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Heritage Language Attrition Among Second-Generation Immigrant Turks Residing in Austria and Germany

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Research Article

Abstract

This study investigated how heritage language maintenance and attrition manifest in agglutinative languages and most affected areas for second-generation immigrant Turks residing in Austria and Germany. Despite considerable attrition research in immigrant communities, heritage-language maintenance research remains scarce in second-generation immigrants and how heavily they value it for culture and identity. Given Turkish's agglutinative framework, where meaning is encoded via long bound-morpheme sequences, this language seems particularly susceptible to attrition, as speakers often simplify morphological complexity. Mixed method design was used with 37 participants. An online questionnaire assessed first-language use frequency, perceived declines in four skills, and confidence in Turkish versus German; semi-structured interviews elaborated on these experiences, and a custom-scored C-test measured inflectional proficiency. Three phenomena were observed: (1) Necessary input for heritage-language maintenance primarily comes from domestic environments rather than education. (2) Reading and writing were affected by attrition more than speaking and listening. (3) Cultural identity motivates strong interest in preserving Turkish. Results indicated inflectional suffixes might be the most vulnerable to attrition. C-test analysis revealed plural, locative, and dative cases are especially vulnerable to attrition, whereas nominative and person cases remain comparatively resilient. Findings underscore sustained input, tailored teaching strategies, and community engagement for preserving Turkish competencies.

Keywords: Heritage language, attrition, second-generation, agglutinative language

1. Introduction

Languages are carriers of culture, identity, and heritage. Many speakers of minority languages experience a progressive loss of their language competence as generations pass, a phenomenon known as language attrition. Language attrition is defined as "*the non-pathological decrease in proficiency in a language that has previously been acquired by an individual*" (Köpke & Schmid, 2004, p. 5). Schmitt and Sorokina (2024)

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observed that language attrition affects people throughout their lives, resulting in reduced L1 or L2 fluency in adults and a gradual loss of heritage language skills in children.

The main focus of this article is heritage language attrition among Turkish families residing in Austria and Germany. The motivation for this research on immigrant Turks' heritage language skills goes back to three years ago, when I first met a group of immigrant Turks born in Austria. Although some of them could speak and explain themselves clearly, there were noticeable gaps in their grammatical structure and vocabulary skills. They commonly mix Turkish and German within a single sentence when they could not find the right words to express their ideas. The use of the heritage language felt confined, as if Turkish was imprisoned in a small room spoken only within the narrow boundaries of the home and rarely allowed to reach beyond its walls.

Montrul (2024) referred to heritage language speakers as native bilinguals who obtained their family's native language organically within the home environment from infancy, while living in a society where that language holds minority status. While extensive research has focused on language attrition in immigrant communities, little is known about how heritage language is managed in second-generation immigrants and how much it is for them to sustain their home language in the name of culture and identity. Individuals are typically classified as second-generation immigrants if they were born into a majority language environment or arrived in the host country at an early age (Silva-Corvalán, 1994). According to Montrul (2024), first-generation immigrants who are the parents of heritage speakers are defined as adults who are native speakers of language varieties, raised in their country of origin, whether in monolingual or multilingual settings, before immigrating later in life. Kuzembayeva et al. (2024) argue that, lamentably, proficiency among heritage language speakers tends to deteriorate over time. The limited use of Turkish beyond the home environment may impact daily communication and influence how their heritage language is valued and passed on within families. Both incomplete first-language acquisition and L1 attrition are manifestations of intergenerational language erosion, with "incomplete acquisition" referring to the mature linguistic state resulting from either under-developed initial learning or early childhood loss (Montrul, 2008). This shift can create tension between cultural identity and social integration for many Turkish families in Austria and Germany. Investigating the lived experiences and challenges faced by second-generation immigrant Turks is crucial to understanding how language attrition unfolds in this context and what can be done to support heritage language maintenance in the long term.

This study explores the linguistic and sociocultural factors contributing to Turkish heritage language attrition in Austria and Germany. More specifically, this research addresses the following questions:

1. How is Turkish as a heritage language maintained or lost among second-generation immigrant Turks living in Austria and Germany?
2. In which areas (speaking, reading, writing, listening) do individuals feel their Turkish proficiency is declining?
3. How important is it for second-generation immigrants to sustain their heritage language in the name of culture and identity?

To address these questions this study uses a mixed-methods approach with 37 participants, combining quantitative online surveys and C-Tests with qualitative interviews to gain statistical insights and deeper personal perspectives from Turkish families living in Austria and Germany.

2. Literature Review

2.1. Understanding Heritage Language Attrition

Heritage language attrition occurs when bilinguals gradually lose active competence in a minority language due to reduced exposure in a dominant-language environment (Montrul, 2023).Research has focused on Indo-European languages in English-dominant contexts, such as Spanish, French, and Hebrew (Escudero et al., 2023; Fridman & Meir, 2023), which share typological similarities. In contrast, Turkish, a south-western Oghuz Turkic language (Lewis, 2000), is agglutinative, conveying grammatical meaning via layered suffixes rather than word order (Göksel & Kerslake, 2005). Its agglutinative structure makes it prone to attrition, as speakers often simplify morphology (e.g., shorter suffix chains, less non-finite subordination), a tendency measured by the Agglutination Index (Huls & van de Mond, 1992; Karayayla, 2018). Thus, patterns observed in Indo-European contexts may not apply to agglutinative languages like Turkish, Japanese, or Korean.

2.2. Sociolinguistic and Sociocultural Factors in Heritage Language Attrition

Heritage language attrition is closely linked to speakers' sociocultural and sociolinguistic contexts. Factors such as identity negotiation, social integration, community support, and attitudes toward bilingualism influence heritage language maintenance or erosion (Schmitt & Sorokina, 2024; Montrul, 2023; Kuzembayeva et al., 2024).

Kuzembayeva et al. (2024) found that in ethnic Kazakh families abroad, heritage language is tied to cultural pride and belonging, and learners benefit from teaching strategies that emphasize intercultural awareness and oral traditions. Similar patterns appear in Turkish-speaking communities, where maintaining Turkish preserves familial unity and cultural identity (Karayayla, 2018; Coşkun Kunduz, 2022).

Montrul (2024) emphasizes that second-generation heritage proficiency depends on the amount and consistency of familial input. Overall, sociolinguistic and sociocultural factors including identity, peer interaction, community attitudes, and intergenerational transmission fundamentally shape heritage language attrition.

2.3. Linguistic Aspects of Heritage Language Attrition

Heritage language attrition does not affect all language domains equally. Morphosyntactic structures, lexical retrieval, and grammatical accuracy are particularly vulnerable, especially when early input is inconsistent or incomplete (Karayayla, 2018; Montrul, 2023; Fridman & Meir, 2023).

This restricts lexical development and leads to blending with the majority language and compensatory strategies such as code-switching.

Morphosyntactic attrition often causes syntactic simplifications or restructuring influenced by the dominant language, especially in complex structures where syntax interacts with semantics or discourse, such as subject pronoun binding (Karayayla, 2018).

Overall, lexical precision, morphosyntactic accuracy, pragmatic fluency, and productive skills are most affected, particularly when sustained, quality input is lacking. These effects are pronounced in typologically rich languages like Turkish, where structural complexity amplifies attrition.

2.4. Methodological Approaches in Language Attrition Research

Method choice is shaped by the heritage language's features and the research questions.

Yılmaz and Sauermann (2023) studied Turkish heritage speakers using an elicitation task on direct object marking, a short film retelling to assess oral proficiency, and a semi-structured autobiographical interview for background information.These approaches demonstrate the need to select methods that match participants' linguistic, cultural, and social characteristics, providing a basis for understanding the multifaceted nature of language attrition across contexts.

