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

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General Introduction

When people migrate to other countries they take their language(s) with them. Within their communities and later with their children, they maintain their mother tongue and create minority language communities. Children of these immigrant communities are called *heritage speakers*, who, through their parents, are exposed to a home language, namely the *heritage language*, which is different to the dominant language of the society (Rothman, 2007). As people have been always mobile, heritage speakers exist everywhere around the world.

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As heritage speakers are bilinguals, in earlier studies they were often referred to as “early or simultaneous/sequential bilinguals” depending on the age of acquisition of their other (non-heritage) language group under investigation (Au et al., 2002; Chee et al., 1999; Hernandez, et al., 2000; Hulslen et al., 2002; Kim et al., 1997; Montrul, 2002). However, around the beginning of the 21st century, the terms *heritage language* and *heritage speakers* emerged (Polinsky & Kagan, 2007; Valdés, 2000)¹. Since then heritage languages and their speakers have been the topic of linguistic and psycholinguistic research. There has been research investigating heritage language speakers’ processing and competence in the heritage language in each and all language areas (speech perception, lexical knowledge, morphological and syntactic processing, and beyond sentence level performances). This has included the study of heritage language speakers’ patterns relating to a variety of linguistic phenomena (e.g., cognates, number/gender agreements, articles, tense, aspect) in comparison to a reference group (monolinguals, second language learners, late and/or early bilinguals) and how demographic factors might influence these patterns (e.g., age of acquisition, amount of language input, literacy) (for related reviews of heritage language processing see e.g., Bayram et al., 2020; Jegerski & Sekerina, 2022; Polinsky & Scontras, 2020).

This dissertation aims to contribute to the literature regarding heritage language speakers by investigating their processing of a linguistic phenomenon called *evidentiality* and, importantly, by exploring implicit and explicit knowledge by using both online and offline methodologies. The rest of this chapter will, first, briefly outline the previous literature on heritage speakers and their language processing, and then provide a description of the linguistic phenomenon that is the focus of this dissertation, evidentiality. We² lay out the theoretical basis of evidentiality in general and then, more specifically, in Turkish, and the phases of its acquisition by monolingual children.

¹ We are aware that the term *heritage (language) speaker* has also been used to refer to the speakers of indigenous and endangered languages. However, throughout this thesis the term is used to refer to the ‘social status of its speakers’ rather than the status of the language itself. For example, Spanish is not heritage language in Spain or other Spanish-speaking countries, where it is the common/official language of the country; whereas it is when spoken in English dominant-US (Valdés, 2005).

² Although this dissertation is that of the PhD candidate Suzan D Tokac-Scheffer, it is the final product of a collaborative work with the constant and substantial guidance and feedback of the supervisors. Moreover, Chapters 3 and 4 are submitted for publication. Therefore, the subject ‘we’ is used throughout the manuscript except the General Discussion chapter (Chapter 6), for which the chosen subject is the first person singular “I”.

Heritage Speakers and Heritage Language Processing

Heritage speakers are speakers of a minority language that is mainly spoken at home and is different from the majority language of the society (Valdés, 2000). Importantly a heritage language is the first language to which the heritage speaker is exposed, mainly through the immediate family and, later in life, the societal majority language becomes their dominant language (Benmamoun et al., 2013). Heritage languages often emerge in the migrant context, consequently, their knowledge and competence vary depending on a number of factors related to language input (Benmamoun et al., 2013). The diversity and the heterogeneity in the speakers' backgrounds, and therefore, of their language input and language experience (e.g., age of majority language introduction, families' knowledge and competencies in the heritage and the majority language, modalities and contexts of heritage language input), results in a highly heterogeneous group of speakers. There is evidence that whereas some adult heritage language speakers are almost indistinguishable from their monolingual peers on an individual level (e.g., Flores, 2010; Montrul, 2016; Montrul & Sánchez-Walker, 2013; Montrul et al., 2015); others can understand the heritage language but do not speak it (Oh, et al., 2003; Rothman, 2007). The diverse language outcome that heritage language speakers exhibit can be used to investigate language acquisition situations and maintenance conditions in native speakers which otherwise cannot be fully understood through monolingual studies (Montrul, 2011; Scontras, et al., 2015).

