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An investigation of heritage language speakers of Turkish: evidentiality processing and the effects of language experience

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CHAPTER

**The bilingual speakers
under examination: heritage vs
emigrant Turkish speakers living
in Australia**

Introduction

This chapter provides a detailed description of the participants whose language processing is examined throughout this thesis. All participants were Turkish native speakers living in Sydney, Australia, comprising two groups based on their language background: heritage language speakers of Turkish, and emigrant speakers of Turkish. *Heritage language speakers* (HLS) are defined as speakers of a home language that is different from the dominant language of the society in which they live and that is spoken by a minority group (Rothman, 2009; Rothman & Treffers-Daller, 2014; Valdés, 2000). This language is called the heritage language (HL), it is available to children in the home from birth, provided by their parents, who brought it with them when they moved and settled in the new geographical area. This first language, the HL, later in life, becomes primarily a home/community language when the HLS are introduced to the dominant language of the society, usually with the start of education. Their proficiency in the majority language rises, while their HL development may stop and/or attrite (Montrul, 2002; Putnam & Sánchez, 2013; Rothman, 2009). The second group of participants in this thesis we call *emigrant speakers*⁶. These are Turkish language speakers who, having grown up in Türkiye, in a monolingual environment, emigrated to Australia where their language became a minority language. Most of these participants were introduced to English at primary school and only used it in this educational setting. When, as adults, they moved to Australia, for higher education or work purposes, their second language, English, became more fluent and the dominant language, while they continued to speak Turkish at home and/or in social settings. We will now provide more detail on these participants.

⁶ The speakers labelled as emigrant speakers migrated from Türkiye to Australia, where they are immigrants. All migrants are both emigrants and immigrants. We chose the term “emigrant” to place our focus on the country of origin, and by extension, the language used there (Turkish), rather than on the final destination, the country being moved to and its language (English). These speakers grew up in Türkiye, with Turkish as both the dominant and the societal language and emigrated as adults. Alternative terms could include second-language learners of English, non-native speakers, or late arrivals to Australia. However, as our focus is on the processing of Turkish rather than English, we felt that emigrant speakers of Turkish maintained that focus better than the former terms. The term emigrant speakers has also been used in other studies (e.g., Andrews, 1988, Gürel, 2002, Polinsky, 1995).

Participants

The participants were recruited via student organizations, Turkish culture and language centers, the Turkish Consulate in Sydney, schools that deliver Turkish education, and advertisements posted on social media and in neighborhoods with large Turkish communities. Inclusion criteria were that participants were between 20-54 years of age, had started acquiring Turkish from birth, used English actively in daily life, and had no previous psychological, neurological, or communication disorders. To maximize recruitment participants were tested in multiple locations across Sydney.

Background Testing

We collected detailed information on participants' language background, language acquisition, and language performance in both languages (Turkish and English). The participants were allocated to the heritage language speaker group (Section 2.4.1.) or the emigrant speaker group (Section 2.4.2.) based on the information provided in the bilingual questionnaire (see section 2.3.1.).

Language and Social Background Questionnaire

The first measure was the bilingualism language background questionnaire constructed based on the Language and Social Background Questionnaire (LSBQ; Anderson et al., 2017) with adaptations tailored to our research questions and to reduce the length of the questionnaire for participants (see Appendix A for the full questionnaire). These adaptations included editing sub-sections such as the *community language use behavior* section (now *language use behavior*) and amending the scaling method for life stages to use average percentages of exposure/use. In addition, *reading* was expanded into a whole section (*reading habits*) to collect more detailed input on participants' reading behaviors given that we planned to use a reading task. We excluded questions from the language use section that were more detailed than needed for our study (i.e., language use for social, religious, extracurricular activities; shopping/restaurant/other commercial services; health care services/government/public offices/banks) and instead included only languages preferred at home, work, social life and in general). The final questionnaire consisted of four sections: *social background*, *language background*, *language use behavior*, and *reading habits*.

