Comprehension of Evidentiality in Spoken Turkish:

Comparing Monolingual and Bilingual Speakers

by

Figen Karaca

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science

Department of Linguistics

University of Alberta

Abstract

This thesis investigated the comprehension of evidentiality in Turkish heritage speakers and first generation immigrants, in comparison to monolingual speakers using a self-paced listening task. The question of how individual differences such as the speakers' proficiency and language environment may modulate their processing was also addressed.

Evidentiality refers to the encoding of the source of information, and in Turkish it is conveyed by means of the past tense suffixes *–DI* and *–mIş*. More precisely, the information gathered through indirect experience, such as third-party narration and inference based on evidence, requires the use of the suffix *–mIş* 'indirect experience', whereas directly experienced events require using the suffix *–DI* 'direct experience'. At the same time, the claim that the suffix *–DI* consistently conveys direct experience in Turkish is argued to be fallacious by Johanson (2003, 2018), according to whom the suffix *–mIş* 'indirect experience' is the marked form and the suffix *–DI* 'direct experience' is its unmarked counterpart in the evidentiality domain. The intricate discourse-dependencies of these suffixes have been argued to cause problems for both heritage speakers and first generation immigrants (Arslan, Bastiaanse, & Felser, 2015; Arslan, De Kok, & Bastiaanse, 2017). Yet, how individual differences modulate the processing of evidentiality has not been examined.

Accordingly, in this thesis, the sensitivity of monolinguals, heritage speakers, and first generation immigrants to the violations of evidentiality was examined. In addition, the role of the proficiency level and the language environment of the participants in the processing of evidentiality was also investigated. The findings of this thesis inform our understanding

of evidentiality in Turkish in that the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' are not on equal footing. The incongruity of the suffix *–mIş* 'indirect experience' induced early and greater processing difficulty, whereas that of the suffix *–DI* 'direct experience' caused a late and less intense processing difficulty for monolingual speakers. First generation immigrants were slower than monolingual speakers but their performance eventually paralleled that of monolingual speakers in the incongruity of the suffix *–mIş* 'indirect experience'. In the case of the suffix *–DI* 'direct experience', no such effect was observed, which may be explained by either slow processing or attrition. Finally, heritage speakers did not show any sensitivity to the incongruity of either suffix. In terms, of individual variables, the richness of the Turkish environment modulated how first generation immigrants processed both suffixes, whereas Turkish use in early childhood modulated how heritage speakers processed one of the two suffixes, the suffix *–mIş* 'indirect experience'.

To recapitulate, this thesis suggests that the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' are not equally violable in the first place. It also argues that evidentiality is indeed a vulnerable domain in Turkish as a heritage language, whereas it does not necessarily undergo attrition in the case of first generation immigrants in that the possibility of similar, but slower processing should also be considered. The question of how individual differences modulate the sensitivity to incongruent uses of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' remained unanswered due to the limited number of first generation immigrants and heritage speakers in this study, though the Turkish richness and Turkish use in early childhood were significant predictors of how these suffixes were processed regardless of congruency.

Preface

This thesis is an original work by Figen Karaca. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name "Processing Evidentiality in Turkish as a Heritage Language", No. Pro00074174, August 15, 2017.

Acknowledgements

I owe my deepest gratitude to my primary supervisor, Dr. Juhani Jarvikivi, who has believed in my abilities through this process, and has patiently helped me think like a researcher. I also would like to express my sincerest appreciation to my secondary supervisor, Dr. Evangelia Daskalaki, who came on-board late but contributed significantly to my thesis-writing process and morale. I cannot thank Juhani and Lila enough for all their help, guidance, and encouragement over the last two years for my academical and personal growth.

I also would like to thank to the members of my examining committee, Dr. Stephanie Archer and Dr. Vicky Chondrogianni, for their insightful comments and feedback.

I am also deeply thankful to my dearest friends Abby, who was kind enough to proofread my entire manuscript and help me with editorial corrections, and Kaidi, who was always patient with me when I needed help with statistics. I was so lucky to have you both my side, and thank you for the times we spent together talking, drinking wine and complaining. I am also grateful to Filip, who was always present when I needed help. I also would like to thank Izzy for helping me out with the intricate analysis and design process of the self-paced listening task.

A very special thanks goes to Derya Çınar, who is the female voice of my experiment, for all the time she spared for the recordings.

I must acknowledge my undergraduate professors, Dr. Martina Gracanin-Yüksek and Dr. Bilal Kırkıcı, who made me love linguistics, and encouraged me to pursue a graduate training.

I would like to extend my sincerest gratitude to Bora, who always went above and beyond his way to help me at each and every step of this process. His presence and support made my life better in every possible way. Thank you for always being there for me under any circumstances.

Lastly, I am deeply thankful to my mother who is always there for me when I need her and who put so much effort into my education, and to my sister who is always first to support me on all my decisions, and to make me believe that I am able. I would not have made it without you. Thank you for your trust, encouragement and support.

I wish to dedicate this thesis, along with everything I have done right, to my family.

Contents

List of Figures

List of Tables

Chapter 1: Introduction

Languages spoken in Canada, apart from English and French, have been rising mainly due to an increase in immigrant languages. Statistics Canada reports that nearly seven million people speak an immigrant language at home, which represents 21.1% of the Canadian population with an increase of 14.7% since 2011 (Statistics Canada, 2016). Under these circumstances, the study of immigrant languages may contribute significantly to linguistic research, as it may enhance our understanding of how language is acquired, developed, and changed under reduced input conditions and under heavy influence of a second language. A better understanding of the factors that may facilitate the acquisition and maintenance of immigrant languages, in turn, can translate into practical advice for educators and immigrants who are interested in maintaining the language of their home country, and also transferring it to the next generation.

Immigrants who move to a new country as adults are usually considered first generation immigrants and their children, therefore, second-generation (Montrul, 2015). Second generation immigrants are referred as heritage language speakers. Although it is hard to find an exhaustive definition of heritage speakers, a widely acknowledged one defines them as early bilinguals who are raised in a household where a language other than the societal language is spoken, and who are to some degree proficient in both languages (Valdes, 2000). Generally, in immigrant contexts heritage speakers are either born in the host-country or arrive at a young age (Montrul, 2015). Whereas, first generation immigrants are raised in a monolingual setting and are exposed to a second language (L2) at a relatively old age, heritage speakers

are born into an L1-rich environment, and the dominance of L1 usually continues until they start pre-school when they are exposed to the societal language. As they get older, the L2 (i.e. the societal language) usually becomes their dominant language (Montrul, 2015). Thus, a wealth of studies has shown that the L1 of first and second generation immigrants typically differs from monolingual norms (Montrul, 2008; Montrul & Sánchez-Walker, 2013; Polinsky, 2011; Pascual y Cabo, 2018; Arslan et al., 2015; Kaltsa, Tsimpli, & Rothman, 2015), a fact which may be due to a variety of reasons including reduced L1 input coupled with intensive L2 exposure.

There is a bias of conducting studies using offline methods in the literature given the dearth of language processing studies in heritage language (Bolger & Zapata, 2011) and L1 attrition. While the value of offline studies and their results is well-acknowledged, online studies can help shed light on some of the differences identified between the language of immigrants and monolingual speakers, which are so far left unanswered. Offline methods such as grammaticality judgement tests help us measure the final decision of an individual by leaving the process of decision-making in the dark (Montrul, 2015). Online tasks offer insight in real-time language processing, which should complement the offline tasks, and help us better understand the changes observed in the L1 of bilinguals. Some of the divergences from target-like skills may stem from differences in online processing. Thus far, a limited number of language processing studies have been conducted with first and second generation immigrants, and have revealed conflicting results. Bergmann, Meulman, Stowe, Sprenger, and Schmid (2015) tested the performance of L1 German attriters and monolingual German speakers in verb and gender agreement by using event-related potentials (ERP). For

the gender agreement condition, masculine and neuter nouns were combined with masculine and neuter determiners, respectively in grammatical sentences, whereas the determiners and nouns were mismatched in gender in ungrammatical sentences. The determiners and nouns were also either adjacent or intervened by an adjective. The results revealed no significant difference between the L1 attriters and monolinguals in processing grammatical gender since both groups showed similar P600 effect and no N400 effect, suggesting that even under prolonged L2 influence, processing in L1 remains unaffected. In contrast, Kaltsa et al. (2015) investigated how Greek L1 attriters and heritage speakers in Sweden process null and overt subject pronouns in adverbial clauses where the null/overt subject pronoun can theoretically refer to both the subject or object of the main clause. They used a self-paced listening study where at the end of each sentence the participants needed to decide on the matching picture. It should be noted that, in this study, the sentence-picture matching preference, the reaction times for that preference and the reaction times on the critical segment were analyzed and reported. The results showed that heritage speakers and L1 attriters differed from monolinguals in overt-pronoun interpretation while the online processing of the first two groups were quite similar. Overall, while Bergmann et al. (2015) reported no difference between L1 attriters and monolingual speakers, Kaltsa et al. (2015) showed that heritage speakers and first generation immigrants performed similarly –yet differently from monolinguals in some domains. The reason for the conflicting findings may be due to individual differences, such as the proficiency level and the language environment of the participants, the tested linguistic phenomenon, and the tested language pairs. The current study aims to examine the language comprehension of first generation immigrants and heritage speakers of Turkish descent, in their first language, Turkish. The phenomenon under investigation

is evidentiality, i.e., grammatical encoding of information source. Furthermore, the role of language proficiency and language environment is also examined. The chapters and sections that follow describe the relevant body of literature and the current study. Section 1.1 introduces the hypotheses that have been proposed to account for the non-native-like patterns observed in heritage and immigrant contexts, and describes the individual differences that affect language processing along with cross-linguistic influence. Section 1.4 reviews the literature on evidentiality in Turkish. Chapter 2 provides an overview of the present study, research questions, and predictions. The methodology and the findings of this study are presented in Chapter 3 and 4, respectively. Lastly, Chapter 5 and 6 include the discussion of the findings and conclusion.

1.1 Deviant patterns in immigrant context: what, how and why?

For a long time, in immigrant settings, knowledge of the societal L2 attracted more attention than knowledge of L1 or the heritage language. Consequently, the main interest was a mono-directional transfer from L1 to L2 (Schmid & Köpke, 2007; Schmid, 2013). The deviant patterns observed in the first languages of first generation immigrants and heritage speakers, however, suggest that not only does L1 interfere with L2 but also that knowing an L2 affects L1. The changes observed in the first language of heritage speakers and first generation immigrants are intra-generational and inter-generational, respectively (Gürel & Yılmaz, 2011). Intra-generational changes are characterized as language attrition. Language attrition, however, is not a well-defined phenomenon. On the one hand, Gürel and Yılmaz (2011) consider language attrition to be an "unconscious rearrangement or restructuring of

the L1 grammar due to L2 contact" (p. 222) when the immigrants have little or no L1-contact coupled with prolonged exposure to L2. On the other hand, Schmid and Köpke (2017) define it as a process where "(a) pre-existing linguistic knowledge becomes less accessible or is modified to some extent as a result of the acquisition of a new language, and (b) L1 production, processing or comprehension are affected by the presence of this other language" (p. 638). In other words, not only representational changes, i.e., restructuring of L1 grammar, but also online processing problems can be regarded as attrition. These different definitions result from a long-lasting debate on competence and performance, and whether problems affecting performance but not linguistic competence should be considered as true attrition. Seliger and Vago (1991) argue that changes resulting from "performance" point to an online accessing problem, which demonstrates itself as trouble in merely accessing, processing and controlling a linguistic system. In other words, they do not necessarily point to a change in linguistic competence of the speakers or a structural reconfiguration. They rather simply stem from slower or less efficient processing due to co-existence of two languages in the same mind. The interest of language attrition studies should therefore be "erosion that reaches the level of competence" (Seliger & Vago, 1991, p. 7). In contrast, Schmid and Köpke (2017) disagree with such a dichotomy and argue that online and representational effects of L2 on L1 are on a continuum where online effects are the first stage that may be –but not necessarily are– followed by the latter. This proposal bears the conclusion that "every bilingual is L1 attriter" (Schmid & Köpke, 2017, p. 641) regardless of whether L1 attrition reaches the final stage of the continuum. Nevertheless, the resolution of such debate is beyond the scope of this thesis. The case of inter-generational change is equally intricate. The debate of whether some changes are caused by divergent representation or merely by different online

processing strategies is also of relevance in heritage language literature.

1.1.1 First generation immigrants

There are several hypotheses in which adult L1 attrition is accounted for (for a detailed discussion see Schmid, 2002; Montrul, 2008). In the following sections, only the Regression Hypothesis (Jakobson, 1941), the Interface Hypothesis (Sorace & Filiaci, 2006), the Activation Threshold Hypothesis (M. Paradis, 1993), and the Feature Reassembly Model (Lardiere, 2009) as applied to L1 context are introduced. The possible effects of cross-linguistic influence will be discussed in Section 1.2.

1.1.1.1 Regression Hypothesis

Jakobson's (1941) Regression Hypothesis argues that the order of acquisition is the key factor in L1 attrition. It argues that order of language attrition mirrors the reversed order of language acquisition. In order words, the late acquired properties are more prone to attrition compared to early acquired ones. Even though, the Regression Hypothesis has been around for a long time, there is little research on L1 attrition where its explanatory power is investigated. Among others, Keijzer (2010) tested the tenability of this hypothesis by using a modified wug test and a retelling story with Dutch immigrants in Canada (mean age 66.4), adult Dutch monolinguals (mean age 66.2) and young Dutch monolinguals (mean age 13.9) who were at the advanced stages of language development but might still show optionality, which cannot be observed in mature Dutch grammar. Though more linguistic structures were tested, only plural inflection and diminutive formation were reported in detail

in Keijzer (2010). The results showed that both Dutch attriters and young monolinguals obtained lower scores in plural marker *–en* and in the irregular forms compared to adult monolinguals. Since the irregular forms were the last acquired ones, this finding was in line with the predictions of Regression Hypothesis. In the case of diminutives, no significant difference was observed between L1 attriters and acquirers, and they both produced more deviant forms than adult monolinguals, except for one diminutive form where acquirers outperformed both adult groups. Taken together, the performance of Dutch L1 attriters and young monolinguals were similar, and yet different from adult monolingual speakers in both plural and diminutive formation, which lends support to the Regression Hypothesis. However, the observed divergences can also be explained within other theoretical frameworks, and Keijzer (2010) argued that the Regression Hypothesis still lacks certain explanatory power in terms of L1 attrition and needs to be grounded in a theoretical framework.

1.1.1.2 Interface Hypothesis

The Interface Hypothesis was first introduced in Sorace and Filiaci (2006) where it was discussed in relation to near-native L2 speakers. Since then, it has been extended to L1 attriters (Chamorro, Sorace, & Sturt, 2016) and heritage speakers (Leal, Rothman, & Slabakova, 2014; Pascual y Cabo, Lingwall, & Rothman, 2012). Grounded in generative framework, the Interface Hypothesis proposed that the linguistic structures operating at the syntax-discourse interface are less likely to be fully acquired compared to the structures at the core syntax in the case of L2 acquisition. The same interfaces are more prone to erosion in L1 attrition and acquired later in heritage languages. The reason behind the said vulnerability in attrition

and acquisition is suggested to be the difficulty of integrating information from different linguistic levels (Sorace, 2011).

For example, Tsimpli, Sorace, Heycock, and Filiaci (2004) investigated attrition in L1 Greek and Italian speakers with regard to interpretation and production of null and overt pronominal subjects. The results reported attrition effects for Italian L1 speakers in the interpretation of overt-pronouns. More precisely, Tsimpli et al. (2004) found that heritage speakers of Italian accepted overt pronominal subjects (which in monolingual grammars are specified as [+Topic Shift]) in [-Topic Shift] contexts. They suggested that overt subjects underwent underspecification of the interpretable [Topic Shift] feature due to the L2 grammar's lack of a similar condition.

More recent research suggests that L1 attrition affects the processing skills of attriters in the interface structures, rather than the knowledge representation (Chamorro & Sorace, 2018, to appear). Chamorro et al. (2016) investigated pronominal subjects (syntax-pragmatics/external interface) in Spanish using an eye-tracking and a naturalness judgement task. The results revealed that L1 attriters, re-exposed L1 attriters, and monolingual speakers performed similarly in the offline naturalness judgement task, whereas the results from the eye tracking task suggested otherwise. Monolinguals showed a robust effect of pronoun antecedent mismatch in both the critical and post-critical regions whereas L1 attriters did not show such sensitivity. The re-exposed L1 attriters were not significantly different from monolinguals, suggesting that re-exposure to L1 attenuates the attrition effects. Thus, the structures in the syntax-discourse interface undergo attrition at the processing level only (Chamorro et al., 2016). These findings are in line with Sorace's (2011) proposal that L1

attrition effects surface in the syntax-discourse interface by affecting the online sensitivity of L1 attriters, not knowledge representation.

1.1.1.3 Activation Threshold Hypothesis

Michel Paradis' (1993) Activation Threshold Hypothesis follows a neurolinguistic approach to language attrition. Activation threshold is the amount of necessary neural impulses to activate a linguistic item, similar to threshold of excitation for neurons. If an item is used frequently and recently, its activation threshold is lowered so that it will be easier to retrieve. However, in the opposite scenario where an item is not stimulated enough as a result of disuse, its threshold increases, thus it will be harder to retrieve. Hence, the Activation Threshold Hypothesis proposes that L1 attrition results from "long-term lack of stimulation" (M. Paradis, 2004, p. 28), and it affects all linguistic domains including the lexicon, the syntactic rules and the phonotactic schemata (M. Paradis, 2004). It is also suggested that L1 attriters are expected to demonstrate improved performance in a case of re-exposure to L1 due to increased frequency and recency of the linguistic items in L1, i.e., reduced activation threshold.

In this framework, the linguistic items are always in competition to be selected. For an item to be selected, the competitors' activation threshold is raised, i.e., inhibition. In the case of bilinguals, when communicating in one language, the other is simultaneously inhibited to avoid interference, or when a linguistic item is activated, its corresponding form in the other language needs to be inhibited (M. Paradis, 2004). From this explanation, it does follow that inhibition of a linguistic form only occurs when there is a corresponding form in the

other language. In other words, when a linguistic item/structure is not frequently activated, its actively used counterpart in L2 will be the winner of the competition. When there is no equivalent, however, L1 forms will not be inhibited and therefore will be well-preserved in spite of a long-term disuse. In line with this prediction, Gürel (2004) investigated the attrition of the pronominal system in Turkish under L2 English influence with regard to overt and null pronouns. The overt pronoun *o* 's/he' has an analogous form in English while the Turkish null-pronoun and the overt pronoun *kendisi* 'self' do not. The results showed that the overt pronoun *o* 's/he', which has an equivalent in English, was subject to attrition. The binding properties of the English pronoun were activated instead of the binding domain of the Turkish pronoun, resulting in treating the Turkish pronoun *o* 's/he' as identical to its English equivalent. The other two pronouns, which have no corresponding form in English, were relatively well-preserved. This suggests that effects of language attrition can also be seen in the syntactic domain –contra to the Interface Hypothesis– and explained within the framework of Activation Threshold Hypothesis (Gürel, 2004). Moreover, additional support comes from Chamorro et al. (2016) where L1 attriters who were re-exposed to their L1 processed pronoun mismatches more target-like compared to L1 attriters without a re-exposure.

1.1.1.4 Feature Reassembly Model

The Feature Reassembly model (Lardiere, 2009) was originally proposed for L2 acquisition. The starting point of this model is that features are the reason why languages differ. The functional categories are a bundle of multiple features, which are hierarchically ordered.

The task in acquisition, therefore, is to assemble the bundle of features onto lexical items (Lardiere, 2009). The features may refer to "Case, Definiteness, Logophoricity, Durativity, Evidentiality" (Schmid & Köpke, 2017, p. 650). In that sense, past tense morphemes in English and in Turkish both encode [+past] while the latter also marks evidentiality (i.e. grammatical encoding of information source) (Schmid & Köpke, 2017), which makes them distinct on the feature level. The task of an L2 learner is however more circuitous since they come with already-assembled feature configurations; they need to re-assemble the features associated with the L2 from their L1. Lardiere explains the task of a second language learner as "identifying one or more lexical items over which to redistribute the features associated with a particular functional element in the L1, as well as acquiring new language-specific configurations of features as these are assembled in the targeted lexical item(s) of the L2" (2009, p. 193). If the L1 and L2 share the same feature configurations, the acquisition will be easier; problems arise when the feature configurations are distinct.

The Feature Reassembly Model has only been applied in an adult L1 attrition context by Domínguez and Hicks (2016). They investigated the changes in Cuban Spanish in Miami and mainland Spanish in the United Kingdom by re-examining the data from Domínguez (2013, as cited in Domínguez & Hicks, 2016) on null and post-verbal subjects in L1 Spanish. In the former context, both Cuban and mainland Spanish were used in addition to English; the contact with Spanish did not decrease but input was qualitatively different since two varieties of Spanish were spoken in Miami. In the U.K., on the other hand, the Spanish speakers from Spain had little contact with Spanish. Furthermore, in Cuban Spanish, null and post-verbal subjects are used less than in mainland Spanish. The results revealed that

Cuban bilinguals used null subjects more than their monolingual controls while the Spanish bilinguals showed no difference. Cuban bilinguals also used post-verbal subjects more than Cuban monolinguals. In contrast, Spanish bilinguals' use of post-verbal subjects was less than monolingual Spanish speakers. That is to say the L1 of Cuban bilinguals and Spanish bilinguals showed different patterns of attrition even though both groups were under L2 English influence. Therefore, they argued that the differences observed in Cuban bilinguals' L1 was not due to L2 English influence or decreased L1 contact. It was because of being exposed to qualitatively and quantitatively different L1 input, e.g., a different dialect of Spanish (Domínguez & Hicks, 2016). In other words, the similarity of structures in Cuban Spanish and Mainland Spanish provided more evidence for feature reassembly to take place than English in the case of Cuban bilinguals. In contrast, the L1 of Spanish bilinguals was affected exclusively by English influence.

1.1.2 Second generation immigrants (heritage speakers)

Within the heritage language literature, the differences observed in L1, have so far been explained by Incomplete Acquisition (Montrul, 2008), Missing-Input Competence Divergence (Pires & Rothman, 2009), L1 attrition (Polinsky, 2011), the Interface Hypothesis, and the Feature Reassembly Model. The effects of cross-linguistic influence will follow in Section 1.2.

1.1.2.1 Acquisition without mastery

The incompleteness of acquisition suggests that some properties of a second language would not be fully acquired after L1 acquisition is completed, that is after the critical period.

Montrul (2008) argued that incomplete acquisition is possible for both L1 and L2 acquired within the critical period. Incomplete L1 acquisition is failing to reach age-appropriate proficiency level for a given linguistic property of L1 due to intensive L2 exposure in the childhood (Montrul, 2008), and due to not receiving the necessary amount of input to acquire certain aspects of syntax and morphology; i.e., insufficient L1 exposure (Montrul, 2015). The terminology, incomplete acquisition, has received several criticisms. Therefore, throughout this thesis, "acquisition without mastery" will be used, instead.

In accordance, Montrul (2009) examined the extent of acquisition without mastery in Spanish tense-aspect and mood morphology with adult Spanish heritage speakers living in the United States (aged 18-30). The results showed that the heritage speakers' command of tense-aspect was significantly better than their command of mood. This suggests that not all linguistic domains are equally affected by acquisition without mastery, and that the effects may persist into adulthood.

Jia and Paradis (2015) investigated referring expressions in first mentions by Mandarin monolingual children and heritage speakers (aged 6-10). The results revealed that the monolingual children outperformed the heritage speakers in all specific classifier morphemes and specific lexical items. However, heritage speakers' performance did not differ from monolinguals in use of numerical determiners in indefinite NPs, in use of possessive NP or post-verbal and relative clauses. Therefore, Jia and Paradis argued that the properties of the L1 whose mastery requires a great deal of input are more vulnerable to acquisition without mastery (2015).

1.1.2.2 L1 Attrition

As discussed earlier, L1 attrition means deterioration or even loss of a linguistic property after fully attained, due to intensive L2 exposure and reduced L1 use. The attrition effects are far more drastic in childhood compared to adult L1 attrition. In order to investigate whether L1 attrition affects heritage speakers, either cross-sectional or longitudinal studies have been conducted, and have yielded contradictory results.

In a cross-sectional study, Polinsky (2011) investigated the comprehension of relative clauses in Russian by comparing adult and child heritage speakers (mean age 22 and 6.2, respectively) to adult and child monolingual speakers (mean age 32 and 6.6, respectively). The results showed that the performance of child heritage speakers paralleled that of monolingual children and adults, and all groups outperformed adult heritage speakers. Considering that child heritage speakers were on a par with both monolingual groups, it was argued that relative clauses in Russian were not subject to acquisition without mastery. Moreover, the fact that child heritage speakers outperformed adult heritage speakers pointed to "the attrition, over the life span, of forms that exist in the baseline" (Polinsky, 2011, p. 323).

Jia and Paradis (2018) conducted both cross-sectional and longitudinal studies investigating comprehension and production of relative clauses in Mandarin by child heritage speakers. In the cross-sectional part, the heritage speakers (mean age 8) displayed similar performances with monolingual controls in comprehension task. However, monolinguals outperformed the heritage speakers in production of relative clauses. The following longitudinal study, which was conducted twice with a year interval, revealed that the production performance of her-

itage speakers significantly improved and converged on target grammar. The improvement in the performance of heritage speakers of Mandarin suggested that acquisition of relative clauses in Mandarin is protracted but definitely not attrited.

1.1.2.3 Missing-Input Competence Divergence

Both acquisition without mastery and L1 attrition try to account for the divergent grammars of heritage speakers with limited L1 contact and intensive L2 exposure, by disregarding the linguistic changes observed in the input providers, i.e., first generation immigrants. This is problematic because at the end, heritage speakers can only acquire what they are presented with. If a certain structure shows variable distribution in the input provided by first generation immigrants, who themselves might have undergone attrition, heritage speakers may replicate the observed variable distribution. Moreover, if a certain structure is absent in the input, or only available in the standard dialect, heritage speakers naturally cannot acquire the said structure. Accordingly, Pires and Rothman (2009) suggest that a distinction should be made between true acquisition without mastery and "missing-input competence divergence". The former refers to cases when a linguistic property is available in the input, yet is not acquired completely. In contrast, missing-input competence divergence refers to failing to acquire a property of heritage language because it is simply not present in the input to start with (Pires & Rothman, 2009). That is to say, monolingual speakers might be exposed to some properties through their contact with the standard dialect via schooling, suggesting that the input that heritage speakers have at hand might be qualitatively different from their monolingual peers (Rothman, 2007; Pires & Rothman, 2009; Pascual y Cabo & Rothman,

2012; Flores, 2015; Sorace, 2012). Therefore, Pascual y Cabo and Rothman (2012) argue that heritage speakers' competence would be "complete, yet simply different" (p. 451). It is also acknowledged that modified input is not likely to be the sole source of the observed differences (Pascual y Cabo & Rothman, 2012).

Rothman (2007) set out to test inflected infinitives in Brazilian Portuguese, which are argued to undergo changes in colloquial dialects (Pires 2002, 2006 as cited in Rothman, 2007). The educated monolingual speakers learn the standard dialect, hence inflected infinitives, via schooling. The results of heritage speakers (aged 18-25) were compared to that of educated native speakers and adult learners of L2 Portuguese from Rothman and Iverson (2007 as cited in Rothman, 2007). Performance of heritage speakers in inflected infinitives was significantly different from both groups. This indicated that heritage speakers lack target-like knowledge of the said structure, which was argued to be due to their exposure to colloquial dialect, and lack of schooling in Brazilian Portuguese.

1.1.2.4 Interface Hypothesis

As mentioned in Section 1.1.1.2, the Interface Hypothesis predicts that the linguistic structures operating on the syntax-discourse interface may pose a problem for bilinguals' first language acquisition, i.e., heritage language acquisition, since such structures are acquired later –if they are at all– compared to linguistic properties requiring only syntactic computations. The differences observed in the first language of bilinguals are argued to be resulting from either divergent knowledge representations or different processing strategies, a by-product of bilingualism (Sorace, 2011). It should be noted, though, that Sorace (2011) explicitly states

that inter-generational attrition is not what the Interface Hypothesis is about since the input, in that case, might already be affected by intra-generational attrition. Sorace (2012) later adds that the predictions regarding heritage speakers can be made "as long as the differences between individual and generational attrition are clear" (p. 214). Nevertheless, the Interface Hypothesis has been tested with heritage speakers in various studies.

Sorace, Serratrice, Filiaci, and Baldo (2009) investigated the acceptability of overt and null pronominal subjects in ±topic shift context in both English and Italian with English-Italian and Spanish-Italian children along with monolingual children and adults. The results suggested that bilingual children were more likely to accept overt subject pronouns in contexts where null subject pronouns would be the most appropriate choice. Moreover, even monolingual Italian adults did not choose pragmatically more appropriate pronoun in each trial such that even they accepted overt pronouns in [–TS] conditions in limited occurrences. For both monolinguals and bilinguals, avoiding an overt pronoun in [–TS] context was harder than avoiding a null subject pronoun in [+TS] context. It gets even more difficult for younger speakers, and under the influence of a language where overt subject pronouns can be used in both conditions, like English (Sorace et al., 2009).

1.1.2.5 Putnam and Sanchez Model

Putnam and Sánchez (2013) argued that a model should incorporate linguistic knowledge and processing skills of heritage speakers in order to better explain their development. They proposed a model that combines the level of activation (M. Paradis, 1993) of functional features and the process of feature reassembly (Lardiere, 2009). The Putnam and Sanchez

model diverges from other models that emphasize the role of quality and quantity of input, and which assume an acquisition without mastery or arrested development of heritage languages.

While the Putnam and Sanchez model clearly shares some bases with Activation Threshold Model (M. Paradis, 1993), it further argues that the L2 being continuously activated over L1 causes reassembly of functional features in L1 on the representation level. The lower level of activation of some functional features (FF) causes those features to be less available, which eventually results in replacement of the features in L1 by that of L2. Such replacement is not due to the input that heritage speakers have been exposed to, but due to the lower level of activation of these FFs for both production and comprehension purposes (Putnam & Sánchez, 2013). That is to say, feature activation, not quality and quantity of input, is the primary factor in retention of associations between features. The lack of activation first affects the declarative memory, i.e., the L1 lexicon, and gradually affects the procedural memory, i.e., the L1 grammar, which is in line with Ullman's Declarative and Procedural Model (2001, as cited in Putnam & Sánchez, 2013).

Karayayla (in press) investigated the production of evidential morphology in Turkish heritage language with first and second generation immigrants. The results of this study were partially in line with the Putnam and Sanchez model, in that heritage speakers used the past tense marker *–DI* 'direct experience' in contexts requiring the past tense marker *–mIş* 'indirect experience'. This replacement pattern suggests that the suffix *–DI* 'direct experience' was reassembled due to reduced L1 activation and its semantic proximity to the English past tense marker (Karayayla, in press) (see Section 1.4.1.2, for a more detailed overview).

1.2 Cross-linguistic influence (CLI)

Studies have shown that cross-linguistic influence (CLI), a possible influence of one language on the other, may lead to transfer, facilitation or delay, though the evidence for the latter is relatively limited (Meroni, Smeets, & Unsworth, 2017). Hulk and Müller (2000) suggested two necessary but not sufficient conditions for CLI to surface. Their proposal is twofold: CLI may occur if (1) a syntax-discourse interface is involved, which is problematic in L1 acquisition, and (2) there is a structural overlap between the given two at the surface level. In other words, if language A allows a particular construction to have more than one syntactic analysis, and language B contains supporting evidence for one of these analyses (Hulk & Müller, 2000), cross-linguistic influence from language B to A is expected (Meroni et al., 2017). The first condition is challenged by the growing evidence of CLI at both the syntax-morphology and syntax-semantics interfaces, as well as core syntax (Meroni et al., 2017; Cuza, 2013).

It has also been shown that CLI effects are present in language processing. Dussias and Sagarra (2007) investigated the relative clause attachment preferences of Spanish-English bilinguals and Spanish monolinguals using eye-tracking. The Spanish-English bilinguals were separated into two groups: extensive vs. limited exposure to English. The reading times in the critical region showed that monolinguals and low-exposure bilinguals preferred NP1 attachment whereas the extensive English exposure group favoured NP2 attachment in Spanish, which is the attachment preference in English. That is to say, only the Spanish-English bilinguals with extensive exposure to English adopted the attachment resolution strategies of English in their L1 Spanish. Similar results were also found in Dussias (2003)

where the same phenomenon was investigated by using a self-paced reading task. All in all, these findings suggest that the L1 comprehension system is under influence of L2 knowledge.