In a large body of research, heritage speaker performance has shown to be distinct from their monolingual peers (e.g., in morpho-syntax, such as gender, tense, aspect, agreement; Benmamoun et al., 2013; Jegerski & Sekerina, 2020). This “non-monolingual-like” language competence and performance have been inferred to reflect *incomplete acquisition* (e.g., Polinsky, 2006; Polinsky & Kagan, 2007; Montrul, 2008; Benmamoun et al., 2013). Rothman (2009) preferred the term *arrested development* and attributed this to the switch in the dominant language from the heritage to the societal majority language. Rothman suggested that the introduction of L2 hinders the development of L1 which then lags behind. In contrast, some researchers have argued that heritage speakers still acquire the heritage language to a certain degree, but that acquisition may follow a *divergent* path to monolinguals (*divergent attainment*; Scontras et al.,

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2015). Irrespective of the terminology, it is important to investigate the pertinent factors influencing heritage speakers' language competence and performance; discerning the differences in language outputs relative to monolinguals.

One of the most cited, experimentally proven, factors that affect heritage language attainment is the quality of input. Qualitatively (and/or quantitatively) reduced input may - directly or implicitly- lead to limited vocabulary, compromised grammar or an underdeveloped interface between syntactic and pragmatic competencies (Blom, 2010; Montrul, 2009; Paradis, 2010; Sorace, 2000; Sorace & Filiaci, 2006; Tsimpli et al., 2004). 'Input' can be an umbrella term for all kinds of language provided/available to heritage speakers and everything related to that input. For example, family attitudes to the use of the heritage language, and family proficiencies in the heritage language constrain the amount, frequency and/or the quality of the input (e.g., De Houwer, 1999, 2007, Hammer et al., 2004; Hoff et al., 2011; Portes & Hao, 1998), the language of education/schooling and literacy (e.g., Rothman, 2007; Rothman, 2009; Tsimpli, 2014), exposure to written materials (e.g., Patterson, 2000; Pires & Rothman, 2009), the extent to which the heritage language is spoken in the heritage speakers' community (e.g., Bousquette & Putnam, 2019; Weltens et al., 1986), and the educational system of the country that they live in (whether the governments implement home/heritage language policies in the education system or promote only the societal language of the country and demote the use of home languages; for examples from the European education systems see Extra & Verhoeven, 1993).

It is not surprising that an increase in one or more of the facets of input mentioned above can have benefits for the skills of heritage language speakers. Au et al. (2002) showed regular input in the heritage language during childhood can facilitate the maintenance of phonological knowledge through adulthood. Similarly, the Korean heritage language speakers in Oh et al. (2003), who were exposed to and used Korean during their childhood, showed sustained phonemic competence in adulthood. This underlines the importance of consistent childhood exposure to the heritage language for "monolingual-like" competence and performance. Kupisch and Rothman (2016) tested Italian and French heritage speakers living in Germany using linguistic stimuli that exist both in Italian and French. French heritage

speakers who attended French schools outperformed the Italian heritage speakers who attended German schools with better knowledge and performance. The authors attributed the French heritage speakers' better, and monolingual-like, performance to the high quality of input they were exposed to through schooling.

All in all, higher heritage language proficiency consolidated via any of the mentioned input factors has been shown to have favourable effects on heritage language speakers' linguistic performance. For example, Montrul (2009) found that advanced and intermediate Spanish heritage speakers (defined according to heritage language proficiency test scores) living in an English dominant country showed monolingual-like performance on a verb production task. Similarly, Jegerski and colleagues (2016) found that highly proficient heritage language speakers also did not differ from their monolingual counterparts using an offline acceptability judgment task to investigate attachment preference in relative clauses.

While input factors impact the overall competence and performance of heritage language speakers, nonetheless the methodological approach used to capture this competence and performance can affect the results and provide further insights into the underlying factors. To date, only a limited, although increasing, number of studies have used tools such as self-paced reading, eye-tracking, and event-related potentials (ERPs) to investigate speakers' online, implicit processing (as opposed to explicit knowledge) of the heritage language speakers (e.g. self-paced reading Jegerski, 2018a; Jegerski, 2018b; Keating et al., 2016; Mikhaylova, 2018; Di Pisa & Marinis, 2022; eye-tracking Jegerski & Sekerina, 2020; Korneev et al., 2017; Parshina et al. 2021; ERPs van Rijswijk, 2016; van Rijswijk et al., 2017). Almost all of these studies mentioned report results attained through online tasks that are different to those compared to offline ones. Therefore, because of these differences, it is pressing to continue our exploration of heritage language speakers using online methods and, most importantly, to compare the patterns observed across methodologies while examining the same linguistic component (Jegerski & Sekerina, 2020, 2022).