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The *social background* section collected information on the demographics, and basic health history (vision, head injury, neurological impairments, etc.). It also provided information regarding participants' parents' first and second language knowledge, education, occupation, and which language participants' parents used to communicate with each other.

The *language background* section included questions about the age and the place they started learning the language, the age they started acquiring language skills in each language (i.e., understanding, speaking, reading, writing), and self-rated proficiency levels (out of ten) on these skills. The participants that were born in Australia or moved here at/before the age of five were also asked to report details of any Turkish schooling/education they had received in Australia, in terms of the age at which they received it, duration in years, the institution that provided the education, and the skills learned.

In the *language use behavior*, section participants were asked to report the percentage of Turkish and English use/exposure at indicated age periods. They were also asked to report the amount of aural and visual material exposure (i.e., watching/streaming video/audio such as listening to music, or watching TV series), language preferences in different situations, and language switching in communication.

The final section of the questionnaire collected data on participants' *reading habits*. They were asked to report the percentages of reading in each language at indicated age periods, type of materials and number of hours they read in both languages per week, and finally the number of books (for each Turkish and English) they had read in the last year.

Reading Proficiency Measures

To provide more detail on the participants' reading skills we used two measures, one that focused on speed and accuracy of reading aloud and one on reading comprehension.

Reading speed and accuracy

In order to obtain an objective estimate of individuals' word reading ability, we administered the word reading (Sight Word Efficiency) subtests from the Test of Word Reading Efficiency (TOWRE, Torgesen et al., 1999) and

the adapted version for Turkish; *Türkçe'de Kelime Okuma Bilgisi Testi* 'Word Reading Knowledge Test in Turkish' (KOBIT; Babür et al., 2011). The subtest for Phonemic Decoding Efficiency was not administered in either language as we were primarily interested in their word reading skill. These tests consisted of 104 words whose complexity increased gradually in terms of word length, frequency and familiarity. Word reading efficiency was measured by the number of words read correctly in 45 seconds for English and 60 seconds for Turkish. The tests come in two parallel forms (A and B, see Appendix A). As participants were sometimes present when another participant was being tested, half of the participants read Form A while the other half read Form B. We analyzed raw scores as norms were not available for our population: the English version provides norms up to 24 years, 11 months of age therefore not comprehensive for our participant group, and the norms of the Turkish adaptation are available only for children between the ages of 6-11.

Reading comprehension

We administered one English and one Turkish cloze test (see Appendix A) for reading comprehension taken from the C1 level (Council of Europe, 2011) of the standardized language proficiency tests of the European Language Certificates (telc GmbH, Frankfurt am Main, Germany, 2014). We chose to use this as an independent measure of proficiency as opposed to self-rated proficiency, as reading skills may be difficult to self-evaluate (see Treffers-Daller, 2015 for a discussion). The English task presented a text with five short paragraphs, and the Turkish text comprised three longer paragraphs. Each text contained 22 blank spaces, approximately one per sentence, that participants had to fill in by choosing the correct word from the given options. In the Turkish test, the selection focused on the correct word inflection. Turkish is an agglutinative language; therefore, inflections are particularly important. In the English test, selection options varied between vocabulary knowledge and inflections for tense and modality. Each correct answer was scored 1 point with a maximum score of 22.

Print Exposure

Print exposure of the participants was examined with a Turkish-English bilingual version of the updated Author Recognition Task (Acheson et al., 2008) adapted for bilingual speakers in Australia. In this updated version of

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the Author Recognition Task by Acheson and colleagues, participants are presented with 66 author and 66 non-author names. In our adaptation, both Australian and Turkish authors were represented in the task for cultural purposes. Of the 132 items, 56 items (23 real international authors and 33 foils) were retained from the original Author Recognition Task. To these, we added 10 Australian authors (from the Australian version, Castles, personal communication) and 33 Turkish authors, and 33 Turkish foils. The full author list is provided in Appendix A. The print exposure score is the number of correct identifications minus incorrect identifications, with a maximum score, therefore, of 132.