CLI is not a separate and an unrelated phenomenon from the previously mentioned literature in Sections 1.1.1 and 1.1.2; it plays a central role in most of the hypotheses covered thus far, such as the Activation Threshold Hypothesis, the Putnam and Sanchez Model, and the Feature Reassembly Model. It is also suggested to be the reason why heritage speakers experience problems with certain structures, as opposed to an arrested development (Cuza, 2013). Moreover, its effects are well-documented in the literature through both online and offline tasks.

1.3 Individual differences

Given the variability observed in the performance of heritage speakers and L1 attriters, the burgeoning literature of individual differences has investigated the complex interplay of internal and external factors that could facilitate or hinder heritage language acquisition and maintenance and L1 attrition, such as the quality and quantity of input, language proficiency, age of onset to L2, and the attitudes and identities of the individuals (for an overview, see (J. Paradis, 2011a; Sorace, 2011; Montrul, 2008; Schmid, 2011). Out of many, only the role of language environment and language proficiency will be examined in this thesis.

Language environment is treated as an umbrella term which includes the individual-external factors: quantitative input and qualitative input in the target language. Quantity of input, on the one hand, can refer to the length of exposure to the heritage language, and the amount of current exposure at home, in school, and in the community. Quality of input, on the

other hand, can refer to the richness of language environment, i.e., amount of native-speaker input that individuals experience through engaging in media and in organized activities in a language (J. Paradis, 2011a). A positive correlation between the language use at home and language proficiency is also reported in the literature, though the direction of this relationship was not clear (J. Paradis, 2011b) such that the individuals who are proficient in heritage language might prefer speaking in the heritage language at home, or language use might facilitate heritage language proficiency. Similarly, Hurtado, Grüter, Marchman, and Fernald (2014) also pointed out that in the case of toddler bilinguals of Spanish and English, more language exposure facilitated the processing rate of bilingual children, which resulted in increased vocabulary knowledge. Also, the children who used more Spanish in daily life compared to English, were more likely to have a larger vocabulary in Spanish than in English. In addition, the ones with larger vocabulary size in Spanish vs. English were faster at accessing Spanish words compared to English in real-time comprehension. In other words, not only absolute but also relative exposure and proficiency predicts language processing in bilinguals.

The evidence that suggests that the quality and quantity of input as well as the use of L1 play crucial roles in heritage language acquisition, maintenance, and processing is robust (Sorace, 2011; J. Paradis & Navarro, 2003; Jia & Paradis, 2015; Unsworth, 2016, 2018, to appear), although the effects of L1 use are far less pronounced, if at all, in first generation immigrants (Schmid, 2016; Yılmaz & Schmid, 2012; Hopp & Schmid, 2013; Schmid & Dusseldorp, 2010). With respect to the quantity of input for heritage speakers, Gathercole (2007) investigated the morphosyntactic development of English-Spanish bilinguals and English-Welsh

bilinguals, and revealed that more exposure to the minority (heritage) language at home and at school facilitated the development of certain structures at an early age –though after reaching a critical mass of data, the differences were mitigated. Accordingly, Flores, Santos, Jesus, and Marques (2017) suggested that the amount of input that children are exposed to plays a crucial role in acquisition of heritage language, specifically for late-acquired properties. Additionally, Daskalaki, Chondrogianni, Blom, Argyri, and Paradis (2018) investigated subject realisation and placement in both syntax-interface and core syntax in Greek heritage language. The results showed that the sufficient amount of L1 use needed for an increase in the accuracy was dependent on the structure under investigation. The subject placement conditioned by syntax-discourse constraints was more affected by limited L1 use than subject placement in narrow syntax. With respect to quality of input, Jia and Paradis (2015) suggested that language richness facilitated the performance of Mandarin heritage speakers who were not exposed to Mandarin at school, since the ones who attended Mandarin-bilingual schools were already in a Mandarin-rich school environment. However, overall richness of heritage language environment was a significant factor predicting the performance of heritage speakers, whereas the richness of English environment was not. Exposure to heritage language in early childhood also modulates the heritage language performance and its effects persist even into adulthood in that Gathercole and Thomas (2009) suggested that the adults who were exposed to only Welsh at home in childhood showed a better performance on vocabulary and idioms in Welsh. In addition, if the same adults have partners who also had only Welsh exposure in the childhood, their performance gets even better, suggesting that continued exposure also plays a role in heritage language maintenance. As for first generation immigrants, the effect of L1 use is argued to be limited. No significant effect of

frequent L1 use in informal settings is reported in lexical performance in free speech or on a speeded naming task (Yılmaz & Schmid, 2012) or in perceived foreign accent ratings (Hopp & Schmid, 2013). In addition, Schmid (2007) suggested that quality of L1 contact may be more important than the mere frequency for L1 maintenance. Furthermore, Schmid and Dusseldorp (2010) argued that it may not be the amount of L1 use but the L2 exposure that affects the L1 retention or attrition. In other words, the fluency problems experienced by the L1 attriters might be due to the difficulties in inhibiting L2, not accessing L1 (Schmid & Dusseldorp, 2010).

In addition, language proficiency and L1 use are also crucial factors in online processing of first generation immigrants and heritage speakers. Kasparian, Vespignani, and Steinhauer (2017) investigated number-agreement in Italian by using event-related potentials (ERP) and reported effects of both L1 use and proficiency. Their ERP responses were modulated by L1 proficiency and L1 use, in that the participants with greater L1 use elicited a more native like P600. Moreover, L1 proficiency affected processing of both monolinguals and attriters, such that the more proficient participants were able to detect the ungrammatical sentences better than the ones with low proficiency. Similarly, Bergmann et al. (2015) attributed the limited changes in verbal agreement in German to reduced L1 use and proficiency of L1 attriters. Proficiency effects are also reported in Knospe and Felser (2016) in relation to heritage speakers' pronoun processing in Turkish. In Turkish, the pronoun *o* 's/he' cannot have a local antecedent, while *kendi* 'himself-herself-him-her' and *kendisi* 'himself-herself-him-her' are reflexives with both local and long distance binding properties, however, the former favours the local antecedent more than the latter does. The findings revealed that

heritage speakers differed from monolingual speakers in their preferences for pronouns. While the heritage speakers with lower proficiency treated the pronouns and reflexives similarly, more proficient heritage speakers showed stronger contrasting, in that for *kendi* 'himself-herself-him-her' they preferred a local antecedent and for *o* 's/he' they preferred a non-local antecedent more strongly than monolinguals. Knospe and Felser's (2016) findings clearly depict how language proficiency can modulate heritage speakers' processing.

In sum, the research to date suggests that language environment and language proficiency of the individuals modulate how L1 processing unfolds for both heritage speakers and to some extend first generation immigrants, though for the latter L2 exposure may be more relevant.

1.4 Evidentiality

In the most essential sense of the term, evidentiality, a linguistic category, refers to the encoding of the source of information of an asserted utterance. There are multiple means available to us human beings to acquire information about the world around us, including (1) directly experiencing an event, (2) hearing about that event from a third party or (3) inferring what might have happened based on some type of evidence. Therein lies a distinction of direct and indirect experience; while the first way of acquiring information is direct experience, the latter two are sources of indirect experience. These different experiences, either direct or indirect, through which we access the information shapes our source of information.

While all languages have lexical ways to express source of information, only a quarter of them grammaticalize it (Aikhenvald, 2004). For instance, in English, a language that does not grammaticalize evidentiality, the indirect source of information can be expressed in several

lexical ways, including expressions like it seems, they say and adverbs like reportedly and allegedly. Languages with grammaticalized evidentiality differ in the complexity of their evidentiality system. While some finer-grained languages have a five-way distinction (e.g., Wintu) or more (e.g. Foe), some others have a two-way contrast in their information source (e.g. Turkish) (see Aikhenvald, 2004 for a detailed discussion).

1.4.1 Evidentiality in Turkish

Turkish is an agglutinative language with rich inflectional morphology. The canonical word order in Turkish is SOV, which is subject to change depending on pragmatic and discourse factors (Gürel, 2016). It also grammaticalizes evidentiality in simple past (Aksu-Koç, 1988). Within the tense-aspect-modality system of Turkish, past reference is encoded by two suffixes, namely *–DI* and *–mIş*[1]. Regarding the temporal distinction of past-non-past, Aksu-Koç (1988) argues both suffixes refer to the past. As for the aspectual dimension, both regard the event as completed. These suffixes differ only with respect to evidentiality (Aksu-Koç, 1988), i.e., the source of information that they specify. Specifically, the suffix *–DI* expresses direct experience, in that it is used to describe directly, consciously, witnessed events, whereas the suffix *–mIş* denotes indirect experience, meaning that the information is gathered through either a third-party narration (i.e. hearsay) or some sort of evidence (i.e. inference). Consequently, Aksu-Koç (1988) argues that in the use of *–mIş* 'indirect experience', the speaker is not 100 percent committed to the truth of the asserted event.

[1]The past tense suffixes *–DI* and *–mIş* in Turkish are realized as -dı, -di, -du, -dü, -tı, -ti, -tu, -tü and -mış, -miş, -muş, -müş, respectively depending on vowel harmony and consonant assimilation.

Additionally *–mIş* 'indirect experience' also conveys surprise, compliment and irony meanings, suggesting an intricate nature, which extends beyond the distinction of witnessed-non-witnessed processes (Aksu-Koç, 1988). Such distinctions though are beyond the scope of this thesis.

In order to better illustrate the evidentiality distinction of the past tense suffixes in Turkish, let us examine the sentences in (1) and (2), where Deniz is a proper name, and the subject.

(1) *Deniz gül-dü.*
Deniz laugh-PAST.DIRECT
'Deniz laughed'

(2) *Deniz gül-müş.*
Deniz laugh-PAST.INDIRECT
'Deniz laughed'

In both (1) and (2) the narrated event is the same, i.e., laughing done by Deniz. However, in (1), the asserted meaning is that the speaker has witnessed the event directly, i.e., the speaker has seen that Deniz laughed, whereas in (2) the asserted meaning is that the speaker has not witnessed the event directly, rather s/he has an indirect information about the event either through hearsay or inference.

Aksu-Koç and Slobin (1986) attempt to present a unified explanation of the diverse range of pragmatic functions of *–mIş* 'indirect experience' by placing the (un)prepared current mental state of the speaker at the center. They argue that even a direct physical evidence entering an unprepared mind as new information, can be expressed using *–mIş* 'indirect experience'. As an example, a speaker can compliment a mother by saying *Kızınız çok iyi piyano çalıyormuş* 'Your daughter plays the piano very well' upon listening to her daughter's recital. Even though the speaker has experienced the recital and witnessed how well the daughter played,

the verb is still marked with *–mIş* 'indirect experience' due to speaker's lack of preparedness for an unexpectedly good performance (Aksu-Koç & Slobin, 1986). Within this framework, *–DI* is regarded to encode a "prepared mind". This also offers a valid explanation of how an event originally reported by *–mIş* 'indirect experience' can be communicated by *–DI* 'direct experience' later in time. In that sense, it closely aligns with a psychological phenomenon where information of an event is stored in memory, while the source of the same information fades away with time. Once assimilated into the speaker's knowledge, the information can no longer be treated as entering an unprepared mind (Aksu-Koç, 1988). Thus, even though the source of information was originally indirect, the event can now be reported using *–DI* 'direct experience'.

However, the claim that the suffix *–DI* consistently conveys direct experience in Turkish is argued to be fallacious[2] by Johanson (2003, 2018). He suggests that Turkic languages, including Turkish, have the grammatical means to encode "indirectivity", which traditionally covers both hearsay and inference, and they also exhibit a contrast of marked vs. unmarked counterparts of indirectives. In Turkish, while the suffix *–mIş* is the marked indirective explicitly expressing evidentiality, the suffix *–DI* is its unmarked counterpart, non-evidential. That is to say, the suffix *–mIş* clearly denotes indirect experience, whereas *–DI* does not necessarily encode direct experience, rather it "exhibit[s] neutral uses in cases where the distinction in question is inessential" (Johanson, 2018, p. 512). He further argues that "Evidentially unmarked terms may suggest that the source of information is direct experience,

[2]Noting this debate, throughout this thesis, the suffixes *–DI* and *–mIş* will be accompanied with 'direct experience' and 'indirect experience' translations, respectively, merely for the sake of clarification and consistency.

but they may also be used for unwitnessed events" (Johanson, 2018, p. 519). This means that the suffix *–mIş* signals indirect evidentiality in Turkish, while the suffix *–DI* is "merely the elsewhere case" (Meriçli, 2016, p. 8).

Regarding the distribution of these two past tense suffixes in natural speech, Öztürk (2008) analyzed the frequency of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' in a 30-minute sample of free speech from the internet in her doctoral dissertation. The results revealed that the distribution was 72 to 12 occurrences, favouring the suffix *–DI* 'direct experience'. In other words, the occurrence of the suffix *–DI* 'direct experience' was six times more often than the suffix *–mIş* 'indirect experience' in a natural conversation (Öztürk, 2008). Subsequently, in an experimental task Ünal, Pinto, Bunger, and Papafragou (2016) investigated how grammatically encoding evidentiality in a language interacts with event source memory with monolingual Turkish and English speakers. Their first experiment included a linguistic task where the participants were asked to describe the events on various photographs. One set of photographs depicted the point after which the event took place so that based on the post-event evidence, the event could be inferred, which theoretically calls for use of the suffix *–mIş* 'indirect experience'. The other set included pictures depicting the exact point that the event was unfolding so that the event could be directly witnessed, which requires the suffix *–DI* 'direct experience' to be used. The results showed that English speakers did not use any evidentiality devices, (e.g. it seems etc.) while describing the events, whereas Turkish speakers did so regularly. While describing the "seen" events, Turkish speakers marked the verbs with *–DI* 'direct experience' 73% of the time as opposed to *–mIş* 'indirect experience' (25% of the time). They chose to use the direct experience marker

significantly more than the indirect experience marker while describing "seen" events. In contrast, while describing "inferred" events, the use of *–mIş* 'indirect experience' dropped to 64% as opposed to the suffix *–DI* 'direct experience (36%). Thus, the use of *–mIş* 'indirect experience' was further examined by splitting the "inferred" events into two: high indirectness and low indirectness. In events with low indirectness, the visual evidence of the event was so strong that the line between inference and perception was blurred and participants used the suffix *–mIş* 'indirect experience' only 48% of the time, i.e., they were less likely to report these events with *–mIş* 'indirect experience' even though they did not witness the unfolding of the events. In events with high indirectness, the evidence was strong enough to make an inference but not strong enough to blur the line between inference and perception. The use of the suffix *–mIş* 'indirect experience' was 81% for such events. In the subsequent source identification task, the participants were presented with the same photographs and asked to report whether the event was seen or inferred in the previous experiment. The results revealed that out of 78% correctly identified events, the "seen" events were reported as "seen" 79% of the time, whereas the "inferred" events were reported as "inferred" only 60% of the time. Among inferred events, the participants reported having inferred the ones with high indirectness 70% of the time, whereas the events with low indirectness were reported as "inferred" only 48% of the time. This suggests that the ones with low indirectness were closer to perception. Overall, it points to a heterogeneous class of inference, which lies on a continuum (Ünal et al., 2016). Therefore, the sole attribution of the suffix *–DI* 'direct experience' to the events that are directly witnessed has been challenged, since the events which have not been witnessed but rather inferred from strong evidence, could also be reported using the suffix *–DI* 'direct experience'. These results can also explain why the

use of the suffix *–DI* 'direct experience' was six times more frequent than the use of the suffix *–mIş* 'indirect experience' in (Öztürk, 2008). Given the wider distribution and the under-specificity of the suffix *–DI* 'direct experience' in Turkish, it is only logical that it is more frequently used than its marked counterpart.

1.4.1.1 Acquisition of evidentiality in Turkish

To date, a considerable amount of literature has been published on the acquisitional trajectory of evidential morphology in Turkish (Aksu-Koç, 1988; Öztürk & Papafragou, 2016; Aksu-Koç, Ögel Balaban, & Alp, 2009; Aksu-Koç, Terziyan, & Erguvanlı-Taylan, 2014; Uzundağ, Taşçı, Küntay, & Aksu-Koç, 2016; Ünal & Papafragou, 2016). Existing research unanimously showed a protracted acquisition of evidentiality, and a well-established production-comprehension asymmetry. Given its rather intricate semantic and pragmatic functions discussed above, it is not a surprise that mastering the evidentiality system does not come easily for children.

The seminal work of Aksu-Koç (1988) pioneered the studies on acquisition of evidentiality in Turkish. Aksu-Koç (1988) conducted both longitudinal and experimental studies to investigate production and comprehension of evidentiality in monolingual Turkish children. The longitudinal study, in which she collected data from 3 Turkish speaking children (aged 1.9-2.6), revealed that the suffix *–DI* 'direct experience' emerges before the suffix *–mIş* 'indirect experience'; however, both suffixes were used with no regard to their evidentiality function, meaning that the witnessed-non-witnessed distinction was yet to consolidate between the ages of 1.9 and 2.6. One child (26.5 months) in this study used the suffix *–mIş* 'indirect ex-

perience' to say that the rocking chair got broken, even though she broke it herself. The same child (27 months) used only *–DI* 'direct experience' or –yor 'progressive' while describing the pictures where she could see the initial and end state, but not the while state in an inference task. The correct forms to use were either *–mIş* 'indirect experience' or –yor 'progressive'. Another child (25 months) used *–mIş* 'indirect experience' to describe states, while using *–DI* 'direct experience' to refer to completed dynamic events and resultant states, instead of using *–mIş* 'indirect experience' throughout the task, as required. This suggests that production was not motivated by witnessed vs. non-witnessed distinction but by the event characteristics. It was also argued that some of the *–mIş* 'indirect experience' utterances between 2.2 and 2.6 years could be interpreted to have an inferential function. The hearsay function, however, was yet to emerge.

Following the longitudinal work, the experimental studies of Aksu-Koç (1988) were carried out with older monolingual Turkish speaking children (aged 3.0-6.4). The production part of the research showed that children before the age of 4, used both suffixes while referring to resultant states and completed events, regardless of witnessed vs. non-witnessed distinction. Similar to the longitudinal study, the stative events favored *–mIş* 'indirect experience' inflection, while dynamic ones *–DI* 'direct experience'. That is, appropriate use of both suffixes was not stabilized, which resulted in a failure to observe the direct vs. indirect experience contrast. The differentiation of this distinction appeared to be gradually developing between the ages of 3.6 and 4.6. In the comprehension task, the children were presented with pictures and stories depicted either with *–DI* 'direct experience' or *–mIş* 'indirect experience'. The children were asked to guess who the speaker was. If the story was told with *–mIş*

'indirect experience', they were expected to identify the speaker as the character who did not witness the event or vice versa. The results of the comprehension part showed that even the oldest age group's (aged 5.8-6.4) correct performance was around 56% for *–mIş* 'indirect experience' and 71% for *–DI* 'direct experience'. Though still far from perfect, a steady improvement of comprehension performance was observed from 5.8 onwards. It was also suggested that hearsay function of the indirect experience marker *–mIş* 'indirect experience' followed the inference function in the acquisitional trajectory, in other words, it is the last acquired function. Then again, given some properties of the experimental design used, one must err on the side of caution while accepting this interpretation. Taken together, the findings of Aksu-Koç (1988) suggest that the children's comprehension of evidentiality lags behind their production, and point towards an acquisitional hierarchy of the direct and indirect experience marker.

Similar asymmetries and protraction in the evidential domain of Turkish were also found in Öztürk and Papafragou (2016). They tested the Turkish monolingual children's (aged 5-7) production and comprehension of the semantics and pragmatics of the direct and indirect experience markers with more controlled experiments. In the production experiment, the children were presented with animated scenarios of direct experience, inference and hearsay. At the end of each trial, the participants were provided with a sentence missing the verb, which the participants were asked complete. They were expected to inflect the verb with *–DI* 'direct experience' in direct experience conditions and with *–mIş* 'indirect experience' in inference and hearsay conditions. Only the suffixes *–DI* and *–mIş* were used to inflect the verbs in this task. The results of the production experiment revealed that the children

used the suffix *–DI* 'direct experience' correctly in the direct experience contexts most of the time. That suggests that only in a limited number of cases, did they use the suffix *–mIş* 'indirect experience' in a direct experience context. However, they did not reliably use the suffix *–mIş* 'indirect experience' in the indirect experience condition. As the participants got older, they were more inclined to use *–mIş* in indirect experience conditions. Older age groups consistently preferred using *–mIş* 'indirect experience' in hearsay but not in inference contexts, while the 5-year-olds used both suffixes interchangeably in indirect experience contexts. To investigate comprehension, a who-said-it task was employed, similar to that of Aksu-Koç (1988) but using videos to create conditions for direct experience, hearsay and inference. The participants were provided with a sentence either marked with *–DI* 'direct experience' or *–mIş* 'indirect experience' and asked to guess who uttered that sentence. If the verb was inflected with the former suffix, the participants were supposed to choose a character who witnessed the event and vice versa. The results showed that 5-year-olds were able to comprehend the direct experience meaning of the suffix *–DI* 67% of the time, and 7-year-olds did so 78% of the time. The 5-year-olds performed below chance level in comprehending the indirect experience meaning of the suffix *–mIş* in both inference and hearsay conditions. The 7-year-olds were able to comprehend the meaning of the suffix *–mIş* 'indirect experience' almost 70% of the time. Overall, the results of the comprehension experiment suggested that children had some understanding of the semantics of *–DI* 'direct experience', whereas only the 7-year-olds successfully comprehended the meaning of the suffix *–mIş* 'indirect experience'. In order to investigate comprehension of the pragmatics of these two suffixes, the children were given a task in which they were presented with animated videos. In these videos, there were two characters and a box. The characters made comments

about what was in the box by uttering sentences with *–mIş* 'indirect experience' and *–DI* 'direct experience'. Then, the children were asked to guess what was in the box. They were expected to trust the character who uttered the sentences inflected with *–DI* 'direct experience' more. The results showed that when it comes to understanding the pragmatics of both suffixes, children's difficulties persisted. Children started to show some awareness of the pragmatics of *–DI* 'direct experience' and *–mIş* 'indirect experience' only at the age of 6, with a drastic improvement at the age of 7. While these results generally support the findings of Aksu-Koç (1988), they present contradicting findings on the acquisitional sequence of inference and hearsay functions of the suffix *–mIş* 'indirect experience'. The findings of Aksu-Koç (1988) suggest that the inference function is acquired before the hearsay function, whereas Öztürk and Papafragou (2016) found the exact opposite.

Further support for the protracted acquisition of evidential morphology and the production-comprehension asymmetry comes from Ünal and Papafragou (2016). They set out to investigate the production and comprehension of children by focusing on the suffix *–DI* 'direct experience' and inferential function of the suffix *–mIş* 'indirect experience' in comparison to Turkish monolingual adults. In the production task, similar to the previous studies, the participants either got to see the event happening, or the initial and end state only. When they witnessed the event, they were expected to describe the event by using the suffix *–DI* 'direct experience'. When they did not see the unfolding of the event, they were expected to use the suffix *–mIş* 'indirect experience'. For seen events, the adult participants always used the suffix *–DI* 'direct experience' and never used *–mIş* 'indirect experience'. For the inferred events, the adults used the suffix *–mIş* 'indirect experience' 88% of the time, and

–DI 'direct experience' 11% of the time. For seen events, the 3-year-olds used the suffix *–DI* 'direct experience' 91% of the time, meaning that they used *–mIş* 'indirect experience' in the remaining 9% of the time. For inferred events, they used the suffix *–mIş* 'indirect experience' 93% of the time and the suffix *–DI* 'direct experience' 7% of the time. The 5 to 6 year-olds always used the suffix *–DI* 'direct experience' and never used *–mIş* 'indirect experience' for seen events. They used the suffix *–mIş* 'indirect experience' 72% of the time for inferred events, meaning that they used *–DI* 'direct experience' in the remaining 28%. Overall, their results of the production experiment showed a more successful performance of monolingual Turkish children (aged 3.1-6.5), as children were able to differentiate the evidential meanings of the past tense morphemes at the age of 3. The better performance of the children compared to aforementioned studies was attributed to the experimental design, which offered more naturalistic stimuli with contextually rich information. In the comprehension task, the participants were shown two videos of the same events in each trial. One of the videos created a context for inference, and the other for direct experience of the same event. At the end of each trial, the experimenter uttered a sentence with *–DI* 'direct experience' or *–mIş* 'indirect experience' and participants matched that sentence with one of the videos. In line with previous studies, the results showed that children of all age groups (3.0-6.7) performed at chance level. Their performance remained at chance level even with a contrastive task with lower cognitive demands (Ünal & Papafragou, 2016). The evidence presented in this study supports the well-established production-comprehension asymmetry in the evidential domain, which is so persistent that even when the children were tested with the same events, they still demonstrated significantly different performances for production and comprehension. Moreover, by employing different experimental paradigms with varying

task demands, Ünal and Papafragou (2016) concluded that the well-observed asymmetry is not due to methodological factors; instead, it is closely related to the psycholinguistic processes required to comprehend evidentials and associate non-witnessed instances with the suffix *–mIş* 'indirect experience'.

Taken together, these studies provide great insight on the acquisition of evidential morphology in Turkish. They unanimously point to protracted acquisition of evidentiality due to its semantic/pragmatic intricacies and the demanding psycholinguistic processes required for its complete acquisition. They agree on the hierarchy between the suffix *–DI* 'direct experience' and *–mIş* 'indirect experience', in that the former emerges significantly earlier than the latter. Moreover, the suffix *–mIş* 'indirect experience' is less likely to be used in direct experience contexts by children, whereas the use of the suffix *–DI* 'direct experience' tends to be over-extended to the indirect experience contexts. The studies are also in agreement on the striking asymmetry between the comprehension and production performances of children, such that the monolingual children do not show a consolidated comprehension of evidentiality until the age of 7. Furthermore, it is suggested that there is an ordered sequence in acquisition of the hearsay and inference functions of the suffix *–mIş* 'indirect experience'. The underlying reasons causing these asymmetries, however, are beyond the purposes of this thesis (see Ünal, 2016 for a detailed discussion).

1.4.1.2 Evidentiality in heritage Turkish

The literature on evidentiality in Turkish as a heritage language is scarce. However, the limited number of studies conducted thus far have investigated this phenomenon from different

perspectives focusing on narrative skills, production and online processing of evidentiality with children and adults.

In one of the earliest studies, Aarssen (2001) investigated narrative skills of Turkish heritage speakers (aged 4-10) in the Netherlands in relation to temporal organisation of events, by using the frog story. The youngest age group tended to shift between past and present tenses, although no such shifts were motivated by the temporal relations in the storybook. As participants got older, the tense-shifts decreased and a trend of using the past tense –both suffixes- emerged. At the age of 10, none of the participants used present tense to anchor the events, instead they used both past tense forms but 7 children still presented unmotivated tense shifts. These results suggest that Turkish-Dutch bilingual children presented high rates of random and unmotivated tense shifts while narrating the frog story at the beginning but gradually started to use both past tense markers dominantly.

Subsequently, Arslan et al. (2015) conducted a pioneering online processing study in a visual world setting with adult heritage speakers, first generation immigrants (living in Germany) and monolingual Turkish speakers. This study specifically focused on the past tense suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience'. The visual displays were in pairs of target and context pictures, in which different stages of an event were depicted. In the direct experience condition, one of the pictures showed the exact unfolding of the event, while the other depicted the post-event state, leading to a witnessed event. In the indirect experience condition, a picture illustrated the pre-event stage while the other depicted the post-event, leading to an inferred event. In both conditions, the post-event picture was the target, and the other was the context picture. While looking at these visuals, participants

were asked to listen to some questions in evidential forms in Turkish and identify the picture matching the question that they just heard. The results showed that all groups performed similarly in the indirect evidential condition, where the question was asked with the suffix *–mIş* 'indirect experience', in terms of accuracy of responses, reaction times, and proportion of looks. Conversely, in the direct experience condition, where the question was asked with the suffix *–DI* 'direct experience', heritage speakers and first generation immigrants experienced problems, as indicated by their lower levels of response accuracy, longer reaction times, and decreased proportion of looks to the target picture. The monolingual speakers did not show any difference in either condition, with similar reaction times, proportion of looks and accuracy levels, which were at 89% in both conditions. The fixations of monolinguals to the target picture increased after 600 ms in both conditions and peaked in 1200 ms, after which they started to shift their gaze to the context picture in the direct evidential condition while continuing to fixate on the target picture in indirect evidential condition. For both heritage speakers and first generation immigrants, the looks at the target picture started after 1000 ms and they consistently showed more fixations on the target picture in the indirect evidential condition compared to direct evidential condition. Overall, these findings suggest that monolinguals' performance did not differ in indirect and direct evidential conditions. Both heritage speakers and first generation immigrants performed monolingual-like in indirect evidential condition, i.e., the suffix *–mIş* 'indirect experience'. In contrast, their performance diverged from that of monolinguals in direct evidential condition, i.e., the suffix *–DI* 'direct experience'. Arslan et al. (2015) argued that the results are not in line with the Interface Hypothesis or with the Regression hypothesis both of which, according to Arslan et al. (2015), predicted greater problems with the suffix *–mIş* 'indirect experience'. Instead,

bilinguals disregarded the evidentiality meaning of the suffix *–DI* 'direct experience', and regarded it as the default past tense in Turkish without any evidentiality-suggestions. In contrast, the evidentiality function of the suffix *–mIş* 'indirect experience' was well-retained. They further argued that these findings are in line with Arslan and Bastiaanse (2014, as cited in Arslan et al., 2015), whom investigated the narrative speech production of heritage speakers. The results of that study revealed that heritage speakers produced the suffix *–DI* 'direct experience' in contexts requiring use of the suffix *–mIş* 'indirect experience' yet not vice versa (Arslan et al., 2015). This finding bears similarities with the production performance of 5 to 6 year-olds and adults in Ünal and Papafragou (2016). In that study, while describing seen events, 5-6 year-olds and adults always used the suffix *–DI* 'direct experience' and never used *–mIş* 'indirect experience. In contrast, for the inferred events 5-6 year-olds used *–DI* 'direct experience' 28% of the time, whereas adults used it 11% of the time.

Arslan et al. (2017) examined the sensitivity towards violations of evidentiality and time reference in Turkish, using a sentence verification task with adult heritage speakers living in the Netherlands and monolingual Turkish speakers. The task consisted of four evidentiality conditions, "seen-direct", "seen-indirect", "heard-direct", and "heard-indirect", where seen vs. heard was the context provided at the beginning of the sentence, and direct vs. indirect referred to the suffixes *–DI* and *–mIş*, respectively. For example, the "seen-direct" condition would be the congruent condition where a direct experience context matched with the suffix *–DI* 'direct experience'. Given the nature of the sentence verification task, where the participants were asked to press a button when they detected an ungrammaticality, it was impossible to examine the reaction times in congruent conditions. Thus, only the reaction times and

accuracies in the "seen-indirect" condition, where the direct experience context was incongruently followed by the suffix *–mIş* 'indirect experience' and in the "heard-direct" condition, where the indirect experience context was incongruently followed by the suffix *–DI* 'direct experience" were analyzed. The analysis of accurate responses, i.e., detecting the violations of evidentials, showed that heritage speakers were less accurate than monolingual speakers. The analysis of inaccurate responses, i.e., incorrectly judging a non-violated sentence as violated, showed that heritage speakers incorrectly responded to the non-violated sentences equally in both conditions. In contrast, monolingual speakers judged "heard-indirect" sentences, i.e., indirect experience context followed by the suffix *–mIş* 'indirect experience', as ungrammatical significantly more than "seen-direct" sentences, i.e., direct experience context followed by the suffix *–DI* 'direct experience'. The analysis of reaction times showed that heritage speakers were significantly slower than monolingual speakers. Heritage speakers performed similarly in both "seen-indirect" and "heard-direct" conditions, suggesting they were equally insensitive to the violations of the suffixes *–mIş* 'indirect experience' and *–DI* 'direct experience'. In contrast, the monolingual speakers showed longer reaction times in "heard-direct" condition with a mean of 1755 ms. compared to those of in "seen-indirect" condition with a mean of 1582 ms. In other words, it took the monolingual speakers longer to detect the ungrammaticality of "heard-direct" condition where the indirect experience context precedes the suffix *–DI* 'direct experience'. They were significantly faster to detect the ungrammaticality of "seen-indirect" conditions where the direct experience context is followed by the suffix *–mIş* 'indirect experience'. Overall, the findings suggested that heritage speakers were less sensitive and less accurate in evidentiality violations compared to monolingual speakers, in that they were indifferent to the semantics and pragmatics of these

two suffixes.