Another important variable to take into consideration in heritage language studies is the linguistic phenomena being examined. "Atypical, complex, or infrequent" phenomena that are already challenging for

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monolinguals are even more challenging for heritage speakers' attainment (Scontras, et al. 2015, p.8), and therefore particularly interesting and important to study. As noted earlier, we will use the grammatical category of evidentiality in Turkish, an example of one of these types of phenomena, to investigate heritage language processing in heritage speakers of Turkish living in Sydney, Australia. In the next section, we will examine this phenomenon further, to outline the challenges it bears.

Concept of Evidentiality

One of the first references to evidentiality was by Franz Boas, who stated that in some languages indicating the *source of information* is obligatory, in contrast to others where it is definiteness, number, and time that are obligatory (Boas, 1938, p.133). Although he referred to the notion of *evidentiality*, the term was first used in the current linguistic meaning by Roman Jakobson (1957) who explained evidentiality as the speech event that narrates about the source of the information of another event. An expanded version of the definition of evidentiality is that it refers to the marking of the source of information, thereby indicating how one gained the knowledge regarding the event that is referred to in one's statement (Aikhenvald, 2004; Chafe & Nichols, 1986; De Haan, 1999; Faller, 2006; Lazard, 2001; Willett, 1988).

While Boas was referring to the grammatical categorization of evidentiality, where evidentiality realizes itself within the morpho-syntax of the language, there are also languages that have evidentiality as a functional category and convey more pragmatic meanings (Cornillie, 2009). While this dissertation investigates the former, morpho-syntactic, type of evidential, we will briefly touch on the second category to help the reader differentiate and understand the type of evidentials investigated throughout this dissertation.

In languages with a functional category of evidentiality, like Indo-European languages, the way that the speaker has gained the knowledge of an event is emphasized through lexical items (De Haan, 1999; Fetzer & Oishi, 2018). For example, in English, when one has direct visual evidence of an event, it is appropriate to say I *saw*, and when it is a result of inferred or reported knowledge, then using phrases such as I have been *told* or I *assume*

is applicable. Although it is not obligatory to indicate the information source using these forms, nevertheless they indicate the degree of evidence in the speakers' assertion (De Haan, 1999). This is where the functional category of evidentiality intersects with *epistemic modality* (Fintel & Gillies, 2010), as they both are concerned with the speaker's degree of commitment to, and attitude towards, the truth of their assertion (Chafe & Nichols, 1986; Givón, 1982; Palmer, 1986; Willett, 1988). According to the evidential form chosen by the speaker (or writer) for communicating a piece of information, the hearer (or reader) develops also an attitude towards that information that influences their decision to believe, reject, or accept the information (Fetzer & Oishi, 2014). It is important to note that there has been disagreement amongst linguistics as to whether evidential meanings and epistemic modality coincide. While some authors have argued that evidentials are seen as a part of the epistemic modality since they "reflect the speaker's knowledge of his utterance" (De Haan, 2013, p. 6), others have claimed that obtaining information from a non-firsthand source does not necessarily imply that the speaker abandons their commitment to the truth of this information (Oswalt, 1986 in de Haan, 2013). However, for the purpose of this dissertation, we will not dwell further on the epistemic connotations of evidentiality (for more on epistemic modality and evidentiality see Fetzer & Oishi, 2014; Palmer, 1986, 2001) and we follow researchers, such as Aikhenvald (2004), who clearly separate evidentials from epistemic modals.

More recent accounts focus on the study of the grammatical category of evidentiality as an independent system (Aikhenvald, 2003, 2004; Cornillie, 2009; De Haan, 1999, 2005; Faller, 2002; Joseph, 2003; Plungian, 2001) that is, the evaluation of the source of a piece of information (e.g., experience/event/knowledge) and accordingly, the choice of appropriate morpho-syntactic form from those available in the language used to convey this source (Aikhenvald, 2004; Chafe & Nichols, 1986; De Haan, 1998). Cross-linguistic studies suggest that as a grammatical unit, evidentiality appears in about a quarter of the world's languages, including Quechua (spoken in the highlands of South America), Aymara (spoken in the Andes), Korean (e.g., Choi, 1995; Papafragou et al., 2007), Bulgarian, and Turkic languages (e.g., Turkish, Azerbaijani, Uyghur; Aikhenvald, 2004) and many others. The papers in Chafe and Nicholas' (1986) edited volume illustrate how much evidential markers can differ within and between languages with

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heterogeneous meaning attributions. For instance, some South American languages, such as Tariana, spoken in Amazonia, have an elaborate system: It differentiates between aural and visual direct sources; and also, for indirect sources, specifies whether it is an inference or an assumption (Aikhenvald, 2004). In contrast, in many Balkan and Asian languages, evidentiality has a simpler distinction that is ingrained in the tense-aspect system. This thesis focuses on one such language: Turkish.