2.5. Educational Context and Language Input

Educational environments and language input patterns are critical for heritage language maintenance, especially when the majority language dominates schools and public life.

Escudero et al. (2023) found that many migrant and refugee parents avoid promoting bilingualism at home, fearing it might hinder children's English development and academic success. Montrul (2023) notes that reduced input after infancy can disrupt language development, particularly inflectional morphology, while phonology and speech perception are less affected.

These findings emphasize the complex interplay of educational policies, family practices, and societal attitudes, showing that educational context and input are crucial in shaping heritage language outcomes.

2.6. Heritage Language Acquisition and Attrition in Turkish Communities

Recent studies on Turkish-speaking diasporas show how morphosyntactic vulnerability, diagnostic baselines, and community practices shape heritage-language outcomes.

Yılmaz and Sauermann (2023) found core vulnerability in Turkish heritage speakers in Germany lay in partitivity rather than analytic forms. Even monolingual controls scored as low as 72% in certain partitive-nonspecific contexts. Heritage speakers struggled to map the accusative suffix to semantic features of specificity and partitivity, showing how subtle morphosemantic distinctions erode under reduced input (pp. 847-848, 860-861).

These findings clarify the linguistic loci of attrition, including nominal complexity, partitivity, and subordination, instrumentation, and scoring procedures used in the present study.

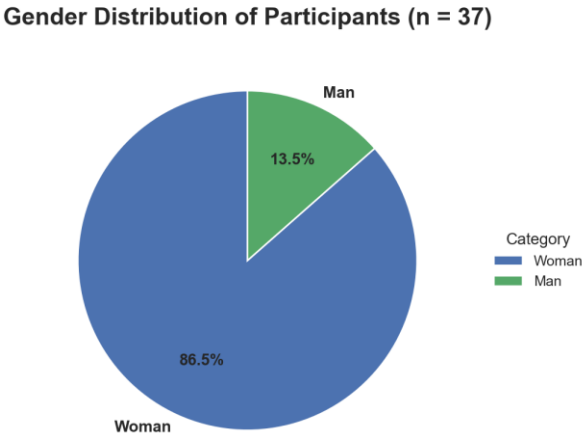
3. Methodology

This research was aimed at investigating how heritage language attrition occurs among the Turkish heritage speakers living in Austria and Germany, as well as the impact of language attrition on the culture and identity. The study employed a mixed-methods approach, including qualitative and quantitative data collection tools to provide an in-depth understanding of the complex nature of language attrition in agglutinative languages.

3.1. Participants

3.1.1 Participant selection criteria and sociolinguistic information about the participants

A total of 37 bilingual and multilingual individuals, with Turkish as their heritage language, in Austria and Germany participated in an online questionnaire for this study. Given the greater efficiency of digital distribution for contacting geographically scattered participants and the logistical challenges inherent in working with individuals residing abroad, the survey was administered exclusively online. The questionnaire was first distributed to an initial contact in Austria, who then forwarded it to her network of Turkish heritage speakers, and so on. Four volunteers from this respondent pool were invited to participate in follow-up semi-structured interviews. While selecting the heritage language speakers, the study aimed to cover a specific age at onset range (14-29 years) to represent the Turkish second-generation immigrant population in Austria and Germany. Thirty-



one were born in Austria, five in Germany, and only one born in Turkey came to live in Austria before the age of four and was raised in a Turkish-speaking family. Figure 1 shows thirty-two female and five male individuals participated in this research.

Figure 1. Gender Distribution

3.2. Instruments

This study employed three primary research instruments: an online questionnaire, semi-structured interviews, and Turkish C-tests.

The questionnaire was based on Karayayla's (2018) sociolinguistic survey but was tailored for the present project: several sections were omitted and others reshaped to align closely with examining heritage-language attrition among second-generation Turkish immigrants in Austria and Germany.

The C-Tests used in this study were directly adopted from Karayayla (2018), accessible from the Language Attrition research platform: (https://languageattrition.org/resources-for-researchers/experiment-materials/c-test/).

This instrument assessed the participants' proficiency in Turkish through a fill-in-the-gap procedure that measured lexical and morphological accuracy.

Finally, semi-structured interviews were developed by the researcher to expand on the themes identified in the questionnaire. These interviews provided qualitative depth by prompting participants to elaborate further on their linguistic practices, attitudes, and experiences related to Turkish language use and maintenance.

3.2.1. Online Questionnaire

Data about participants' personal profiles and language histories were collected through an online questionnaire**.** The questionnaire was adopted and adapted from the sociolinguistic questionnaire developed initially by Karayayla (2018); certain sections from the original instrument were excluded, and others were adjusted to ensure direct relevance to the research questions. The adapted version of the questionnaire was organised into several thematic blocks. First, a personal background section collected basic demographic and residential details (e.g. age, sex, date and place of birth, length of residence in Austria or Germany, highest level of education). Next, a linguistic-profile section asked about patterns of first-language use (e.g. how often they speak Turkish at home and with friends, how frequently they hear or watch Turkish through media or the internet, and how regularly they travel to Turkey). A separate module listed other languages known together with self-rated proficiency. An attitudes block explored participants' views on keeping Turkish alive and passing it on to future generations, as well as their comfort when speaking Turkish with monolingual or bilingual speakers.

To make the survey easy to comprehend, Likert-scale statements were avoided. Instead, frequency questions offered five clear choices (e.g. never, rarely, sometimes, often, and always), so that respondents could mark how frequently they engage in each activity.

Each short-answer question was accompanied by clear, explicit instructions to elicit concise responses.

3.2.1.1. Procedure of application

The questionnaire was delivered online in Turkish and served as the first task in the testing sequence, helping to "warm up" participants before administering C-Tests.

If a participant had trouble understanding a Turkish term, they could reach out to my on-site contact in Austria, who offered immediate clarification and, when needed, provided a German translation of the unfamiliar word.

3.2.2. Semi-Structured Interviews

Karayayla (2018), drawing on Schmid, Köpke, and Bot (2012, p. 678), notes that spontaneous speech, such as that elicited in semi-structured interviews is particularly well-suited for detecting attrition or incomplete acquisition across bilinguals who vary widely in age of onset, because it lets participants draw on their entire linguistic repertoire with minimal cognitive load, thereby avoiding ceiling effects in late bilinguals and task failures in early bilinguals. A semi-structured interview comprising six sections and twenty-two questions was developed to obtain more nuanced and qualitative information on language attrition. Participants were prompted to explain how and how frequently they use their

heritage language. Separate blocks were addressed: language skills, perceived decline and the interplay of language, culture, and identity. Moreover, the way Turkish is taught and how efficiently it is taught in schools were criticized during the interview. Finally a section where participants could express further information at their will was added.

3.2.2.1. Procedure of application

The semi-structured interviews were administered to 4 participants as a follow-up to the online questionnaire. Interviews lasted 15 minutes on average, and all four were conducted through video calls. All four participants gave consent for their voices to be recorded.

3.2.3. C-Tests and Modifications

The C-test is a shortened cloze-type procedure that provides a global index of overall language proficiency (Schmid 2004). It typically contains five to six brief, authentic texts of about 70 words apiece. Beginning with the second sentence, the latter half of every second lexical item is deleted; test takers must restore the missing segments. Because successful completion depends on exploiting the inherent redundancy of connected discourse, the task taps not only lower-level resources such as lexis, morphology, and idiom but also higher-order abilities, including sentence-to-sentence integration and global text comprehension. Decades of research have shown the format to be easy to administer and score while yielding highly reliable and valid general proficiency estimates (see Grotjahn 1992; Schmid 2004).