More recently, Karayayla (in press) examined the production of evidentiality morphology in Turkish, with adult heritage speakers and first generation immigrants in the U.K, in comparison to Turkish monolingual speakers. This study also investigated whether the input that heritage speakers were exposed to was qualitatively different (see Missing-Input Competence Divergence model in Section 1.1.2.3), along with the role of quantity/quality of input and L1 contact. In a semi-structured interview and picture description task, the suffix *–DI* 'direct experience', as well as the hearsay and inference functions of the suffix *–mIş* 'indirect experience' were elicited. The results of evidential accuracy showed that all groups had a tendency to use the suffix *–DI* 'direct experience' in contexts requiring the suffix *–mIş* 'indirect experience'. Overall, all groups achieved a ceiling-level accuracy in direct experience condition, i.e., they used the suffix *–DI* appropriately in direct experience contexts. The monolinguals and first generation immigrants also scored 100% accuracy in the inference condition, whereas the heritage speakers' performance was at 95%. However, heritage speakers were significantly less accurate than both first generation immigrants (95%) and monolingual speakers (99%) in the hearsay condition of the suffix *–mIş* 'indirect experience' with 69% accuracy. The analysis of individual differences showed that heritage speakers who had a rich L2 environment in early childhood were more likely to use the suffix *–DI* 'direct experience' in indirect experience context, however, L1 use in early childhood compensated the negative effects of L2 richness in early childhood. Furthermore, the heritage speakers were split into two groups: native-like performers (NPs) and non-native like performers (NNPs). It was revealed that the environment of NPs during early childhood was slightly richer in Turkish,

whereas that of NNPs was slightly richer in English. In addition, the L1 input of NPs in early childhood was slightly higher than NNPs. Also, the interactive L1 use of NPs was more frequent than that of NNPs. All in all, the input that heritage speakers were exposed to was not qualitatively different given the similar performances of monolinguals and first generation immigrants; the variability cannot be explained by missing-input competence divergence. Thus, Karayayla (in press) argues that it is more likely that the suffix *–DI* 'direct experience' was underspecified in the heritage grammar and therefore reassembled, as suggested in the Putnam and Sanchez Model, under not only L2 influence both also reduced L1 exposure.

Taken together, these studies suggest that evidentiality is a vulnerable domain in the case of heritage speakers, as suggested by both production and comprehension studies. Heritage speakers were likely to over-extend the suffix *–DI* 'direct experience' in production, and to show no sensitivity to its violations. The results for comprehension of the suffix *–mIş* 'indirect experience' were conflicting since heritage speakers' performance was in line with that of monolinguals in one study while diverging in another. Similarly, the first generation immigrants showed reduced sensitivity to the incongruity of the suffix *–DI* 'direct experience' but not to those of the suffix *–mIş* 'indirect experience'. Their production performances of both suffixes, however, are suggested to pattern with monolingual Turkish speakers' performance. These findings point to a variability that is present for both heritage speakers and first generation immigrants on the comprehension level.

So far, the online processing of evidentiality in Turkish by heritage speakers, first generation immigrants and monolingual Turkish speakers has only been investigated in Arslan et al.

(2015, 2017) using eye tracking and a sentence verification task. However, no study to date employed a self-paced listening study which is well-suited for fine grained processes and offers an opportunity to examine the reaction times in not only incongruent but also congruent sentences. Moreover, the individual differences, such as the language environment and the proficiency level of the speakers (both the heritage speakers and first generation immigrants), have not been examined in the real-time comprehension of evidentiality in Turkish.

Chapter 2: Present study

The purpose of this study is to investigate the comprehension of evidentiality in Turkish, i.e., the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience', with Turkish heritage speakers and first generation immigrants, in comparison to monolingual speakers. This study will address the following research questions:

1. Do heritage speakers and first generation immigrants show different levels of sensitivity to the violations of evidentiality compared to monolingual speakers?
2. If so, is the observed (in)sensitivity the same in magnitude for both suffixes?
3. If so, how do the language proficiency and language environment of the heritage speakers and first generation immigrants modulate this (in)sensitivity?

In order to answer these questions, a self-paced listening experiment was employed. In this experiment, the participants listened to dialogues at their own pace, where the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' were used either congruently or incongruently. The reaction times recorded during the experiment allowed us to examine the fine-grained processes in both congruent and incongruent conditions of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience'. In order to examine the effects of individual differences, both a Turkish proficiency test and a language environment questionnaire were also administered.

Based on the previous literature, the predictions of this study are as follow:

1. Heritage speakers, first generation immigrants and monolingual speakers will show

different levels of sensitivity to the violations of evidentiality due to a variety of reasons including the reduced L1 input and intensive L2 exposure in the cases of the former two groups. The monolingual speakers will be the most sensitive group to the violations with the longest reaction times. The first generation immigrants will immediately follow the monolinguals, but with a reduced sensitivity to the violations. The heritage speakers will show the smallest level of sensitivity to the violations of evidentiality.

2. The violations of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' will prompt different levels of sensitivity in monolinguals, first generation immigrants and heritage speakers.

   As for monolinguals,

   - The literature suggests that the suffix *–DI* 'direct experience' might be used in high certainty indirect experience contexts (where inference approaches perception) instead of the suffix *–mIş* 'indirect experience' (Ünal et al., 2016). Moreover, Ünal and Papafragou (2016) showed that adult monolinguals and 5 to 6-year-olds never used *–mIş* 'indirect experience' in direct experience context but used *–DI* 'direct experience' in indirect experience context 11% and 28% of the time, respectively. These findings suggest that the suffix *–DI* 'direct experience' is less-specified and distributed more liberally in Turkish compared to its specified counterpart *–mIş* 'indirect experience'. If this is the case, monolingual speakers are expected to show a processing asymmetry for these two suffixes. The violations of the suffix *–mIş* 'indirect experience' will induce early and greater processing difficulty, whereas the incongruity of the suffix *–DI* 'direct experience'

will cause a less intense processing difficulty that may appear later than for *–mIş* 'indirect experience'.

As for first generation immigrants,

- There is a well-established order of emergence for the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience', where the former precedes the latter between the ages of 1.9-2.6 (Aksu-Koç, 1988). The discourse conditions underlying their distribution are not acquired until the age of 7 (Öztürk & Papafragou, 2016; Ünal & Papafragou, 2016). Thus, younger children are reported to overextend the use of *–DI* 'direct experience' in indirect contexts, where *–mIş* 'indirect experience' would be the preferred option, but the reverse is less likely to occur. If what is critical for the Regression Hypothesis is the emergence of a structure, then first generation immigrants are expected to show less sensitivity to the violations of the suffix *–mIş* 'indirect experience' since it will be more prone to attrition (Arslan et al., 2017). Conversely, if what is critical is their discourse-proper use, then first generation immigrants are expected to show reduced sensitivity to the incongruity of the suffix *–DI* 'direct experience' whose discourse distribution stabilizes later than the suffix *–mIş* 'indirect experience'. Because what is critical for the present study is the discourse distribution of the two suffixes, we will be assuming the second reading of the Regression Hypothesis. In other words, first generation immigrants will be less sensitive to the incongruity of the suffix *–DI* 'direct experience'.

- The Interface Hypothesis suggests that linguistic structures requiring integration

of morphosyntactic and discourse knowledge will be more prone to attrition. Accordingly, the Interface Hypothesis predicts that first generation immigrants will experience problems with evidentiality (i.e. the suffixes *–DI* 'direct experience and *–mIş* 'indirect experience) since it is an interface phenomenon involving the integration of morphosyntactic and discourse knowledge. As to which of the two suffixes in Turkish will be more problematic, different versions of the theory make different predictions. Chamorro et al. (2016) argue that under the processing account of the Interface Hypothesis, the marked forms (e.g., overt pronouns) may become a "default" option, which is used by the bilinguals when they experience processing difficulties in computing the discourse appropriateness of a given structure (e.g., pronoun-antecedent mapping). Following this account, on the assumption that the suffix *–mIş* 'indirect experience' is the marked form, the Interface Hypothesis predicts that first generation immigrants will show reduced sensitivity to the violations of the suffix *–mIş* 'indirect experience'. Since it is the marked form in the evidentiality domain, it may be treated as the "default" form to which first generation immigrants resort when they experience processing difficulties.

- Given the more liberal distribution of the suffix *–DI* 'direct experience' in Turkish, and the more restricted use of the suffix *–mIş* 'indirect experience', the former bears more resemblance to the past tense marker in English. The Activation Threshold Hypothesis predicts that if a certain structure in L1 has a similar corresponding structure in L2, these structures compete for selection. The more

frequent use of L2 in the case of first generation immigrants lowers the activation threshold of the English past tense marker while increasing the threshold for the suffix *–DI* 'direct experience'. Thus, the suffix *–DI* 'direct experience' with a higher activation threshold will be harder to activate compared to the suffix *–mIş* 'indirect experience', which has no competing structure in English. Consequently, the Activation Threshold Hypothesis predicts that first generation immigrants will be less sensitive to the incongruity of the suffix *–DI* 'direct experience', whereas the suffix *–mIş* 'indirect experience' is less likely to suffer from attrition.

- The Feature Reassembly Hypothesis predicts that for reassembly to take place, the L1 and L2 structures should share some level of similarity, so that the functional features of an L2 structure could be redistributed over the functional features of L1 structure. The English past tense morpheme does not have the [+evidentiality] feature, whereas the Turkish past tense suffixes do. In this account, the surface similarity of the suffix *–DI* 'direct experience' and the English past tense marker could engender sufficient conditions for feature reassembly to take place. Thus, the Feature Reassembly Hypothesis predicts that [-evidentiality] and [+past] features of the English past tense marker will be redistributed over the suffix *–DI* 'direct experience' in Turkish, and consequently first generation immigrants will show less sensitivity to its incongruity.

As for the heritage speakers,

- The acquisition without mastery account predicts that heritage speakers will experience more difficulties with the structures acquired late in the monolingual

setting, since their acquisitions are more likely to be disrupted by intensive L2 exposure and reduced L1 use. The suffix *–DI* 'direct experience' emerges earlier than the suffix *–mIş* 'indirect experience' in monolingual children's speech (Aksu-Koç, 1988); however, the discourse-appropriateness of these suffixes are not acquired before the age of 7 (Öztürk & Papafragou, 2016; Ünal & Papafragou, 2016). Intensive L2 exposure for heritage speakers starts with schooling (Montrul, 2015), hence around the age of 5. Thus, the acquisition without mastery account predicts that heritage speakers will not show sensitivity to the incongruity of either suffix. Given the ordered sequence of emergence of the suffixes *–DI* and *–mIş*, the heritage speakers may experience problems with processing the latter since it emerges later.

- The predictions of the L1 attrition are in line with that of acquisition without mastery. However, it is hard tease apart attrition from acquisition without mastery. Since the discourse distribution of the two suffixes is acquired later, in the absence of a longitudinal study, it is impossible to tell with certainty whether they were ever acquired.

- The Missing-Input Competence Divergence model predicts that heritage speakers will be more likely to display reduced sensitivity to the violations of the same suffix that exhibits signs of attrition in first generation immigrants.

- The Interface Hypothesis predicts that heritage speakers will experience problems with evidentiality in Turkish. As to which of the two suffixes in Turkish will be more problematic, following Chamorro et al. (2016), the prediction is that

heritage speakers will show reduced sensitivity to the violations of the suffix *–mIş* 'indirect experience'. Because the suffix *–mIş* 'indirect experience' is the marked form in evidentiality domain in Turkish, it may be regarded as the 'default' form to which heritage speakers resort when they experience processing difficulties. However, it should be noted here that Sorace (2012) specifically argues that the Interface Hypothesis can only be applied to the heritage speakers' context only if the tested domains are not subject to attrition in first generation immigrants, since that would cause changes in the input that they have received.

- The suffix *–DI* 'direct experience' is more similar to English past tense marker than the suffix *–mIş* 'indirect experience' considering the wider distribution of the former and more restricted use of the latter. Based on this similarity, the Putnam and Sanchez model predicts that the activation level of the suffix *–DI* 'direct experience' will be lowered, i.e., it will become less available, and consequently the suffix *–DI* 'direct experience', which has the features of [+past] and [+evidentiality], will be more likely to be reassembled under the influence of the English past tense marker, which has [+past] and [-evidentiality] features. In other words, the values of English past tense morpheme will be redistributed over the suffix *–DI* 'direct experience' so that it will have [+past] without any evidentiality distinction. Thus, heritage speakers will be less sensitive to the incongruity of the suffix *–DI* 'direct experience', while the sensitivity to the violations of the suffix *–mIş* 'indirect experience' is less likely to be affected.

3. The sensitivity levels of both heritage speakers and first generation immigrants will be

positively correlated with their proficiency levels in Turkish, or with the relative proficiency of Turkish to English (Knospe & Felser, 2016; Kasparian et al., 2017; Hurtado et al., 2014). As for language environment, L1 use at home and in early childhood, as well as the richness of the L1, will be positively correlated with heritage speakers' performance (Daskalaki et al., 2018; Gathercole & Thomas, 2009; Jia & Paradis, 2015). The performance of first generation immigrants, however, will be negatively correlated with the richness of the English language environment and positively correlated with L1 richness (Schmid & Dusseldorp, 2010; Schmid, 2007).

Chapter 3: Method

3.1 Participants

Two groups of adult Turkish-English bilinguals participated in this study: second generation heritage speakers who speak Turkish as a Heritage Language (HSs) and first generation immigrants who speak Turkish as an L1 (FGIs). The first bilingual group comprised of 15 HSs (M_{age}=26.1, SD=5.82, range=19-36, 10 female) and the second group consisted of 10 FGIs (M_{age}=43.9, SD=12.6, range=20-62, 3 female). Both groups lived in Edmonton, Canada at the time of testing and were compensated 15 CAD for their participation.

Both HSs and FGIs completed a language background questionnaire adapted from the Alberta Language Environment Questionnaire (ALEQ: J. Paradis, 2011b; see Section 3.1.1.3) in order to gather information on the place of birth, age of arrival to Canada, years of residence in Canada, age of onset to English and to Turkish. This information was later used to evaluate their fit into the groups and none of the participants were excluded from the study at that point. The HSs were either born in or immigrated to Canada before the age of 5. While their age of onset to English (AoO) varied (M_{AoO}=3.5, SD=1.41, range=0-5), they were all exposed to Turkish from birth, and four of them attended Turkish Sunday school only for one month at most as a child. All HSs had native Turkish speaking parents, with an exception of one participant whose mother was Canadian. The FGIs were L2 speakers of English who came to Canada after puberty, except for one participant whose age of arrival (AoA) was 10. As in Gürel (2004), the minimum years of residence in the host country (Canada, in this case) was set to 10 years in order to fully capture the possible signs of

attrition.

As a reference group, 40 Turkish monolingual speakers (MSs) (M_{age}=35.7, SD=11.7, range= 17-61, 22 female) were recruited in Turkey. They were all born and raised in Turkey and reported to have not stayed abroad for more than 4 months. Since at least one foreign language -usually English- is taught as part of the curriculum in both public and private schools in Turkey, the participants were asked whether they speak any foreign language. While 19 participants out of 40 reported no knowledge of a foreign language, the rest stated to have been exposed to English in a classroom setting after the age of 11 (M=13.3, SD=6.3, range=11-39, n=21). They were then asked to rate their English proficiency on a 1-5 point scale (1 = not proficient at all, 5 = highly proficient). It was revealed that none were highly proficient in English (M=2.6, SD=0.5, range=2-3, n=21).

The mean age of MSs was significantly different from both HSs and FGIs. The difference was unavoidable since the former was used as a control group for the latter groups. However, the age range of the MSs considerably overlaps with HSs and FGIs (Table 3.1). In addition, evidentiality in Turkish is not fully acquired before the age of 7 (Öztürk & Papafragou, 2016; Ünal & Papafragou, 2016), thus the age difference is not expected to be problematic.

The basic biographical information of the groups is illustrated in Table 3.1.

Table 3.1: Mean age, socioeconomic status, Turkish PPVT, English PPVT, age of arrival to Canada, years of residence in Canada, age of onset to English

	FGIs ($n = 10$)			HSs ($n = 15$)			MSs ($n = 40$)		
	M	R	SD	M	R	SD	M	R	SD
Age	43.9	20-62	12.56	26.1	19-36	5.82	35.7	17-61	11.65
SES	19.6	12-22	3.98	14.5	12-18	1.88	15.6	5-22	3.3
PPVT-Tr (RS)	94.2	86-98	3.49	79	56-90	8.72	98.2	95-100	1.23
PPVT-Eng (RS)	188.3	145-209	17.3	194	164-222	17.25	-	-	-
PPVT-Eng (SS)	85.9	61-99	10.21	95.1	72-126	15.74	-	-	-
AoA	24.3	10-40	7.48	1.7	0-5	2.1	-	-	-
YoR	19.6	10-38	8.65	24.4	17-35	5.87	-	-	-
AoO-Eng	20.6	10-30	5.42	3.53	0-5	1.41	-	-	-

Note: SES = socioeconomic status as measured by years of schooling; PPVT-Tr = Turkish receptive vocabulary; PPVT-Eng = English receptive vocabulary; RS = raw scores; SS = standardized scores; AoA = age of arrival to Canada; YoR = years of residence in Canada; AoO-Eng = age of onset to English in years.

3.1.1 Baseline tasks

3.1.1.1 English Peabody Picture Vocabulary Test (English PPVT: Dunn & Dunn, 2007)

The English PPVT (4th Edition) was used to measure the English proficiency of the HSs and FGIs, which is a standardized receptive vocabulary task. In this task, participants were seated in front of a four-picture panel and asked to point to the picture that corresponded to the word provided by the experimenter. Both raw and standard scores of the participants were calculated (Table 3.1). Two tailed independent samples t-tests were carried out on the standard scores. The results showed that the groups did not differ statistically in English proficiency [$t(23) = 1.5625$, $p = 0.13$].

3.1.1.2 Turkish Peabody Picture Vocabulary Test (Turkish PPVT: Katz et al., 1974)

To assess the participants' proficiency in Turkish, Turkish PPVT which is an adapted and standardized version of Peabody picture vocabulary test was employed. Even though the Turkish PPVT is more commonly used to assess the receptive vocabulary skills of monolingual children (aged 2-12), in the absence of an alternative -considering the HSs' lack of literacy in Turkish- it was deemed to be the most feasible test to employ. This test consists of 100 cards, each presenting 4 pictures. The participants were provided with a word for each card, and asked to point to the corresponding picture. The difficulty of words increased gradually, and the test continued to be administered until the participants gave 6 erroneous

answers in 8 successive cards. The raw scores were calculated to determine the proficiency level of the Turkish FGIs and HSs in comparison with the proficiency level of monolingual speakers (Table 3.1). A one-way ANOVA with the groups as a grouping factor and raw Turkish PPVT scores as the dependent variable revealed a main effect of Group [$F(2, 62) = 94.8$, $p < .001$]. Pairwise comparisons using the Tukey HSD showed that all groups significantly differed from each other in their Turkish proficiencies.

3.1.1.3 Alberta Language Environment Questionnaire for Heritage Speakers (ALEQ_Heritage)

ALEQ_Heritage is a parental questionnaire, which is based on Alberta Language Environment Questionnaire (ALEQ: J. Paradis, 2011b; http://www.linguistics.ualberta.ca/CHESL_Centre/Questionnaires.aspx). It is designed to measure the current heritage language use of children, while the original ALEQ measures the same for the majority language, English. For this study, ALEQ_Heritage was adapted for adults and employed to further understand the language background of FGIs and HSs. It included questions related to the participants' level of education, age of arrival to Canada, language use (input and output), language richness, and current literacy/language activities. In addition, information on frequency of visits to/from Turkey, participants' attitudes towards Turkish culture and language, their identity, as well as their motivations of learning/maintaining Turkish language/culture was gathered through this questionnaire. The information collected is summarized in Table 3.2, and the full questionnaire is available in Appendix A.

The language use was treated as a composite variable in which language input and output

were combined (J. Paradis, 2011b). For Turkish use at home, outside home and in the early childhood, participants were asked to rate their interactions with family members, friends and colleagues on a 1-5 point scale [1 = English (almost) always, Turkish (almost) never; 5 = Turkish (almost) always, English (almost) never] for both input and output separately. The mean proportions were calculated from these responses by totalling the input and output scores of a participant and then dividing it by the highest total number that that participant could score. For instance, if a participant is living with both of her parents and does not have any siblings, the highest total number she could score is 20 and it would increase to 30 for a participant living with both of her parents and a sister. Since they were proportions, the range was between 0-1. Considering that the lowest scores corresponded to (almost) no Turkish use, the closer their score to 1, the higher their Turkish use was.

To measure the richness of Turkish and English environments, participants were asked to rate their weekly reading, writing, speaking, listening activities as well as the organized activities that they attend for both languages on a 0-3 scale (0 = never, 3 = everyday). Mean proportions were calculated for English and Turkish separately by dividing the total of their scores by the highest possible number (15). Again, because they were proportions, the values ranged between 0 and 1, and the closer the number was to 1, the higher their current richness score was. However, one should bear in mind that Turkish and English language richness scores were not complements of each other, meaning that a Turkish richness score of 0.6 did not entail that the English richness score was 0.4. The ratio of the current richness of Turkish environment to that of English, on the other hand, was calculated differently. In that, the Turkish richness proportion was simply divided by the English richness score.

Table 3.2: Mean proportions of L1 use at home, outside home and in early childhood, mean proportion of current English and Turkish richness and their ratio

	FGIs (n = 10)			HSs (n = 15)		
	M	R	SD	M	R	SD
L1-use-home	0.37	0-0.9	0.34	0.65	0-1	0.23
L1-use-outside	0.38	0.2-0.7	0.2	0.34	0.2-0.9	0.2
L1-use-EC	-	-	-	0.91	0.6-1	0.13
Cur-rich-Eng	0.91	0.8-1	0.06	0.83	0.6-1	0.12
Cur-rich-Tr	0.55	0.3-0.8	0.15	0.50	0.1-0.9	0.25
Cur-rich-Tr-Eng-ratio	0.60	0.4-0.8	0.15	0.61	0.1-1.1	0.33

Note: L1-use-home = mean proportion of L1 use at home; L1-use-outside = mean proportion of Turkish use outside home; L1-use-EC = mean proportion of L1 use in early childhood; Cur-rich-Eng = mean proportion of current richness of English; Cur-rich-Tr = mean proportion of current richness of Turkish; Cur-rich-Tr-Eng-ratio = ratio of mean proportion of Turkish richness to that of English. Since FGIs were born and raised in Turkey, their L1-use-EC scores are not summarized.

Since this was a ratio, a score of 1 corresponded to equal richness of both languages and a ratio over 1 represented a higher Turkish richness compared to that of English.

Based on the information collected by ALEQ_Heritage, both L1 use at home and outside home of FGIs and HSs were analyzed using paired t-tests. The analyses revealed that L1 use of FGIs at home did not differ from their L1 use outside home [$t(9)$ = -0.13, $p = 0.9$], while HSs used Turkish at home significantly more than outside home [$t(14) = 4.66$, $p < .001$]. When the groups were compared using independent samples t-tests, it became evident that HSs used Turkish at home significantly more than FGIs [$t(23) = 2.36$, $p = 0.03$], while their L1 use outside home did not differ statistically [$t(23)$ = -0.43, $p = 0.67$]. As for the richness of their language environments, FGIs and HSs did not show any statistical difference in

Turkish: [$t(23) = 0.6$, $p = 0.55$], and only a marginal difference in English: [$t(23) = 1.8$, $p = 0.08$]. In addition, it was clear that both groups had richer English language environments compared to that of Turkish [$t(9) = 8.06$, $p < 0.001$; $t(14) = 4.3$, $p < 0.001$].

3.2 Experimental materials

A self-paced listening experiment consisting of 192 experimental, 32 filler and two practice dialogues was designed. A complete list of dialogues is provided in Appendix B. All dialogues were pre-recorded and read by the same female and male Turkish speakers. The speakers were graduate students at the University of Alberta and had been in Canada for less than 8 months at the time of recording.

This experiment used dialogues as stimuli, as it was originally designed to investigate how listeners process the two evidentiality suffixes (*–DI* and *–mIş*) both at the sentence and at the discourse level. For the purposes of the current thesis, I focused on the sentence level only. Before moving on to the presentation of the critical segments under investigation in this thesis, the structure of the experimental dialogues will be introduced.

All experimental dialogues had 4 turns. In the first turn of each dialogue, an indirect or direct experience context favouring one of the two past tense suffixes was set. For instance, a sentence starting with *gözümün önünde* 'right before my eyes' required the suffix *–DI* 'direct experience', whereas *ben yokken* 'while I was gone' called for the suffix *–mIş* 'indirect experience'. In some cases, the indirect experience context can also be followed by the suffix *–DI* 'direct experience' (see Section 1.4.1 for the relevant discussion). Following the first segment, the main verb of the sentence was marked either with the suffix *–DI* 'direct

experience' or *–mIş* 'indirect experience' followed by an adverb of time, such as *dün sabah* 'yesterday morning'.

Let us say the main verb in the first turn is *düş-* 'to fall', which can be appended by the direct experience marker and become *düş-tü*, or by the indirect experience marker and become *düş-müş*. In the second turn, the second speaker questions the first speaker's information source by asking whether s/he saw the event happening. This turn was kept almost identical across all experimental dialogues. In the third turn, the speaker answers either *evet, gördüm* 'yes, I did see' or *hayır, görmedim* 'no, I did not see'. Following that Y/N response, support from three different conditions, namely direct experience, hearsay and inference, was provided. To understand this structure better, let us continue with the main verb of *düş-* 'to fall'. Saying *çok kötü düştü* '(she) fell pretty bad' is considered a support from direct experience and always followed the "yes, I did see" answer. This is on the assumption that knowing how an action is performed signals that the speaker witnessed the event. Also, the verb, following the same logic, is appended with *–DI* "direct experience". Saying *babam düştüğünü söyledi* 'my father told me that (she) fell', on the other hand, qualifies as a support from hearsay and is always coupled with *hayır, görmedim* 'no, I did not see' answer. The speaker's information source is a third party who witnessed or heard about the event. Similarly, saying *kızımın kolu sargılıydı* 'my daughter's arm was bandaged' signals support from inference and was always paired with *hayır, görmedim* 'no, I did not see' answer. To maintain the logical flow, a "no" answer was always followed by either hearsay or inference supports, while a "yes" answer was only followed by a direct experience support. The last turn changed in each dialogue, and served as a logical wrap-up. Continuing with the same example, the last turn

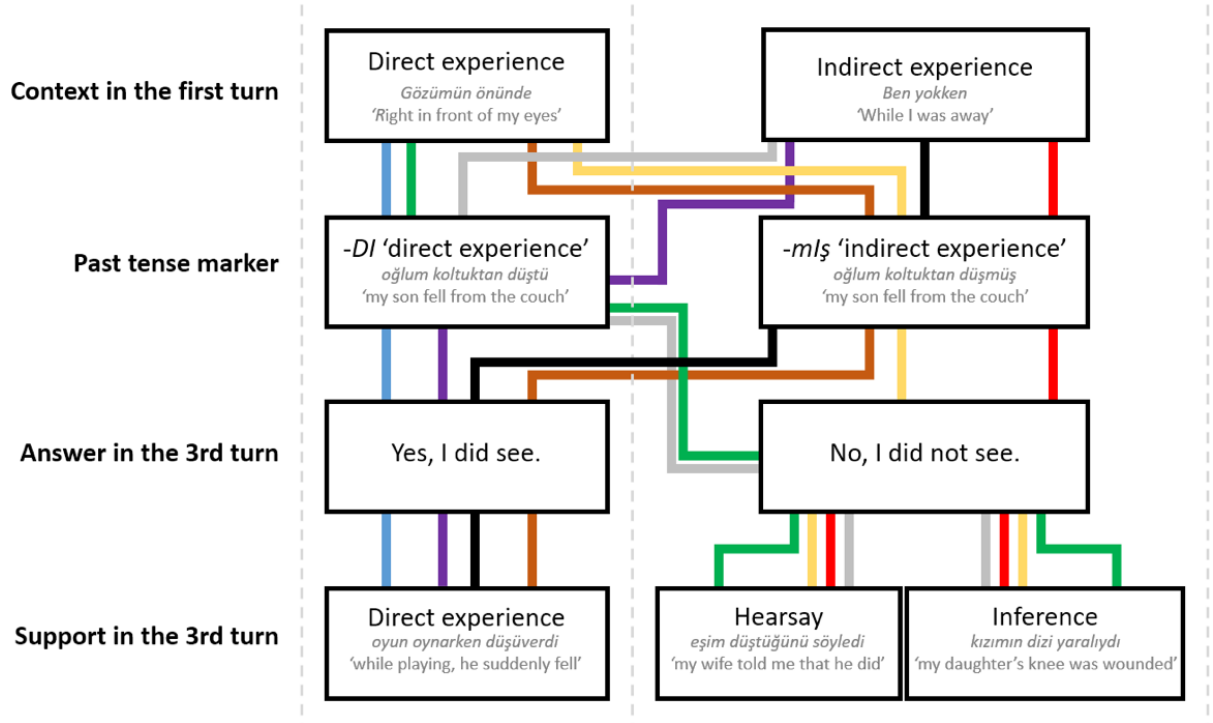

Figure 3.1: Structural design of the experimental dialogues

of this dialogue would be *geçmiş olsun, çok üzüldüm* 'I am sorry to hear that'.

The structural design of the experimental dialogues is illustrated in Figure 3.1.

To create experimental dialogues, the design in Figure 3.1 was followed for 16 high frequency verbs. For each support condition, one dialogue was written where the past tense marker in the first turn and the Y/N answer in the third turn were matching. By only manipulating the past tense marker and the Y/N answer, three more dialogues were written. These dialogues were distributed across 4 lists so that each participant listened to only one dialogue with the same structure.

Following a 3x2x2 factorial design combined with 16 verbs, 192 experimental dialogues were created. Additionally, 32 filler dialogues were written in future tense. With the experimental dialogues counterbalanced across 4 lists, there were 80 dialogues in each list (48 experimental

+ 32 filler dialogues). Both the filler and the experimental dialogues were divided into 10 segments. During the segmentation process, the prosodic structure of sentence was taken into consideration to maintain naturalness of the stimuli. It was also ensured that the respective segments across dialogues were equal in length in milliseconds.

A complete set of a sample dialogue for the "hearsay" support condition of the verb *düş-* 'to fall' is provided below. The segmentation points are indicated with " | ".

Table 3.3: Structural design of the dialogue (1)

The verb	Context in the first turn	Past tense marker on the main verb in the first turn	Yes/No answer in the 3rd turn	Support in the 3rd turn
düş- 'to fall'	Indirect experience	*–mIş* 'indirect experience'	No	Hearsay

Ben yok=ken | oğlu-m koltuk-tan düş-müş | dün sabah.
I away=while | son-1SG-POSS couch-ABL fall-PAST.IND-3SG | yesterday morning
'While I was away, my son fell off the couch yesterday morning.'

Aa nasıl ol-muş? | Sen nasıl düş-tü-ğü-nü | gör-dü-n mü?
Oh, how happen-PAST-3SG | You how fall-PAST-3SG-ACC | see-PAST-2SG-Q
'Oh, how did it happen? Did you see how he fell?'

Hayır, gör-me-di-m. | Ama eş-im | düş-tü-ğü-nü söyledi.
No, see-NEG-PAST-1SG. | But wife-POS-1SG | fall-PAST-3SG-ACC tell-PAST
'No, I did not. But my wife told me that he did.'

Um-ar-ım bir şey-i yok-tur.
Hope-AOR-1SG a thing-ACC not-PRESENT
'I hope he is fine now.'

In Table 3.3, in the first segment, an indirect context is set followed by the main clause whose verb is marked with *–mIş* 'indirect experience' in the second segment. The first turn ends

with an adverbial time phrase in the third segment. In the second turn, the second speaker questions the information source of the first speaker by asking whether s/he witnessed the event. Thus, the third turn starts with a "no" answer, which is followed by a support from hearsay. This "no" answer is in line with both the indirect experience and the indirect context presented in the first turn. Therefore, the dialogue in Table 3.3 is felicitous.

Table 3.4: Structural design of the dialogue (2)

The verb	Context in the first turn	Past tense marker on the main verb in the first turn	Yes/No answer in the 3rd turn	Support in the 3rd turn
düş- 'to fall'	Indirect experience	*–DI* 'direct experience'	No	Hearsay

Ben yok=ken | *oğlu-m koltuk-tan düş-tü* | *dün sabah.*
I away=while | son-1SG-POSS couch-ABL fall-PAST.DE-3SG | yesterday morning
'While I was away, my son fell off the couch yesterday morning.'