Evidentiality in Turkish

Turkish is an agglutinative language with an extensive verbal inflection paradigm, and it obligatorily marks the source of information (Aksu-Koç & Slobin, 1986). Omitting an evidential marker while referring to the past, results in an ungrammatical utterance in Turkish. This compulsory feature of evidentiality makes the speaker of Turkish highly dependent on knowledge of the information source and places a particular responsibility on the speaker.

Turkish has two distinct evidential markers inflected at the verb: the direct evidential (-DI, 1a) and the indirect evidential (-mİş, 1b). The **direct evidential** is used when the speaker has witnessed/perceived or carried out the mentioned action or event, and so has firsthand knowledge of the information. The **indirect evidential** is used when the speaker has received the information about the event from hearsay (quotative or reportative) or inferred it from a resultative state, therefore, their knowledge has been acquired non-firsthand (Aksu-Koç & Slobin, 1986; Aksu-Koç et al., 2009; De Haan, 2005; Slobin & Aksu, 1982; Underhill, 1976). The distinction between the two grammatical forms is salient when the type of evidence for the past event is available to the speakers and if it is contextually supported. That is, the direct or the indirect evidence related to the aforementioned event determines the type of evidential to be used.

For example, if one saw Sedat while he was washing the car, when talking about this event, the direct evidential marker (-DI) would be appropriate:

(1a) Sedat arabayı yıkadı.

Sedat car_{ACC} wash direct evidential 3SG

I witnessed that Sedat washed the car.

In contrast, if one saw Sedat next to a wet and clean car with a bucket and a hose; or someone else reported that it was Sedat who washed the car, the indirect evidential marker (-mİş) would be the appropriate one to use:

(1b) Sedat arabayı yıkamış.

Sedat car_{ACC} wash indirect evidential 3SG

It was reported to me or I inferred it from the traces of the event that Sedat washed the car.

The indirect form specifies a lack of *conscious involvement* of the speaker in an action/event (Aksu-Koç & Slobin, 1986). The speaker either has had to make an observation to collect evidence from the end-state of an action/event (*inferential*) or she/he has reported an action/event which was the experience or the perception of others (*reportative*).

The indirect evidential form (-mİş) can also be used for additional purposes; it makes non-past references to events that are a surprise to the speaker (*mirativity*, 1c, Aksu-Koç & Slobin, 1986; DeLancey, 1997); and is used for the *narration* of unreal events such as fairytales, myths, and legends (1d) (Slobin & Aksu, 1982).

(1c) Sedat ne güzel dans ediyormuş.

Sedat what beautiful dance practice present.indirect evidential 3SG

Sedat is dancing beautifully. [I did not know that Sedat could dance this well. Just watching him now has given me this unexpected insight.]

(1d) Pamuk Prenses elmayı yemiş ve birden bayılmış.

Snow White apple_{ACC} eat indirect evidential 3SG and suddenly faint indirect evidential 3SG

Snow-white ate the apple and suddenly fainted. [It is clear from the use of the indirect form that the narrator did not witness these events.]

All these distinct specifications add an extra computational load to the indirect evidential making it the 'marked' form, leaving the direct evidential as the default 'less marked/unmarked' form (Johanson, 2003).

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The unique metalinguistic properties of evidentials, that is their relation to, and difference from, the past tense (in Turkish) and also the distinction between the two evidential markers are particularly challenging for processing. We now outline the evidence regarding the processing of evidentials in Turkish, using data from various populations of native speakers to disentangle their complex properties.

Acquisition of Turkish Evidentials

Extensive acquisition studies have been carried out examining the acquisition phases of evidentiality and the distinction between direct and indirect evidential markers. Evidentials emerge in Turkish speaking children's spontaneous speech quite early, around 18 months to two years of age, when it is used as a past tense reference to directly perceived events (Aksu-Koç, 1988; Aksu-Koç et al., 2009). However, children's successful identification of the differences between the two evidential markers, and the association of each marker with its semantic attributions, as well as the accompanying pragmatic functions, only stabilise at a later age. It is important to highlight here that stabilisation does not refer to full mastery of the evidentiality distinctions. Aksu-Koç (1988) showed that, even at 6 years old, children do not demonstrate adult-like mastery of Turkish evidential markers while describing past events (production of the corresponding marker was correct 72% for witnessed and 56% for nonwitnessed events). Later studies showed that even at the age of 7 children were still struggling to discriminate between different information sources and source monitoring (Öztürk & Papafragou, 2008, 2016).

