2 3 4 5
23.	I can take an active part in discussion in familiar contexts, accounting for and sustaining my views.	1 2 3 4 5	1 2 3 4 5

24.	I can present clear, detailed descriptions of complex subjects integrating sub-themes, developing particular points and rounding off with an appropriate conclusion.	1 2 3 4 5	1 2 3 4 5
25.	If I do have a problem I can backtrack and restructure around the difficulty so smoothly that other people are hardly aware of it.	1 2 3 4 5	1 2 3 4 5
26.	I can connect phrases in a simple way in order to describe experiences and events, my dreams, hopes and ambitions.	1 2 3 4 5	1 2 3 4 5
27.	I can present clear, detailed descriptions on a wide range of subjects related to my field of interest.	1 2 3 4 5	1 2 3 4 5
		Dutch	English
28.	I can express myself fluently and convey finer shades of meaning precisely.	1 2 3 4 5	1 2 3 4 5
29.	I can explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.	1 2 3 4 5	1 2 3 4 5
30.	I can briefly give reasons and explanations for opinions and plans.	1 2 3 4 5	1 2 3 4 5
31.	I can express myself fluently and spontaneously without much obvious searching for expressions.	1 2 3 4 5	1 2 3 4 5
32.	I can formulate ideas and opinions with precision and relate my contribution skillfully to those of other speakers.	1 2 3 4 5	1 2 3 4 5
	Writing proficiency	Dutch	English
33.	I can select style appropriate to the reader in mind.	1 2 3 4 5	1 2 3 4 5
34.	I can write simple connected text on topics which are familiar or of personal interest.	1 2 3 4 5	1 2 3 4 5
35.	I can write complex letters, reports or articles which present a case with an effective logical structure which helps the recipient to notice and remember significant points.	1 2 3 4 5	1 2 3 4 5
36.	I can write an essay or report, passing on information or giving reasons in support of or against a particular point of view.	1 2 3 4 5	1 2 3 4 5

37.	I can write personal letters describing experiences and impressions.	1 2 3 4 5	1 2 3 4 5
38.	I can express myself in clear, well-structured text, expressing points of view at some length.	1 2 3 4 5	1 2 3 4 5
39.	I can write summaries and reviews of professional or literary works.	1 2 3 4 5	1 2 3 4 5
40.	I can write clear, detailed text on a wide range of subjects related to my interests.	1 2 3 4 5	1 2 3 4 5
41.	I can write clear, smoothly flowing text in an appropriate style.	1 2 3 4 5	1 2 3 4 5
42.	I can write letters highlighting the personal significance of events and experiences.	1 2 3 4 5	1 2 3 4 5
43.	I can write about complex subjects in a letter, an essay or a report, underlying what I consider to be the salient issues.	1 2 3 4 5	1 2 3 4 5

Appendix 22 Yetenek Ölçeği

Aşağıda gördüğünüz ölçek İngilizce dilindeki yetenek ve yeterliliğinize yönelik sorular içermektedir. Lütfen her açıklamayı dikkatlice okuyunuz ve aşağıdaki sayı ölçeğini kullanarak her bir açıklama için kendinize uygun olan sayıyı yuvarlak içine alınız.

1= kesinlikle yapamıyorum

2= çok zorlanarak yapabiliyorum

3= yapabiliyorum ama biraz zorlanıyorum

4= kolaylıkla yapabiliyorum

5= hiçbir zorlanma yaşamıyorum/ çok rahat bir şekilde yapabiliyorum

Örnek:

Bar ya da cafe gibi gürültülü bir ortamda yanımdaki kişileri anlayabilir ve sohbete katılabilirim. 1 2 3 4 5

	DİNLEDİĞİNİ ANLAMA	İngilizce
1.	Birçok haber ve tartışma programını anlayabilirim.	1 2 3 4 5
2.	Kişisel veya profesyonel anlamda ilgime yönelik bir çok radyo ve TV programlarının ana konusunu kısmen yavaş ve açık bir şekilde sunulduğu sürece anlayabilirim.	1 2 3 4 5
3.	Eğer aksana alışmam için yeterli sürem varsa, canlı ya da banttan yayınlardaki en hızlı konuşuru bile hiç zorlanmadan anlayabilirim.	1 2 3 4 5
4.	Konuşmada geçen konular ve ilişkiler açıkça belirtilmemiş ve yapılandırılmamış olsa bile uzun konuşmaları anlayabilirim.	1 2 3 4 5
5.	İş, okul v.s. de düzenli karşılaşılan, bildik konulardaki standart konuşmaların ana noktalarını kolaylıkla anlayabilirim.	1 2 3 4 5
6.	Uzun konuşma ve sunumları anlayabilir ve konu tanıdık bir konu olduğu sürece o konudaki karmaşık tartışmaları bile takip edebilirim.	1 2 3 4 5
7.	Standart diyalektlerin konuşulduğu filmlerin büyük çoğunluğunu anlayabilirim.	1 2 3 4 5
8.	Çok çaba sarfetmeden televizyon programları ve filmleri anlayabilirim.	1 2 3 4 5
	OKUMA BECERİSİ	
9.	Değişik stil ve usluplerin farkındalığına sahip olup uzun ve karmaşık fiili ve edebi metinleri anlayabilirim.	1 2 3 4 5
10.	Günümüz çağdaş sorunları üzerine belirli tutum ve bakış açılarıyla yazılmış makale ve raporları okuyabilirim.	1 2 3 4 5