Aa nasıl ol-muş? | *Sen nasıl düş-tü-ğü-nü* | *gör-dü-n mü?*
Oh, how happen-PAST-3SG | You how fall-PAST-3SG-ACC | see-PAST-2SG-Q
'Oh, how did it happen? Did you see how he fell?'

Hayır, gör-me-di-m. | *Ama eş-im* | *düş-tü-ğü-nü söyledi.*
No, see-NEG-PAST-1SG. | But wife-POS-1SG | fall-PAST-3SG-ACC tell-PAST
'No, I did not. But my wife told me that he did.'

Um-ar-ım bir şey-i yok-tur.
Hope-AOR-1SG a thing-ACC not-PRESENT
'I hope he is fine now.'

In Table 3.4, the dialogue starts with setting an indirect context which is identical with Table 3.3. However, verb of the main clause, is marked with *–DI* 'direct experience' in the second segment. Even though an indirect context requires *–mIş* 'indirect experience', its

combination with *–DI* 'direct experience' is acceptable under certain conditions as discussed before (see Section 1.4.1). The rest of the dialogue follows the same structure with Table 3.3. However, this time, "no" answer in the third turn is in line with the context of the first turn but clashes with *–DI* 'direct experience', which does not necessarily cause an ungrammaticality but it is not as felicitous as Table 3.3 either. Thus, the dialogue in Table 3.4 is considered as neutral.

Table 3.5: Structural design of the dialogue (3)

The verb	Context in the first turn	Past tense marker on the main verb in the first turn	Yes/No answer in the 3rd turn	Support in the 3rd turn
düş- 'to fall'	Indirect experience	*–DI* 'direct experience'	Yes	Direct experience

Ben yok=ken | oğlu-m koltuk-tan düş-tü | dün sabah.
I away=while | son-1SG-POSS couch-ABL fall-PAST.DE-3SG | yesterday morning
'While I was away, my son fell off the couch yesterday morning.'

Aa nasıl ol-muş? | Sen nasıl düş-tü-ğü-nü | gör-dü-n mü?
Oh, how happen-PAST-3SG | You how fall-PAST-3SG-ACC | see-PAST-2SG-Q
'Oh, how did it happen? Did you see how he fell?'

Evet gör-dü-m. | Oyun oynar=ken | düş-üver-di.
Yes, see-PAST-1SG. | Game play-AOR=WHILE | fall-ACL-PAST
'Yes I did. While playing, he suddenly fell.'

Um-ar-ım bir şey-i yok-tur.
Hope-AOR-1SG a thing-ACC not-PRESENT
'I hope he is fine now.'

In Table 3.5, the structure of the first turn is identical with Table 3.4. However, this time, the answer in the third turn is "yes". Coupled with a support from direct experience, it means

that the speaker is now suggesting that she has witnessed the event she mentioned in the first turn. This answer is in line with *–DI* 'direct experience' but not with the indirect context, which was set earlier. Considering the mismatch between the context and the answer in the third turn, the dialogue in Table 3.5 is infelicitous.

Table 3.6: Structural design of the dialogue (4)

The verb	Context in the first turn	Past tense marker on the main verb in the first turn	Yes/No answer in the 3rd turn	Support in the 3rd turn
düş- 'to fall'	Indirect experience	*–mIş* 'indirect experience'	Yes	Direct experience

Ben yok=ken | oğlu-m koltuk-tan düş-müş | dün sabah.
I away=while | son-1SG-POSS couch-ABL fall-PAST.DE-3SG | yesterday morning
'While I was away, my son fell off the couch yesterday morning.'

Aa nasıl ol-muş? | Sen nasıl düş-tü-ğü-nü | gör-dü-n mü?
Oh, how happen-PAST-3SG | You how fall-PAST-3SG-ACC | see-PAST-2SG-Q
'Oh, how did it happen? Did you see how he fell?'

Evet gör-dü-m. | Oyun oynar=ken | düş-üver-di.
Yes, see-PAST-1SG. | Game play-AOR=WHILE | fall-ACL-PAST
'Yes I did. While playing, he suddenly fell.'

Um-ar-ım bir şey-i yok-tur.
Hope-AOR-1SG a thing-ACC not-PRESENT
'I hope he is fine now.'

In Table 3.6, the structure of the first turn is identical with Table 3.3 where an indirect context is felicitously followed by *–mIş* 'indirect experience'. The structure of the third turn, however, is the same with Table 3.5 where the answer is "yes" and support is from direct experience. Since this answer, suggesting a direct experience, is in line neither with the

indirect context nor with *–mIş* 'indirect experience', the dialogue in Table 3.6 is infelicitous.

3.2.1 The structure of the critical segments

As mentioned above, each experimental dialogue consisted of 10 segments, only two of which will be analyzed in this thesis due to time and space limitations. The selected segments are all within the first sentence of the dialogues, i.e., the first turn.

The first turn included 3 segments. The context suggesting a direct or an indirect experience was set in the first segment. The second segment served as the critical segment where the main clause was in/congruently marked either with the suffix *–DI* 'direct experience' or *–mIş* 'indirect experience'. The third and last segment included an adverb of time as a padding phrase, and was designed to catch possible spill-over or late effects. The structure of the first turn of each dialogue is provided in the Table 3.7. The condition *DI*-congruent started with a direct experience context, which was congruently followed by the suffix *–DI* 'direct experience' in the second segment. The condition *DI*-incongruent also included the suffix *–DI* 'direct experience' in the second segment, which was preceded by an indirect experience condition. The *mIş*-congruent condition started with an indirect experience context, which was congruently followed by the suffix *–mIş* 'indirect experience'. Lastly, the *mIş*-incongruent condition included the suffix *–mIş* 'indirect experience', which was incongruently preceded by a direct experience context.

Table 3.7: The structure of the first turn of the experimental dialogues and the conditions under examination

Condition	The first segment	The second segment	The third segment
***DI*-congruent** Direct experience context, *–DI* 'direct experience'	*Gözümün önünde* 'Right in front of my eyes'	*Oğlum koltuktan düş–tü* 'My son fell off the couch'	*dün akşam* 'yesterday evening'
***DI*-incongruent** Indirect experience context, *–DI* 'direct experience'	*Ben yokken* 'While I was away'	*Oğlum koltuktan düş–tü* 'My son fell off the couch'	*dün akşam* 'yesterday evening'
***mIş*-congruent** Indirect experience context, *–mIş* 'indirect experience'	*Ben yokken* 'While I was away'	*Oğlum koltuktan düş–müş* 'My son fell off the couch'	*dün akşam* 'yesterday evening'
***mIş*-incongruent** Direct experience context, *–mIş* 'indirect experience'	*Gözümün önünde* 'Right in front of my eyes'	*Oğlum koltuktan düş–müş* 'My son fell off the couch'	*dün akşam* 'yesterday evening'

3.2.2 Plausibility ratings of the experimental dialogues

The experimental dialogues constructed for this study were rated for plausibility by 22 monolingual Turkish speakers (M_{age}= 24.2, SD=1.9, range=22-27, 13 female). The dialogues were distributed across 4 different questionnaires so that each participant rated only one version of the 4 dialogues with the same structure. The participants were naive to the aims of the study, and were asked to read the dialogues at their own pace and then rate the plausibility of the dialogues on a 1-7 point scale (1 = highly implausible, 7 = highly plausible). If they rated a dialogue implausible, they were required to write the cause of the implausibility. The offline ratings of the dialogues were done online through Google Forms, and none of the raters participated in the later stages of the experiment.

The ratings were analyzed in R version 3.1.1. (R Core Team, 2016). A one-way ANOVA with the dialogues as a grouping factor and ratings as the dependent variable revealed that the ratings of congruent, neutral and incongruent dialogues were significantly different [$F(2, 1027) = 251.9$, $p < .001$]. Post hoc comparisons using the Tukey HSD showed that congruent and incongruent dialogues were rated significantly different (Mean rating = 6.27 vs. 2.77, respectively; $p = 0$), along with the neutral and congruent dialogues (Mean rating = 6.27 vs. 3.21, respectively; $p = 0$). The ratings of neutral and incongruent dialogues were also significantly different (Mean rating = 3.21 vs. 2.77, respectively; $p = 0.05$).

The ratings of the neutral dialogues, where an indirect context coupled with *–DI* 'direct experience' was combined with a "no" answer in the third turn, and dialogues where an indirect context coupled with *–mIş* 'indirect experience' was combined with a "no" answer in

the third turn (indirect congruent) were also compared; the neutral dialogues were rated significantly lower than indirect congruent dialogues (Mean rating = 3.21 vs. 6.36, respectively; $p < .001$)

The ratings for the dialogues in hearsay and inference conditions of the neutral dialogues, where an indirect context coupled with *–DI* 'direct experience' was combined with a "no" answer in the third turn, did not differ significantly (Mean rating = 3.19 vs. 3.21, respectively; $p = 0.9$). The same two support conditions in congruent dialogues, where *–mIş* 'indirect experience' was combined with a "no" answer, were not rated significantly different, either [Mean rating = 6.34 vs. 6.38, respectively; $p = 0.8$). This means that the raters did not treat hearsay or inference supports differently.

By taking the raters' feedback into account, some modifications were made on the dialogues where the participants consistently rated a felicitous dialogue implausible and vice versa.

3.3 Procedure

The stimuli were programed using OpenSesame experimental software (Mathôt, Schreij, & Theeuwes, 2012) and were presented to the participants in 4 different lists. Each list had the same number of congruent, incongruent and neutral dialogues. Each participant listened to 82 dialogues (48 experimental, 32 filler, 2 practice) presented in a pseudorandomized order. None of the participants were presented with more than one variation of the dialogues structured with the same verb within the same condition.

Data from first generation immigrants and heritage speakers were collected in a quiet room at Center of Comparative Psycholinguistics in University of Alberta. The data collection

of monolingual speakers was done in Turkey in two different cities: Muğla and Istanbul. The monolingual speakers were tested in a quiet room either at their home or their university. Both environments were equipped with a 13-inch MacBook pro and headphones. The participants were seated in front of the laptop and the instructions of the experiment were presented in Turkish on the screen. The participants were told that they would be listening to dialogues between a male and a female speaker through the headphones, and that the dialogues would be presented to them in a phrase-by-phrase fashion, not as a whole, such that the task would be self-paced, i.e., the participants would listen to the dialogues at their own pace. In order to start the experiment, they needed to press the space button, which would trigger the presentation of the first segment. They were instructed to press the space button throughout the experiment in order to listen to the next segment or dialogue. After one fourth of the dialogues, they were presented with yes/no questions about the dialogues that they had just heard. In order to answer the questions, they were instructed to press either the D or L button for yes and no, respectively. Before moving on to the experimental trials, the participants were presented with two practice dialogues, one of which was followed by a question and the other was not so that the participants got familiarized with both cases. After the practice trials, if participants did not have any questions, the experimental session began. Each button-press was recorded during the trials to be analyzed later. The procedure lasted approximately 25 minutes. The translation of the exact instructions is provided in Appendix C.

Chapter 4: Results

In the self-paced-listening task, the reaction times (RTs, henceforth) were measured. The data were analyzed in R version 3.1.1 (R Core Team, 2016) using the "lme4" package (Bates, Mächler, Bolker, & Walker, 2015), and to obtain significance values the "lmerTest" package (Kuznetsova, Bruun Brockhoff, & Haubo Bojesen Christensen, 2016) was used. Filler trials and trials with incorrect answers were removed prior to analysis. Furthermore, RTs shorter than 80 ms or 100 ms (depending on the relevant segment) and longer than 2800 ms were excluded from the analysis (4.93% of the data). The RTs were then log-transformed to ensure normal distribution. Statistical analyses were performed by fitting linear mixed effect regression models to the log RTs. All models were fitted in the same fashion by taking the log transformed RTs as the response variable and the interaction of Suffix, Congruence and Group as the predictor, except when the groups were analyzed separately, then the predictor was just the interaction of Suffix and Congruence. The most complex model in terms of random and fixed structure was fitted first, and the following models were backward fitted. The random effects were removed one at a time and the likelihood of the simpler model was tested against the more complex one using Akaike Information Criterion (AIC). The random structures were simplified until the more complex model was favoured by the model comparison, i.e., 2/+ points lower AIC score. Trial and previous segment were included to all models in order to counter auto-correlation (for further discussion, see Baayen & Milin, 2010). Only the models that best fit the data were reported.

The results of the second segment, where the main verb was marked with the suffixes *–DI*

'direct experience' and *–mIş* 'indirect experience', will be presented in the Section 4.1. First the group comparisons will be shown, then the groups will be analyzed separately for the Suffix-by-Congruence conditions. Section 4.2 will present the results of the third segment, which was designed to catch possible spill-over or late effects, by following the same order in Section 4.1.

4.1 Results of the second segment

The first set of analyses examined the RTs in the second segment of the dialogues, where the main verb of the sentence was marked with *–DI* 'direct experience' or *–mIş* 'indirect experience'. The analysed conditions were *DI*-congruent, *DI*-incongruent, *mIş*-congruent and *mIş*-incongruent, which are a combination of the suffix *–DI* 'direct experience' with a prior direct or indirect experience context, and a combination of the suffix *–mIş* 'indirect experience' with a preceding indirect or direct experience context, respectively (Table 3.7). Mean RTs of groups to Suffix-by-Congruence conditions are illustrated in Figure 4.1. Overall, monolingual speakers (MS) were fastest in congruent conditions of both suffixes, followed by heritage speakers (HS) and by first generation immigrants (FGI). In the *DI*-incongruent condition, only a small increase in RTs was observed for monolingual speakers and first generation immigrants, whereas no such change was present in the case of heritage speakers. In the *mIş*-incongruent condition, however, the mean RTs of monolinguals speakers increased notably, while first generation immigrants showed only a slight increase. The mean RTs of heritage speakers, on the other hand, did not change in *mIş*-incongruent condition.

A linear mixed effects regression model was fitted to the log-transformed RTs in the second

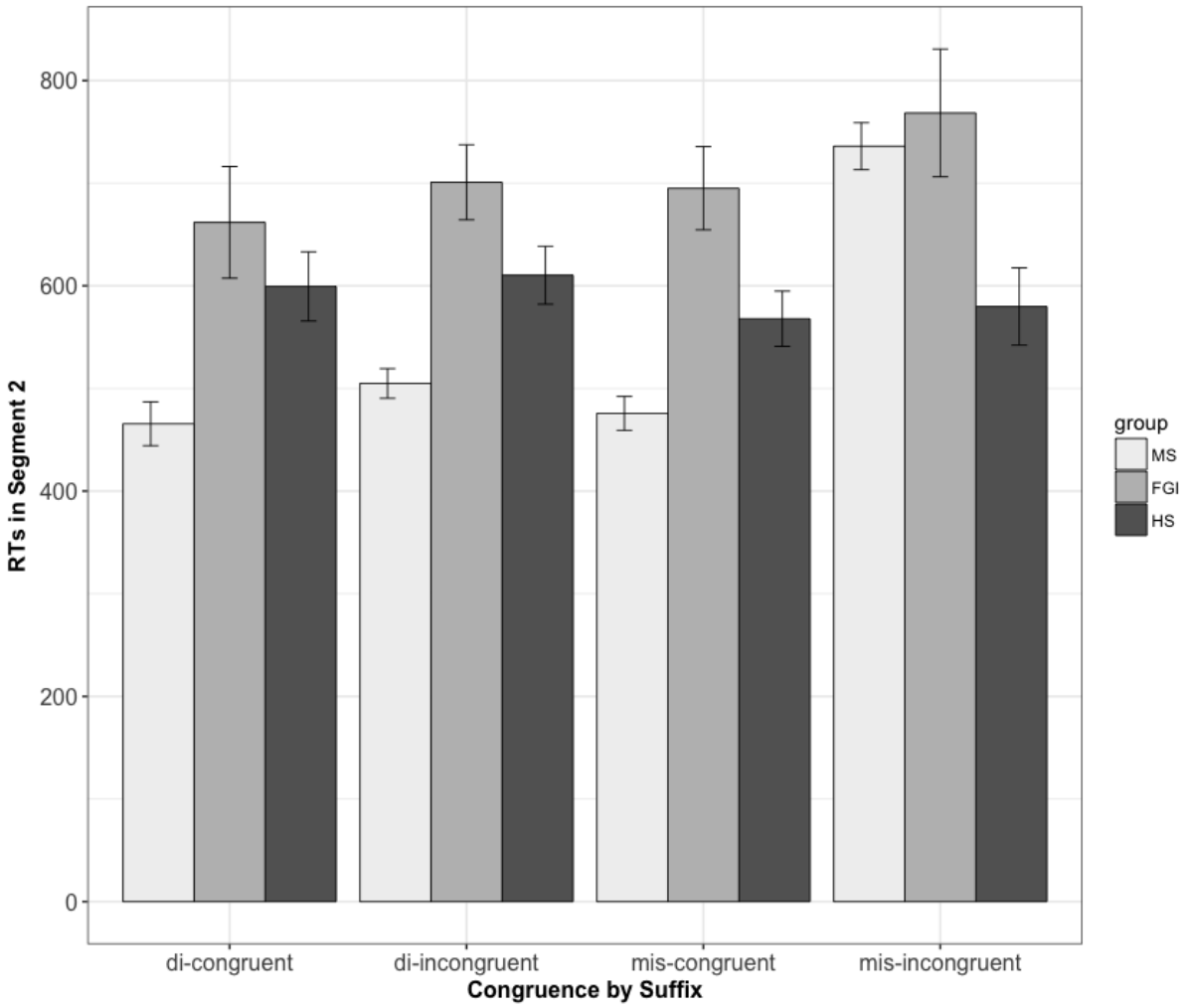

Figure 4.1: Mean RTs of monolingual speakers (MS), first generation immigrants (FGI) and heritage speakers (HS) in Suffix-by-Congruence conditions. di-congruent = suffix *–DI* preceded by direct experience context; di-incongruent = suffix *–DI* preceded by indirect experience context; mis-congruent = suffix *–mIş* preceded by indirect experience context; mis-incongruent = suffix *–mIş* preceded by direct experience context. Error bars represent standard deviation.

segment with the interaction of Suffix (*–DI*, *–mIş*), Congruence (congruent, incongruent) and Group (MS, HS, FGI). The model also included a by-dialogue random intercept and a by-subject random slope for Suffix by Congruence. Further random structure did not reach significance level or the models failed to converge. The coefficients of the fitted model are presented in Table 4.1.

As can be seen in the Table 4.1, the results revealed no effect of Suffix, a significant effect of Congruence, and a marginally significant effect of Group. The temporal covariates, RT in preceding segment and trial, had the largest t-values, which showed that the task itself was also highly significant in predicting the RTs. The negative sign on the estimate of trial indicated that as the experiment proceeded, the participants got significantly faster to respond, i.e., learning the task. The positive sign on the estimate of RT in preceding segment suggested that as the RTs in the first segment increased, so did the RTs in the second segment. The inclusion of both trial and RT in preceding segment in the model controlled for these temporal dependencies and helped the model estimate the effect of the other predictors more precisely. The results also showed that the interaction between the Suffix and Congruence was highly significant for monolingual speakers. Lastly, a significant interaction of Suffix, Congruence and Group on the log-transformed RTs was found. This suggested that the effects of these three variables were dependent on the changes in one another. To further understand the cause of this interaction, the same analysis was carried out with each group separately. The conditional mean RTs in milliseconds based on the model in Table 4.1 are given in Table 4.2.

Table 4.1: Summary of the fixed-effects from the linear mixed-effects regression model with interaction of suffix, congruence and group fitted to log-transformed RTs in the second segment

	Estimate	Std. Error	t-value	p-value
Intercept	5.0740	0.1346	37.705	<0.0001 ***
suffixmis	-0.0319	0.0539	-0.592	0.5555
congruenceincongruent	0.1149	0.0577	1.990	0.0498 *
groupFGI	0.2530	0.1460	1.733	0.0881 .
groupHS	0.2339	0.1243	1.882	0.0647 .
logRT1	0.1760	0.0186	9.464	<0.0001 ***
trial	-0.0052	0.0004	-12.557	<0.0001 ***
suffixmis:congruenceincongruent	0.4389	0.1037	4.231	<0.0001 ***
suffixmis:groupFGI	0.0087	0.0917	0.095	0.9242
suffixmis:groupHS	-0.0825	0.0752	-1.096	0.2763
congruenceincongruent:groupFGI	-0.0914	0.1026	-0.891	0.3762
congruenceincongruent:groupHS	-0.1840	0.0855	-2.151	0.0354 *
suffixmis:congruenceincongruent:groupFGI	-0.3574	0.1662	-2.150	0.0351 *
suffixmis:congruenceincongruent:groupHS	-0.3589	0.1383	-2.596	0.0118 *

R Code : `logRT2 ~ suffix * congruence * group + logRT1 + trial + (1+ suffix * congruence|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '

Note: Group = monolingual speakers (MS), heritage speakers (HS), first generation immigrants (FGI); Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

Table 4.2: The conditional RTs in milliseconds in the second segment

	Monolingual Speakers	First Generation Immigrants	Heritage Speakers
DI-congruent	377.2824	485.8802	476.6912
DI-incongruent	423.2115	497.4211	444.8731
mIş-congruent	365.4348	474.7546	425.1789
mIş-incongruent	635.7892	527.315	429.8714

Note: *DI*-congruent = the suffix *–DI* 'direct experience' combined with direct experience context; *DI*-incongruent = the suffix *–DI* 'direct experience' combined with indirect experience context; *mIş*-congruent = the suffix *–mIş* 'indirect experience' combined with indirect experience context; *mIş*-incongruent = the suffix *–mIş* 'indirect experience' combined with direct experience context

4.1.1 Monolingual speakers in the second segment

First, the log-transformed RTs of the monolingual speakers were analyzed by fitting a similar linear mixed effect regression model, with the interaction of suffix (*–DI*, *–mIş*) and congruence (congruent, incongruent), and with a by-dialogue random intercept and a by-subject random slope for Suffix by Congruence. Further random structure was not warranted, hence not included in the model.

The results in Table 4.3 showed that the main effect of Suffix was not significant, and the main effect of Congruence was marginally significant. The control variables, RT in previous segment and order of trial, on the other hand, were highly significant. The negative sign on the estimate of trial suggested that it significantly decreased the log-RTs in segment 2. That is, as the experiment proceeded, the monolingual speakers got faster in responding, i.e., learning. The positive sign on the estimate of RTs in previous segment indicated that the RTs in the second segment significantly increased when the RTs in the first segment

Table 4.3: Summary of the fixed-effects from the linear mixed-effects model with interaction of suffix and congruence fitted to log-transformed RTs of monolingual speakers in the second segment

	Estimate	Std. Error	t-value	p-value
Intercept	5.0150	0.1664	30.140	<0.0001 ***
suffixmis	-0.0349	0.0567	-0.616	0.5400
congruenceincongruent	0.1151	0.0620	1.857	0.0675 .
logRT1	0.1793	0.0248	7.234	<0.0001 ***
trial	-0.0041	0.0005	-9.009	<0.0001 ***
suffixmis: congruenceincongruent	0.4373	0.1171	3.734	0.0004 ***

R Code : `logRT2 ~ suffix * congruence + logRT1 + trial + (1+ congruence * suffix|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
Note: Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

increased. Lastly, the interaction of Suffix with Congruence was significant.

To further examine the source of this interaction, post-hoc tests (by using Satterthwaite approximation for degrees of freedom and Tukey method for estimates) were employed. The pairwise comparisons of the conditional means suggested a significant difference between the congruent and incongruent conditions of the suffix *–mIş* 'indirect experience' (β = -0.5524, SE = 0.0857, t = -6.443, $p < 0.0001$). In contrast, no such difference was observed for the suffix *–DI* 'direct experience' (β = -0.1151, SE = 0.0620, t = -1.857, $p = 0.2559$). In the incongruent condition, the difference between the suffixes *–DI* and *–mIş* was significant (β = -0.4024, SE = 0.0699, t = -5.757, $p < 0.0001$). However, no significant difference between the two suffixes was present in the congruent condition ($\beta = 0.0349$, SE = 0.0567, $t = 0.616$, $p = 0.9267$). This suggested that while monolingual speakers processed *DI*-congruent, *DI*-

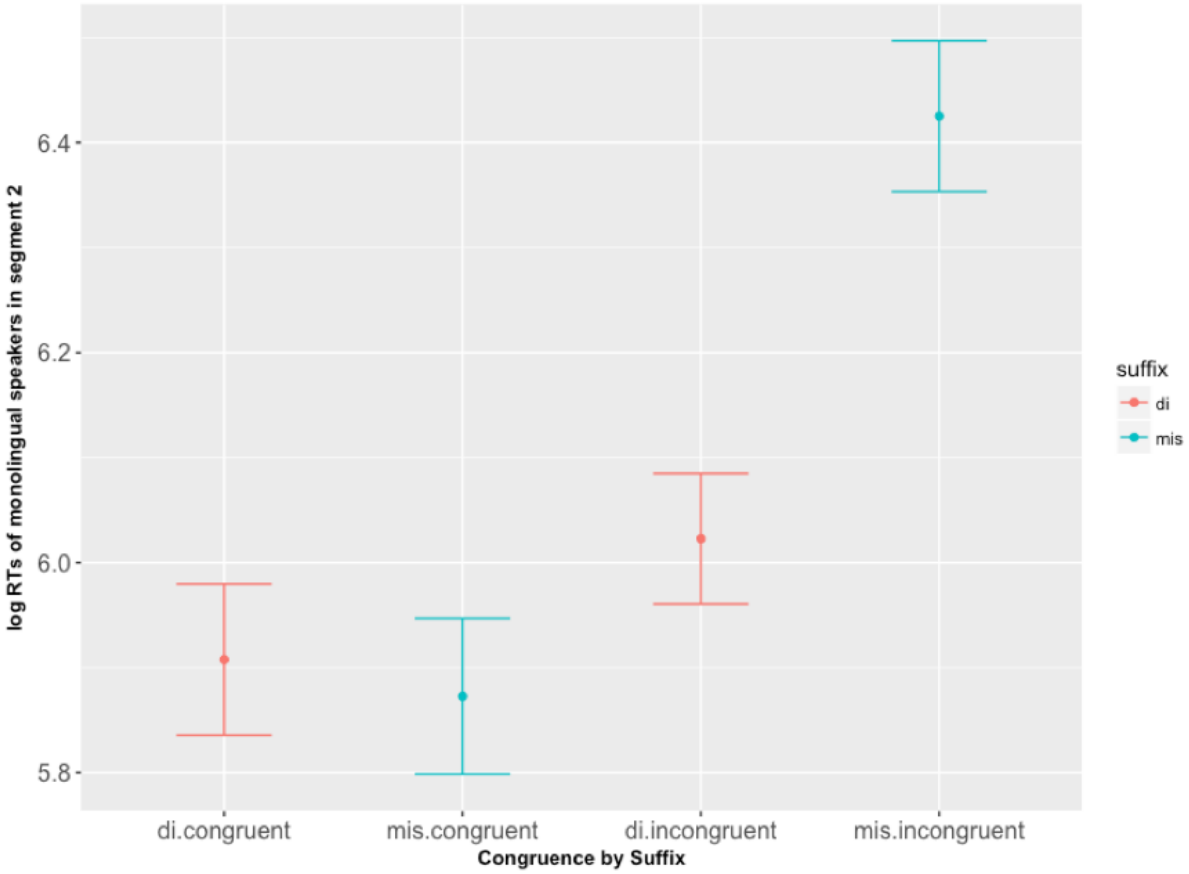

Figure 4.2: Conditional mean log-transformed RTs of monolingual speakers to congruence by suffixes conditions (Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent). Error bars represent standard deviation.

incongruent and *mIş*-congruent sentences in a similar fashion, they only showed significantly increased RTs in the *mIş*-incongruent condition. The conditional mean RTs of monolingual speakers in different conditions are illustrated in Figure 4.2.

4.1.2 First generation immigrants in the second segment

Secondly, the log-transformed RTs of first generation immigrants were examined for the Suffix (*–DI*, *–mIş*) and Congruence (congruent, incongruent) interaction. The model fitted included a by-dialogue and by-subject random intercept, since further random effects were

Table 4.4: Summary of the fixed-effects from the linear mixed-effects model with interaction of suffix and congruence fitted to log-transformed RTs of first generation immigrants in the second segment

	Estimate	Std. Error	t-value	p-value
Intercept	6.1793	0.3506	17.624	<0.0001 ***
suffixmis	-0.0148	0.0991	-0.149	0.882
congruenceincongruent	0.0334	0.0989	0.338	0.736
logRT1	0.0429	0.0475	0.903	0.367
trial	-0.0060	0.0014	-4.279	<0.0001 ***
suffixmis: congruenceincongruent	0.0705	0.1547	0.456	0.651

R Code : `logRT2 ~ suffix * congruence + logRT1 + trial + (1|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
Note: Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

not warranted.

The results, shown in Table 4.4, indicated that neither the main effects of Suffix and Congruence nor their interaction was significant for first generation immigrants. While RT in previous segment was not significant, trial was highly significant with a negative estimate, which suggested that towards the later stages of the experiment, first generation immigrants got significantly faster to respond. Given the insignificant interaction between Suffix and Congruence, no post-hoc analysis was employed.

Figure 4.3 illustrates the conditional mean RTs of first generation immigrants in the second segment. In Figure 4.3, the rather large error bars should be noted, which resulted from the greater variability observed in first generation immigrants' RTs compared to that of monolingual speakers (Figure 4.2).

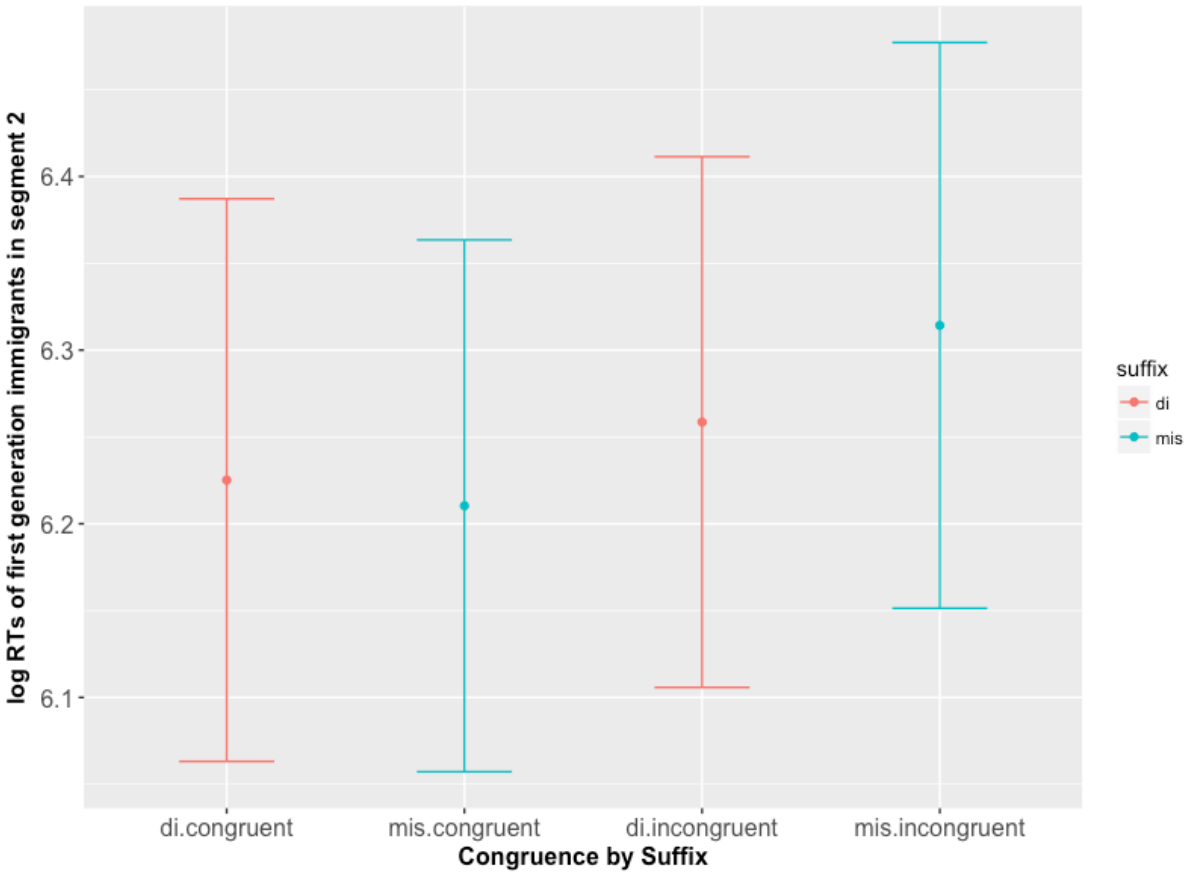

Figure 4.3: Conditional mean log-transformed RTs of first generation immigrants to congruence by suffix conditions (Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent). Error bars represent standard deviation.