The acquisition of the two markers is not simultaneous and they emerge in speech (and full ability to comprehend) at slightly different ages during childhood: the indirect evidential follows the direct. Children reach mastery (accuracy above 90%) earlier in production than in comprehension, and in both production and comprehension, proficiency is achieved earlier for the direct evidential (-DI) compared to indirect evidential (-mİş) (Aksu-Koç, 1988; Aksu-Koç et al., 2009; Öztürk & Papafragou, 2008; Ünal & Papafragou, 2016).

Earlier mastering of the direct evidential marker suggests that children become familiarized with the concept of direct evidential easier as it is the mental representation of a direct experience (Aksu-Koç et al., 2009). The late mastery of evidential distinctions between the direct and indirect evidentials has been suggested to be related to children's linguistic development, such that children are not yet able to make appropriate linguistic distinctions while applying the correct evidential to their utterances referring to the past, whether it was the knowledge gained from others, inferred from the end-state or an experience of their own (Aksu-Koç et al., 2009). Aksu-Koç and colleagues (2009) attributes this also the maturation of memory that at the later stages of development, children are able to store linguistic information in their long-term (semantic) memory, which helps them differentiate firsthand and non-firsthand information sources in memory.

In sum, the results of acquisition studies show that evidential markers in Turkish are quite distinct from each other: they emerge and develop in a distinct manner in native speakers' grammar, and comprehension of the indirect evidential requires additional processing resources, which emerge with the overall development of the child (Öztürk & Papafragou, 2016)³.

Evidentiality Processing After Brain Damage

Further evidence regarding evidentiality processing can be found in studies of aphasia - an acquired language and communication disorder after damage to the brain. More specifically, evidentiality processing has been investigated in individuals with agrammatism⁴. Arslan and colleagues (2014) studied evidentiality production and comprehension (source identification) in Turkish with individuals with agrammatism to investigate the effects of language loss on evidentiality processing. In production, the direct evidential required more effort and led to more errors compared to the indirect evidential verb forms used for inferential and reportative speech. Arslan et al. explained the results within the PAST DIscourse

³ As underlined by the majority of the authors, there are experimental limitations when studying evidentiality. One is the empirical challenge of the difficulty of the task itself. The second is the difficulty in claiming that the direct evidential has an advantage compared to indirect due to the artificial nature of an experimental task.

⁴ Agrammatism presents itself with non-fluent speech (Nestor et al., 2003) with word retrieval difficulties, effortful speech, grammatical errors (Bastiaanse & Jonkers, 1998), and limited morphological competence (e.g., Burchert et al., 2005; Friedmann & Grodzinsky, 1997).

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Linking Hypothesis (PADILIH; Bastiaanse et al., 2011) which claims that referring to the past requires a discourse-linking relationship and this linking is effortful for agrammatic speakers. As mentioned earlier, evidential markers are obligatory past tense indicators. The direct evidential reports events and actions carried out and completed in a past time frame, whereas the indirect evidential mentions the resultative state of action or reports from a third person's past experience, that is, an evaluation of a past event later than the actual event time, which assigns a perfective (non-past) meaning to the marker (Slobin & Aksu, 1982; Arslan, et al., 2014). Arslan et al. suggested that the direct evidential requires discourse linking because it marks specific readings (much like definite articles) in a past time, while the indirect evidential lacks such a linking relationship. Therefore, agrammatic speakers find the direct evidential form harder (Arslan et al., 2014) because of the need for discourse linking. Arslan et al. (2014) also carried out a comprehension task that required source identification. Participants with agrammatism were presented with short video clips and were asked to identify the source of the information that was presented in the video. In contrast to the production task, agrammatic speakers showed 'better' performance for the direct evidential compared to the indirect (inferential and reportative) source identifications. They interpret these results as an artefact of the task in that, irrespective of the evidential form presented in the video, the participants "watched/saw" a video clip. Therefore, they had direct evidence related to the action of "watching a video" rather than what is happening in the video and consequently they misattributed all the events to the direct evidential form (Arslan et al., 2014). These studies of evidentiality in people with acquired language loss and/or experiencing language-related problems have helped us understand which aspects of processing are vulnerable to impairment and hence more complex, and which aspects are more resilient to deterioration.