The adopted C-Test from Karayayla (2018) included two different C-Tests. Participants were given 7 minutes to fill out both of the tests. Time limit for filling in the tests based on the instructions from the Language Attrition research platform: (https://languageattrition.org/resources-for-researchers/experiment-materials/c-test/)

Language Attrition Network. (2003). *Summary of decisions re C-Tests following Attrition Workshop, Language Attrition Network,* https://languageattrition.org/wp-content/uploads/2019/02/principles.pdf**,** used for understanding the scoring system.

A web platform was subsequently designed to record the scores.The original C-test rubric, ranging from 0 to 9 points per item, was available on the Language Attrition website; however, it was determined that this scheme could not be applied reliably to a strongly agglutinative language such as Turkish. Because the original C-test rubric (0–9 points) and its binary "right–wrong" offered as an alternative on the Language Attrition site and employed by Karayayla (2018), in which scores 1–5 are lumped as incorrect and 6–9 as correct, was judged to be more suitable for languages with limited morphology, it fails to capture graded accuracy in Turkish, where a single lexical stem may host several suffixes.

Consider two items from Passage 1.

- For *arkadaşının* '*friend-3SG.POSS-GEN*' one participant wrote *arkadaşlarının* '*friend-PL-3SG.POSS-GEN*'. The response preserves the correct stem (*arkadaş-*) and the entire possessive-genitive chain, adding only an unnecessary plural suffix *-lar-*. Under the legacy rubric, this would be placed in category 4 ("*correct lexical stem, correct word class, agreement error*").
- For *manyaklık* '*craziness,*' the same participant left the cell blank. That empty slot is scored 0 ("*empty response*").

Although the first attempt is clearly "almost correct" while the second supplies no morphological information, the binary interpretation of the legacy scheme would brand *both* as simply *wrong*, masking the learner's partial grammatical knowledge.A five-band scale was introduced in the present study to avoid this conflation. Within the new system *arkadaşlarının* receives 4 points (Morphologically complete and context-appropriate, meaningful in context (acceptable variant) but minor surface error), whereas the blank remains at 0. This finer gradation recognises incremental accuracy in agglutinative word structures, providing a more sensitive, and linguistically appropriate, measure of heritage Turkish proficiency.

Göksel and Kerslake (2005) observe that Turkish builds new lexical items primarily by stacking suffixes to the right of the root, a process that can produce long and semantically dense words that correspond to complete sentences in English. Incremental accuracy must be captured rather than collapsed into an all-or-nothing judgement. In the revised five-band rubric, partial credit is awarded whenever the lexical stem and some suffixes are supplied. At the same time, greater deductions are reserved for omissions of entire morphological slots or significant category mismatches. This graded treatment aligns more closely with the agglutinative character of Turkish, where every suffix carries a single grammatical meaning; accordingly, a scoring scheme that recognises each correctly produced suffix reflects the language's inherent one-form-one-function transparency more faithfully than the original 0–9 scale.

Consequently, a modified scoring protocol tailored to the morpho-syntactic properties of Turkish was developed and implemented.

Table 1. The modified scoring protocol tailored to the morpho-syntactic properties of Turkish

Score	**Criteria (Turkish C-Test)**
0	**Blank** (no attempt) or the word does not make sense or made-up words
1	**Wrong lexical stem** (unrelated word or nonsense sequence)
2	**Correct stem, wrong or missing suffix chain** (affixes violate harmony, order, or meaning; or crucial morphemes omitted)
3	**Correct stem and some relevant suffixes, but at least one major morpho-syntactic error** (e.g., wrong case, tense, or person; violated vowel harmony that changes function)
4	**Morphologically complete and context-appropriate** (acceptable variant) but **minor surface error** (e.g., missing buffer consonant, single diacritic/vowel-harmony slip that does not change grammatical function)
5	**Entirely correct**: stem and entire suffix chain match required word in form and function, including spelling and harmony

3.2.3.1. Procedure of application

A PDF version of the C-test was initially distributed to participants; however, administering it in this format required each respondent to be telephoned individually so that the seven-minute time limit could be supervised and the completed files could be collected. These logistical demands substantially restricted scalability. A web-based platform replicating the original C-test was developed to resolve this limitation. (https://furkanbilgin.net/ctest)

Prior to the test, a brief ten-item demographic survey, containing questions paralleling those in the main questionnaire was completed by participants. They were then directed automatically to the C-test on the same site. The platform incorporated (i) an automated seven-minute countdown timer and (ii) a navigation lock that prevented previously confirmed responses from revisiting, thereby preserving standard administration procedures.

Upon completion, all responses were exported automatically to a spreadsheet for scoring. Using the PDF method, usable data had been obtained from only four participants, whereas the online system yielded 13 completed C-tests, more than tripling the sample size.

3.2.3.2. Data Analysis on quantitative C-Test data

Ten high-frequency Turkish inflectional categories extracted from a 40-gap C-test administered to heritage speakers were analysed. For every participant and suffix the number of correct realisations and the total number of attempts were computed. Collapsing across participants yielded (a) a per-suffix accuracy ratio and (b) raw token counts that indicate the practical size of each problem. In addition to accuracy, appearance frequency and corrected realisation rates were included to allow a more precise assessment of relative vulnerability across suffix categories.

At the participant level, suffix accuracy was correlated with the global C-test score using Pearson r, Spearman ρ, and Kendall τ. Spearman's ρ was adopted as the primary effect size because it correlates with rank orders and is robust against outliers, making it appropriate for the non-normal accuracy distributions typical of attrition research.

To quantify the precision of each ρ, Fisher's z transformation was applied with 95% confidence intervals obtained through standard procedures. Raw p-values were interpreted at $\alpha = .05$, and Benjamini–Hochberg false-discovery-rate q-values were provided for readers who prefer multiplicity control. This procedure allowed a clearer distinction between morphologically stable categories and those showing weaker, less reliable associations with overall proficiency. This approach has been used in recent applied linguistics research to handle multiple comparisons in learner corpus studies (Lopopolo et al., 2025).

3.3 Ethical Statement

All participants provided informed consent, and all gathered data was anonymised in accordance with standard ethical guidelines.

4. Results and Discussion

To address the first research question "*How is Turkish as a heritage language maintained or lost among second-generation Turks in Austria and Germany*?" data obtained from semi-structured interviews, corroborated by an online questionnaire, were analysed.

4.1. Semi-Structured Interview Results

4.1.1. Domains and Interlocutors

Across the four interviewees, Turkish was reported as the default language in private, family-centred settings, while German dominated in institutional or peer-group contexts. All participants reported Turkish usage when communicating with their parents. Participants A and B used Turkish exclusively and

Participants C and D predominantly. Conversely, with siblings and university peers, Participants C and D shifted to German most of the time, reflecting the linguistic preferences of their immediate peer networks. Participant C exhibited the clearest domain-specific pattern: Turkish was used at home and within her exclusively Turkish-speaking social circle in Austria, German was obligatory at her German university due to the absence of Turkish-speaking peers. Participants A and D, who are employed in German-medium workplaces, estimated an approximately equal distribution of Turkish and German usage over the course of a typical day.

4.1.2. Convergence

All respondents identified the home as the primary setting supporting Turkish maintenance, citing limited effectiveness of formal instruction. This aligns with Montrul's (2024) observation that consistent input from heritage-speaking parents yields greater grammatical accuracy, while reduced input accelerates attrition.

4.1.3. Divergence

The breadth of that domain varied: *Participant C* and *Participant D* regularly shifted to German with same-generation relatives, whereas *Participant B* never did so.

4.2. Code-Switching Behaviour

All four speakers acknowledged some intra-sentential switching, but the frequency and triggers differed.