In order to see what predictors modulated how first generation immigrants processed these Suffix-by-Congruence conditions, the predictors of the current amount of Turkish use at home, age of onset to English, length of exposure to English, age of arrival to Canada, years of residence in Canada, the current richness of language activities, and lastly Turkish and English proficiency were added to the model in Table 4.4. For proficiency and current richness predictors, the ratio of both languages was also tested. The predictors that entered a significant interaction with Suffix and Congruence were then compared against the simpler model to check whether they improved the model's fit. Only the interaction of Suffix, Congruence and English richness proportion reached significance level ($\beta = 4.3891$, SE = 1.9804, $t = 2.216$, $p = 0.0274$). The model comparison showed that this interaction improved the simpler model (AIC = 656 vs. 649, $p = 0.005$). However, given the complexity of the model and limited amount of data at hand, it was highly likely that the results would not reflect an actual effect of English richness proportion. Thus, it is not included (see the Appendix D for the model output). The interaction of the same predictive variables with Suffix only was also tested to see whether any of the predictors modulated how the suffixes were processed regardless of Congruence. Only the interaction of Suffix with Turkish richness proportion was a significant predictor. The modal comparison showed that this interaction improved the simpler model (AIC = 652 vs. 650, $p = 0.037$). The final model is reported in Table 4.5.

The results in Table 4.5 revealed a significant effect of Suffix and a marginal effect of Turkish richness proportion. While RT in previous segment was not significant, trial was highly significant with a negative estimate, which suggested that towards the later stages of the

Table 4.5: Summary of the fixed-effects from the linear mixed-effects model with interaction of suffix and Turkish richness proportion fitted to log-transformed RTs of first generation immigrants in the second segment

	Estimate	Std. Error	t-value	p-value
Intercept	5.1862	0.5803	8.937	<0.0001 ***
suffixmis	0.5097	0.2444	2.086	0.0378 *
Turkish_richness_proportion	1.8128	0.8951	2.025	0.0746 .
congruence	0.0616	0.0627	0.983	0.3264
logRT1	0.0380	0.0473	0.802	0.4233
trial	-0.0061	0.0014	-4.374	<0.0001 ***
suffixmis:Turkish_richness_proportion	-0.8576	0.4130	-2.077	0.0386 *
R Code : `logRT2 ~ suffix * Turkish_richness_proportion + congruence + logRT1 + trial + (1|subject) + (1|dialogue)`				

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
Note: Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

experiment, first generation immigrants got significantly faster to respond. The interaction between Suffix and Turkish richness proportion was also significant. The Figure 4.4 illustrates this interaction.

In Figure 4.4, the richness of Turkish environment increases from 0.4 to 0.8. As the richness of environment in Turkish increased, the RTs of first generation immigrants increased for both suffixes but the slope for the suffix *–mIş* 'indirect experience' was less steep. That is to say, a richer Turkish environment inhibited the RTs of first generation immigrants in the second segment for both suffixes regardless of congruence. The richer the Turkish environment of first generation immigrants, the harder it was to integrate the suffixes *–DI* and *–mIş* into the previous context. The notable difference in steepness of the slopes suggested that

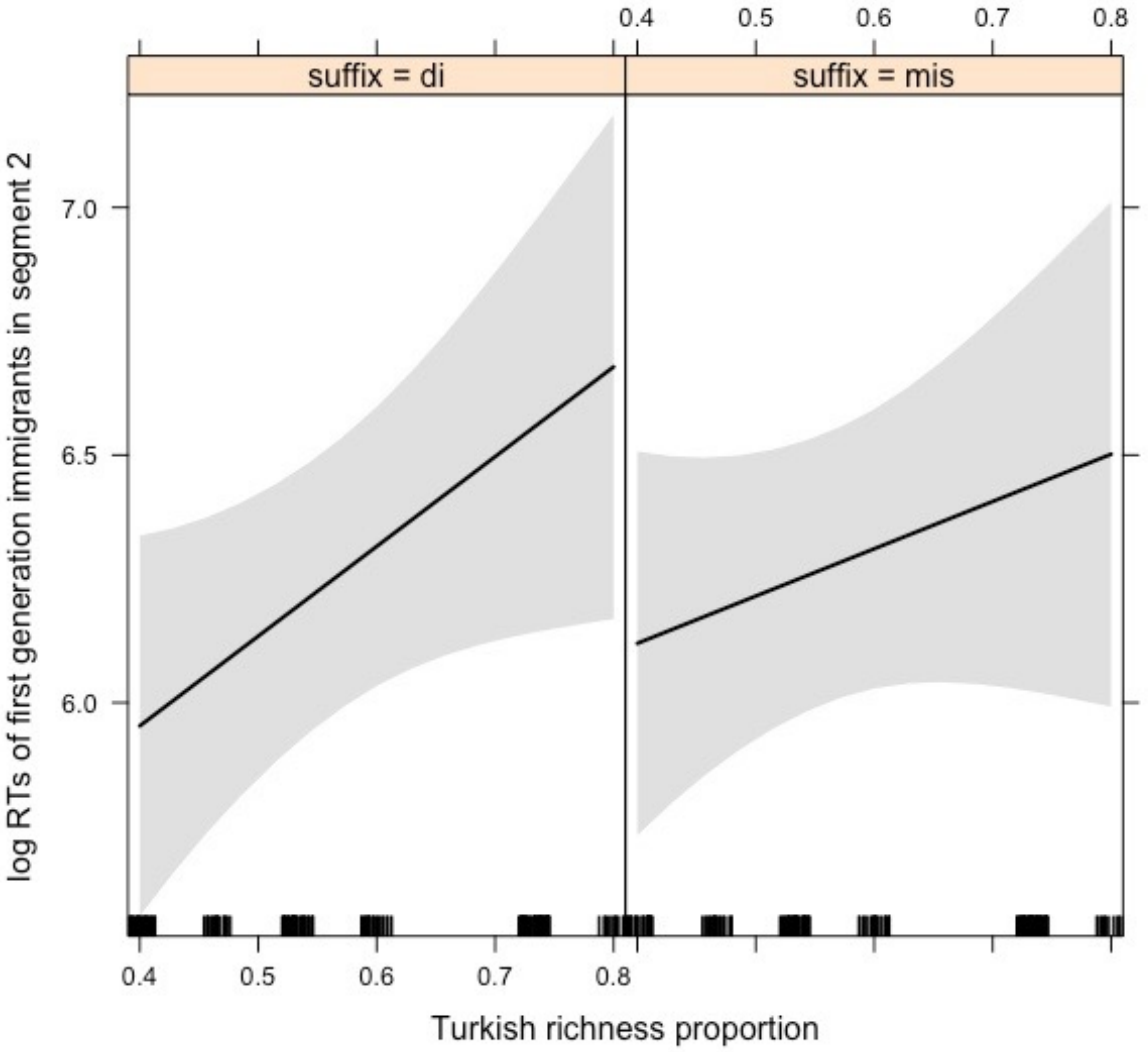

Figure 4.4: The effect of the interaction between suffix and the richness of Turkish environment on the RTs of first generation immigrants in the second segment. Grey bands represent 95% confidence interval

in the second segment, it was easier to reach a judgement regarding the suffix *–mIş* 'indirect experience' compared to the suffix *–DI* 'direct experience', as the richness of Turkish environment of first generation immigrants increased.

4.1.3 Heritage speakers in the second segment

Lastly, the log transformed RTs of heritage speakers in the same conditions were analyzed by fitting a linear mixed effect regression model with a by-dialogue and a by-subject random intercepts. Random slopes did not improve the model's fit, hence, were not included. As shown in Table 4.6, there was no significant interaction between Suffix and Congruence for heritage speakers either, meaning that the RTs did not significantly change depending on the changes in Suffix or Congruence. In other words, heritage speakers were insensitive to the incongruence of the suffix and the preceding context. Given the insignificant interaction, no post-hoc tests were employed.

Figure 4.5 presents the conditional mean RTs of heritage speakers in this segment. It should be noted that the error bars are larger for the RTs of heritage speakers compared to monolingual speakers, which indicates that greater variability in RTs was observed for heritage speakers.

In order to examine what affected how heritage speakers processed Suffix by Congruence conditions in this segment, the model in Table 4.6 was fed with the predictors of the current amount of Turkish use at home, the amount of Turkish use in early childhood, age of onset to English, length of exposure to English, current richness of language activities, and lastly

Table 4.6: Summary of the fixed-effects from the linear mixed-effects model with interaction of suffix and congruence fitted to log-transformed RTs of heritage speakers in the second segment

	Estimate	Std. Error	t-value	p-value
Intercept	5.0050	0.2581	19.392	<0.0001 ***
suffixmis	-0.1243	0.0728	-1.708	0.0907 .
congruenceincongruent	-0.0894	0.0732	-1.221	0.2248
logRT1	0.2428	0.0362	6.704	<0.0001 ***
trial	-0.0077	0.0010	-8.047	<0.0001 ***
suffixmis:congruenceincongruent	0.0934	0.1172	0.797	0.43

R Code : `logRT2 ~ suffix * congruence + logRT1 + trial + (1|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
Note: Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

Turkish and English proficiency. For proficiency and current richness predictors, ratio of both languages was also tested. The predictors were first added to the model one by one in order to see their individual effects. The ones that entered a significant interaction with Suffix and Congruence were then compared against the simpler model to check whether they improved the model's fit.

In an interaction with Suffix and Congruence, only the Turkish proficiency reached the significance level ($\beta = 0.0216$, SE = 0.0105, $t = 2.049$, $p = 0.0409$), while Turkish to English proficiency ratio was marginally significant ($\beta = 2.3970$, SE = 1.368, $t = 1.752$, $p = 0.0803$). The model comparison showed that the interaction of Turkish proficiency, Suffix and Congruence did not improve the simpler model (AIC = 973 vs. 997, $p = 1$). Turkish to English proficiency ratio, on the other hand, did (AIC = 964 vs. 959, $p = 0.015$). However, given

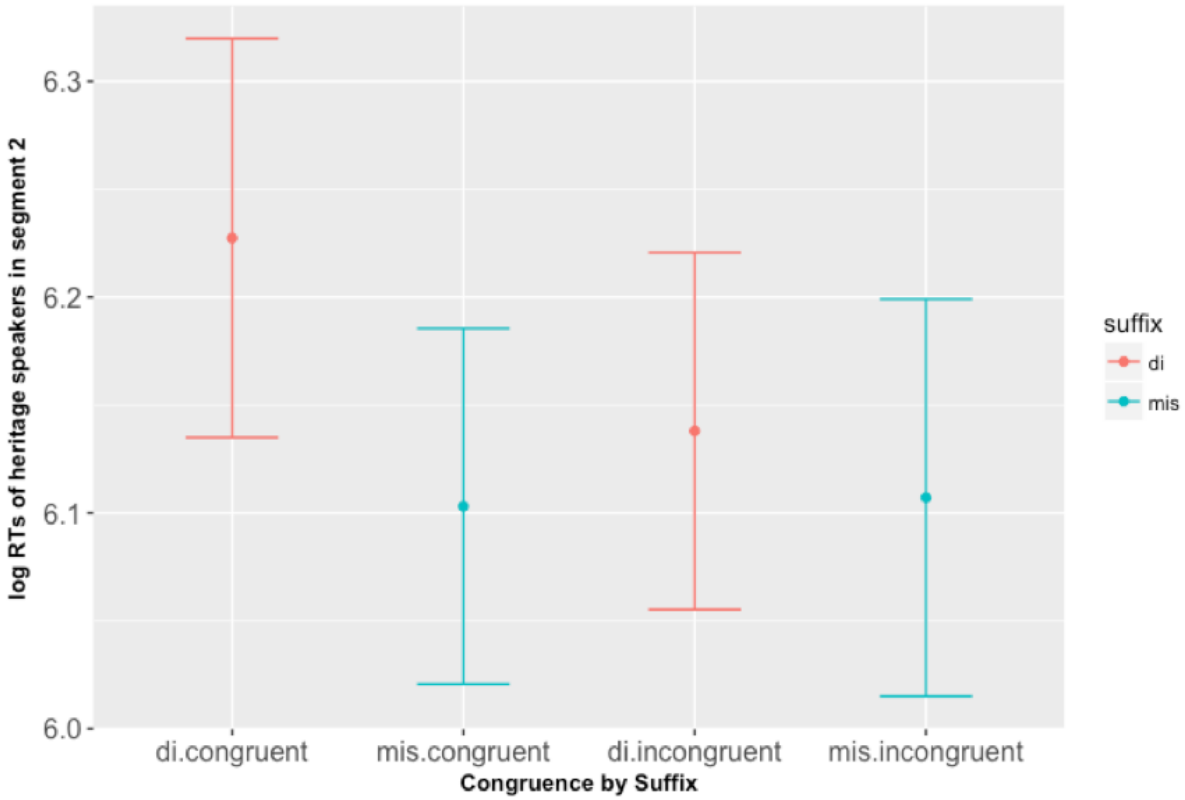

Figure 4.5: Conditional mean log-transformed RTs of heritage speakers to congruence by suffixes conditions (Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent). Error bars represent standard deviation.

the complexity of the model and limited amount of data at hand, it was highly likely that the results would not reflect an actual effect of Turkish to English proficiency ratio. Thus, the model is not included (see the Appendix E for the model output). The interaction of the same predictive variables with Suffix only was also tested to see whether any of the predictors modulated how the suffixes were processed regardless of Congruence. None of the predictors had a significant interaction.

4.2 Results of the third segment

A new set of analyses was carried out on the third segment of the dialogues where the adverb of time was presented to the participants. This segment immediately followed the second segment and was designed to catch possible spill-over or late effects. The analysis pattern was similar to that of the second segment. Again, the conditions analysed were *DI*-congruent (the suffix *–DI* 'direct experience' combined with an initial direct experience context), *DI*-incongruent (the suffix *–DI* 'direct experience' combined with an initial indirect experience context), *mIş*-congruent (the suffix *–mIş* 'indirect experience' combined with an initial indirect experience context) and *mIş*-incongruent (the suffix *–mIş* 'indirect experience' combined with an initial direct experience context). The by-group mean RTs to the conditions are illustrated in Figure 4.6.

Overall, except for *mIş*-incongruent condition, monolingual speakers (MS) were the fastest group, followed by heritage speakers (HS) and first generation immigrants (FGI). In the *DI*-incongruent condition, both monolingual speakers and heritage speakers showed similarly increased RTs compared to the *DI*-congruent condition. In the RTs of first generation immigrants, however, only a small increase was observed. In the *mIş*-incongruent condition, both monolingual speakers and first generation immigrants displayed notably increased RTs compared to the *mIş*-congruent condition. The RTs of heritage speakers, however, barely increased in this condition.

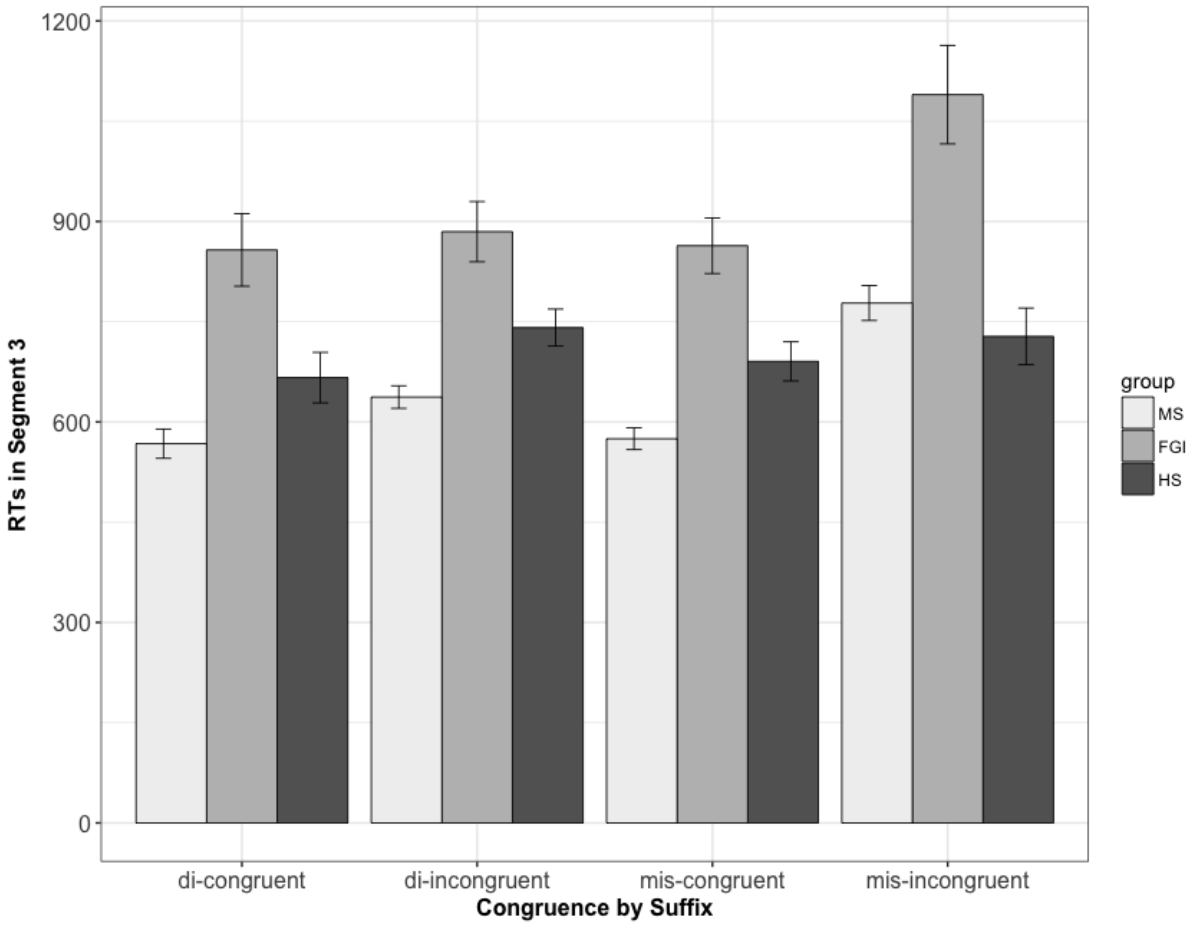

Figure 4.6: Mean RTs of monolingual speakers (MS), first generation immigrants (FGI) and heritage speakers (HS) in suffix-by-congruence conditions. di-congruent = suffix *–DI* preceded by direct experience context; di-incongruent = suffix *–DI* preceded by indirect experience context; mis-congruent = suffix *–mIş* preceded by indirect experience context; mis-incongruent = suffix *–mIş* preceded by direct experience context. Error bars represent standard deviation.

Table 4.7: Summary of the fixed-effects from the linear mixed-effects model with interaction of suffix, congruence and group fitted to log-transformed RTs in the third segment

	Estimate	Std. Error	t-value	p-value
Intercept	4.9970	0.1055	47.382	<0.0001 ***
suffixmis	0.0251	0.0296	0.85	0.3960
congruenceincongruent	0.1162	0.0335	3.47	0.0007 ***
groupFGI	0.3738	0.1322	2.829	0.0060 **
groupHS	0.1455	0.1127	1.291	0.2008
logRT2	0.2268	0.0140	16.255	<0.0001 ***
trial	-0.0046	0.0003	-14.393	<0.0001 ***
suffixmis:congruenceincongruent	0.0934	0.0465	2.009	0.0479 *
suffixmis:groupFGI	-0.0260	0.0606	-0.428	0.6688
suffixmis:groupHS	-0.0075	0.0505	-0.148	0.8826
congruenceincongruent:groupFGI	-0.1171	0.0701	-1.67	0.0967 .
congruenceincongruent:groupHS	-0.0439	0.0586	-0.748	0.4553
suffixmis:congruenceincongruent:groupFGI	0.1672	0.0868	1.926	0.0542 .
suffixmis:congruenceincongruent:groupHS	-0.1123	0.0716	-1.57	0.1166

R Code : `logRT3 ~ suffix * congruence * group + logRT2 + trial + (1+congruence|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
Note: Group = monolingual speakers (MS), heritage speakers (HS), first generation immigrants (FGI); Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

In order to investigate the effect of the interaction of Suffix (*–DI*, *–mIş*), Congruence (congruent, incongruent) and Group (MS, HS, FGI) on the log-transformed RTs, a linear mixed effect regression model with a by-dialogue random intercept and a by-subject random slope for congruence of suffix and preceding context was fitted to the data. Further random effects did not reach significance level or the models failed to converge. The coefficients of the model

are presented in Table 4.7.

The results, presented in Table 4.7, revealed a significant main effect of Congruence and Group. Both control covariates, i.e., RT in the preceding segment and trial, were again significant in predicting the RTs in the third segment. The largest t-value belonged to RT in preceding segment with a positive estimate, suggesting that an increased RT in the second segment significantly increased the RT in the third segment. Trial with the second largest t-value and a negative estimate suggested that as the experiment proceeded the participants got faster. The interaction between Suffix and Congruence was also significant. Lastly, the interaction between Suffix, Congruence and Group, was marginally significant, meaning that the groups behaved differently in different Suffix-by-Congruence conditions. To further investigate this interaction, the groups were analyzed separately. The conditional mean RTs in milliseconds in the third segment based on the model in Table 4.7 are given in Table 4.8.

Table 4.8: The conditional RTs in milliseconds in the third segment

	Monolingual Speakers	First Generation Immigrants	Heritage Speakers
DI-congruent	494.3150	718.3874	571.7541
DI-incongruent	555.2442	717.7892	614.6783
mIş-congruent	506.9006	717.8101	581.9532
mIş-incongruent	625.1515	930.7689	613.9515

Note: *DI*-congruent = the suffix *–DI* 'direct experience' combined with direct experience context; *DI*-incongruent = the suffix *–DI* 'direct experience' combined with indirect experience context; *mIş*-congruent = the suffix *–mIş* 'indirect experience' combined with indirect experience context; *mIş*-incongruent = the suffix *–mIş* 'indirect experience' combined with direct experience context

4.2.1 Monolingual speakers in the third segment

First, the monolingual speakers were subsetted and a linear mixed effect regression model with the interaction of the Suffix and Congruence, with a by-dialogue random intercept and a by-subject random slope for Suffix by Congruence was fitted to the log RTs in the third segment. No further random structure was warranted, thus not included.

As can be seen in Table 4.9, the results suggested a significant effect of Congruence. The effects of preceding RT and trial were also significant. A significant effect for the interaction between the Suffix and Congruence was also found. Therefore, post-hoc tests (by using Satterthwaite approximation for degrees of freedom and Tukey method for estimates) were performed.

Table 4.9: Summary of the fixed-effects from the linear mixed-effects model with interaction of suffix and congruence fitted to log-transformed RTs of monolingual speakers in the third segment

	Estimate	Std. Error	t-value	p-value
Intercept	5.2180	0.1279	40.799	<0.0001 ***
suffixmis	0.0244	0.0334	0.729	0.4682
congruenceincongruent	0.1201	0.0387	3.107	0.0029 **
logRT2	0.1878	0.0176	10.67	<0.0001 ***
trial	-0.0043	0.0004	-12.007	<0.0001 ***
suffixmis:congruenceincongruent	0.1112	0.0527	2.11	0.0402 *

R Code : `logRT3 ~ suffix * congruence + logRT2 + trial + (1+ suffix * congruence|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
Note: Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

The pairwise comparison of the log RTs in conditions showed a significant difference between the congruent and incongruent conditions of the suffix *–mIş* 'indirect experience' (β = -0.2314, SE = 0.03846, t = -6.017, $p < 0.0001$). The same difference with a smaller effect size was also present for the suffix *–DI* 'direct experience' (β = -0.1201, SE = 0.0387, t = -3.107, p = 0.0151). In the congruent condition, there was no significant difference between the suffixes (β = -0.0245, SE = 0.0334, t = -0.729, p =0.8849) whereas in the incongruent condition, a significant difference was found between the suffix *–DI* 'direct experience' and *–mIş* 'indirect experience' (β = -0.1356, SE = 0.0356, t = -3.707, p = 0.0025). The comparisons of the mean log RTs are illustrated in Figure 4.7.

These results suggested that monolingual speakers processed *DI*-congruent (the suffix *–DI* 'direct experience' preceded by a direct experience context) and *mIş*-congruent (the suffix *–mIş* 'indirect experience' preceded by an indirect experience context) similarly. In contrast, they had significantly longer RTs in the *mIş*-incongruent (the suffix *–mIş* 'indirect experience' preceded by a direct experience context) condition compared to the *mIş*-congruent condition (the suffix *–mIş* 'indirect experience' preceded by an indirect experience context). They also processed the *DI*-incongruent condition significantly faster compared to the *mIş*-incongruent condition. So far, the results were in line with the pattern observed in the second segment for monolingual speakers (Figure 4.2). The only divergence surfaced when the *DI*-congruent and *DI*-incongruent conditions were compared. In the second segment, these two conditions were processed in a similar fashion, i.e., no significant difference, while in the third segment, a late-effect of congruence was observed for the suffix *–DI* 'direct experience'. That is to say, the congruent and incongruent conditions of the suffix *–DI* were processed similarly in the

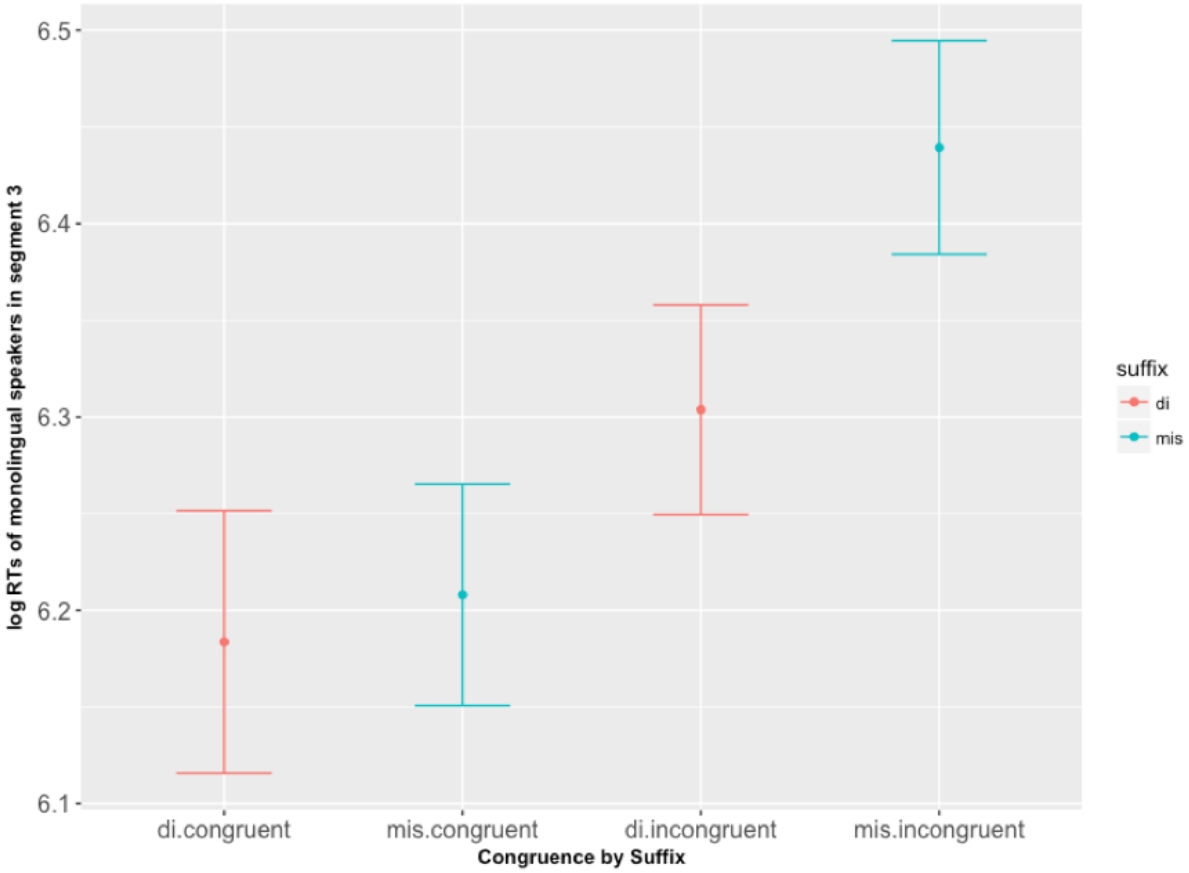

Figure 4.7: Conditional mean log-transformed RTs of monolingual speakers to congruence by suffixes conditions (Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent). Error bars represent standard deviation.

second segment but not in the third segment. Monolingual speakers responded significantly slower when the suffix *–DI* 'direct experience' was preceded by an indirect experience context (*DI*-incongruent) compared to when it was preceded by a direct experience context (*DI*-congruent) in the third segment.

4.2.2 First generation immigrants in the third segment

Next, the RTs of first generation immigrants in the third segment were analyzed to assess the effect of the Suffix and Congruence interaction, by fitting a mixed effect linear regression model with random intercepts for subject and dialogue. Further random structures were not included since they did not improve the model's fit.

The results presented in Table 4.10 revealed a significant effect of the interaction between Suffix and Congruence, suggesting that the effect of Congruence was dependent on suffix or vice versa. To further understand what this interaction meant, post-hoc tests (by using Satterthwaite approximation for degrees of freedom and Tukey method for estimates) were used.