Cognitive Measures: Digit Span Forward and Backward

Some authors have suggested that short-term and/or working memory may impact performance on some of the tasks used in this thesis (Conway et al. 2005). Consequently, we assessed forward and backward digit span (see Appendix A), as measures of short-term and working memory, respectively, to enable control for any effects of participants' memory span on the experimental task. The digit span task was adapted from the Wechsler Adult Intelligence Scale (WAIS; Weschler, 2008) and was administered in the oral modality. For the Forward recall span task, participants were asked to recall and repeat digit strings of increasing length from two to eight digits. For the Backward recall span task, participants were asked to repeat digit strings in the reverse order to that presented with an increasing span of digit strings from two to six digits (e.g., for 1-5-2- they should respond 2-5-1). In both recall tasks, two trials of 2 digits were used as practice at the beginning, and then two trials were presented per span. Following Conway and colleagues (2005), a trial was counted as accurate when digits were correctly recalled in the correct order, and testing continued until participants incorrectly repeated both trials in the same span. One mark was awarded for each correctly repeated string; hence the maximum score was 14 for the Forward Span and 10 for the Backward Span. Participants were given the option of being tested in their preferred language, and all but three participants took the test in Turkish.

Procedure

Following a verbal and written explanation of the study, participants signed the consent form. They completed the *social background* section of the Bilingual Questionnaire and then undertook the self-paced reading experiment (see Chapter 4). Following an optional short break, they completed the remaining sections of the Bilingual Questionnaire, the Turkish reading tasks (KOBIT, Turkish cloze test), and the Author Recognition Test. Participants who also took part in the auditory sentence verification experiment (see Chapter 3) completed this next. After all the Turkish tests, participants undertook the English reading tests (TOWRE, English cloze test). The testing sessions ended with the Digit Span Task. The sessions lasted for approximately two hours. Participants were offered regular breaks and could take as many as they wished. This study was approved by the Macquarie University Human Research Ethics Committee (approval number: 3531).

Results: Participant characteristics

A total of sixty-five speakers were initially recruited for this study. However, before the analyses, 12 participants were excluded since they did not fulfill the criteria: five participants were over the age limit (above 55 years of age), one participant had suspected dyslexia, and nine participants had a complicated language history with relocation between several countries and hence did not fit in either of our two participant groups. These participants' data is not reported any further.

The remaining 53 bilingual speakers of Turkish and English (28 F; $M_{AGE} = 34.4$ years; $SD = 9.1$; 4 left-handed) were included in this study. As noted above, participants were divided into two group⁷ according to their answers to the Bilingual Questionnaire.

The heritage language speaker group comprised individuals who were either born in, or moved to, Australia, where Turkish is a minority language, before the age of five, and had parent(s) of Turkish heritage who spoke Turkish to them at home.

⁷ Although, in this thesis, two groups of speakers were compared to each other, the aim was not to make a binary division of amongst the speakers based on their language quantitatively but rather to treat them as a part of the bi/multilingual spectrum. The separation of speakers as heritage language speakers and emigrant speakers was based solely on the settings they participants grew up in. These settings had a substantial impact on their language competence and defined their language input factors (Turkish as the majority language vs not).

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The emigrant speaker group comprised participants who had Turkish as a first and dominant language until at least the age of 12, after which they migrated to a country where their first language, Turkish, was not the dominant language of the society.

Heritage language speakers (HLS)

Twenty-three heritage language speakers of Turkish were recruited. Their age ranged between 20 and 45 years (see Table 2.1 for demographic variables), and the onset of English acquisition ranged between 0 and 5 years of age.