Table 2. Speakers code switching

Participant	**Self-reported CS frequency**	**Main trigger(s)**
Participant A	"Always"	Lexical gaps/word retrieval problems
Participant B	"Rare," confined to peer talk	Lexical gaps/word retrieval problems
Participant C	"Always"	Lexical gaps/word retrieval problems
Participant D	"Always"	Lexical gaps/word retrieval problems/ Larger German vocabulary

A common motivation was lexical insufficiency in Turkish. Three participants (*Participant A, Participant C, and Participant D*) explicitly linked switching to momentary word-search difficulties; *Participant B* considered it an occasional strategy in conversations with bilingual friends but "*never in family talk*".

Thirty-seven participants who contributed to the online questionnaire also answered a question about self-reported code-switching frequency. Figure 2 shows that 100% of participants use code-switching daily.

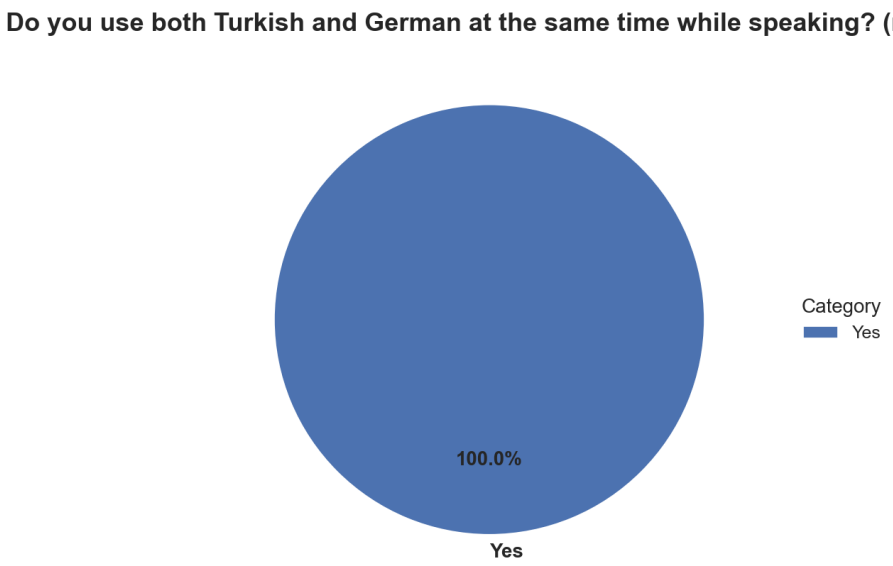


Figure 2. Language usage

4.2.1. Perceived Comfort and Expressivity

Table 3. Perceived comfort

Language judged "more comfortable" in family talk	**Participants**
Turkish	Participants A, B, and D
German	Participant C

Analysis indicated that three of the four participants experienced greater affective ease in Turkish, describing it as more suitable for expressing emotions (Participant D) or more comprehensible (Participant A). Participant B, despite acknowledging weaker structural proficiency in Turkish, preferred it for family interactions. In contrast, Participant C perceived German to afford greater precision and comfort, even though she routinely used Turkish with her parents.

Thirty-seven respondents answered the online questionnaire item, "*In which language do you feel most comfortable speaking?*" Their preferences were contrary to Table 3 and distributed as follows: 40.5 % reported feeling more at ease in German, 37.8 % indicated no difference between the two languages, and 21.6 % felt more comfortable speaking Turkish. (See Figure 3.)

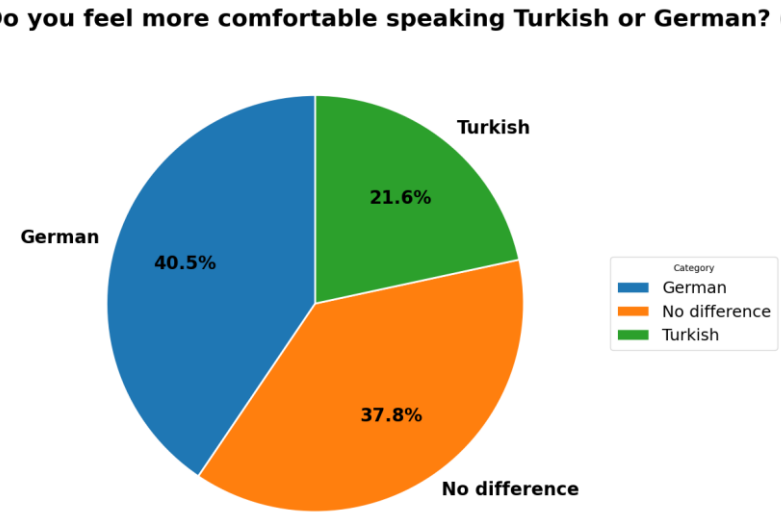


Figure 3. Perceived comfort

4.3. Self-reported areas of attrition and resilience

To address the second research question, "*In which areas (speaking, reading, writing, listening) do individuals feel their Turkish proficiency is declining?"* data gathered from semi-structured interviews and C-Tests were examined. More specific grammar instruction suggestions were implied to enhance educational support for heritage speakers.

Four semi-structured prompts were administered to gauge which macro-skills participants perceived as most vulnerable in Turkish. Responses revealed a consistent pattern of skill-specific decline.

- Analysis revealed that the reading and writing domains exhibited the lowest performance. Of the four participants, three (A, B, and C) reported that reading had declined most substantially, and two of these (A and C) likewise reported a significant decline in writing, attributing these losses to limited print exposure and minimal practice composing in Turkish.
- Speaking was singled out by one participant (*D*) as the area of most significant erosion, primarily because spontaneous conversation "moves too fast" to allow planning time in her less-dominant language.
- Listening was never characterised as a declining skill; however, it was rated the strongest domain by two speakers (*A, C*). The remaining two speakers located their strongest skill in speaking (*B*) and reading (*D*), respectively, underscoring individual variation in perceived competence.

Two respondents (*A, C)* reported low confidence in texting or e-mailing in Turkish when asked about productive literacy. In contrast, the other two (*B, D*) sent written messages "routinely" and felt secure about accuracy. This split mirrors the decline in earlier self-appraisals of writing.

A media-consumption inventory further contextualised these judgements. All four interviewees listened regularly to Turkish music, and three watched Turkish television series. Only one participant (*D*) reported frequent reading of Turkish books. In contrast, the rest engaged with print rarely or never a usage pattern that aligns with the reported attrition in literacy skills.

When prompted to assess overall development, all four participants reported satisfactory improvements in general proficiency over recent years. Participants B, C, and D attributed these gains to increased interaction with native-Turkish friends or partners, whereas Participant A linked the improvement primarily to a modest uptick in reading. However, Participants A and C continued to experience comprehension difficulties in dense or specialized discourse, indicating that passive skills remain dependent on topic and register.

4.4 Conclusions from C-test Data Analysis

4.4.1 Accuracy Patterns Across Suffixes

Figure 4 presents accuracy ratios across ten high-frequency suffix categories. The passive suffix shows the highest accuracy (0.85, n = 13), followed by the past definite tense (0.79, n = 52) and person suffixes (0.73, n = 78). Mid-range accuracy appears for the dative suffix (0.67, n = 13), nominative case (0.66, n = 143), and the present continuous tense (0.63, n = 52). Lower values occur for possessive suffixes (0.58, n = 104) and plural marking (0.54, n = 78). The locative suffix shows the lowest accuracy (0.13, n = 39). These patterns reveal stable core verbal morphology alongside more variable nominal and spatial morphology.