In sum, the processing of evidentiality involves the morpho-syntactic interface, pragmatic functionality, and discourse analysis. This contributes to the challenging nature of evidentiality as a linguistic unit. Given the slightly different acquisition trajectories for each marker, and the unusual order of acquisition with production preceding comprehension, the study of evidentiality in Turkish can serve as a valuable tool for examining the factors influencing the acquisition of complex structures. Moreover, the

semantic and pragmatic differences between the two markers can help us detect language processing difficulties. In this thesis, we use this linguistic unit to investigate heritage speakers' processing of, and performance on, their heritage language, hypothesizing that (problems with) evidentiality processing may be informative about the factors affecting the language development/status of heritage speakers in bilingual settings.

Evidentiality Processing in Heritage Language Speakers

In this section, we briefly review some of the research that has been performed to date regarding evidentiality in heritage language speakers. Further detail is provided in the individual chapters of this dissertation regarding specific studies of relevance to those chapters.

Studies on the evidentiality processing of children who are heritage language speakers are scarce and the data were mainly collected through narratives and story-telling tasks. An early study by Pfaff (1993) showed that home language dominance plays an important role in their skills. Pfaff reported that children who were *Turkish-dominant* heritage language speakers showed similar evidentiality competence to that of Turkish monolingual children. In contrast, during a story-telling task, children who were *German-dominant* heritage language speakers of Turkish (4;4-6 years of age) showed selective use of direct evidential marker and significantly reduced preference for indirect evidential use compared to the Turkish-dominant heritage language children (3;11-5;8 years of age, Pfaff, 1993). Aarssen (2001) reported that even the older child heritage language speakers born in the Netherlands (aged 4-10) exhibited pragmatically inappropriate shifts between direct and indirect evidential markers during story-telling. Following up, in 2007, Karakoç investigated Turkish heritage language speaking children (aged 5-8) in Germany using a task requiring the retelling of a fairy tale. The children showed a selective dual preference for the present continuous marker (-Iyor) and the direct past -DI, and no use of the indirect evidential, -mİş (Karakoç, 2007). Similarly, Arslan and Bastiaanse (2020) studied young adult Turkish heritage language speakers (aged 17-29 years) born and raised in the Netherlands, and reported extensive use of direct evidentials, including for incidents where it was appropriate to use the indirect evidential (Arslan & Bastiaanse, 2020). In comparison, Aksu-Koç (1988, 1994, 2000; Aksu-Koç et al., 2009) showed

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that monolingual Turkish children of comparable ages to those in the studies reported above have a better command of evidentials in Turkish.

The clear difference that has been found between children who are heritage language speakers and those who are monolingual is also evident in studies with adults. Arslan and colleagues (2017) investigated the evidentiality processing of adults who were Turkish heritage speakers or monolingual speakers. They used a timed-sentence verification task where the participants listened to sentences that started with a statement about whether the information source was firsthand or non-firsthand information. This was followed by a matching or mismatching evidentiality marker appended at the verb. Arslan et al's aim was to investigate participants' sensitivity to the violations of the information source, where the evidential markers did not match the information source as in (2a) and (2b).

(2a) violation of seen direct information with the indirect evidential marker

Yerken **gördüm**, az önce adam yemeği *yemiş.

Eat see_{direct evidential 3SG} just before man food_{ACC} *eat_{indirect evidential 3SG}

*Previously I saw the man eating, he *ate the food (reportedly).*

(2b) violation of reported information by the direct evidential marker

Yerken **görmüşler**, az önce adam yemeği *yedi.

Eat see_{indirect evidential 3PL} just before man food_{ACC} *eat_{direct evidential 3SG}

*Previously they saw the man eating, he *ate the food (witnessed).*

Monolingual speakers were found to be significantly more accurate and faster in their judgment of violating evidential markers than the heritage language speakers. In terms of the processing of the two types of evidential markers, heritage language speakers did not differ between the two conditions, whereas monolinguals exhibited a selective sensitivity to the violation of the direct information source, with faster responses to the violation of the direct information source by the indirect evidential (2a) than the indirect information source followed by the mismatching direct evidential marker (2b). This was discussed from two points of view, first, the longer reaction times in the latter sentences (e.g., 2b) were suspected to be caused by the demanding transition from an outside perspective into one's own perception (Arslan et al., 2017). The second possibility, also discussed in Aikhenvald (2004), was that it is counter-intuitive for a speaker to talk about reported knowledge as if it was her/his direct experience, so the monolingual Turkish native speakers rejected such mismatches immediately (shorter reaction times to 2a than 2b) (Arslan et al., 2017). It was also of note that heritage language speakers judged acceptable sentences as unacceptable more often than monolinguals.