The results of the pairwise comparison revealed that on the one hand the difference between the congruent and incongruent conditions of the suffix *–DI* 'direct experience' was not significant (β = -0.0013, SE = 0.0661, t = -0.019, p = 1), indicating that the RTs of first generation immigrants were not affected by the change of congruence for the suffix *–DI* 'direct experience'. On the other hand, the same difference was highly significant for the suffix *–mIş* 'indirect experience' (β = -0.2768, SE = 0.0681, t = -4.066, p = 0.0005),

Table 4.10: Summary of the fixed-effects from the linear mixed-effects model with interaction of suffix and congruence fitted to log-transformed RTs of first generation immigrants in the third segment

	Estimate	Std. Error	t-value	p-value
Intercept	6.0670	0.2785	21.782	<0.0001 ***
suffixmis	0.0018	0.0662	0.028	0.978
congruenceincongruent	0.0013	0.0661	0.019	0.9848
logRT2	0.1147	0.0362	3.174	0.0016 **
trial	-0.0046	0.0010	-4.783	<0.0001 ***
suffixmis:congruenceincongruent	0.2755	0.0994	2.771	0.0083 **
R Code : `logRT3 ~ suffix * congruence + logRT2 + trial + (1|subject) + (1|dialogue)`				

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
Note: Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

meaning that the suffix *–mIş* was processed significantly faster in the congruent condition compared to the incongruent condition. Pairwise comparison of the incongruent conditions of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' revealed a significant difference (β = -0.2773, SE = 0.0681, t = -4.075, p = 0.0005). In the incongruent condition, the former was processed significantly faster. In the congruent condition, on the other hand, no such difference was observed (β = -0.0018, SE = 0.0662, t = -0.028, p = 1). Lastly, it should be noted that the RTs of first generation immigrants in the third segment and the RTs of monolingual speakers in the second segment were notably similar. Overall, it was observed that first generation immigrants were sensitive towards the incongruence between the suffix *–mIş* 'indirect experience' and preceding direct experience context in the third segment. However, no such sensitivity was present for the incongruence of the suffix *–DI*

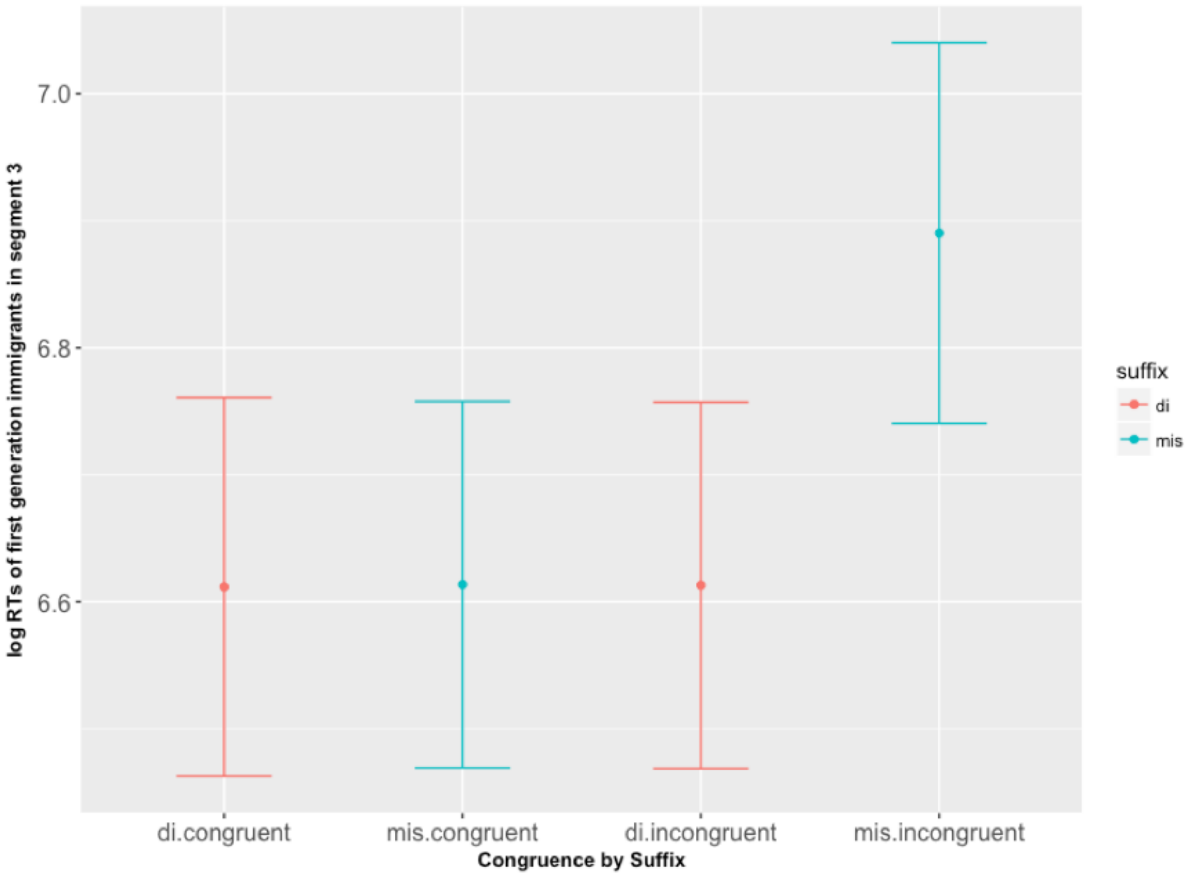

Figure 4.8: Conditional mean log-transformed RTs of first generation immigrants to congruence by suffixes conditions (Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent). Error bars represent standard deviation.

'direct experience' in this segment. The conditional means of the RTs of first generation immigrants are illustrated in Figure 4.8.

In order to examine what other variables might explain the variability in the RTs, the simple interaction model in Table 4.10 was fed with the predictors of the current amount of Turkish use at home, age of onset to English, length of exposure to English, age of arrival to Canada, years of residence in Canada, the current richness of language activities, and lastly Turkish and English proficiency. For proficiency and current richness predictors, the ratio of both languages was also tested. Predictors were added to the model one by one, and none of the

predictors entered a significant interaction with Suffix and Congruence.

4.2.3 Heritage speakers in the third segment

Next, the RTs of heritage speakers were analyzed by fitting a linear mixed effect regression model, with the interaction of Suffix and Congruence, with by-subject and by-dialogue random intercepts. Further random slopes and intercepts did not significantly improve the model's fit, hence were not included.

Table 4.11: Summary of the fixed-effects from the linear mixed-effects model with interaction of suffix and congruence fitted to log-transformed RTs of heritage speakers in the third segment

	Estimate	Std. Error	t-value	p-value
Intercept	4.4260	0.2129	20.79	<0.0001 ***
suffixmis	0.0249	0.0497	0.501	0.618
congruenceincongruent	0.0683	0.0493	1.386	0.168
logRT2	0.3471	0.0293	11.854	<0.0001 ***
trial	-0.0051	0.0007	-6.875	<0.0001 ***
suffixmis:congruenceincongruent	-0.0194	0.0749	-0.259	0.796

R Code : `logRT3 ~ suffix * congruence + logRT2 + trial + (1|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
Note: Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

The results given in Table 4.11 revealed that RT in the preceding segment and trial significantly predicted the RTs in the third segment. The interaction between Suffix and Congruence, however, was not significant, suggesting that the RTs of heritage speakers in the third

segment showed no significant change based on Suffix-by-Congruence conditions. In other words, they processed congruent and incongruent conditions of the suffixes similarly. Based on the model in Table 4.11, the heritage speakers' conditional mean RTs in milliseconds are given in Table 4.12 and the log-transformed RTs are illustrated in Figure 4.9.

Table 4.12: The conditional mean RTs of heritage speakers in milliseconds in the third segment

DI-congruent	*DI*-incongruent	*mIş*-congruent	*mIş*-incongruent
580.0637	621.0509	594.6833	624.4586

Given the results presented in Table 4.11, the way heritage speakers processed *DI*-congruent, *DI*-incongruent, *mIş*-congruent and *mIş*-incongruent was not significantly different. However, the trend observed in Figure 4.9 and the difference in RTs given in Table 4.12 should still be noted. Though insignificant, the heritage speakers still processed the congruent conditions of these suffixes faster than their incongruent counterparts.

In order to examine what affected how heritage speakers processed suffix by congruence conditions in this segment, the predictors of the current amount of Turkish use at home, the amount of Turkish use in early childhood, age of onset to English, length of exposure to English, the current richness of language activities and their ratio, Turkish and English proficiency and their ratio were added to the simpler model in Table 4.11. None of the predictors had a significant interaction.

Next, the interactions of the same predictive variables with Suffix only were tested to see whether any of the predictors affected how the suffixes *–DI* and *–mIş* were processed regard-

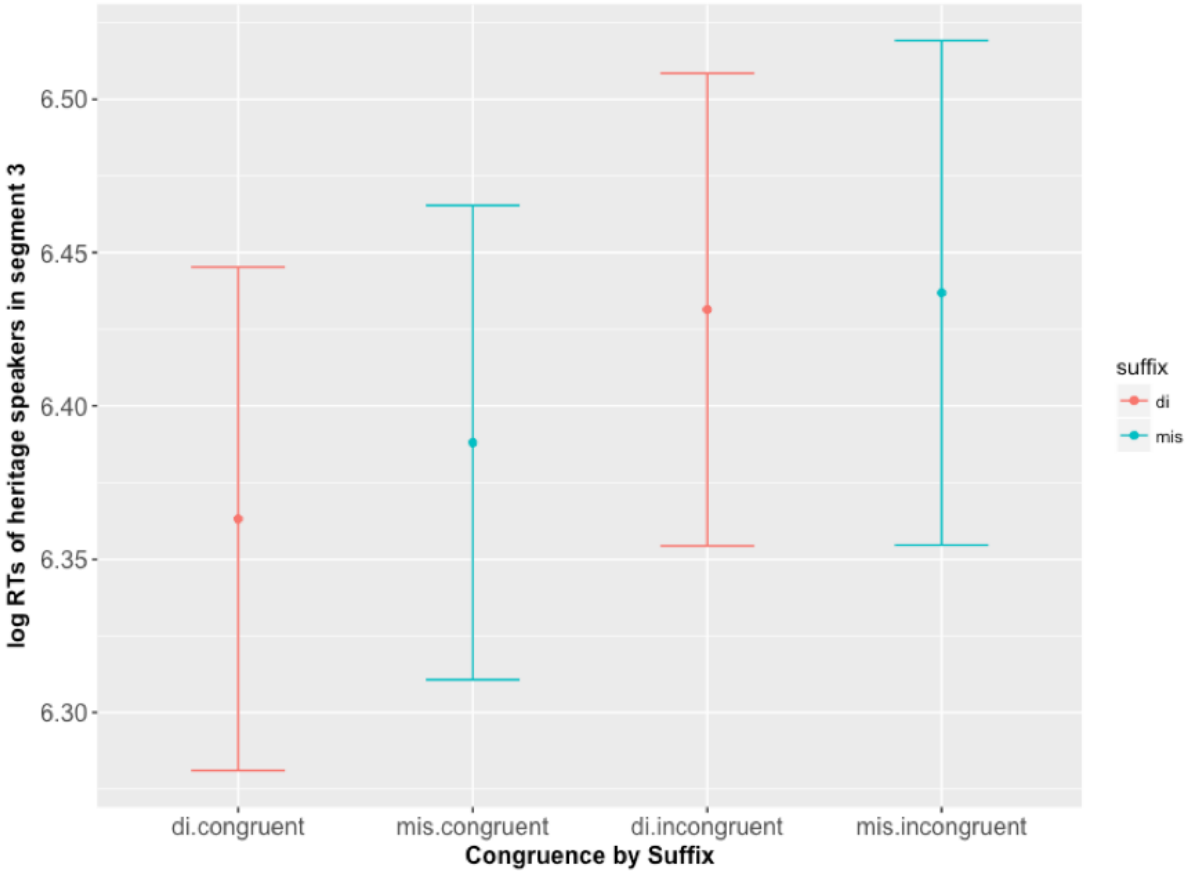

Figure 4.9: Conditional mean log-transformed RTs of heritage speakers to congruence by suffixes conditions (Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent). Error bars represent standard deviation.

less of Congruence. The interaction of Suffix with the age of onset to English (β = -0.4499, SE = 0.2271, t = -1.9810, p = 0.0480), and with the amount of Turkish used in early childhood reached significance level (β = -0.0447, SE = 0.0224, t = -1.9960, p = 0.0463). The model comparison showed that the interaction between Suffix and age of onset to English did not improve the simpler model (AIC = 740 vs. 744, p = 1), while the interaction between Suffix and amount of Turkish used in early childhood did (AIC = 735 vs. 736, p = 0.09). The reason why the model comparison did not prefer the first interaction and barely preferred the second interaction, despite the interactions being significant, may be due to a lack of power, which would have been solved with a larger dataset. That being said, the final model included the interaction between Suffix and the amount of Turkish used in early childhood.

Table 4.13: Summary of the fixed-effects from the linear mixed-effects model with interaction of suffix and the amount of Turkish use in the childhood fitted to log-transformed RTs of heritage speakers in the third segment

	Estimate	Std. Error	t-value	p-value
Intercept	4.4430	0.5792	7.671	<0.0001 ***
suffixmis	0.4225	0.2083	2.029	0.0429 *
Turkish_use_in_childhood	-0.0236	0.5832	-0.041	0.9683
congruenceincongruent	0.0592	0.0325	1.824	0.0686 .
logRT2	0.3482	0.0292	11.918	<0.0001 ***
trial	-0.0050	0.0007	-6.727	<0.0001 ***
suffixmis:Turkish_use_in_childhood	-0.4499	0.2271	-1.9810	0.0480 *

R Code : `logRT3 ~ suffix * Turkish_use_in_childhood + congruence + logRT2 + trial + (1|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
Note: Suffix = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

The results shown in Table 4.13 revealed a significant effect of Suffix on the RTs and a marginally significant effect of Congruence. The control variables, RT in the preceding segment and trial, were also significant in predicting the RTs. The interaction between Suffix and the amount of Turkish used in the childhood was also marginally significant, which indicates that the effect of Suffix on RTs was dependent on the effect of the amount of Turkish used in the childhood. The effect of this interaction is visualized in Figure 4.10.

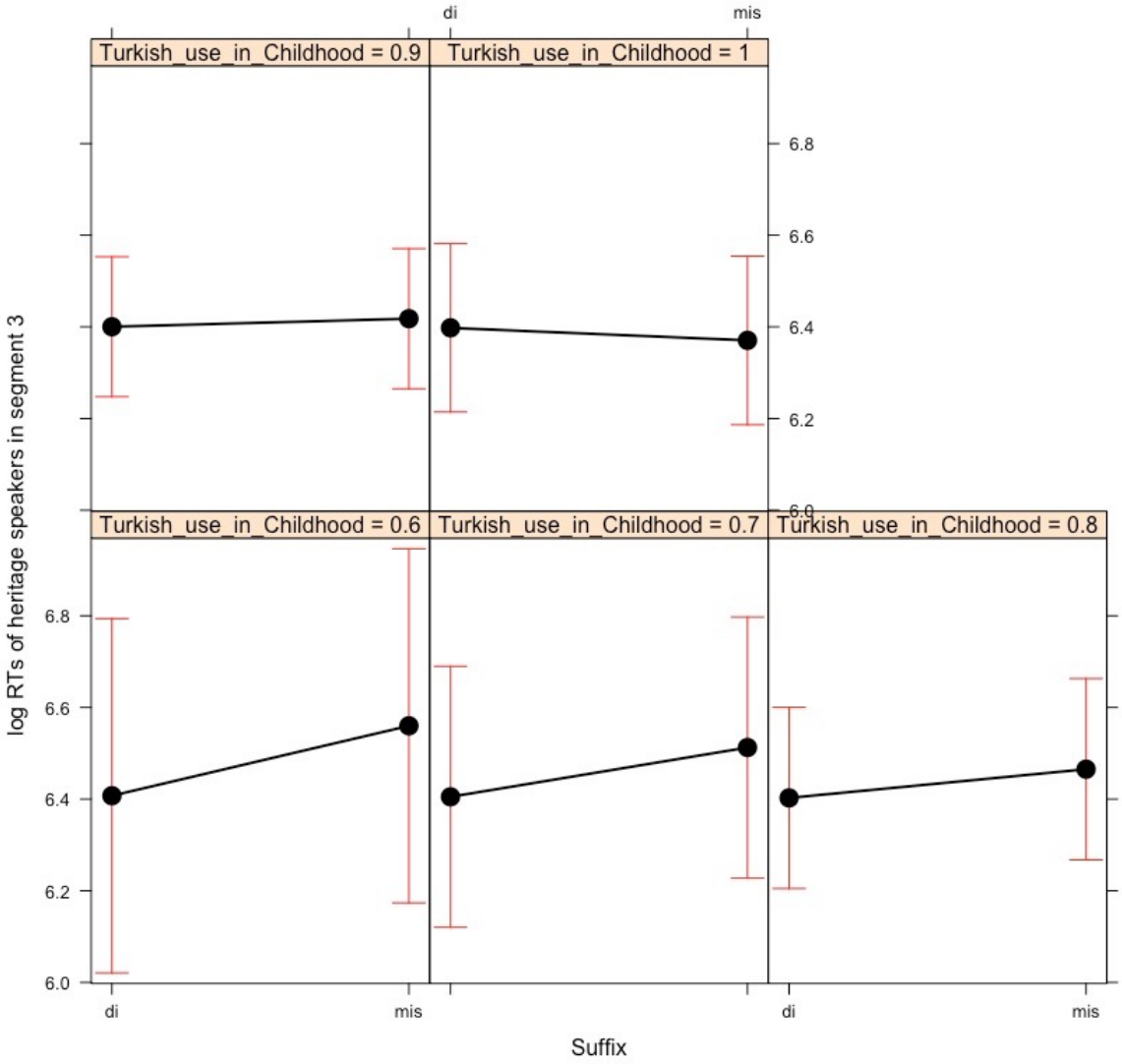

Figure 4.10: The effect of the interaction of suffix and the amount of Turkish use in childhood on the RTs of heritage speakers in the third segment

In Figure 4.10, the amount of Turkish used in early childhood is a proportion and increases from 0.6 to 1. The proportional value of 1 means that in early childhood, participants interacted with their parents, siblings, and caregivers (if any) in Turkish almost 100% of the time. An increase in the amount of Turkish in early childhood did not have any effect on the RTs for the suffix *–DI* 'direct experience', whereas it facilitated the RTs for the suffix *–mIş* 'indirect experience'. When the proportion was 0.6 (bottom left panel), the suffix *–mIş* 'indirect experience' was processed significantly slower than the suffix *–DI* 'direct experience'. As the amount of Turkish used in early childhood increased, the difference in the RTs for the suffixes *–DI* and *–mIş* gradually faded away, and eventually disappeared at the proportional value of 0.9 and 1. That is, the amount of Turkish in early childhood did not affect how heritage speakers processed the suffix *–DI* 'direct experience'. However, the participants who interacted in Turkish more processed the suffix *–mIş* 'indirect experience' faster compared to those who did not.

4.3 Summary of the results

Monolingual speakers showed substantially longer RTs in the *mIş*-incongruent condition compared to the *mIş*-congruent condition in both the second (365.43 ms vs. 635.79 ms) and the third segment (506.90 ms vs. 625.15 ms), suggesting that they were highly sensitive to the violations of the suffix *–mIş* 'indirect experience' in both segments. In contrast, their RTs in the *DI*-incongruent condition were not significantly longer than their RTs in the *DI*-congruent condition in the second segment (377.28 ms vs. 423.21 ms), suggesting that they did not process the *DI*-incongruent condition as a violation in this segment. The effect of

the *DI*-incongruent condition surfaced late, in the third segment as indicated by significantly longer RTs compared to the *DI*-congruent condition (494.32 ms vs. 555.24 ms). Still, the observed difference in RTs for the *DI*-congruent and *DI*-incongruent conditions (60.92 ms) was nowhere close to that of the *mIş*-congruent and *mIş*-incongruent conditions, which were 270.36 ms and 118.28 ms in the second and third segments, respectively. These results point to a processing asymmetry for the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience', in the case of monolingual speakers. In other words, the way monolingual speakers processed the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' was not the same in that the violations of the latter resulted in greater and more immediate processing difficulties. They were less likely to process the use of the suffix *–DI* 'direct experience' in indirect experience context as ungrammatical.

The RTs of first generation immigrants did not significantly differ in either condition in the second segment, suggesting that they did not process the conditions of *DI*-incongruent and *mIş*-incongruent as ungrammatical in this segment. Conversely, in the third segment, they showed significantly longer RTs in the *mIş*-incongruent condition compared to the RTs in the *mIş*-congruent condition (717.81 ms vs. 930.77 ms). The insignificant difference between the RTs in *DI*-congruent and *DI*-incongruent conditions persisted in the third segment. It should be noted that their RTs in third segment for the *mIş*-incongruent condition mirrored the RTs of monolinguals in the second segment. These results suggested that even though the effect came in late, it still induced substantially longer RTs in the *mIş*-incongruent condition. Thus, first generation immigrants were still sensitive to the violations of the suffix *–mIş* 'indirect experience'. However, no such effect was present for the suffix *–DI*

'direct experience'. In terms of individual differences, the RTs of first generation immigrants in the second segment were modulated by the richness of their Turkish environments. In that, as the Turkish language environments got richer, it was harder to integrate the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' into the previous context. However, the richness of the Turkish environment helped them reach a judgement on the suffix *–mIş* 'indirect experience' faster than the suffix *–DI* 'direct experience'.

The RTs of heritage speakers showed that they were not sensitive to the violations of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' in either segment. Though not significant, the RTs in the third segment showed a slight increase in the incongruent conditions of both suffixes. The RTs for the suffixes, regardless of congruency, were modulated by Turkish use in early childhood. That is to say, the heritage speakers experienced greater difficulties in processing the suffix *–mIş* 'indirect experience' if their Turkish use was low in early childhood. As Turkish use in early childhood increased, the processing difficulties of the suffix *–mIş* 'indirect experience' faded away.

Chapter 5: Discussion

In this study, the comprehension of evidentiality in Turkish, i.e., the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience', was investigated with Turkish monolingual speakers, first generation immigrants, and heritage speakers using a self-paced listening task. The first research question was whether heritage speakers and first generation immigrants would show different levels of sensitivity to the violations of evidentiality compared to monolingual speakers. The second research question concerned whether the sensitivity level would be the same for both suffixes. The last research question was whether the language proficiency and the language environment of the heritage speakers and first generation immigrants would modulate the sensitivity towards the violations of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience'.

No difference was observed in the RTs of heritage speakers for incongruity of either suffix, whereas monolinguals speakers showed sensitivity to both, though more immediate and larger in magnitude for the suffix *–mIş* 'indirect experience'. Thus, regarding the first question, it can be concluded that heritage speakers and monolingual speakers processed evidentiality in Turkish differently. When the RTs of first generation immigrants were compared to monolingual speakers, the picture became complicated. The RTs of first generation immigrants in the third segment mirrored the pattern observed for monolinguals in the second segment in that first generation immigrants did not show any effect of incongruity of the suffix *–DI*, but showed a substantial effect of incongruity of the suffix *–mIş* 'indirect experience'. The fact that such effect was not present for the suffix *–DI* 'direct experience' might be due to

two reasons: (1) first generation immigrants underwent attrition, which affected the suffix *–DI* 'direct experience', while the suffix *–mIş* 'indirect experience' was relatively unaffected, (2) the processing patterns of first generation immigrants may well be similar to monolingual speakers, only slower in that the effects observed in the second and third segments for monolinguals might move to the third and fourth segments for first generation immigrants. Indeed, this is what was observed for suffix *–mIş* 'indirect experience'. Monolingual speakers showed sensitivity to the incongruity of the suffix *–mIş* 'indirect experience' in the second segment, and the suffix *–DI* 'direct experience' in the third segment, while first generation immigrants' sensitivity to the incongruity of the suffix *–mIş* 'indirect experience' surfaced late, in the third segment. However, in the absence of a fourth segment, it is impossible to reach a conclusion regarding whether first generation immigrants processed the suffix *–DI* 'direct experience' differently compared to monolingual speakers. In addition, it should be noted that, the RTs of first generation immigrants for both suffixes were modulated by the richness of language environment in Turkish in the second segment, which might lend support to the second conclusion. The effect will be discussed later in more detail.

Regarding the second research question, it was predicted that monolingual speakers would be more sensitive to the incongruity of the suffix *–mIş* 'indirect experience', which is more specified and used more restrictedly compared to that of the suffix *–DI* 'direct experience', which is more liberally used, as suggested in the production studies (Ünal et al., 2016; Ünal & Papafragou, 2016). The findings were in line with the predictions, in that there was a processing asymmetry between the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' in the case of monolingual speakers. The incongruity of the suffix *–mIş* 'indirect

experience' induced substantially longer RTs in the critical segment and post-critical segment, whereas the effect of incongruity of the suffix *–DI* 'direct experience' surfaced in the post-critical segment, only with a smaller magnitude. In other words, monolingual speakers were less likely to process the incongruity of the suffix *–DI* 'direct experience' as a violation of grammaticality compared to the suffix *–mIş* 'indirect experience'.

A similar asymmetry was also observed for first generation immigrants who might be following the processing patterns of monolinguals speakers, only in a slower fashion. If this is the case, it means that no attrition effect was observed for first generation immigrants in this study. Alternatively, the discourse-appropriateness of the suffix *–DI* 'direct experience' might have been attrited, while that of the suffix *–mIş* 'indirect experience' was well retained. If this is the case, some of the hypotheses discussed earlier may account for the said asymmetry. To begin with, following Chamorro et al. (2016), the Interface Hypothesis predicted that the suffix *–mIş* 'indirect experience' will be more prone to attrition since it is the marked form, hence more likely to be regarded as the default form to compensate the processing difficulties. Thus, the prediction of the Interface Hypothesis is not in line with the findings of this study. The Regression Hypothesis predicted attrition to follow the reverse order of acquisition. Thus, the discourse-appropriateness of the suffix *–DI* 'direct experience' will be more prone to attrition since its discourse distribution stabilizes later than the suffix *–mIş* 'indirect experience'. This is in line with the asymmetry observed in this study on the assumption that the processing pattern of the first generation immigrants is different from that of monolingual speakers. Activation Threshold Hypothesis defined attrition as "long-term lack of stimulation" (M. Paradis, 1993, p. 28) and predicted that a linguistic structure

in L1 would be more prone to attrition if it has a corresponding competing structure in the L2. The wider distribution and liberal use of the suffix *–DI* 'direct experience' (see Section 1.4.1, for a detailed discussion) makes it more proximal to the English past tense marker. Thus, the activation threshold of the suffix *–DI* 'direct experience' will be increased due to its similarity to the English past tense marker and the competition between the two. The suffix *–mIş* 'indirect experience', which does not have any corresponding structure in English, will be relatively well-retained. These predictions are in line with the pattern observed in this study for first generation immigrants, if their processing is indeed different from monolingual speakers. If the cross-linguistic influence is left aside, the activation thresholds might also account for the slower processing of first generation immigrants. The reduced use of Turkish might increase activation thresholds of certain items, which in turn, might slow down first generation immigrants. In other words, it might be the case that first generation immigrants did not lose their sensitivity to evidentiality in Turkish, they just needed more time to process it. The predictions of Feature Reassembly model were in line with that of Activation Threshold Hypothesis. However, it also predicted that the changes would be reflected on the representational level in that the values of the suffix *–DI* 'direct experience' would be reassembled according to the English past tense marker. If first generation immigrants' processing of the suffix *–DI* 'direct experience' is indeed different than monolingual speakers, this might be due to the effect of the English past tense marker. Consequently, the differences in processing might stem from a representational change since the [+evidentiality] and [+past] features of the suffix *–DI* might have been reassembled under [-evidentiality] and [+past] features of the English past tense marker. However, since the data collected in this study do not allow us to speak for the representational changes, it can only be said that the

results of this study are to this point consistent with the Feature Reassembly Hypothesis and need to be supported with further testing which might help unraveling the underlying structures and a possible reassembly case.

Regarding the heritage speakers, it was evident that they were insensitive to the violations of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience'. This insensitivity will be discussed in relation to Acquisition without Mastery, L1 Attrition, Missing-Input Competence Divergence, the Interface Hypothesis and the Putnam and Sanchez Model. The acquisition without mastery suggests that some properties of the heritage languages cannot be fully acquired due to the intensive exposure to an L2 and reduced L1 use. Given that the discourse-appropriateness of these suffixes *–DI* and *–mIş* are not acquired before the age of 7 (Öztürk & Papafragou, 2016; Ünal & Papafragou, 2016), the acquisition without mastery predicted heritage speakers to experience problems with discourse-proper use of these two suffixes. Leaving discourse appropriateness aside, if one suffix were to be more problematic than the other, it would be predicted to be the suffix *–mIş* 'indirect experience', which emerges later in monolingual context. The results of this study showed that the heritage speakers experienced problems with context-appropriateness of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience'. The mean age of onset to English was 3;6 for the heritage speakers in this study, which suggests that it is highly likely that the heritage speakers did not fully acquire the discourse-appropriate distributions these suffixes by the time of intensive English exposure. It is likely that the acquisitional process of Turkish evidentiality was disturbed by an early exposure to English, resulting in an arrested development of evidentiality in heritage Turkish. Alternatively, it is also possible that heritage speakers might

have protractedly acquired the witnessed vs. non-witnessed distinction of these suffixes to some extent, and these features attrited over the life span. The resolution of this distinction is, however, beyond the scope of this thesis. The Interface Hypothesis predicted that heritage speakers would experience problems with evidentiality in Turkish. Following Chamorro et al. (2016), it also predicted that heritage speakers would show reduced sensitivity to the incongruity of the suffix *–mIş* 'indirect experience' since it is the marked form, which would be regarded as the "default" form to resort to in the face of computing difficulties. This prediction is not in line with the findings of this study since heritage speakers showed equal level of (in)sensitivity towards the incongruity of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience'. However, as Sorace (2012) points out, predictions under the Interface Hypothesis regarding the heritage speakers can be made "as long as the differences between individual and generational attrition are clear" (p. 214). If the processing patterns of first generation immigrants are different from monolingual speakers, and if they are reflective of the production patterns, the input that heritage speakers were exposed to would be qualitatively different than the type of input that monolingual speakers were exposed to. In that case, heritage speakers in this study would fall out of the territory of the Interface Hypothesis, and could better be explained under Missing-Input Competence Divergence. However, it is not certain that first generation immigrants show signs of attrition, to start with. Even if they do, the production patterns of the first generation immigrants cannot be known based on the data at hand. Thus, this study cannot speak to the predictions of Missing-Input Competence Divergence. Lastly, since the suffix *–DI* 'direct experience' is less restrictedly used in Turkish compared to the suffix *–mIş* 'indirect experience', the former bears more similarities with the English past tense marker. Accordingly, the Putnam

and Sanchez model predicted that the activation level of the suffix *–DI* 'direct experience' would be lowered due to its similarity to the English past tense marker. Consequently, its [+evidentiality] and [+past] features would be reassembled under the features of the English past tense marker which is [+past] and [-evidentiality]. In other words, the suffix *–DI* 'direct experience' would be [+past] without any distinction of evidentiality. This prediction might explain why heritage speakers showed no sensitivity to the incongruity of the suffix *–DI* 'direct experience'; however, it does not explain the case of the suffix *–mIş* 'indirect experience'.

The last research question was whether language proficiency and language environment of the heritage speakers and first generation immigrants modulated the sensitivity levels to the violations of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience'. Considering the limited number of participants in this study, the data at hand prevented us from examining the effects of language proficiency and language environment reliably in a Suffix-by-Congruence interaction. However, there were some variables that affected how the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' were overall processed. In the case of first generation immigrants, the richness of the environment in Turkish modulated how they processed the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' in the second segment, regardless of congruency. As the Turkish richness score increased, it was harder to process these suffixes. This might point to that the first generation immigrants were aware of the intricate discourse-dependencies of the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience'. As the richness of the Turkish language environment increased, first generation immigrants became more aware of that they needed to integrate these suf-

fixes into a discourse, but they did not reach a conclusion in the second segment. They realized that the suffix *–mIş* 'indirect experience' needed to be integrated into the discourse faster than the suffix *–DI* 'direct experience'. This asymmetric effect favouring the suffix *–mIş* 'indirect experience' in the second segment might be driving the asymmetry observed in the third segment, where the incongruity of the suffix *–mIş* 'indirect experience' induced a significant RT difference. It was evident that the Turkish richness of the language environment also modulated the processing of the suffix *–DI* 'direct experience' in the second segment, but first generation immigrants were slower to realize that it also required discourse integration. This might suggest that the longer RTs for the incongruity of the suffix *–DI* 'direct experience' may have been observed in a fourth segment as a late effect (if there had been a fourth segment). In the case of heritage speakers, it was the Turkish use in early childhood that modulated how they processed the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience'. When the Turkish use of heritage speakers between the ages of 0-4 was relatively low, they experienced problems in processing *–mIş* 'indirect experience', while the suffix *–DI* 'indirect experience' was not affected. The heritage speakers who used Turkish almost always in childhood processed the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' equally well. The facilitatory effect of early L1 exposure in adult heritage language maintenance was also reported in Gathercole and Thomas (2009) in relation to their performance on vocabulary and idioms in the heritage language. The effect of Turkish use in early childhood also contributes to the explanatory power of acquisition without mastery. It is likely that between the ages of 0-4, the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' were still being acquired given the relatively late acquisition of these suffixes, even under intensive and sole L1 exposure. After the start of an intensive L2 exposure, the

acquisition of these suffixes might have started to slow down and eventually halted. In that case, acquisition without mastery would predict the heritage speakers who used their L1 relatively low in early childhood to experience more problems with the suffix *–mIş* 'indirect experience' since it emerges later than the suffix *–DI* 'direct experience', as observed in the results of this study.

Chapter 6: Conclusion and future directions

In this study, the comprehension of evidentiality in Turkish, i.e., the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience', was investigated with Turkish monolingual speakers, first generation immigrants, and heritage speakers using a self-paced listening task. In addition, the role of language proficiency and language environment in processing evidentiality was also examined.

It was found that monolingual speakers did not process the suffixes *–DI* 'direct experience' and *–mIş* 'indirect experience' similarly, in that the incongruity of the latter induced greater and more immediate processing difficulties even though the former is more frequent in the natural speech (Öztürk, 2008). This finding corroborates Johanson's (2003, 2018) claim that the suffix *–mIş* clearly denotes indirect experience, whereas *–DI* does not necessarily encode direct experience in Turkish. He also further argued that "evidentially unmarked terms may suggest that the source of information is direct experience, but they may also be used for unwitnessed events" (Johanson, 2018, p. 519). To recapitulate, this study raises the question of whether the sole attribution of the suffix *–DI* to the events that are directly experienced is genuinely motivated, since the processing patterns of monolingual Turkish speakers depict a different picture.