11.	Soyut, yapısal ya da dilsel karmaşık metinler (kılavuzlar, özel makaleler, edebi metinler v.b.) dahil olmak üzere hemen hemen her türlü yazılı metin ve türevlerini kolaylıkla okuyabilirim.	1 2 3 4 5
12.	Kişisel mektup ve benzeri metinlerde belirtilen istek, hisler ve olay betimlemelerini anlayabilirim.	1 2 3 4 5
13.	Çok sık rastlanan günlük ya da mesleki dilde yazılmış metinleri anlayabilirim.	1 2 3 4 5
14.	İlgi alanımın dışında olsa bile uzun teknik talimatlar içeren uzman makaleleri, metinleri anlayabilirim.	1 2 3 4 5
15.	Çağdaş edebi metinleri anlayabilirim.	1 2 3 4 5
	KONUŞMA YETENEĞİ	
16.	Anadili İngilizce olan kişiler ile belirli bir doğallık ve akıcılıkla, düzenli iletişim kurabilirim.	1 2 3 4 5
17.	Herhangi bir argüman ya da açıklamayı, hitap ettiğim kişilerin bu açıklama ya da argümandaki önemli noktaları farketmesini ve hatırlamasını sağlayacak şekilde uygun bir üslup ile düzgün ve akıcı bir şekilde sunabilirim.	1 2 3 4 5
18.	Mesleki ve toplumsal amaçlar için İngilizceyi esnek ve etkin bir şekilde kullanabilirim.	1 2 3 4 5
19.	Tanıdık, kişisel ilgi ya da günlük yaşamla ilgili olan (aile, iş, seyahat, hobiler gibi) konularda hazırlıksız sohbetlerde bulunabilirim.	1 2 3 4 5
20.	Deyimsel açıklamalar ve günlük konuşma dili yapılarına oldukça aşina olup, herhangi bir konuşma ya da tartışmaya hiç çaba sarfetmeden katılabilirim	1 2 3 4 5
21.	Bir kitap ya da film konusunu anlatabilir ve görüşlerimi bildirebilirim.	1 2 3 4 5
22.	İngilizce dilinin konuşulduğu bir bölgeye yaptığım yolculuk sırasında ortaya çıkabilecek bir çok durumla baş edebilirim.	1 2 3 4 5
23.	Tanıdık konulardaki tartışmalarda aktif rol alabilir, düşüncelerimi doğrulayabilir ve açıklayıcı bir şekilde anlatabilirim.	1 2 3 4 5
24.	Karmaşık konuları alt temalarla bütünleştirerek detaylı bilgi verebilir, belirli bakış açıları geliştirip uygun sonuçlara bağlayabilirim.	1 2 3 4 5
25.	Konuşma esnasında yaşadığım bir sorun olursa, diğer insanların farkedemeyeceği şekilde kolaylıkla zorlandığım kısma geri dönüp o kısmı tekrar yapılandırıp söyleyebilirim.	1 2 3 4 5
26.	Yaşadıklarımı, deneyimlerimi, isteklerimi v.s. betimlemek için kalıpları basit bir şekilde kullanabilir ve bağlantı kurabilirim.	1 2 3 4 5
27.	İlgi alanıma giren konularda geniş bir yelpazede net, ayrıntılı bilgi verebilirim	1 2 3 4 5
28.	Kendimi akıcı bir şekilde ifade edebilir ve kesin, ince anlam ifadeleri yükleyebilirim.	1 2 3 4 5

29.	Çeşitli seçeneklerin olumlu ve olumsuz yanlarını ortaya koyarak bir konu hakkında görüş bildirebilirim.	1 2 3 4 5
30.	Düşünce ve planlara ilişkin açıklama ve nedenler ortaya koyabilirim.	1 2 3 4 5
31.	Sözcük ve ifadeleri çok aramaksızın, kendimi akıcı ve doğal bir şekilde rahatlıkla ifade edebilirim.	
32.	Fikir ve görüşlerimi hassasiyetle oluşturabilir ve diğer konuşmacıların fikirleriyle ustalıkla ilişkilendirebilirim.	1 2 3 4 5
	YAZMA BECERİSİ	
33.	Hitap edeceğim okuyucuya uygun bir üslup seçebilirim.	1 2 3 4 5
34.	Bildik ya da ilgi alanıma giren konularla bağlantılı bir metin yazabilirim.	1 2 3 4 5
35.	Okuyucunun önemli noktaları ayırt edip anımsamasına yardımcı olacak etkili, mantıksal bir yapılandırma ile bir durum ortaya koyan karmaşık mektuplar, raporlar ya da makaleler yazabilirim.	1 2 3 4 5
36.	Belli bir bilgi vermeye yönelik olan ya da bir düşünceyi savunma veya çürütmeye yönelik nedenlerin belirtildiği kompozisyon ve raporlar yazabilirim.	1 2 3 4 5
37.	Deneyim ve izlenimlerimi betimleyen kişisel metinler yazabilirim.	1 2 3 4 5
38.	Kendimi belli bir uzunlukta olan açık, berrak ve iyi yapılandırılmış metinlerle ifade edebilirim.	1 2 3 4 5
39.	Mesleki ya da edebi yapıt özetleri ya da eleştirileri yazabilirim.	1 2 3 4 5
40.	İlgi alanıma giren konularda geniş bir yelpazede ayrıntılı ve anlaşılır metinler yazabilirim.	1 2 3 4 5
41.	Uygun bir üslupla açık ve akıcı metinler yazabilirim.	1 2 3 4 5
42.	Olayların ve deneyimlerin benim için taşıdıkları önemi ön plana çıkaran metinler yazabilirim.	1 2 3 4 5
43.	Belli başlı sorun teşkil eden ve göze çarpan problemlerin temelini oluşturduğunu düşündüğüm konularda kompleks mektup, rapor ya da kompozisyonlar yazabilirim.	1 2 3 4 5