The differences in the processing of these two evidential markers and between monolinguals and bilinguals were shown also during online processing: a visual world eye-tracking study by Arslan and colleagues (2015). They compared Turkish speaking monolingual speakers to early bilinguals, who were heritage language speakers born in Germany and to late bilinguals who moved to Germany after the age of 13 and learned German as a second language. Participants were presented with two pictures, a context picture and a target picture, depicting different stages of an event. The target picture in the experimental (evidentiality) conditions, always depicted the end state of the event (e.g. a man holding an empty glass having already drunk the milk that was in it). Participants listened to questions in past tense including either of the evidential markers and had to identify the corresponding picture. In the direct evidential condition (-DI), the context picture depicted the event as it was unfolding (e.g. the man was drinking the milk) and the participant was asked, for example, "In which photograph did the man drink_{DIRECT EVID} the milk yesterday...?". The direct evidential being appropriate as the participant had witnessed the event. For the questions asked using the indirect evidential marked verb

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(-mİş) (e.g., “In which photograph did the man drink_{INDIRECT EVID} the milk yesterday....?”), the context picture depicted the pre-event stage (e.g., the man was holding a full glass of milk) and the participant therefore had to infer that the action had occurred. Questions in the future form were used as non-evidential filler items which included pre and ongoing pictures of an event where the target was a picture that depicted pre-event states of an event (participants were asked: “In which photograph will the man drink the milk soon...”). Both late and early bilinguals performed less accurately and responded more slowly than the monolingual participants, but only, selectively, in the direct evidential condition. In the indirect condition, the three groups did not differ. Moreover, the bilingual groups also showed a significant difference between the direct and indirect evidential conditions: they were less accurate and slower in the direct condition, whereas monolinguals showed no differences between conditions.

In Arslan et al. ’s eye-movement study, in response to the direct evidential marker (-DI) condition, monolinguals first looked at the picture showing the ongoing event before they turned their attention to the picture showing the end-state of that event. This was interpreted as that the monolingual speakers were in need of direct evidence (in this case witnessing the event) in order to validate their selection of the direct evidential condition. However, such an effect was not present in the heritage language (early bilinguals) or the late bilinguals (Arslan et al., 2015). This result was ground breaking in showing monolingual evidentially processing. There were no effects of evidential condition on either accuracy and reaction time for monolinguals; the bilinguals performed like monolinguals only in the indirect condition but not in the direct condition, and overall, they showed better performance in the indirect condition (Arslan et al., 2015). The better processing of *indirect* evidentials by bilinguals was contradictory to the predictions of both the Interface and Regression hypotheses. According to the Interface hypothesis⁵, the indirect evidential should be more challenging since it is the evidential marker with more meaning attributions (i.e., inference and hearsay; see Sorace, 2011 for more detail). Moreover, the indirect evidential has slightly later development than the direct during childhood. Therefore,

⁵ The Regression Hypothesis proposes that linguistic items that are acquired later will be lost first or affected more by attrition. This hypothesis was first proposed by Jakobson (1941) to be able to explain the language loss of individuals with aphasia. It was later extended to bilingualism research to account for the attrition that these speakers experience (Keijzer, 2010).

based on the Regression hypothesis the bilingual speakers were predicted to experience more problems with the indirect evidential (Arslan et al., 2015). Arslan et al. argued that their results could be explained by bilinguals registering the direct evidential marker -DI as the default past tense marker with simplified/reduced evidential connotations and indirect evidential -mİş as the specification of non-witnessed events (Arslan et al. 2015). This was supported by the (early and late) bilinguals showing reduced looks to the context picture in the direct condition compared to the monolinguals - suggesting that they did not require 'evidence' of 'witnessing' to use the direct evidential marker. Similarly, Arslan and Bastiaanse (2020) showed that early adult heritage language speakers of Turkish showed overt use of direct evidential to narrate events when indirect evidential use was more appropriate but not vice versa which was taken as an indication of generalization of direct evidential marker -DI as a default past tense form.

Arslan and colleagues also discussed this difference between heritage speakers (early bilinguals) and monolinguals in both of their studies (2015, 2017) from an incomplete acquisition and/or attrition of acquired linguistic components point of view. However, given the lack of information regarding participants' Turkish competence they were unable to tease these accounts apart. Further investigation of evidential markers in relation to heritage speakers' language background variables that are shown to impact heritage language speakers' competence and performance such as acquisition profiles, language use, exposure, and literacy skills could aid in the discrimination between these accounts.