These participants were either born in Australia (n=21) or migrated there before the age of five (n=2). The onset age for Turkish was always from birth in this group. They were exposed to Turkish at home, within the Turkish community in which they lived, and in social environments. Their use of English became dominant in all areas of their lives over time and, except for four participants, they learned to read and write in Turkish after they had acquired these skills in English.

Participants' parents had all moved to Australia either as children with their parents or on their own as adults, with the exception of one participant whose father was born in Australia after his parents had migrated there. Consequently, following the common definitions given in the literature, two participants (mentioned above) were first-generation migrants, the rest were second-generation migrants and all were Turkish heritage language speakers (e.g., Benmamoun et al., 2013; Scontras, 2015). The HLS reported their parents' English level to vary between basic levels (n=10) to intermediate (n=4) and advanced/native (n=3). The remaining six participants had only one parent with an advanced level of English, whereas the other parent had basic (n=4) or intermediate level (n=2).

The participants' first introduction to English was either as a daily language that they were exposed to by their older sibling(s)/parents/the community they lived in from birth (n=18) or at the start of daycare/formal education (n=5). These five participants also included two participants who arrived in Australia at the age of five and started their formal education here.

Eighteen of the 23 HLS received some degree of Turkish schooling. Seventeen attended Saturday School of Community Languages, at which they carried out activities in Turkish for at least four hours once a week. Of these participants, one was also homeschooled in Turkish, and another received Turkish as a second language during her regular studies. Another of the eighteen participants received Turkish education only during primary school as a second language. When asked about the benefits they had gained through their Turkish educational activities (question 18 on the BQ), most of the 18 participants reported benefits in *communication* skills with this being rated as contributing an average of 50% to their total benefit followed by *vocabulary* improvement (29%) and *grammar* skills (21%). The remaining five HLS participants reported not having received any education/schooling in Turkish.

Emigrant speakers (ES)

The emigrant speakers of Turkish consisted of 30 native speakers of Turkish (15 F; $M_{AGE} = 37.7$; age range 23–54 years) who were born in Türkiye and moved to Australia no earlier than at 12 years of age. The duration of their residence in Australia was between one month and 32 years (see Table 2.1 for details).

The ES participants' first exposure to English ranged between 6 and 17 years of age ($M_{onset\ of\ English\ exposure} = 11.5$ years; $SD = 2.0$), mostly during education at primary school. English as a second/foreign language is mandatorily included in the curriculum of all schools in Türkiye. However, several participants reported that they learned little through this exposure and that their onset of English learning coincided with their arrival in Australia, we nevertheless registered their very first contact, during their education in Türkiye, as the onset of English exposure. Most of the ES group (22 of the 30) reported that both their parents had no English knowledge. Of the eight remaining participants, six reported only beginner or intermediate level for both their parents, one reported beginner level English for their father with their mother having less than beginner knowledge and one participant reported having an advanced English-speaking father and a mother with beginner level English.

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Comparison of the two participant groups

In this section, we compare the two groups on the background measures. Table 2.1 summarizes the results and the full details for each participant can be found in Appendix A.1.

Language and Social Background Questionnaire

Outcomes from the bilingualism language questionnaire (see Table 2.1) showed that the two groups were significantly different in age, the ES's mean age was higher than the HLS's, however, in education, the groups did not differ significantly.

Language proficiency

Self-rated language proficiency was a combined score of four skills: comprehension, speaking, reading, and writing. The mean of the HLS' self-rated Turkish proficiency was significantly lower than the mean of ES's Turkish proficiency.

All HLS rated all their English skills 10, except for two participants. As would be expected, the mean for the English skills of the ES group was significantly lower than for the HLS group.

Within group analyses showed that the HLS were significantly more proficient in English compared to Turkish ($t(22) = 5.96, p < .001, CI = 1.28 - 2.65$) and the opposite held for ES in that they reported greater proficiency in Turkish ($t(29) = -5.44, p < .001, CI = -2.29 - -1.04$).