The first generation immigrants showed a late effect of incongruity for only the suffix *–mIş* 'indirect experience'. The fact that such effect was not present for the suffix *–DI* 'direct experience' might be due to two reasons. First, the processing pattern of the first generation immigrants might be similar to that of monolingual speakers but only slower, in that the

effects that surfaced in the second and third segments for the monolingual speakers, might have moved to the third and fourth segments for first generation immigrants. Second, the suffix *–DI* 'direct experience' might have undergone attrition in the case of first generation immigrants. However, the design of this study lacks a fourth segment, which would have been a tie-breaker, thus, it is not possible to know for sure why first generation immigrants did not show an effect of the incongruity of the suffix *–DI* 'direct experience'. If it is the first reason, activation thresholds, without a cross-linguistic influence, might offer an explanation in that the reduced use of Turkish may increase the activation threshold of certain items, which in turn, might increase the time needed for retrieval, and slow down the first generation immigrants. If it is the second reason, the Activation Threshold Hypothesis as a processing account offers a better explanation than the other hypotheses. If the processing patterns of first generation immigrants are divergent from that of monolingual speakers, it might be due to an L2 induced L1 attrition, where the suffix *–DI* 'direct experience' is more likely to suffer from attrition due to its similarity to the English past tense marker.

The case of the heritage speakers who did not show any sensitivity to the incongruity of either suffix lends support to acquisition without mastery hypothesis when all things are considered, such as protracted acquisition of evidentiality, early exposure to English, and the facilitatory effect of the Turkish use in early childhood, only for the suffix *–mIş* 'indirect experience'. It is highly likely that the process of acquiring evidentiality in Turkish was interrupted by the intensive English exposure and reduced Turkish use; hence halted for the case of heritage speakers.

Overall, this study challenges taking the suffixes *–DI* 'direct experience' and *–mIş* 'indirect

experience' on equal footing. It also suggests that evidentiality is indeed a vulnerable domain in Turkish as a heritage language, which might be due to various reasons. However, the results of this study might be interpreted to favour the acquisition without mastery account. In contrast, first generation immigrants may not necessarily suffer from attrition. It might well be due to the slower processing on the part of first generation immigrants. In order to disentangle the effects of attrition from slow processing, a self-paced listening study offers a helping hand, though it is necessary to include a fourth segment to catch all possible late effects, which may be of interest for future studies. Lastly, the question of how individual differences modulate real-time comprehension of evidentiality remained unanswered at present. Further studies, which take these variables into account, will need to be undertaken with more participants.

References

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* (p. 209–232). Amsterdam: John Benjamins Publishing.

Aikhenvald, A. Y. (2004). *Evidentiality*. Oxford, UK: Oxford University Press.

Aksu-Koç, A. (1988). *The acquisition of aspect and modality: The case of past reference in Turkish*. Cambridge, UK: Cambridge University Press.

Aksu-Koç, A., & Slobin, D. I. (1986). A psychological account of the development and use of evidentials in Turkish. In W. L. Chafe & J. Nichols (Eds.), *Evidentiality: The linguistic coding of epistemology* (pp. 159–167). Norwood, NJ: Ablex.

Aksu-Koç, A., Terziyan, T., & Erguvanlı-Taylan, E. (2014). Input offers and child uptakes: acquiring mood and modal morphology in Turkish. *Language, Interaction and Acquisition*, *5*(1), 62–81.

Aksu-Koç, A., Ögel Balaban, H., & Alp, I. E. (2009). Evidentials and source knowledge in Turkish. *New Directions for Child and Adolescent Development*, *125*, 13–28.

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. *Frontiers in Psychology*, *6*, 1387.

Arslan, S., De Kok, D., & Bastiaanse, R. (2017). Processing grammatical evidentiality and time reference in Turkish heritage and monolingual speakers. *Bilingualism: Language and Cognition*, *20*(3), 457–472.

Baayen, R. H., & Milin, P. (2010). Analyzing reaction times. *International Journal of*

Psychological Research, *3*(2), 12–28.

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, *67*(1), 1–48. doi: 10.18637/jss.v067.i01

Bergmann, C., Meulman, N., Stowe, L. A., Sprenger, S. A., & Schmid, M. S. (2015). Prolonged L2 immersion engenders little change in morphosyntactic processing of bilingual natives. *Neuroreport*, *26*(17), 1065–1070.

Bolger, P. A., & Zapata, G. C. (2011). Psycholinguistic approaches to language processing in heritage speakers. *Heritage Language Journal*, *8*(1), 1–29.

Chamorro, G., & Sorace, A. (2018, to appear). The Interface Hypothesis as a framework for studying L1 attrition. In M. S. Schmid & B. Köpke (Eds.), *The Oxford handbook of first language attrition.* Oxford, UK: Oxford University Press.

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.

Cuza, A. (2013). Crosslinguistic influence at the syntax proper: Interrogative subject–verb inversion in heritage Spanish. *International Journal of Bilingualism*, *17*(1), 71–96.

Daskalaki, E., Chondrogianni, V., Blom, E., Argyri, F., & Paradis, J. (2018). Input effects across domains: The case of Greek subjects in child heritage language. *Second Language Research*. Retrieved from `https://doi.org/10.1177/0267658318787231`

Domínguez, L., & Hicks, G. (2016). Synchronic change in a multidialectal community: evidence from Spanish null and postverbal subjects. In A. Cuza, L. Czerwionka, & D. Olson (Eds.), *Inquiries in Hispanic linguistics: From theory to empirical evidence* (pp. 53–72). Amsterdam: John Benjamins Publishing.

Dussias, P. E. (2003). Syntactic ambiguity resolution in L2 learners: Some effects of bilinguality on L1 and L2 processing strategies. *Studies in Second Language Acquisition*, *25*(4), 529–557.

Dussias, P. E., & Sagarra, N. (2007). The effect of exposure on syntactic parsing in Spanish-English bilinguals. *Bilingualism: Language and Cognition*, *10*(1), 101–116.

Flores, C. (2015). Understanding heritage language acquisition. some contributions from the research on heritage speakers of European Portuguese. *Lingua*, *164*, 251–265.

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.

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.

Gathercole, V. C. M., & Thomas, E. M. (2009). Bilingual first-language development: Dominant language takeover, threatened minority language take-up. *Bilingualism: Language and Cognition*, *12*(2), 213–237.

Gürel, A. (2004). Selectivity in L2-induced L1 attrition: A psycholinguistic account. *Journal of Neurolinguistics*, *17*(1), 53–78.

Gürel, A. (2016). Introduction: Linguistic aspects of Turkish as a second language. In A. Gürel (Ed.), *Second language acquisition of Turkish* (pp. 1–15). Amsterdam: John Benjamins Publishing.

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.

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*(2), 361–394.

Hulk, A., & Müller, N. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition*, *3*(3), 227–244.

Hurtado, N., Grüter, T., Marchman, V. A., & Fernald, A. (2014). Relative language exposure, processing efficiency and vocabulary in Spanish-English bilingual toddlers. *Bilingualism: Language and Cognition*, *17*(1), 189–202.

Jakobson, R. (1941). *Kindersprache, aphasie und allgemeine lautgesetze*. Uppsala: Almqvist.

Jia, R., & Paradis, J. (2015). The use of referring expressions in narratives by Mandarin heritage language children and the role of language environment factors in predicting individual differences. *Bilingualism: Language and Cognition*, *18*(4), 737–752.

Jia, R., & Paradis, J. (2018). The acquisition of relative clauses by Mandarin heritage language children. *Linguistic Approaches to Bilingualism*. Retrieved from `http://dx.doi.org/10.1075/lab.16015.jia`

Johanson, L. (2003). Evidentiality in Turkic. In A. Y. Aikhenvald & R. M. W. Dixon (Eds.), *Studies in evidentiality* (pp. 273–291). Amsterdam: John Benjamins Publishing.

Johanson, L. (2018). Turkic indirectivity. In A. Y. Aikhenvald (Ed.), *The Oxford handbook of evidentiality* (pp. 510–524). Oxford, UK: Oxford University Press.

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*, 266–288.

Karayayla, T. (in press). 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 Publishing.

Kasparian, K., Vespignani, F., & Steinhauer, K. (2017). First language attrition induces changes in online morphosyntactic processing and re-analysis: An ERP study of number agreement in complex Italian sentences. *Cognitive Science*, *41*(7), 1760–1803.

Keijzer, M. (2010). The regression hypothesis as a framework for first language attrition. *Bilingualism: Language and Cognition*, *13*(1), 9–18.

Knospe, G.-M., & Felser, C. (2016). *The role of proficiency in Turkish heritage speakers' processing of pronouns.* Presentation at the Heritage Language Acquisition Workshop, University of Tromsø, Tromsø, Norway, 19-20 September.

Kuznetsova, A., Bruun Brockhoff, P., & Haubo Bojesen Christensen, R. (2016). lmerTest: Tests in linear mixed effects models [Computer software manual]. Retrieved from `https://CRAN.R-project.org/package=lmerTest` (R package version 2.0-33)

Lardiere, D. (2009). Some thoughts on the contrastive analysis of features in second language acquisition. *Second Language Research*, *25*(2), 173–227.

Leal, T., Rothman, J., & Slabakova, R. (2014). A rare structure at the syntax-discourse interface: Heritage and Spanish-dominant native speakers weigh in. *Language Acquisition*, *21*(4), 411–429.

Mathôt, S., Schreij, D., & Theeuwes, J. (2012). OpenSesame: An open-source, graphical experiment builder for the social sciences. *Behavior Research Methods*, *44*(2), 314–324.

Meriçli, B. (2016). *Modelling indirect evidence* (Unpublished master's thesis). University of

California Santa Cruz.

Meroni, L., Smeets, L., & Unsworth, S. (2017). Cross-linguistic influence in scope ambiguity: Evidence for acceleration. In E. Blom, L. Cornips, & J. Schaeffer (Eds.), *Cross-linguistic influence in bilingualism: In honor of Aafke Hulk* (pp. 181–206). Amsterdam: John Benjamins Publishing Company.

Montrul, S. (2008). *Incomplete acquisition in bilingualism: Re-examining the age factor*. Amsterdam: John Benjamins Publishing.

Montrul, S. (2009). Knowledge of tense-aspect and mood in Spanish heritage speakers. *International Journal of Bilingualism*, *13*(2), 239–269.

Montrul, S. (2015). *The acquisition of heritage languages*. Cambridge, UK: Cambridge University Press.

Montrul, S., & Sánchez-Walker, N. (2013). Differential object marking in child and adult Spanish heritage speakers. *Language Acquisition*, *20*(2), 109–132.

Paradis, J. (2011a). The impact of input factors on bilingual development: Quantity versus quality. *Linguistic Approaches to Bilingualism*, *1*(1), 67–70.

Paradis, J. (2011b). Individual differences in child English second language acquisition: Comparing child-internal and child-external factors. *Linguistic Approaches to Bilingualism*, *1*(3), 213–237.

Paradis, J., & Navarro, S. (2003). Subject realization and crosslinguistic interference in the bilingual acquisition of Spanish and English: What is the role of the input? *Journal of Child Language*, *30*(2), 371–393.

Paradis, M. (1993). Linguistic, psycholinguistic, and neurolinguistic aspects of "interference" in bilingual speakers: The activation threshold hypothesis. *International Journal of*

Psycholinguistics, *9*(2), 133–145.

Paradis, M. (2004). *A neurolinguistic theory of bilingualism.* Amsterdam: John Benjamins Publishing.

Pascual y Cabo, D. (2018). Examining the role of cross-generational attrition in the development of Spanish as a heritage language: Evidence from gustar-like verbs. *Linguistic Approaches to Bilingualism*, *FirstView*, 1–24.

Pascual y Cabo, D., Lingwall, A., & Rothman, J. (2012). Applying the interface hypothesis to heritage speaker acquisition: Evidence from Spanish mood. In *Proceedings of the 36th annual Boston University Conference on Language Development* (pp. 564–576). Somerville, MA: Cascadilla Press.

Pascual y Cabo, D., & Rothman, J. (2012). The (il)logical problem of heritage speaker bilingualism and incomplete acquisition. *Applied Linguistics*, *33*(4), 450–455.

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.

Polinsky, M. (2011). Reanalysis in adult heritage language: New evidence in support of attrition. *Studies in Second Language Acquisition*, *33*(2), 305–328.

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.

R Core Team. (2016). R: A language and environment for statistical computing [Computer software manual]. Vienna, Austria. Retrieved from `https://www.R-project.org`

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.

Schmid, M. S. (2002). *First language attrition, use and maintenance: The case of German Jews in anglophone countries*. Amsterdam: John Benjamins Publishing.

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* (pp. 135–153). Amsterdam: John Benjamins Publishing.

Schmid, M. S. (2011). *Language attrition*. Cambridge, UK: Cambridge University Press.

Schmid, M. S. (2013). First language attrition. *Linguistic Approaches to Bilingualism*, *3*(1), 94–115.

Schmid, M. S. (2016). Research timeline: First language attrition. *Language Teaching*, *49*(2), 186–212.

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.

Schmid, M. S., & Köpke, B. (2007). Bilingualism and attrition. In B. Köpke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language attrition: Theoretical perspectives* (pp. 1–7). Amsterdam: John Benjamins Publishing.

Schmid, M. S., & Köpke, B. (2017). The relevance of first language attrition to theories of bilingual development. *Linguistic Approaches to Bilingualism*, *7*(6), 637–667.

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. 3–15). Cambridge: Cambridge University Press.

Sorace, A. (2011). Pinning down the concept of "interface" in bilingualism. *Linguistic Approaches to Bilingualism*, *1*(1), 1–33.

Sorace, A. (2012). Pinning down the concept of interface in bilingual development: A reply to peer commentaries. *Linguistic Approaches to Bilingualism*, *2*(2), 209–217.

Sorace, A., & Filiaci, F. (2006). Anaphora resolution in near-native speakers of Italian. *Second Language Research*, *22*(3), 339–368.

Sorace, A., Serratrice, L., Filiaci, F., & Baldo, M. (2009). Discourse conditions on subject pronoun realization: Testing the linguistic intuitions of older bilingual children. *Lingua*, *119*, 460–477.

Statistics Canada. (2016). *2016 Census: Immigrant languages in Canada.* Statistics Canada catalogue no: 11-627-M2017025. Retrieved from `https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2017025-eng.htm`

Tsimpli, I., 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.

Unsworth, S. (2016). Quantity and quality of language input in bilingual language development. In E. Nicoladis & S. Montanar (Eds.), *Bilingualism across the lifespan: Factors moderating language proficiency* (p. 103—122). Berlin: De Gruyter.

Unsworth, S. (2018, to appear). Quantifying experience in heritage language development. In M. S. Schmid & B. Köpke (Eds.), *The Oxford handbook of first language attrition.* Oxford, UK: Oxford University Press.

Uzundağ, B., Taşçı, S., Küntay, A. C., & Aksu-Koç, A. (2016). Functions of evidentials in Turkish child and child-directed speech in early child-caregiver interactions. In *Pro-*

ceedings of the 40th annual Boston University Conference on Language Development (pp. 403–416). Somerville, MA: Cascadilla Press.

Valdes, G. (2000). The teaching of heritage languages: An introduction for Slavic-teaching professionals. In O. Kagan & B. Rifkin (Eds.), *The learning and teaching of Slavic languages and cultures* (pp. 375–403). Bloomington, IN: Slavica.

Yılmaz, G., & Schmid, M. S. (2012). L1 accessibility among Turkish-Dutch bilinguals. *The Mental Lexicon*, *7*(3), 249–274.

Öztürk, Ö. (2008). *Acquisition of evidentiality and source monitoring* (Unpublished doctoral dissertation). University of Delaware.

Öztürk, Ö., & Papafragou, A. (2016). The acquisition of evidentiality and source monitoring. *Language Learning and Development*, *12*(2), 199–230.

Ünal, E. (2016). *The language-cognition interface: Evidence from the domain of evidentiality* (Unpublished doctoral dissertation). University of Delaware.

Ünal, E., & Papafragou, A. (2016). Production-comprehension asymmetries and the acquisition of evidential morphology. *Journal of Memory and Language*, *89*, 179–199.

Ünal, E., Pinto, A., Bunger, A., & Papafragou, A. (2016). Monitoring sources of event memories: A cross-linguistic investigation. *Journal of Memory and Language*, *87*, 157–176.

Appendix A: ALEQ_Heritage

Alberta Language Environment Questionnaire (ALEQ)
(Adapted Version for Adult Heritage Speakers)

Name of the Participant/Participant Code:
Gender:
Heritage Language:
Date of Interview:

1a. When is your date of birth?

1b. Were you born in Canada? YES NO

1c. If you were not, where were you born and raised?

1d. When did you come to Canada? Give approximate date of arrival (month/year).

1e. Did you go to a Turkish heritage school (weekend schools)? If yes, for how long?

1f. Were your mother/father born in Canada?

2. How many years of education do you have (including Turkey and Canada)?

Education	Completed?		Years of School	Country	Language of the School
Primary	YES	NO			
Middle School	YES	NO			
High School	YES	NO			
College	YES	NO			
University-Degree	YES	NO			
University-Master	YES	NO			
University- PhD	YES	NO			

3a. How well do you speak English?

1 **Not Fluent in English**	**2** **Limited Fluency in English**	**3** **Somewhat Fluent in English**	**4** **Fluent in English**	**5** **Native-like Fluency in English**
No understanding or speaking ability	Some understanding and can say short, simple sentences	Good understanding and can express myself on many topics	Very comfortable expressing myself in English in most situations	
	e.g can answer the phone in English, can say basic greetings	e.g can order food in a restaurant, can give and ask for directions		

1

3b. How well do you speak Turkish?

1 **Not Fluent in Turkish** No understanding or speaking ability	2 **Limited Fluency in Turkish** Some understanding and can say short, simple sentences	3 **Somewhat Fluent in Turkish** Good understanding and can express myself on many topics	4 **Fluent in Turkish** Very comfortable expressing myself in Turkish in most situations	5 **Native-like Fluency in Turkish**
	e.g can answer the phone in Turkish, can say basic greetings	e.g can talk about my hobbies, can give and ask for directions		

3c. How well do you read in Turkish?

1 **Cannot read in Turkish**	2 **Limited reading ability in Turkish**	3 **Somewhat proficient reading ability in Turkish**	4 **Proficient reading ability in Turkish**	5 **Native-like reading ability in Turkish**

4a. Do you have a husband/wife/roommate?

YES NO

4b. IF YES, how long have your wife/ husband/roommate been living in Canada?

4c. IF YES, how many years of education does your husband/wife have (including Turkey and Canada)?

Education	Completed?		Years of School	Country	Language of the School
Primary	YES	NO			
Middle School	YES	NO			
High School	YES	NO			
College	YES	NO			
University-Degree	YES	NO			
University-Master	YES	NO			
University- PhD	YES	NO			

4d. IF YES, how well does your husband/wife/partner speak Turkish?

1 **Not Fluent in Turkish** No understanding or speaking ability	2 **Limited Fluency in Turkish** Some understanding and can say short, simple sentences	3 **Somewhat Fluent in Turkish** Good understanding and can express myself on many topics	4 **Fluent in Turkish** Very comfortable expressing myself in Turkish in most situations	5 **Native-like Fluency in Turkish**

	e.g can answer the phone in Turkish, can say basic greetings	e.g can talk about my hobbies, can give and ask for directions		

4e. IF YES, how well does your husband/wife/partner speak English?

1 **Not Fluent in English** No understanding or speaking ability	2 **Limited Fluency in English** Some understanding and can say short, simple sentences	3 **Somewhat Fluent in English** Good understanding and can express myself on many topics	4 **Fluent in English** Very comfortable expressing myself in English in most situations	5 **Native-like Fluency in English**
	e.g can answer the phone in Turkish, can say basic greetings	e.g can talk about my hobbies, can give and ask for directions		

4f. IF YES, in what language(s) do you speak to your husband/wife/roommate in your home?

1 **English (almost) always, Turkish (almost) never**	2 **English usually, Turkish seldom**	3 **English 50% Turkish 50%**	4 **English seldom, Turkish usually**	5 **English (almost) never, Turkish (almost) always**

4g. IF YES, in what language(s) does your husband/wife/roommate speak to you in your home?

1 **English (almost) always, Turkish (almost) never**	2 **English usually, Turkish seldom**	3 **English 50% Turkish 50%**	4 **English seldom, Turkish usually**	5 **English (almost) never, Turkish (almost) always**

5a. Do you have children that live with you or that visit you at least twice per week?

YES NO

5b. If YES, in what language(s) do you speak to child 1?

1 **English (almost) always, Turkish (almost) never**	2 **English usually, Turkish seldom**	3 **English 50% Turkish 50%**	4 **English seldom, Turkish usually**	5 **English (almost) never, Turkish (almost) always**

5c. If YES, in what language(s) does child 1 speak to you?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

5d. If YES, in what language(s) do you speak to child 2?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

5e. IF YES, in what language(s) does child 2 speak to you?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

5f. If YES, in what language(s) do you speak to child 3?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

5g. If YES, in what language(s) does child 3 speak to you?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

6a. Do you live with your parents?

YES NO

6b. IF YES, in what language(s) do you speak to your mother?

1 English (almost) always, Turkish (almost) never	**2 English usually, Turkish seldom**	**3 English 50% Turkish 50%**	**4 English seldom, Turkish usually**	**5 English (almost) never, Turkish (almost) always**

6c. IF YES, in what language(s) does your mother speak to you?

1 English (almost) always, Turkish (almost) never	**2 English usually, Turkish seldom**	**3 English 50% Turkish 50%**	**4 English seldom, Turkish usually**	**5 English (almost) never, Turkish (almost) always**

6d. IF YES, in what language(s) do you speak to your father?

1 English (almost) always, Turkish (almost) never	**2 English usually, Turkish seldom**	**3 English 50% Turkish 50%**	**4 English seldom, Turkish usually**	**5 English (almost) never, Turkish (almost) always**

6e. IF YES, in what language(s) does your father speak to you?

1 English (almost) always, Turkish (almost) never	**2 English usually, Turkish seldom**	**3 English 50% Turkish 50%**	**4 English seldom, Turkish usually**	**5 English (almost) never, Turkish (almost) always**

7a. Do you have siblings?

YES NO

7b. If YES, how many? Are you the oldest?

7c. IF YES, do you live with your siblings, or do they visit you at least twice per week?

YES NO

7d. IF YES, in what language(s) do you speak to Sibling 1?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

7e. IF YES, in what language(s) does Sibling 1 speak to you?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

7f. IF YES, in what language(s) do you speak to Sibling 2?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

7g. IF YES, in what language(s) does Sibling 2 speak to you?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

8a. Are there other adults that live in your home or that visits you at least twice a week (e.g. grandmother/grandfather)?

YES NO

8b. IF YES, how long have they been living in Canada?

8c. IF YES, what language(s) do you speak with them?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

8d. IF YES, what language(s) do they speak to you?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

9a. Do you have friends or acquaintances with whom you interact after work (by phone or in person?)

YES NO

IF YES, think about the 2 friends/ acquaintances with whom you interact most while answering the following.

9b. In what language(s) do you speak with friend 1?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

9c. In what language(s) does friend 1 speak to you?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

9d. In what language(s) do you speak with friend 2?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

9e. In what language(s) does friend 2 speak to you?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

10a. Do you work outside home? /Are you a student?

YES NO

10b. IF YES, what language(s) do you speak in your work place/school?

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom, Turkish usually	English (almost) never, Turkish (almost) always

11a. In what language did your mother talk to you in early childhood? (before the age of 4)

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom Turkish usually	English (almost) never, Turkish (almost) always

11b. In what language did you talk to your mother in early childhood? (before the age of 4)

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom Turkish usually	English (almost) never, Turkish (almost) always

12a. In what language did your father talk to you in early childhood? (before the age of 4)

1	2	3	4	5
English (almost) always Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom Turkish usually	English (almost) never, Turkish (almost) always

12b. In what language did you talk to your father in early childhood? (before the age of 4)

1	2	3	4	5
English (almost) always, Turkish (almost) never	English usually, Turkish seldom	English 50% Turkish 50%	English seldom Turkish usually	English (almost) never, Turkish (almost) always

13a. If you have siblings, in what language did they talk to you in your childhood?

1	2	3	4	5
English (almost) always Turkish (almost) never	**English usually, Turkish seldom**	**English 50% Turkish 50%**	**English seldom Turkish usually**	**English (almost) never, Turkish (almost) always**

13b. In what language did you talk to them in early childhood? (before the age of 4)

1	2	3	4	5
English (almost) always, Turkish (almost) never	**English usually, Turkish seldom**	**English 50% Turkish 50%**	**English seldom Turkish usually**	**English (almost) never, Turkish (almost) always**

14a. Were there any other adults that interacted with you at least twice per month in your childhood (grandmother/nanny)? IF YES, in what language did they talk to you?

1	2	3	4	5
English (almost) always Turkish (almost) never	**English usually, Turkish seldom**	**English 50% Turkish 50%**	**English seldom Turkish usually**	**English (almost) never, Turkish (almost) always**

14b. In what language did you talk to them in early childhood? (before the age of 4)

1	2	3	4	5
English (almost) always, Turkish (almost) never	**English usually, Turkish seldom**	**English 50% Turkish 50%**	**English seldom Turkish usually**	**English (almost) never, Turkish (almost) always**

16. What literacy and language activities do you do each week? (Please circle that all apply.)

Reading: Includes reading books and magazines.

Internet: Includes only internet activities that involve language, such as Social Network

(Facebook, Twitter, Instagram, Snapchat etc.)

(Cell)phone: calling and texting

Skype:

Movies/TV shows: DVD, Netflix, television, cinema

Music

Activities	English				Turkish			
	Everyday	At least once in a week	Occasionally	Never	Everyday	At least once in a week	Occasionally	Never
Reading (books/magazines/newspaper/FB posts/e-mails)	3	2	1	0	3	2	1	0
Writing (posting/commenting on FB, writing e-mails/ texting)	3	2	1	0	3	2	1	0
Speaking (on phone/face to face/skyping)	3	2	1	0	3	2	1	0
Listening (Watching Movies/TV Shows/News/music)	3	2	1	0	3	2	1	0
Total by column								
Total by language	/12				/12			

17. Do you engage in any organized activities? What language do they take place in? (sports/dance/music/clubs/TCS)

	everyday	At least once in a week	Occasionally	Almost never/never
English	3	2	1	0
Turkish	3	2	1	0

18a. Do you visit Turkey regularly?

1	2	3	4	5
No visits in the last 4 years	**Less than 2 times in the last 4 years**	**Once in a year in the last 4 years**	**Twice in a year in the last 4 years**	**More than twice in a year for in last 4 years**

18b. How long do you stay in each visit?

1	2	3	4	5
Less than a week	**1 to 2 weeks**	**2-3 weeks**	**almost a month**	**more than a month**

If more than a month, please specify.

18c. Do your relatives/friends from Turkey visit you in Canada?

1	2	3	4	5
No visits in the last 4 years	**Less than 2 times in the last 4 years**	**Once in a year in the last 4 years**	**Twice in a year in the last 4 years**	**More than twice in a year for in last 4 years**

18d. How long do they stay with you?

1	2	3	4	5
Less than a week	**1 to 2 weeks**	**2-3 weeks**	**a month**	**more than a month**

If more than a month, please specify.

19. Do you agree with the statements (a) to (c)?

a. It is a priority for me that I can understand and speak Turkish.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

b. It is a priority for me that I can read and write in Turkish.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

c. It is a priority for me that I know about the history, religion, and traditions of Turkey.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

Positive Attitude

Score: ___ / 15

20. Why is it important to you that you learn Turkish?

a. Because it might facilitate my professional development in Canada or in Turkey.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

b. Because I want to be independent when I visit Turkey.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

Instrumental Motivation

Score: ___ / 10

c. Because it enables me to better relate with my grandparents and extended family, as well as the Turkish community in Canada.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

d. Because it enables me to better relate with Turkish culture (read literature, watch movies etc.)

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

Integrational Motivation

Score: ___ / 10

e. I feel privileged knowing Turkish.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

Intrinsic Motivation

Score: ___ / 5

f. Because I am worried that I will be criticized by my family and/or the Turkish community.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

Extrinsic Motivation

Score: ___ / 5

21. Do you share any of these beliefs/concerns?

a. If I maintain close ties with the Turkish culture, I might find it harder to integrate in the Canadian Society.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

b. I will have more chances for professional development, if I renounce my Turkish culture/language.

1	2	3	4	5
Disagree	Somewhat disagree	Somewhat agree	Agree	Very much agree

Negative Attitude

Score: ___ / 10

22. It's the World Cup Final and Canada is competing against Turkey. Which team will you support?

1	2	3	4	5
The Canadian team	The Canadian team most likely	I don't know	The Turkish team, most likely	The Turkish team

23. Which one of the following statements best describe how you identify yourself?

1	2	3	4	5
I am a Canadian	On most occasions, I identify myself as Canadian	I am Turkish-Canadian	On most occasions, I identify myself as Turkish	I am Turkish

Identity

Score: ___ /10

Appendix B: List of experimental and filler dialogues

B.1

A: Ben yokken oğlum koltuktan düş-müş / -tü dün sabah.
While I was away, my son fell off the couch yesterday morning.

B: Aa nasıl olmuş? Sen nasıl düştüğünü gördün mü?
Oh, how did it happen? Did you see how he fell?

A: Evet gördüm. Oyun oynarken düşüverdi. / Hayır görmedim. Ama eşim düştüğünü söyledi.
Yes I did. While playing, he suddenly fell. / No, I did not. But my wife told me that he did.

B: Umarım bir şeyi yoktur.
I hope he is fine now.

B.2

A: Ben yokken kızım okulda düş-müş / -tü dün sabah.
While I was away, my daughter fell at the school yesterday morning.

B: Aa nasıl olmuş? Sen nasıl düştüğünü gördün mü?
Oh, how did it happen? Did you see how she fell?

A: Hayır, görmedim ama kızımın dizi yaralıydı. / Evet gördüm. Kötü düştü, çok ağladı.
No, I did not but her knee was injured. / Yes I did. She fell pretty bad, and cried.

B: Geçmiş olsun, çok üzüldüm.
Sorry to hear that.

B.3

A: Ben sallarken kuzenim salıncaktan düş-müş / -tü dün sabah.
While I was pushing the swing, my cousin fell off it yesterday morning.

B: Aa nasıl olmuş? Sen nasıl düştüğünü gördün mü?
Oh, how did it happen? Did you see how he fell?

A: Hayır, görmedim ama kuzenimin kolu sargılıydı. / Evet gördüm. Kötü düştü, epey ağladı.
No, I did not but his arm was bandaged. / Yes I did. He fell pretty bad, and cried.

B: Kötü olmuş, çok üzüldüm.
I'm sorry to hear that.

B.4

A: Ben yokken tavuk kümesten kaç-mış / -tı dün sabah.
While I was away, the chicken ran away from the hen house yesterday morning.

B: Aa nasıl olmuş? Sen nasıl kaçtığını gördün mü?
Oh, how did it happen? Did you see how it run away?

A: Hayır, görmedim ama annem kaçtığını söyledi. / Evet gördüm. Kümesten hızlıca çıkıverdi.
No, I did not but my mom me told that it did. / Yes, I did. It escaped pretty fast.

B: Hadi ya, çok kötü olmuş.
Oh, that is too bad.

B.5

A: Ben uyurken kedi evden kaç-mış / -tı dün gece.
While I was sleeping, the cat ran away from home yesterday morning.

B: Aa nasıl olmuş? Sen nasıl kaçtığını gördün mü?
Oh, how did it happen? Did you see how it run away?

A: Hayır, görmedim ama uyandığımda evde yoktu. / Evet, gördüm. Açık pencereden çıkıp gitti.
No, I did not but when I woke up, it wasn't around. / Yes, I did. It went out from the window.

B: Tüh ya, umarım bulursunuz.
Oh, I hope you will find it.

B.6

A: Gözümün önünde mahkum hapisten kaç-mış / -tı dün gece.
Right before my eyes, the prisoner ran away from prison yesterday night.

B: Aa nasıl olmuş? Sen nasıl kaçtığını gördün mü?
Oh, how did it happen? Did you see how he run away?

A: Hayır görmedim ama sabah hücresi boştu. / Evet gördüm. Hatta yakalamaya çalıştım.
No I didn't but his cell was empty in the morning. / Yes, I did. I even tried to catch him.

B: Kötü olmuş. Umarım yakalanır.
Too bad, I hope he gets caught.

B.7

A: Ben uyurken Messi gol at -mış / -tı dün akşam.
When I was sleeping, Messi scored a goal yesterday evening.

B: Hadi ya! Sen golü nasıl attığını gördün mü?
Really! Did you see how he scored?

A: Hayır görmedim, ama babam attığını söyledi. / Evet gördüm, penaltıdan bir gol attı.
No, I didn't but my father told me that he scored. / Yes, I did. He scored a penalty.