In line with the overt use of the direct evidential form, recent studies that have examined adult heritage language speakers of Turkish living in the Netherlands (Arslan & Bastiaanse 2020) and the UK (Schmid & Karayayla 2019) similarly point to the overuse of direct evidentials relative to indirect evidentials in narrative speech.

Summary

All in all, there is a unanimous conclusion in the literature that heritage language speakers have divergent language attainment compared to monolinguals and other types of bilinguals, and that this divergence can be minimized by qualitatively and quantitatively increased input (Kupisch

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& Rothman, 2016; Montrul & Sánchez-Walker, 2013; Polinsky & Scontras, 2020; Putnam & Sánchez, 2013). In this dissertation, I aim to contribute to the field by investigating a group of heritage language speakers' processing of a grammatical unit that is shown to be complex in structure and acquisition to increase understanding of which factors contribute to the language processing of heritage language speakers.

Moreover, this dissertation also aimed to address some methodological issues in the literature, specifically, the choice of a reference group and the difference in findings when experimental methods tap into moment-by-moment processing, versus explicit reflection on the results of processing (i.e., online vs offline processing).

Outline of this dissertation

The main aim of this dissertation was to contribute to the heritage speaker literature by investigating the underlying factors that influence heritage language speakers' processing of complex linguistic structures such as evidentiality and to show the importance of the methodological approach. It does this by

- a. replicating and extending Arslan et al. (2017) by comparing heritage speaker performance with a different reference group – native speakers who become bilingual in later life (labelled emigrant speakers, see Chapter 2 & Chapter 3);
- b. investigating the implicit knowledge of evidentiality in a task that taps moment-by-moment processing online (self-paced reading; Chapter 4);
- c. examining which of several possible factors influence heritage language speakers' processing of evidentiality (Chapter 5).

First, Chapter 2 presents details about the participants' background with a focus on their bilingual profile and examines the differences between the heritage speaker group and the reference group of emigrant bilinguals. This chapter also presents all the testing conducted to gain a thorough profile of both groups' language backgrounds and compares these profiles between the groups.

Chapter 3 replicates and extends the study by Arslan et al. (2017), who investigated the auditory comprehension of evidentiality and time reference

of a heritage language speaker group relative to monolingual speakers. We extended this research by comparing heritage language speakers' performance to that of a reference group of bilingual emigrant speakers, instead of a monolingual group. We aimed to extend the understanding of (bilingual) heritage language speaker performance when the reference group also consisted of bilinguals, but who had different language development histories. This chapter addressed the following research question:

(1) Do bilingual speakers of Turkish who grew up in heritage language conditions differ in their processing of evidentiality from a bilingual reference group of emigrant Turkish speakers?

Chapter 4 focuses on the moment-by-moment processing of evidentiality using a self-paced reading paradigm. In this chapter, we aimed to investigate the online language processing of heritage language speakers and to gain knowledge on the implicit language processing of Turkish heritage speakers compared to bilingual emigrant Turkish speakers. The research questions were:

(1) Does the online processing of Turkish heritage language speakers and Turkish emigrant speakers differ during the time course of reading sentences with evidentiality marking?

(2) Does the online processing of evidentiality by Turkish heritage language speakers and emigrant speakers of Turkish differ depending on the evidentiality distinction -direct vs. indirect? Do the two groups differ in this regard?

(3) Are there differences between online and offline processing of evidentiality for heritage language speakers and emigrant speakers? Do the two groups differ in this regard?

Chapter 5, investigates the factors underlying heritage speakers' online evidentiality processing. We aimed to discover the source of variability in the processing of heritage speakers in a more nuanced way: by investigating the effect of different aspects of their heritage language background on performance. The research questions to address this issue are:

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(1) Does greater exposure to and use of heritage language during early childhood (critical periods) have a positive effect on heritage language speakers' processing of evidentiality?

(2) Does a shift in the dominant language (to English) later in life reduce the proficiency in evidentiality processing?

(3) Does participating in formal learning activities (schooling and education) in the heritage language, facilitate performance on the evidentiality processing tasks?

(4) Does higher exposure to print and better literacy skills (reading time and materials) in Turkish facilitate evidentiality processing?

Finally, Chapter 6 discusses the findings of the experimental studies, limitations of this work and pointers for future research.