Onset of bilingualism

As mentioned above, the onset of English exposure was registered as the first contact with the language and for most ES this was in Türkiye during school. However, when the participants were asked to specify the age at which they acquired particular language skills most of the participants reported the age they moved to Australia (or a few years later). Therefore, the age of onset overall (averaged across subskills), and age of acquisition of subskills were different from the ages reported for English onset. For the ES, reported mean acquisition ages for four language skills in English was as follow: $M_{comprehension} = 14.2 (SD = 5.3)$, $M_{speaking} = 14.4 (SD = 5.4)$, $M_{reading} = 14.6 (SD = 5.5)$, $M_{writing} = 14.9 (SD = 6.4)$. Amongst the HLS speakers, the bilingualism onset and age of acquisition also differed with many

participants reporting this occurring after the start of schooling, especially for reading and writing ($M_{\text{comprehension}} = 1.6$ ($SD = 2.7$), $M_{\text{speaking}} = 2.0$ ($SD = 2.8$), $M_{\text{reading}} = 5.3$ ($SD = 1.4$), $M_{\text{writing}} = 5.4$ ($SD = 1.4$)). Nevertheless, the bilingualism onset for HLS was significantly earlier than ES in all domains (Comprehension $t(45.2) = 11.08$, $p < .001$, $CI = 10.28 - 14.83$; Speaking $t(45.7) = 10.68$, $p < .001$, $CI = 10.05 - 14.72$; Reading $t(33.8) = 8.80$, $p < .001$, $CI = 7.16 - 11.45$; Writing $t(32.6) = 7.92$, $p < .001$, $CI = 7.09 - 11.99$).

Table 2.1. Summary of the bilingualism language background questionnaire for Heritage Language Speakers (HLS, n=23) and Emigrant Speakers (ES, n=30) and statistical comparison of the groups

	HLS		ES		Welch <i>t</i> -test (<i>p</i> -value)	95% CIs
	Mean	SD	Mean	SD		
Age (years)	30.17	8.73	37.70	8.16	3.20 (.002) *	[2.79, 12.26]
Education (years)	16.17	1.75	16.67	2.90	0.76 (.447)	[-0.80, 1.79]
Years of residence in Australia	28.04	9.31	10.46	8.59	-7.04 (<.001) *	[-22.61, -12.56]
Age of Onset: English	1.00	1.98	11.53	1.96	19.29 (<.001) *	[9.43, 11.63]
Turkish Proficiency (self-rated)	7.91	1.52	9.90	0.28	6.22 (<.001) *	[1.33, 2.66]
English Proficiency (self-rated)	9.88	0.41	8.24	1.60	-5.39 (<.001) *	[-2.26, -1.02]
Exposure TR (3-6 years, %)	66.95	27.83	100	0	5.69 (<.001) *	[21.00, 45.08]
Exposure TR (6-12 years, %)	45.00	23.88	98.80	3.86	10.70 (<.001) *	[43.39, 64.20]
Exposure TR (12-18 years, %)	41.09	22.15	78.11	27.04	5.48 (<.001) *	[23.45, 50.60]
Exposure TR (18-24 years, %)	34.60	17.12	73.03	28.42	6.11 (<.001) *	[25.81, 51.12]
Turkish Exposure & Use (current %)	30.02	18.20	33.00	19.00	0.54 (.590)	[-7.55, 13.11]
Turkish Material - Audio & Video (hr/day)	1.72	1.26	1.75	2.07	0.07 (.947)	[-0.89, 0.96]
English Material - Audio & Video (hr/day)	4.26	5.87	2.92	1.66	-1.06 (.296)	[-1.24, 3.74]
Turkish Material - Written (current %)	19.70	17.24	33.33	22.45	2.50 (.016) *	[2.69, 24.58]
English Material - Written (current %)	80.30	17.24	66.66	22.45	-2.50 (.016) *	[-24.58, -2.69]
Turkish Material - Written (hr/week)	3.00	2.62	10.98	9.09	4.57 (<.001) *	[4.43, 11.53]
English Material - Written (hr/week)	22.73	19.07	25.30	19.40	0.48 (.632)	[-8.15, 13.27]

Note. Values of significant effects ($p < .05$) are asterisked*.