B: Tüh, keşke sen de görseydin.
Oh, I wish you had seen it as well.

B.8

A: Ben uyuklarken Ronaldo gol at-mış / -tı dün akşam.
When I was dozing off, Ronaldo scored a goal yesterday evening.

B: Gerçekten mi! Sen golü nasıl attığını gördün mü?
Really! Did you see how he scored?

A: Hayır görmedim ama gol sevincini gördüm. / Evet gördüm, serbest vuruştan gol attı.
No, I didn't but I saw his celebration. / Yes, I did. He scored a free kick.

B: Tüh, keşke sen de görseydin.
Oh, I wish you had seen it as well.

B.9

A: İzlediğim maçta Lebron üçlük at-mış / -tı dün akşam.
While I was watching, Lebron scored three points yesterday night.

B: Gerçekten mi! Sen nasıl attığını gördün mü?
Really! Did you see how he scored?

A: Hayır görmedim ama kuzenim attığını söyledi. / Evet gördüm, çok güzel bir sayıydı.
No, I didn't but my cousin told me that he scored. / Yes, I did. It was a great shot.

B: Tüh, keşke sen de görseydin.
Oh, I wish you had seen it as well.

B.10

A: Ben yokken Figen evime gel-miş / -di dün sabah.
While I was away, Figen came to my home yesterday morning.

B: Aa öyle mi? Sen geldiğini gördün mü?
Is that so? Did you see her coming?

A: Hayır görmedim, ama annem geldiğini söyledi. / Evet gördüm, hatta annem de gördü.
No, I didn't but my mom told me that she came. / Yes, I did. My mom saw her as well.

B: Aa neden gelmiş acaba.
Oh, I wonder why she came.

B.11

A: Ben yokken ofisime bir paket gel-miş / -di dün sabah.
While I was away, a package was delivered to my office yesterday morning.

B: Öyle mi? Sen geldiğini gördün mü?
Oh, is that so? Did you see it delivered?

A: Hayır görmedim ama masamın üstüne bırakmışlar. / Evet gördüm, paketi sekreterim aldı.
No I didn't but they left it on my desk. / Yes, I did. My secretary accepted the delivery.

B: Aa, kim yollamış acaba.
Oh, I wonder who sent it.

B.12

A: Ben yokken Ayşe ofisime gel-miş / -di dün sabah.
While I was away, Ayşe came to my office yesterday morning.

B: Aa öyle mi? Sen geldiğini gördün mü?
Oh, is that so? Did you see her coming?

A: Hayır görmedim ama sekreterim geldiğini söyledi. / Evet gördüm, hatta biraz lafladık.
No I did not but my secretary told me that she came. / Yes, I did. We talked for a bit.

B: Sen de görseymişsin keşke.
I wish you had seen her too.

B.13

A: Benden habersiz Bora benim evimde kal-mış / -dı dün gece.
Without asking me first, Bora stayed at my home yesterdat night.

B: Aa öyle mi? Sen kaldığını gördün mü?
Oh, is that so? Did you see him staying?

A: Hayır görmedim ama komşum kaldığını söyledi. / Evet gördüm, hatta komşum da gördü.
No, I did not but my neighbour said that he stayed. / Yes, I did. My neighbour saw it too.

B: Keşke önce senden izin alsaymış.
He should have asked for you first.

B.14

A: Ben yokken Esra kardeşimde kal-mış / -dı dün gece.
While I was away, Esra stayed at my sister's yesterday night.

B: Gerçekten mi? Sen kaldığını gördün mü?
Really? Did you see her staying?

A: Hayır görmedim ama sabah kapıyı o açtı. / Evet gördüm. Hatta biraz laflad ık.
No I did not but she opened the door in the morning. / Yes I did. We chatted a little at night.

B: Neden kendi evinde kalmadı acaba?
I wonder why she did not stay at her own place.

B.15

A: Ben de evdeyken Murat bende kal-mış / -dı dün gece
While I was at home, Murat stayed with me yesterday night.

B: Aa öyle mi? Sen kaldığını gördün mü?
Oh is that so? Did you see him staying?

A: Hayır görmedim, ama babam kaldığını söyledi. / Evet gördüm, hatta yatağını ben hazırladım.
No I did not but my father said that he stayed. / Yes I did. I even prepared his bed.

B: Neden sende kaldı acaba?
I wonder why he stayed at your place.

B.16

A: Ben dışarıdayken kardeşim evi temizle-miş / -di dün akşam.
While I was out, my brother cleaned the house yesterday evening.

B: Gerçekten mi? Sen temizlerken gördün mü?
Really? Did you see him cleaning?

A: Hayır görmedim ama annem temizlediğini söyledi. / Evet gördüm hatta biraz yardım ettim.
No I did but my mom said that he cleaned. / Yes I did see. I helped him cleaning a little.

B: Size yardımcı olması ne güzel.
How nice it is that he helps you.

B.17

A: Ben okuldayken ablam balkonu temizle-miş / -di dün sabah.
While I was at school, my sister cleaned the balcony yesterday morning.

B: Aa öyle mi? Sen temizlerken gördün mü?
Oh is that so? Did you see her cleaning?

A: Hayır görmedim ama balkon tertemizdi. / Evet gördüm, hatta çok uğraştı.
No I did not but the balcony was pretty clean. / Yes I did. It took her a long time.

B: Balkon çok kirliydi, iyi olmuş.
The balkony was quite diry. It is nice (that it is clean now).

B.18

A: Ben odamdayken annem odamı temizle-miş / -di dün sabah.
While I was in my room, my mom cleaned my room yesterday morning.

B: Aa öyle mi? Sen temizlerken gördün mü?
Oh is that so? Did you see her cleaning?

A: Hayır görmedim ama annem temizlediğini söyledi / Evet gördüm, temizlemesi epey zaman aldı.
No I did not but my mom said that she cleaned. / Yes I did see it. It took her a long time.

B: Keşke sen de yardım etseydin.
I wish you had helped her.

B.19

A: Ben yokken annem parmağını kes-miş / -ti dün sabah.
While I was away, my mom cut her finger yesterday morning.

B: Aa geçmiş olsun. Sen nasıl kestiğini gördün mü?
Sorry to hear that. Did you see how she cut it?

A: Hayır görmedim ama babam kestiğini söyledi. / Evet gördüm. Kanaması uzun süre durmadı.
No I did not but my father said that she did. / Yes I did. The bleeding didn't stop for a while.

B: Umarım hemen iyileşir.
I hope she gets well soon.

B.20

A: Ben yokken Ahmet karpuzu kes-miş / -ti dün akşam.
While I was away, Ahmet cut the watermelon yesterday evening.

B: Öyle mi? Ahmetin karpuzu kestiğini gördün mü?
Oh, really? Did you see him cutting it?

A: Hayır görmedim ama karpuzun yarısı yenmişti. / Evet gördüm. Hiç düzgün kesemedi karpuzu.
No, I did not but half of the watermelon was gone. / Yes, I did. He could not cut it well.

B: Yenisini alırsın artık.
You can always buy another.

B.21

A: Ben de izlerken başbakan kurdeleyi kes-miş / -ti dün sabah.
While I was watching, the prime minister cut the ribbon yesterday morning.

B: Aa öyle mi? Sen kurdeleyi keserken gördün mü?
Is that so? Did you see him cutting (the ribbon)?

A: Hayır görmedim ama arkadaşım kestiğini söyledi. / Evet gördüm, güzel bir tören yaptılar.
No I did not but my friend said that he did. / Yes I did. It was a beautiful cerenomy.

B: Tüh keşke ben de görseydim.
I wish I had seen it too.

B.22

A: Ben yokken eşim evde kolunu kır-mış / -dı dün sabah.
While I was away, my wife broke her arm at home yesterday morning.

B: Aa geçmiş olsun. Sen nasıl olduğunu gördün mü?
Sorry to hear that. Did you see how it happened?

A: Hayır görmedim ama oğlum haber verdi. / Evet gördüm, merdivenden düşüverdi.
No I did not but my son called and told me. / Yes I did, she suddenly fell off the stairs.

B: Çok üzüldüm, geçmiş olsun.
I am so sorry to hear that.

B.23

A: Ben dışarıdayken oğlum odamdaki vazoyu kır-mış / -dı dün akşam.
While I was away, my son broke the vase at home yesterday evening.

B: Gerçekten mi? Sen oğlunun kırdığını gördün mü?
Really? Did you see him breaking (the vase)?

A: Hayır görmedim ama döndüğümde vazo kırıktı. / Evet gördüm. Yanlışlıkla vazoya çarptı.
No I did not but the vase was broken. / Yes I did. He accidentially broke the vase.

B: Senin oğlun da pek yaramaz.
Your son is such a trouble-maker.

B.24

A: Ben bakarken hırsız komşumun camını kır-mış / -dı dün gece.
While I was watching, a thief broke my neighbour's window last night.

B: Gerçekten mi? Sen hırsızın camı kırdığını gördün mü?
Really? Did you see him breaking (the window)?

A: Hayır görmedim ama uyandığımda camlar kırıktı. / Evet gördüm, gözümün önünde kırdı.
No I did not but the window was broken. / Yes I did. He broke (it) in front of my very eyes.

B: Tüh, umarım hemen yakalanır.
Too bad, I hope he gets caught soon.

B.25

A: Ben evde yokken oğlum dışarı çık-mış / -tı dün gece.
While I was away, my son went out yesterday night.

B: Öyle mi? Sen dışarı çıktığını gördün mü?
Is that so? Did you see him going out?

A: Hayır görmedim ama kızım çıktığını söyledi. / A: Evet gördüm. İzin almadan çıktı gitti. .
No I did not but my daughter said that he went out. / Yes I did. He didn't even ask.

B: Keşke izin almadan çıkmasaymış. .
I wish he had let you know first.

B.26

A: Ben işteyken annem alışverişe çık-mış / -tı dün sabah.
While I was at work, my mom went out for shopping yesterday morning.

B: Hadi ya! Sen alışverişe giderken gördün mü?
Oh, is that so? Did you see her leaving.

A: Hayır görmedim ama kapıya not bırakmış. / Evet gördüm hatta gideceği yere ben bıraktım.
No I did not but she left a note on the door. / Yes I did. I gave her a ride to the mall.

B: A: İyi olmuş, hiç sıkılmamıştır.
Itis good that she didn't get bored.

B.27

A: Gözümün önünde kedim pencereden çık-mış / -tı dün akşam.
Before my eyes, my cat went out from the window yesterday evening.

B: Aa, gerçekten mi? Sen çıkarken gördün mü?
Oh, is that so? Did you see (it) getting out?

A: Hayır görmedim ama evde ortalıkta yoktu. / Evet gördüm. Gözümün önünde çıktı.
No I did not but it was nowhere to be found. / Yes I did. It happened right in front of me.

B: Umarım hemen geri döner.
I hope she returns soon.

B.28

A: Ben yokken annem evde film izle-miş / -di dün sabah.
While I was away, my mom watched a movie yesterday morning.

B: Öyle mi? Sen film izlediğini gördün mü?
Oh is that so? Did you see her watching?

A: Hayır görmedim ama babam izlediğini söyledi. / Evet gördüm. Ailecek hep beraber izledik.
No I did not but my father said that (she) watched. / Yes I did. We watched it together.

B: İyi olmuş, sıkılmamıştır.
That is good. She must have had fun.

B.29

A: Ben evde yokken babam televizyon izle-miş / -di dün akşam.
While I wasn't at home , my dad watched TV yesterday night.

B: Aa öyle mi? Sen izlerken gördün mü?
Is that so? Did you see him watching (the TV)?

A: Hayır görmedim ama geldiğimde televizyon açıktı. / Evet gördüm. Dünkü maçı seyrediyordu.
No I did not but the TV was on when I came back. / Yes I did. He was watching the game.

B: Kapatmayı unutmuş heralde.
He must have forgotten to close it.

B.30

A: Ben yanındayken babam maçı izle-miş / -di dün gece.
While I was with him, my father watched the game yesterday night.

B: Aa öyle mi? Sen izlediğini gördün mü?
Is that so? Did you see him watching (the game)?

A: Hayır görmedim ama annem izlediğini söyledi. / Evet gördüm hatta ben de biraz seyrettim.
No I did not but my mom said that he did. / Yes I did. I even joined him for a while.

B: Baban da maçları hiç kaçırmıyor!
He watches each and every game!

B.31

A: Ben dışardayken annemler tavla oyna-mış / -dı dün gece.
While I was out, my parents played backgammon yesterday night.

B: Aa öyle mi? Sen oynarlarken gördün mü?
Oh is that so? Did you see them playing?

A: Hayır görmedim ama babam oynadıklarını söyledi. / Evet gördüm. Uzun süre oynadılar.
No I did not but my father told that they played. / Yes I did. They played (it) for a long time.

B: İyi olmuş, eğlenmişlerdir.
That is nice. They must have had fun.

B.32

A: Ben yokken oğlum top oyna-mış / -dı dün sabah.
While I was away, my son played ball yesterday morning.

B: Aa öyle mi? Sen oynadığını gördün mü?
Is that so? Did you see him playing?

A: Hayır görmedim ama ayakkabıları çamurluydu. / Evet gördüm, arkadaşlarıyla oynadı.
No I did not but his shoes were covered in mud. / Yes I did. He played with his friends.

B: Ne güzel vakit geçiriyorlar.
They enjoy their time.

B.33

A: Ben de yanlarındayken çocuklar futbol oyna-mış / -dı dün akşam.
While I was with them, the kids played football yesterday evening.

B: Aa öyle mi? Sen futbal oynadıklarını gördün mü?
Is that so? Did you see them playing?

A: Hayır görmedim ama babam oynadıklarını söyledi. / Evet gördüm. Akşama kadar oynadılar.
No I did not but my dad told me that they played. / Yes I did. They played until the sundown.

B: Çocuk olmak var şu hayatta!
How nice it is!

B.34

A: Ben yokken yeğenim kaydıraktan kay-mış / -dı dün akşam.
While I was away, my nephew slided down the slide.

B: Öyle mi? Sen yeğenini kayarken gördün mü?
Is that so? Did you see him sliding?

A: Hayır görmedim ama babam kaydığını söyledi. / Evet gördüm hatta bir daha kaymak istedi.
No I did not but my father told me that he did. / Yes I did. He even wanted to slide again.

B: Ne güzel ya, çok eğlenmiştir.
How nice! I bet he had so much fun!

B.35

A: Ben uyurken kızım paten kay-mış / -dı dün sabah.
While I was at work, my daughter skated yesterday morning.

B: Öyle mi? Sen paten kayarken gördün mü?
Is that so? Did you see her skating?

A: Hayır görmedim ama uyandığımda patenleri kirliydi. / Evet gördüm, azimle öğrenmeye çalıştı.
No I did not but her skates were dirty. / Yes I did. She was determined to learn it.

B: Böyle hevesli olması ne güzel.
How nice it is that she is enthusiastic.

B.36

A: Gözümün önünde adam buzda kay-mış / -dı dün sabah.
A man slipped on the ice in front of my eyes.

B: Gerçekten mi? Sen kaydığını gördün mü?
Is that so? Did you see him slipping?

A: Hayır görmedim. Ama başında insanlar toplanmıştı. / Evet gördüm. Çok kötü kayıp düştü.
No I did not but people gathered around him. / Yes I did. He slipped and fell pretty bad.

B: Bir şey olmamıştır inşallah.
I hope he is okay.

B.37

A: Ben işteyken kızım diplomasını al-mış / -dı dün sabah.
While I was at work, my daughter got her diploma yesterday morning.

B: Aa gerçekten mi? Sen diplomasını alırken gördün mü?
Oh really! Did you see her getting it?

A: Hayır görmedim ama eşim arayıp haber verdi. / Evet gördüm. Heyecandan elleri titriyordu.
No I did not but my wife told me so. / Yes I did. Her hands were shaking.

B: Tebrikler, hayırlı olsun.
Congratulations!

B.38

A: Ben yokken oğlum arabamı al-mış / -dı dün gece.
While I was away, my son took out the car yesterday night.

B: Öyle mi? Sen oğlunun aldığını gördün mü?
Is that so? Did you see him taking the car?

A: Hayır görmedim. Ama oğlum da araba da yoktu. / Evet gördüm. Anahtarı gizlice aldı.
No I did not but neither my son nor the car was there! / Yes I did. He sneaked the keys.

B: Keşke önce izin alsaymış.
He should have taken your permission first.

B.39

A: Ben de yanlarındayken öğrenciler karne al-mış / -dı dün sabah.
While I was with them, the students got their report cards yesterday morning.

B: Öyle mi? Sen karne alırlarken gördün mü?
Oh really? Did you see them getting their report cards?

A: Hayır görmedim ama diğer öğretmenler söyledi. / Evet gördüm. Öğrenciler çok mutluydu.
No I did not but the other teachers told me so. / Yes I did. The students were very happy.

B: Bir sene daha bitti desene!
One more year has gone by!

B.40

A: Ben uyurken epey dolu yağ-mış / -dı dün gece.
While I was sleeping, it hailed yesterday night.

B: Gerçekten mi? Sen dolu yağdığını gördün mü?
Really? Did you see it hailing?

A: Hayır görmedim. Ama kızım yağdığını söyledi. / Evet gördüm. Bütün gece aralıksız yağdı.
No I did not buy my daughter told me. / Yes I did. It hailed all night.

B: İyi bari gündüz yağmamış.
I am happy that it did not hail in the morning.

B.41

A: Ben uyuduktan sonra çok yağmur yağ-mış / -dı dün gece.
After I slept, it rained a lot yesterday morning.

B: Aa öyle mi? Sen yağmur yağdığını gördün mü?
Is that so? Did you see it raining?

A: Hayır görmedim ama uyandığımda yerler ıslaktı. / Evet gördüm. Bütün gece sağanak yağdı.
No I did not but when I woke up, everywhere was wet. / Yes I did. It rained pretty hard.

B: Sabaha dinmesi iyi olmuş.
It is good that it stopped in the morning.

B.42

A: Ben yürürken epey kar yağ-mış / -dı dün sabah.
While I was walking, it snowed heavily yesterday morning.

B: Aa öyle mi! Sen kar yağdığını gördün mü?
Oh, is that so! Did you see it snowing?

A: Hayır görmedim ama her yer kar olmuştu. / Evet gördüm. Hatta yürürken çok zorlandım.
No I did not but everywhere was covered with snow. / Yes I did. It was difficult to walk.

B: Havalar da iyice garipleşti.
The weather is odd these days.

B.43

A: Ben yokken herkese davetiye gönder-miş / -di dün sabah.
While I was away, he sent invitations to everyone yesterday morning.

B: Öyle mi? Sen onu gönderirken gördün mü?
Is that so? Did you see him sending the invitations?

A: Hayır görmedim ama arkadaşım haber verdi. / Evet gördüm. Gözümün önünde yolladı.
No I did not but my friends told me. / Yes I did. He sent them in front of me.

B: Çok ayıp etmiş o zaman.
That's not nice of him.

B.44

A: Ben yokken müdür öğrencileri gönder-miş / -di dün sabah.
While I was gone, the principal sent all the students (to homes) yesterday morning.

B: Öyle mi? Sen müdürün gönderdiğini gördün mü?
Really? Did you see her doing that?

A: Hayır görmedim ama döndüğümde sınıf boştu. / Evet gördüm. Duyuruyu gelip sınıfta yaptı.
No I did not but class was empty when I got there. / Yes I did. She announced it in the class.

B: Keşke sana haber verseymiş.
She should have let you know.

B.45

A: Gözümün önünde Aylin bir kargo gönder-miş / -di dün sabah.
Before my eyes, Aylin sent a parcel yesterday morning.

B: Gerçekten mi? Sen kargoyu gönderdiğini gördün mü?
Really? Did you see her sending it?

A: Hayır görmedim ama Eda gönderdiğini söyledi. / Evet gördüm. Ben de yanındaydım.
No I did not but Eda told me that she did. / Yes I did. I was there too.

B: Kime ne gönderdi acaba.
I wonder what she sent.

B.46

A: Ben uyurken Alper yarışmayı kazan-mış / -dı dün gece.
I was sleeping, Hamit won the contest last night.

B: Öyle mi? Sen Alper'in kazandığını gördün mü?
Really? Did you see him winning?

A: Hayır görmedim ama annem kazandığını söyledi. / Evet gördüm. Canlı yayında seyrettim.
No I did not but my mother told me. / Yes I did. I watched the livecast.

B: Ben katıldığını bile bilmiyordum.
I did not even know he participated.

B.47

A: Ben uyurken Türkiye kupayı kazan-mış / -dı dün gece.
While I was sleeping, Turkey won the cup last night.

B: Öyle mi? Sen kupayı kazandıklarını gördün mü?
Really? Did you see them winning the cup?

A: Hayır görmedim. Ama kutlama seslerini duydum. / Evet gördüm. Maçın sonları heyecanlıydı.
No I did not but I woke up to the celebrations. / Yes I did. The end of the game was exciting.

B: Tüh, keşke biz de seyretseymişiz.
I wish we had watched it too.

B.48

A: Gözümün önünde Ahmet çekilişi kazan-mış / -dı dün gece.
In front of my eyes, Ahmet won the lottery yesterday night.

B: Gerçekten mi? Sen Ahmet'in kazandığını gördün mü?
Really! Did you see Ahmet winning the lottery?

A: Hayır görmedim ama bugün pek neşeliydi. / Evet gördüm. Kazanınca çok sevindi.
No I didn't but he was cheerful today. / Yes, I did. He was so happy to win.

B: Ne kadar şanslı bir adam!
What a lucky man!

Appendix C: Translation of the instructions

In this linguistics study, you will listen to some dialogues between a man and a women speaker at your own pace. These dialogues will be presented to you in segments. As soon as the previous segment ends, you need to press SPACE button on the keyboard in order to listen to the next segment/dialogue. You need to be quick but also listen to each segment until it ends. After some dialogues, not all, a Yes/No question about that dialogue will be presented on the screen. You can think about the answer as long as you want. If the answer is YES, please press D. If the answer is NO, please press L. The D and L buttons are marked on the keyboard for you.

Appendix D: Model output of suffix by congruence by English richness proportion for first generation immigrants

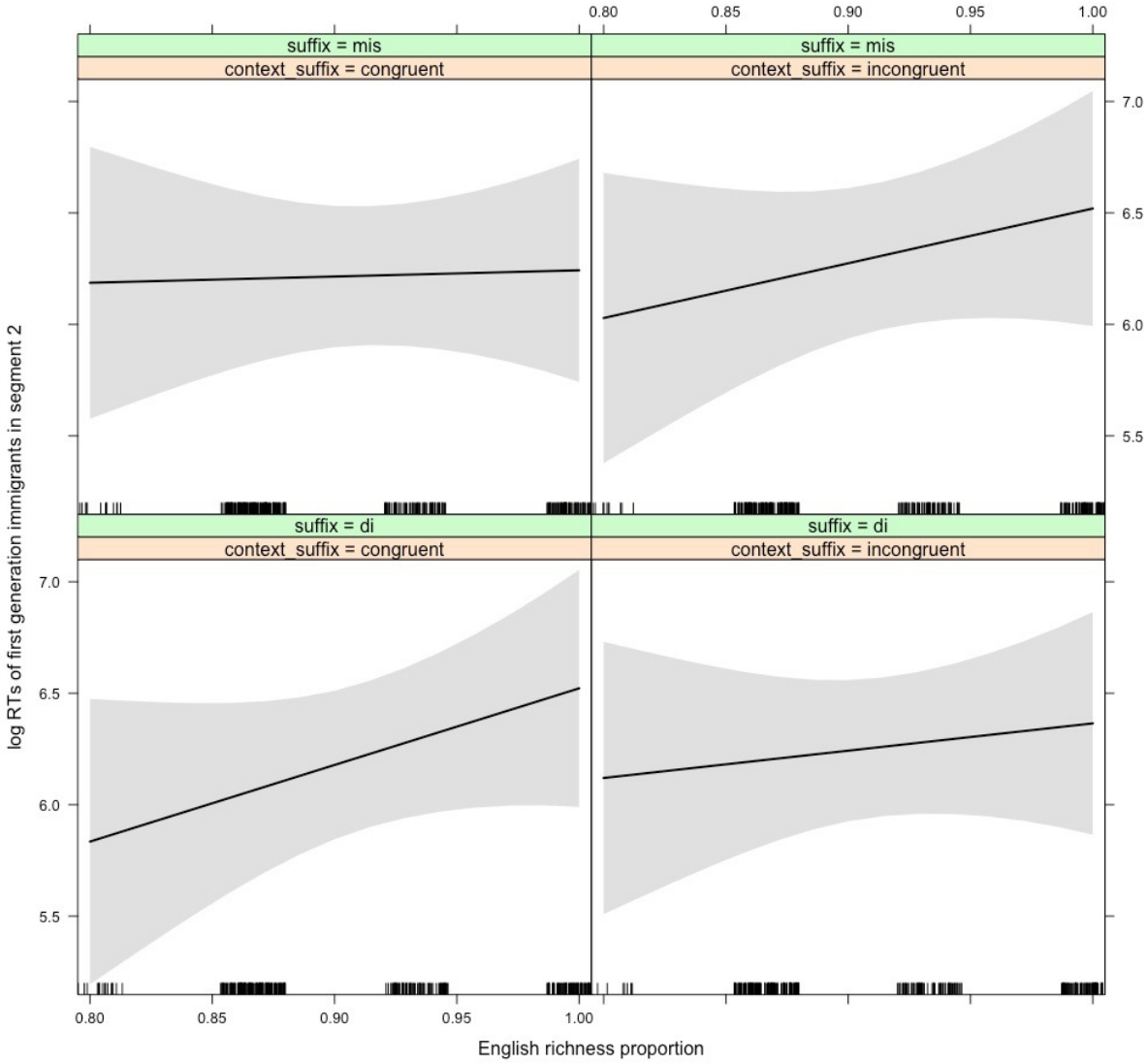

Figure D.1: The effect of the interaction of suffix, congruence and English richness proportion on the RTs of first generation immigrants in the second segment. Grey bands represent 95% confidence interval.

Table D.1: Summary of the fixed-effects from the linear mixed-effects model, with interaction of suffix, congruence and English richness proportion, fitted to log-transformed RTs of first generation immigrants

	Estimate	Std. Error	t-value	p-value
Intercept	3.0944	2.2614	1.368	0.1966
suffixmis	2.8779	1.2896	2.232	0.0263 *
congruenceincongruent	2.0557	1.2905	1.593	0.1122
English_richness_proportion	3.4376	2.4659	1.394	0.1891
logRT1	0.0362	0.0475	0.762	0.4464
trial	-0.0064	0.0014	-4.534	<0.0001 ***
suffixmis:congruenceincongruent	-3.9549	1.8251	-2.167	0.0310 *
suffixmis:English_richness_proportion	-3.1573	1.4038	-2.249	0.0252 *
congruenceincongruent:English_richness_proportion	-2.2129	1.4042	-1.576	0.1160
suffixmis:congruenceincongruent:English_richness_proportion	4.3891	1.9804	2.216	0.0274 *

R Code : `logRT2 ~ suffix * congruence * English_Richness_proportion + logRT1 + trial + (1|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '

Note: Suffixes = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent

Appendix E: Model output of suffix by congruence by Turkish to English proficiency ratio for heritage speakers

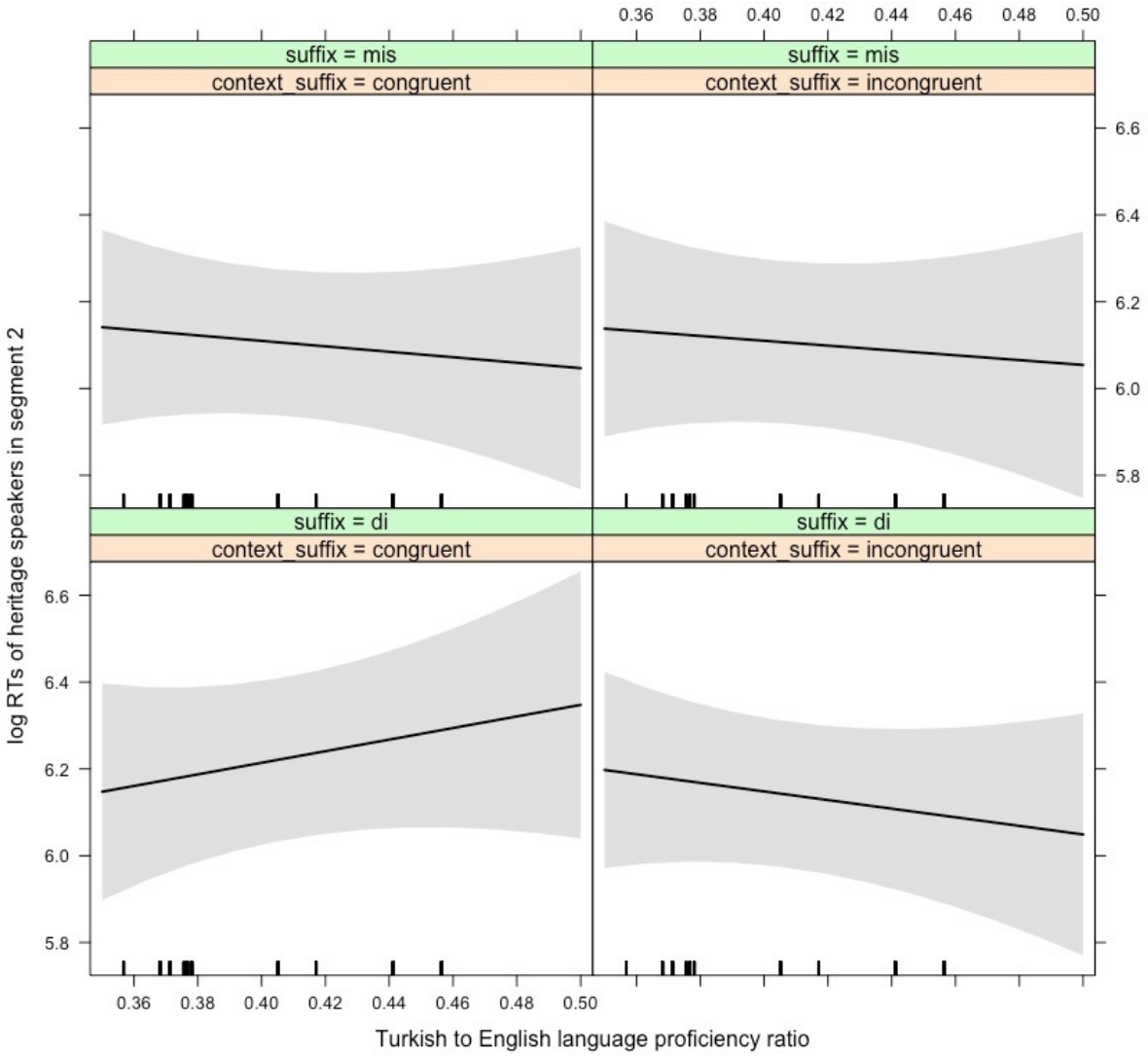

Figure E.1: The effect of the interaction of suffix, congruence and Turkish to English proficiency ratio on the RTs of heritage speakers in the second segment. Grey bands represent 95% confidence interval.

Table E.1: Summary of the fixed-effects from the linear mixed-effects model, with interaction of Turkish to English proficiency ratio, suffix and congruence, fitted to log-transformed RTs of heritage speakers

	Estimate	Std. Error	t-value	p-value
Intercept	4.4720	0.6222	7.189	<0.0001 ***
suffixmis	0.6809	0.4130	1.649	0.0997 .
congruenceincongruent	0.8642	0.4163	2.076	0.0383 *
Turkish_to_English_proficiency_ratio	1.3350	1.3970	0.955	0.3484
logRT1	0.2407	0.0362	6.647	<0.0001 ***
trial	-0.0078	0.0010	-8.118	<0.0001 ***
suffixmis:congruenceincongruent	-0.8924	0.5738	-1.555	0.1204
suffixmis:Turkish_to_English_proficiency_ratio	-1.9630	0.9934	-1.976	0.0486 *
congruenceincongruent:Turkish_to_English_proficiency_ratio	-2.3260	0.9995	-2.327	0.0203 *
suffixmis:congruenceincongruent:Turkish_to_English_proficiency_ratio	2.3970	1.3680	1.752	0.0803 .

R Code : `logRT2 ~ suffix * congruence * Turkish_to_English_proficiency_ratio + logRT1 + trial + (1|subject) + (1|dialogue)`

Note: Significance codes = 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '

Note: Suffixes = *–DI* 'direct experience', *–mIş* 'indirect experience'; Congruence = congruent, incongruent