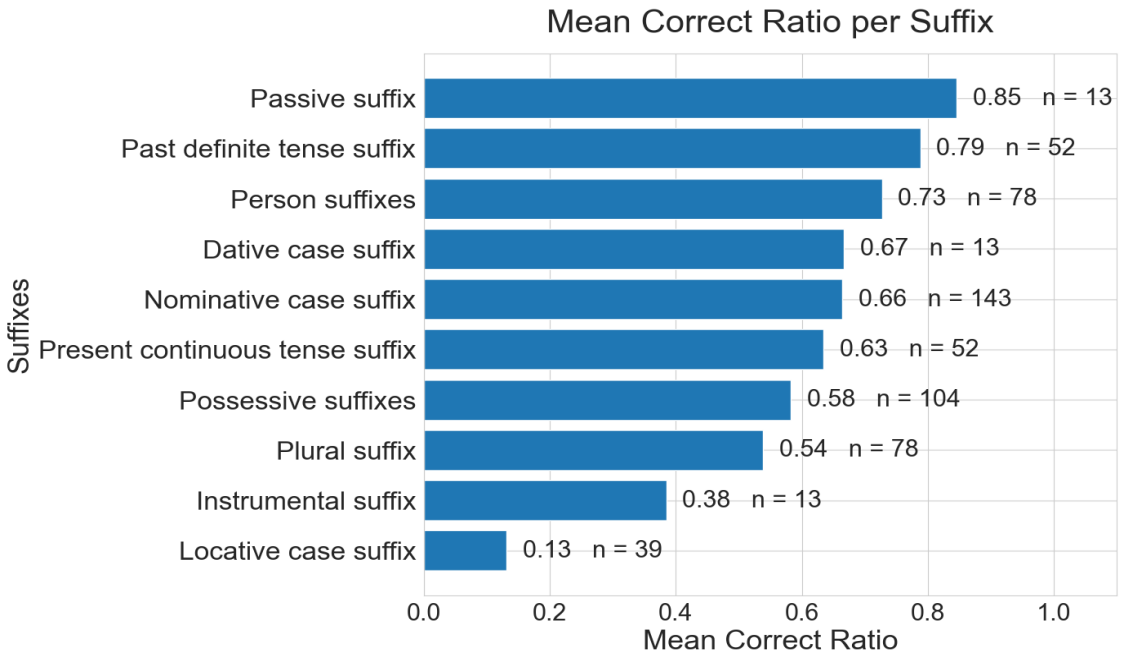


Figure 4. Mean correct ratio per suffix

4.4.2 Teaching Priority Index

To identify which suffixes require the most instructional attention, a Teaching Priority Index was calculated by combining appearance frequency, error rate, and overall significance within the dataset. The values were normalized to the interval 0 to 1 (indexed at 1 = highest priority suffix) so that higher scores indicate greater pedagogical priority.

Figure 5 shows that possessive suffixes have the highest Teaching Priority Index (1.00). These are followed by plural suffixes (0.82) and the locative case suffix (0.77). Together they form the group of high-priority instructional targets. Person suffixes (0.50) and the present continuous tense (0.43) fall into the mid-range. Lower values are observed for the past definite tense suffix (0.25), the instrumental suffix (0.18), the dative suffix (0.09), and the passive suffix (0.05). These values reflect the combined influence of frequency and difficulty rather than accuracy alone, and they indicate which forms may benefit most from targeted pedagogical reinforcement. Figure 5 provides a visual overview of the full index.

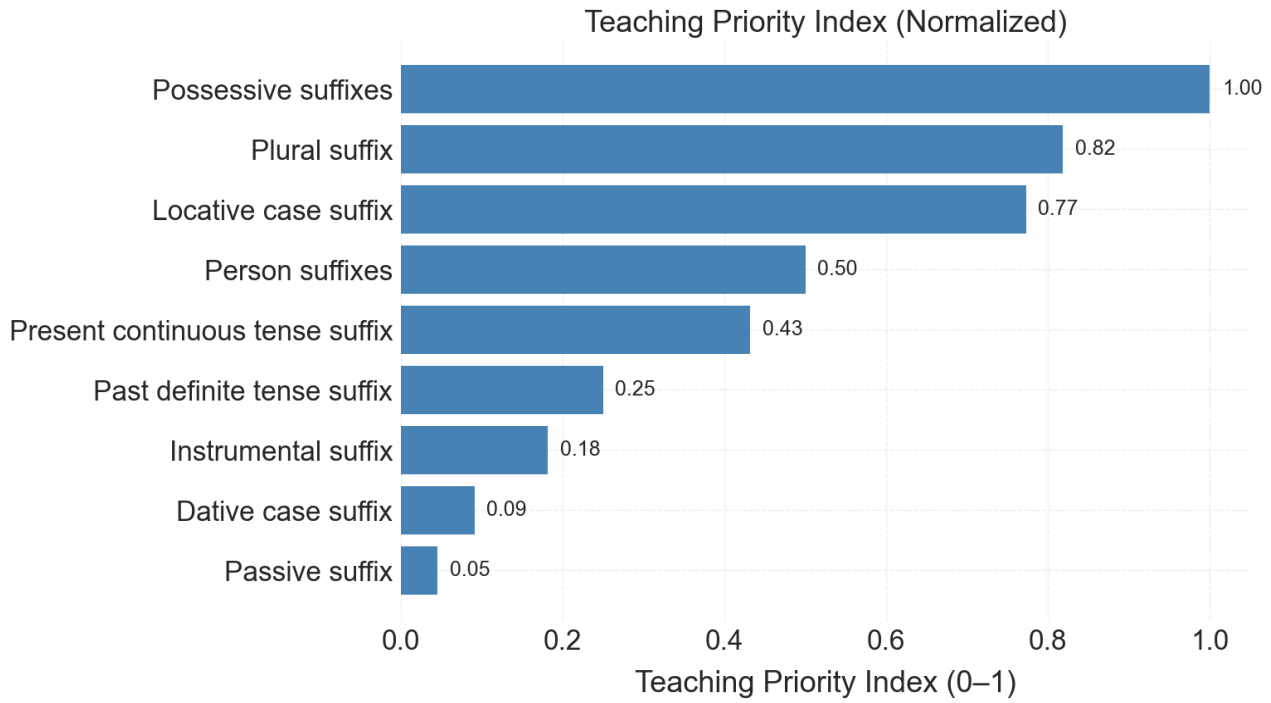


Figure 5. Teaching priority index

4.4.3 Distribution of Error Rates

Error rates were calculated as 100 minus the correct realisation percentage for each suffix. Figure 6 displays these values and highlights the distribution of difficulty across the system. The locative suffix shows the highest error rate (87.2 percent), followed by the instrumental suffix (61.5 percent), the plural suffix (46.2 percent), and the possessive suffixes (42.3 percent). Moderate error rates are found in the present continuous tense (36.5 percent), person suffixes (28.2 percent), the dative suffix (30.8 percent), and the past definite tense suffix (21.2 percent). The passive suffix displays the lowest error rate (15.4 percent). These values

show how difficulty is distributed across the morphological system and identify the areas where learners encounter the greatest challenges. Figure 6 shows these values in detail.