Age of Onset: refers to the age at which the participants had (reported) first contact with a given language.

Proficiency refers to self-rated scores out of 10, where 10 is native-like proficiency.

% refers to the (rated) percentage of language exposure during each age bracket that was in Turkish, the remaining percentage is the English use.

Turkish and English exposure and use through the lifespan

Although current exposure to and use of Turkish was not significantly different between the groups, the HLS' Turkish exposure and use was significantly lower at every other point in their lives than for the ES. Nevertheless, during early childhood (3-6 years), it was significantly higher than at any other stage in the HLS' lives (vs 6-12 years $t(22) = 3.45, p = .002, CI = 8.00 - 32.0$; vs 12-18 years $t(22) = 3.50, p = .002, CI = 10.53 - 41.20$; vs current $t(22) = 5.2, p < .001, CI = 22.12 - 51.35$). ES showed similar amounts of Turkish usage up until the age of 12 (3-6 years vs 6-12 years $t(29) = 1.70, p = .09, CI = -0.24 - 2.64$) but then significantly less in the years following (3-6 years vs 12-18 years $t(29) = 4.43, p < .001, CI = 11.78 - 31.98$; vs current $t(29) = 19.30, p < .001, CI = 59.90 - 74.10$). Current English exposure was similar for each group.

We now turn to participants' reporting of which language they preferred to use at home, work, in their social lives, and in general. The majority of the HLS reported using only Turkish at home (39.1%), 30.4% reported only English use and the remaining 30.4% reported using both languages at home. For the ES, the most common answers on the languages preferred at home were only Turkish (39.9%) or only English (43.3%), whereas only 16.6% reported using both languages at home. None of the participants reported using only Turkish at work. 8.6% HLS and 19% ES reported using both languages at work (the reason for using Turkish at work was either with colleagues, and/or customers or because they were doing business with Turkish companies/people). The rest of the participants reported using only English at work. In their social lives, none of the HLS reported using only Turkish, 39.1% reported only English and the other 60.9% reported using both languages. Most of the ES (63.3%) reported using both languages, 10% reported using only Turkish and the remaining 26.6% preferred using only English in their social life. For general use, 43.4% of HLS reported using both languages and the remainder reported only English. While 6.6% (n=2) of the ES reported a preference for using only Turkish in general, most likely because they had limited English language skills. The rest of the ES group mentioned a preference for either only English (33.3%) or both languages (59.9%). The hours of watching/streaming video/audio materials did not differ significantly between the groups for either Turkish or English.

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In terms of language switching, the majority of participants, 50.9%, switched between Turkish and English when speaking with family members (13 HLS; 14 ES); only five HLS and 12 ES indicated that they hardly ever (*never* or *rarely*) switched languages in communication with their family members. A total of 12 participants (5 HLS, 7 ES; 22.6%) reported *never/rarely* switching between English and Turkish while they were communicating with their friends. The context where participants switched the least was when interacting on social media or over the internet: 56.6% (12 HLS, 18 ES) indicated *never* or *rare* switching between Turkish and English.

Reading habits

In terms of percentages of time currently spent reading in Turkish versus English, there was a significant difference between the groups with the ES reading significantly more in Turkish, and the HLS reading significantly more in English (see Table 2.1). Four of the HLS reported not reading in Turkish at all (0%).

There were also significant differences in the total number of hours each group spent reading in Turkish during a regular week, ES read significantly more than HLS. However total numbers of English reading hours were similar between the two groups with the ES reporting spending more time reading in English following their emigration to Australia as this was mostly for education and work purposes. Both groups read in English significantly more than in Turkish (HLS $t(22) = -4.97, p < .001, CI = -27.97 - -11.51$; ES $t(29) = -4.24, p < .001, CI = -21.22 - -7.41$). This is not surprising considering both groups were living in an English-dominant environment.