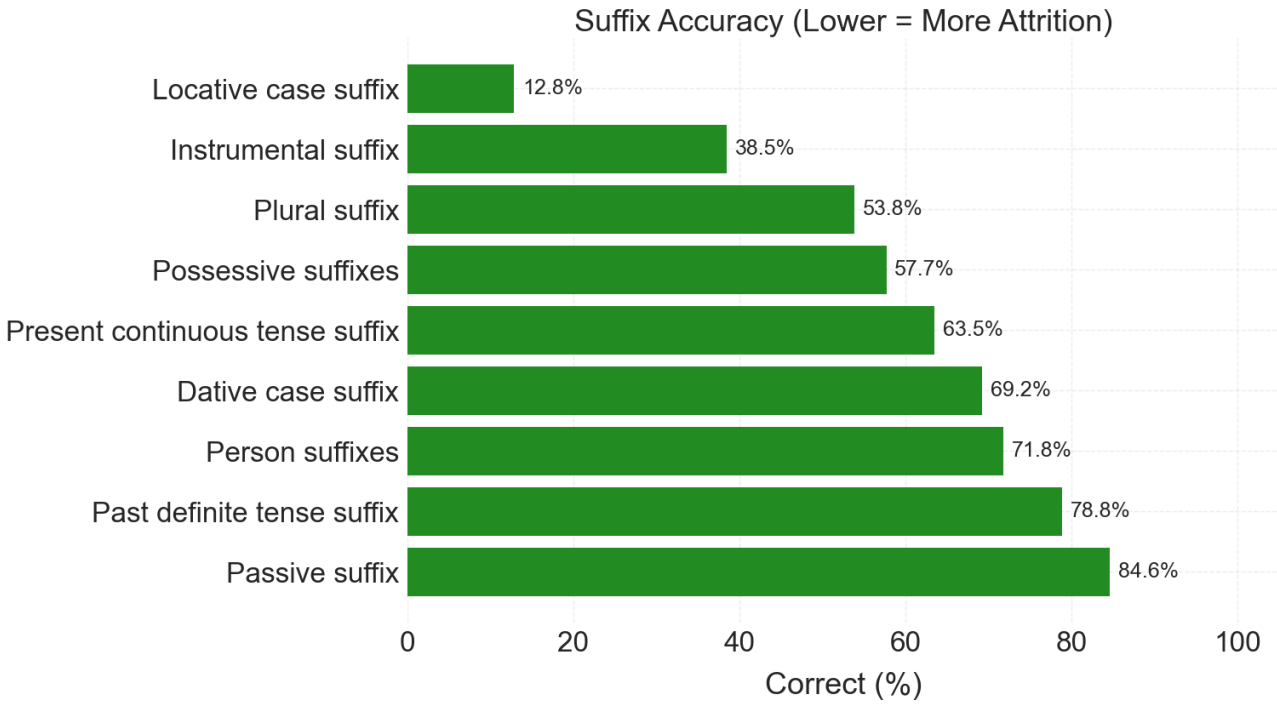


Figure 6. Suffix accuracy

4.4.4 Frequency and Difficulty Interaction

To examine how appearance frequency interacts with suffix difficulty, Figure 7 plots appearance percentage against error rate. This representation provides an overview of how often a form occurs in the C-test and how likely participants are to produce an incorrect realisation.

Three clusters are visible. The first cluster consists of suffixes that appear frequently and have high error rates, possessive suffixes (20 percent appearance and 42.3 percent error), plural suffixes (15 percent appearance and 46.2 percent error), and the locative case suffix (7.5 percent appearance and 87.2 percent error). These suffixes form the main concentration of difficulty. A second cluster consists of suffixes with mid-range frequency and moderate difficulty, including the present continuous tense, person suffixes, and the past definite tense. A third group consists of low-frequency forms such as the instrumental, dative, and passive suffixes. Their values remain unstable due to limited token counts.

This interaction plot highlights which forms combine substantial frequency with high difficulty and therefore constitute potential instructional focus points. Figure 7 presents the complete visualisation.

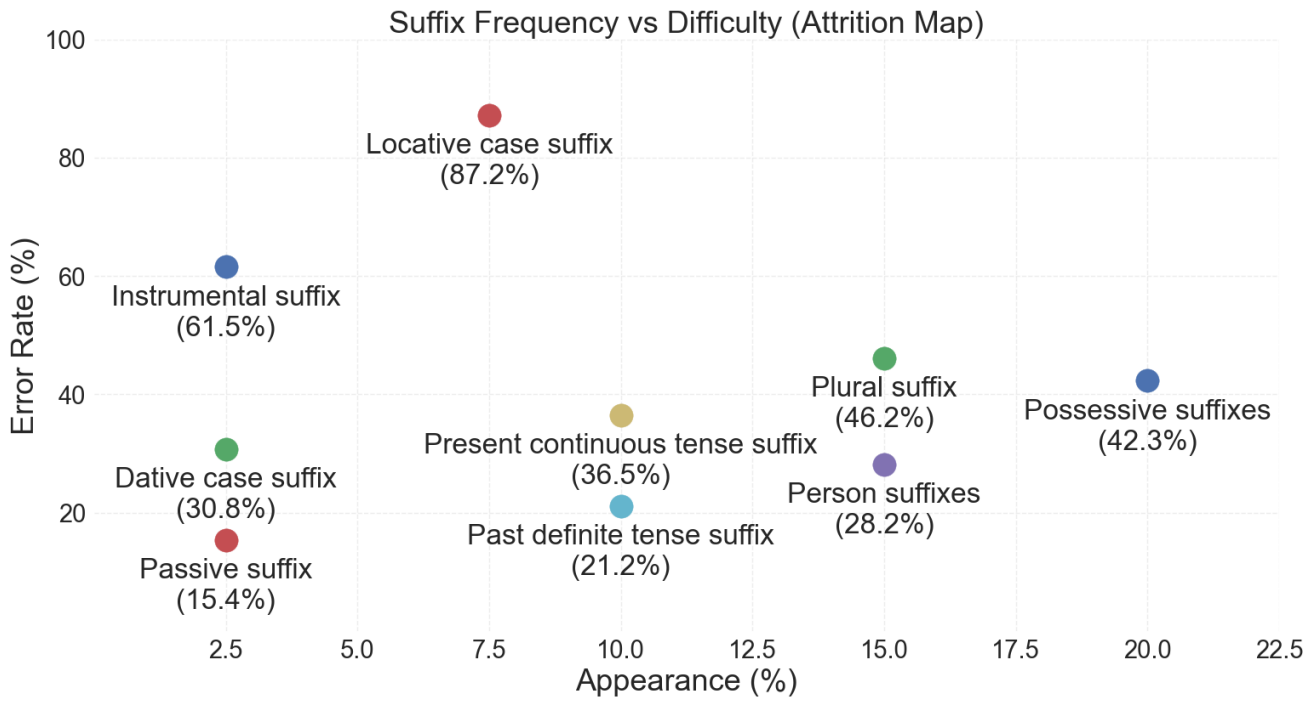


Figure 7. Suffix frequency vs. difficulty

4.4.5 Correlation Between Suffix Accuracy and Overall Proficiency

Figure 8 presents Spearman correlations between each participant's suffix accuracy and their overall C-test score, together with 95 percent confidence intervals. Only suffixes with sufficient token counts were included.

Positive and statistically reliable correlations appear for the nominative case suffix (approximately 0.45, $p < .05$), person suffixes (approximately 0.28, $p < .05$), the past definite tense suffix (approximately 0.26, $p < .05$), and possessive suffixes (approximately 0.15, $p < .05$). The present continuous tense suffix shows a similar positive association (approximately 0.15, $p < .05$). These results indicate higher overall proficiency corresponds to more consistent realisation of these commonly used morphological categories.

The plural suffix, the locative suffix, the instrumental suffix, the dative suffix, and the passive suffix show weak or statistically unreliable correlations because their confidence intervals intersect zero. These weak or non-significant correlations primarily reflect low token counts or restricted variability, which limits the stability of the correlation estimates rather than indicating meaningful absence of association. Figure 8 visualises these associations and their confidence intervals.