Reading Proficiency Measures

As expected, the Turkish reading proficiency of the HLS was significantly lower than the ES, with significantly fewer Turkish words read on the KOBIT, and significantly poorer performance on the Turkish cloze test (see Table 2.2). In contrast, and as expected, HLS performed significantly better than the ES on the English reading proficiency tests, with significantly higher English word reading on the TOWRE and better performance in the English cloze test.

The total print exposure score (number of authors correctly selected minus the number of non-authors selected) for the HLS was significantly lower than the ES. However, when we separate the data into Turkish versus International authors, while the ES recognized significantly more Turkish authors than the HLS (ES: $M = 19.1$, $SD = 7.7$; HLS: $M = 4.5$, $SD = 5.9$, $t(51.0) = 7.82$, $p < .001$, $CI = 10.86 - 18.36$), there was no significant difference between groups for the international authors ($M_{HLS} = 3.9$, $SD_{HLS} = 5.3$; $M_{ES} = 6.3$, $SD_{ES} = 4.6$, $t(50.2) = 1.75$, $p = .085$, $CI = -0.35 - 5.14$).

Digit Span

The digit span scores did not yield any statistical difference between the groups for the forward recall but ES showed a significantly larger backward span (see Table 2.2), suggesting somewhat better working memory in these participants.

Table 2.2. Descriptive Statistics (Mean and standard deviations) of test scores for both groups: Heritage Language Speakers (HLS) and Emigrant Speakers (ES)

	HLS		ES		Welch <i>t</i> -test (<i>p</i> -value)	95% CIs
	Mean	SD	Mean	SD		
<i>Reading proficiency and print exposure measures</i>						
KOBIT (max 104)	56.65	18.53	85.37	10.56	6.65 (<.001) *	[19.92, 37.50]
TOWRE (max 104)	89.74	7.32	77.23	11.08	-4.93 (<.001) *	[-17.60, -7.41]
Turkish Reading Proficiency (cloze test, max 22)	13.09	4.52	16.97	4.61	3.07 (.003) *	[1.34, 6.42]
English Reading Proficiency (cloze test, max 22)	17.43	2.50	11.77	4.57	-5.75 (<.001) *	[-7.65, -3.69]
Print Exposure (Author Recognition Test) (max 66)	7.65	8.63	23.93	12.19	5.69 (<.001) *	[10.53, 22.03]
<i>Cognitive measures</i>						
Forward (total correct recall) (max 14)	8.78	1.95	9.23	2.34	0.76 (.449)	[- 0.73, 1.64]
Backward (total correct recall) (max 10)	5.56	1.47	6.70	1.78	2.53 (.014) *	[0.24, 2.03]

Note. Values of significant effects ($p < .05$) are asterisked*.
Max: maximum score on each task.

Summary

In this chapter, we have provided detailed information regarding the participants. Our aim was to collect and provide information on those language background variables defined by the bilingualism literature that have been suggested to contribute to language processing.

Group comparisons showed, as expected, that the emigrant speakers of Turkish showed better Turkish skills and proficiency than the speakers of Turkish as a heritage language. In contrast, the heritage language speakers showed better English skills and proficiency. This pattern was consistent across self-ratings, word reading, proficiency tests, recognizing author names (Turkish only), and exposure to written materials in each language.

Both groups showed higher Turkish exposure and use in early childhood than as young adults, with a decrease for both groups corresponding with the gradually increasing use of a second language. However, both groups showed equivalent current (at the time of testing) exposure and use making them particularly appropriate for comparison.

In the next two chapters (Chapters 3 and 4), we report the experiments conducted with these groups of participants comparing their performance. Then, in the last chapter (Chapter 5), we focus further on the heritage language speakers to investigate the individual differences in language processing using the variables described in this chapter.