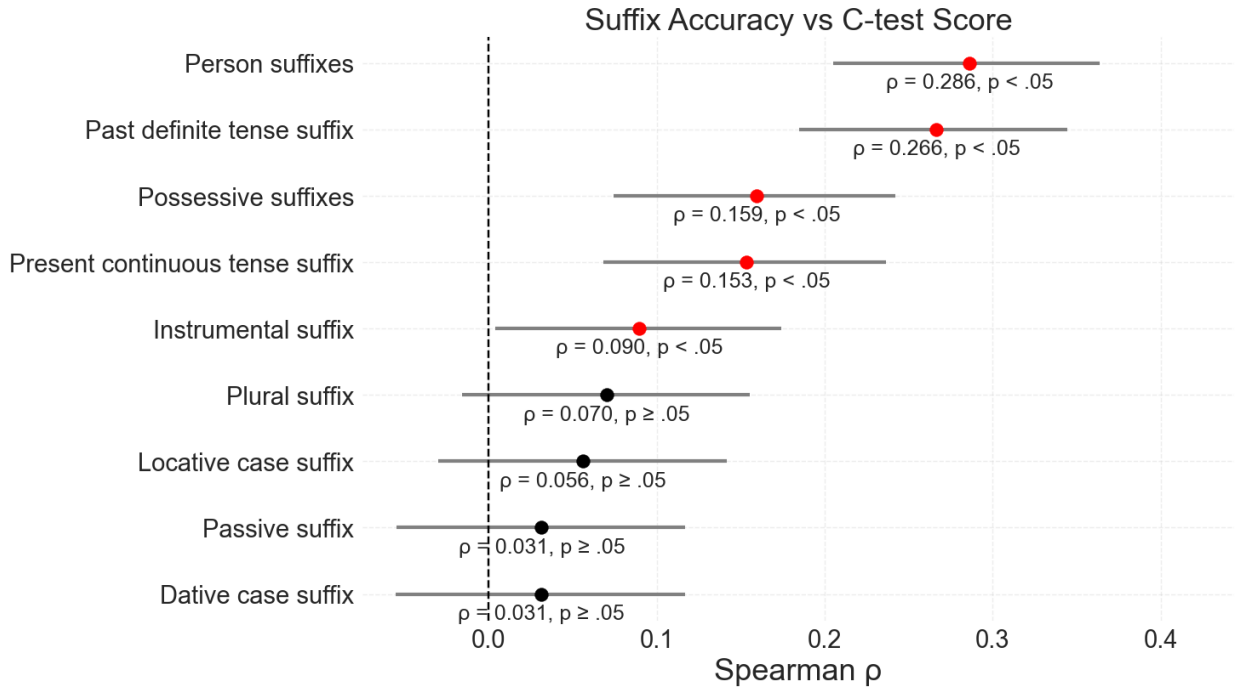


Figure 8. Suffix accuracy vs. c-test

Figure 8 presents a forest plot of Spearman rank-correlation coefficients comparing each suffix's accuracy with overall C-test performance. The horizontal axis displays the correlation coefficient together with 95 percent confidence intervals obtained through Fisher's z transformation. Red points indicate suffixes whose p-values fall below $p < .05$. All observed correlations are positive in direction, and confidence intervals that cross zero reflect statistically inconclusive associations rather than absence of relationship. The plot therefore illustrates which morphological categories show reliable alignment with overall proficiency and which remain indeterminate due to low token counts or variability.

4.5. Sustaining the Heritage Language in the Name of Culture and Identity

To explore the third and final research question "*How important is it for second-generation immigrants to sustain their heritage language in the name of culture and identity?*" responses from semi-structured interviews, supported by data from the online questionnaire, were analysed.

Participants' reflections indicated a broad spectrum of attitudes toward the symbolic value of Turkish for culture and identity. When respondents were asked *what Turkish meant to them*, the language was described variously: it was characterised simply as "*a language inherited from one's mother*" (*Participant A*), acknowledged as a first language that should be appropriately spoken (*Participant B*), portrayed as the earliest-acquired code that nevertheless shaped personality only indirectly (*Participant C*), and framed as the tongue in which a speaker "*felt most like herself*" and with which a sense of belonging was associated (*Participant D*).

When the Turkish identity link was probed, divergent positions emerged. *Participant A* asserted *that* cultural affiliation could be maintained without Turkish. In contrast, *Participants B* and *C* reported that speaking the language strengthened their connection to Turkish culture, *Participant D* maintained that Turkish competence was a prerequisite for self-identifying as Turkish.

Regarding *intergenerational transmission*, the majority preference favoured passing Turkish on to future children, though motivations and priorities differed. *Participant A* expressed a conditional desire, emphasizing German proficiency more; *Participants B* and *D* regarded Turkish transmission as essential; *Participant C* supported bilingual upbringing for cultural and practical reasons (i.e., an additional language resource).

Finally, when experiences of *cultural or linguistic "in-betweenness"* were explored, mixed responses were provided. Participant B reported a distinct sense of not fully belonging to German-speaking society and Participant C reported a dual sense of partial belonging in Austria and Turkey. In contrast, *Participant D* stated that comfort was felt within both linguistic–cultural spheres, while *Participant A* declined to comment.

Overall, the data suggest that the importance of sustaining Turkish as a marker of identity and a legacy for future generations varied considerably across individuals, with stronger endorsement observed among those who viewed linguistic competence as integral to cultural self-definition.

Figure 9 shows participants' ratings, gathered via the online questionnaire, of the importance of maintaining their Turkish heritage language. A plurality (37.8 %) rated it "*very important*," and an equal share (37.8 %) rated it "*important.*" Another 18.9 % judged it "*somewhat important*," while 5.4 % considered it "*not very important*."

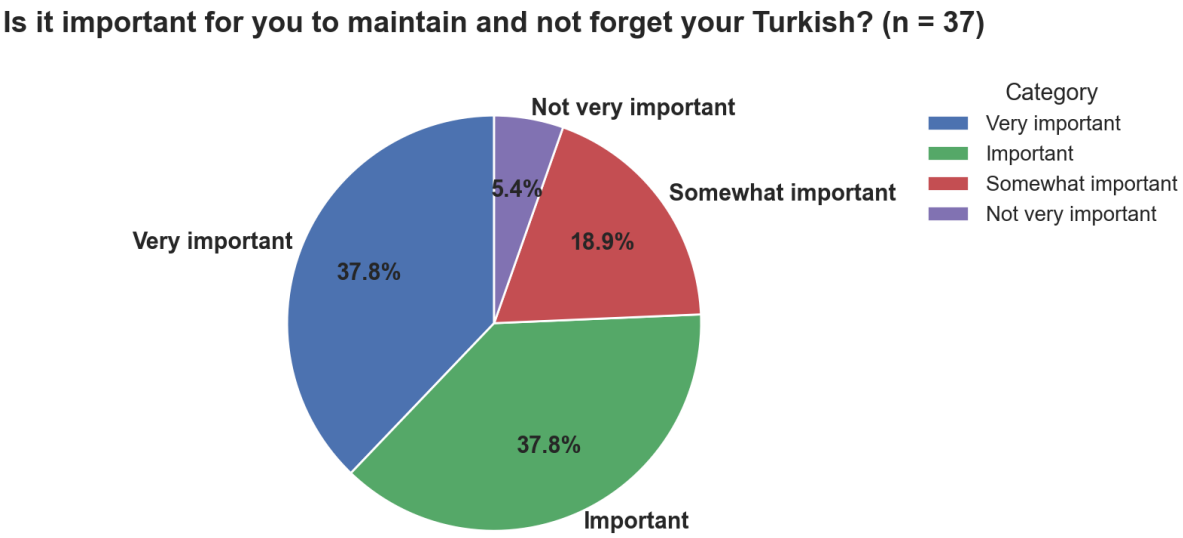


Figure 9. Language retention opinions

5. Conclusion

This study investigated heritage language attrition among second-generation immigrant Turks residing in Austria and Germany through a mixed-methods approach with 37 participants. The research revealed three key findings: family and home environments serve as the primary source of heritage language maintenance rather than educational institutions; reading and writing skills show greater vulnerability to erosion than speaking and listening abilities; and second-generation immigrants demonstrate strong motivation to maintain their heritage language for cultural and identity purposes, with 75.6% rating Turkish maintenance as essential. The C-test analysis identified a clear morphological vulnerability hierarchy, with plural suffix (-lar/-ler) and locative case (-da/-de) showing the lowest accuracy scores and weakest associations with overall proficiency. At the same time core verbal morphology including past tense and person agreement suffixes remained more resilient to attrition. These findings contribute significantly to heritage language attrition theory by demonstrating how agglutinative language structure influences vulnerability patterns, revealing that morphologically complex languages exhibit distinct attrition profiles compared to the Indo-European languages that have dominated previous research.

The research underscores that heritage language attrition is not inevitable but a complex process shaped by input quality, educational support, and community engagement. The demonstrated resilience of core grammatical morphology alongside vulnerability of peripheral forms suggests that targeted interventions can meaningfully impact heritage language outcomes. These C-test patterns directly support prioritising literacy-enhancing instruction and structured morphological practice in HL classrooms.

6. Pedagogical Implementations and Suggestions for Further Research

6.1 Educational Support for Heritage-Turkish: Participants' Perceptions

Because bilingual environments uniquely permit researchers to examine the effects of limited input on language development well beyond the early years, heritage speakers are an ideal population to investigate these processes (Montrul, 2023). Against this backdrop, all four interviewees in the present study agreed that school-based provision for Turkish in Austria is seriously inadequate. *Participant A* recalled that "Turkish classes" in primary school amounted essentially to colouring Turkish flags and memorising facts about Atatürk, with little or no explicit language instruction. *Participant B* echoed this experience, adding that the curriculum still centres on cultural-historical content rather than systematic literacy or grammar work. She further noted that many instructors are not graduates of Turkish-language-teaching programmes; instead, they obtain ad-hoc certification after short courses and, as a result, "*cannot model accurate Turkish themselves*". *Participant C*, who attended weekend courses, attributed her limited gains to teachers' weak pedagogical skills rather than to a lack of learner motivation. *Participant D* was equally categorical, describing the current school offer as "*very insufficient*" and emphasising a pervasive shortage of qualified teachers. These first-hand observations echo findings from a recent survey of Turkish HL programmes, which identified the same staffing shortfalls and scarcity of HL-specific instructional resources, but also showed that strong family and community engagement can offset them by boosting lexical growth and morphological accuracy (Coşkun Kunduz, 2022).

Overall, the narratives reveal two systemic problems: (i) a content–skill mismatch, whereby classes prioritise cultural topics over linguistic competence, and (ii) human-resource deficiencies, with many instructors lacking formal training in Turkish as an L1/L2.

Implications for practice. To improve heritage-language maintenance, the participants implicitly call for

- Structured literacy, vocabulary, and grammar instruction tailored to bilingual learners, in addition to history-oriented lessons;
- Teacher-training pathways that require full Turkish-Language-Teaching credentials rather than brief certification courses; and
- Ongoing professional development so that instructors can adopt modern bilingual pedagogy.

In the participants' view, strengthening these areas would align school provision with family and community efforts and thus offer a more robust support system for Turkish as a heritage language.

6.1.2. Conclusion for Educational Practice

These narratives indicate that input type drives skill maintenance: sustained exposure to aural materials (music, television) appears sufficient to keep listening robust, whereas print exposure is scarce and, correspondingly, literacy is where attrition is most keenly felt. Pedagogical interventions that embed regular reading and guided writing tasks into heritage-language programs while also fostering spontaneous conversation are thus likely to target the areas participants themselves identify as most at risk.

Montrul (2024) synthesises earlier work (e.g., Montrul, 2008, 2016a; O'Grady et al., 2011; Polinsky, 2006; Silva-Corvalán, 2014, 2018) to show that restricted heritage-language input in childhood and adolescence typically yields only partial grammatical development: although core structural domains such as word order, basic case marking and tense are acquired, morphological accuracy often remains incomplete. Building on this finding, curricula that preserve heritage language in second-generation immigrants should include targeted morphological drills for the weakest domains, specifically plural (*–lar/–ler*) and locative (*–da/–de*) endings. For example, instructors might deploy reading passages that present dozens of minimally contrasting sentences (e.g. "ev-ler-de", "kitap-lar-ı") to reinforce plural and locative patterns in context. Fill-in-the-blank C-test mini-exercises can require learners to supply the correct suffix under timed conditions while in real time digital storybooks or annotated texts can develop vowel-harmony alternations and morpheme ordering.

Meanwhile, spontaneous conversation and listening activities can be augmented with brief morphology check-ins. After a listening task, learners can be prompted to identify and reproduce target suffixes to ensure robust aural exposure which also develops skills for the more vulnerable print-reinforced forms. Through weaving together print-focused drills, guided writing, interactive reading, and targeted speaking/listening tasks, heritage-language programs can reinforce agglutinative heritage languages precisely where attrition bites deepest to improve their literacy (reading and writing) without losing learners' conversational strengths

7. Limitations

The most significant methodological limitation concerns the suitability of the C-test format for capturing morphological attrition in Turkish. The standard procedure, which deletes the latter half of every second word starting from the second sentence, primarily targets word-final inflectional morphology. This design overlooks derivational affixes that typically appear closer to the lexical stem. This omission is problematic because Turkish is an agglutinative language that builds complex words through extensive derivation. As a result, potential attrition in derivational morphology could not be systematically assessed. The emphasis

on inflectional morphology alone may have produced an incomplete picture of participants' overall morphological competence.

Another critical limitation involves sample size and statistical power. Although the total number of participants (n = 37) is adequate for mixed-methods research, several morphological categories were underrepresented. For example, the instrumental and passive suffixes appeared in only 13 instances, resulting in wide confidence intervals and inconclusive findings. The study also demonstrates a particularly pronounced gender imbalance. Of the 37 participants, 32 (86.5%) were female, while only 5 (13.5%) were male. This restricts the generalizability of the findings concerning male heritage speakers, who may exhibit different patterns of language use, attrition, and attitudes toward maintenance.The qualitative component also had limited scope. Although the four semi-structured interviews provided rich insights, they represent only a narrow segment of the target population. Notably, all interview participants were female, which means the qualitative data reflects exclusively female perspectives and does not capture how male heritage speakers might experience or negotiate heritage language attrition. This limits the study's ability to provide a comprehensive qualitative account of the full gender spectrum within the Turkish heritage community.

Geographic and socioeconomic representation were likewise limited. The sample included 31 participants from Austria and only six from Germany, constraining comparisons across different national contexts. Moreover, detailed socioeconomic information was not collected. Without such data, it was impossible to assess how parental education, household income, or occupation variables might influence heritage language trajectories.

Finally, the snowball sampling method, initiated through a single contact in Austria, may have introduced network bias. Participants were likely to share similar social, educational, or ideological backgrounds, reducing the sample's diversity. Furthermore, self-selection bias may have occurred, as individuals who chose to participate in a Turkish-language survey may already place higher value on their heritage language or feel more confident in their Turkish abilities. This could lead to an overrepresentation of participants with stronger ethnic affiliation, higher motivation for HL maintenance, or more positive attitudes toward bilingualism. Conversely, individuals who experience greater attrition, discomfort, or insecurity in their Turkish skills may have been less likely to participate, resulting in their perspectives being systematically underrepresented. Together, these factors limit the external validity of the study.

In light of these limitations, the findings should be interpreted with caution. Future research would benefit from the developing assessment tools and tests (such as a modified C-test) tailored to agglutinative languages and from including larger, more demographically balanced samples. Recruitment strategies that ensure broader socioeconomic, gender, and geographic representation will help strengthen the generalizability of results concerning heritage language attrition.

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