Converbs in heritage Turkish: A contrastive approach

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Abstract

Turkish expresses adverbial subordination predominantly by means of converb clauses. These are headed by nonfinite verbs, i.e. converbs, which have a converb suffix attached to the stem. The different converbs express different aspectual relations between the subordinate and the superordinate clause, and they can be modifying or non-modifying. We analyse data from speakers of Turkish as a heritage language in Germany and the U.S. as well as monolingual speakers of Turkish in Turkey. The data come from two age groups: adults and adolescents. We show that unlike in canonical Turkish, converbs in heritage Turkish can be multifunctional, meaning that they can express both simultaneity and causality, for example. Furthermore, we show that converbs in heritage Turkish can be both modifying and non-modifying. As possible factors which might be responsible for such variation, we discuss language contact, sociolinguistic differences between the speaker communities (Germany vs. the U.S.) and age of the speakers.

1. Introduction

In this paper, we investigate the development of adverbial subordination by means of converbs (verbal adverbs, adverbial participles) in Turkish as a heritage language (HL)[1] in Germany and in the U.S., and compare it with Turkish as used in Turkey, where it is the majority language. We use quasi-naturalistic data and compare two age groups in each setting. We also take into consideration the sociolinguistic profiles of our speakers and the sociolinguistic differences between the speaker communities.

Turkish is a language where in the standard variety subordination is realized mainly by means of nonfinite forms.[2] These are formed by attaching special suffixes to the verbal stem. The language has three main strategies of nonfinite subordination: (i) complement clauses which are clausal nominalizations, (ii) relative clauses

headed by participles, and (iii) adverbial clauses headed by converbs (Kornfilt 1997, Göksel & Kerslake 2005). The question of what happens to nonfinite subordination in situations of language contact between Turkish and languages with predominantly finite subordination has been addressed with reference to different contact constellations before.[3] What interests us here is the particular contact situation of Turkish as an HL.

An HL is a language acquired at home in a society where it is not the majority language (ML) (Lohndal et al. 2019). Under this definition, an HL may be an indigenous minority language or a language of immigrants and their descendants. Heritage speakers (HS) acquire the HL in their family, and they may acquire the ML as their (early) second language, or they acquire both languages simultaneously. Usually, at the beginning of the speakers' life, the HL is the dominant language of the HS, or the two languages develop simultaneously. However, with the speakers' gradual entry into the social institutions of the society they live in, the ML becomes the dominant language especially in formal settings, since the ML is usually the only language they receive formal education in. Language contact between the two languages is ubiquitous, in most cases, both in individual linguistic repertoires and in the speech community.

One of the central questions in heritage language research is whether the attested dynamics of variability, variation and change can be attributed to cross-linguistic influence or to internal developments. The latter can occur as a result of the spread or further development of features of the spoken language, which is accelerated by the sociolinguistic environment, e.g. by a limited access to literacy (Schroeder 2016, Aalberse, Backus & Muysken 2019), among other factors.

The outline of the paper is as follows: First, we summarize the research on the development of converbs in heritage Turkish (Section 2). Subsequently, we present our research questions (Section 3). Then we describe the canonical system of converbs in Turkish and touch upon contrasts between Turkish, German and English in the domain of adverbial subordination (Section 4). After introducing the reader to our data and research methodology (Section 5), we present the outcome of our quantitative and qualitative analyses (Section 6). We discuss our findings in Section 7 and provide a conclusion in Section 8.

2. Converbs in heritage Turkish

The topic of clause-combining, particularly that of nonfinite subordination in heritage Turkish in Western Europe, especially in Germany, has kept researchers' attention for quite some time. Broadly speaking, there are two main complementary findings: first, HS of Turkish use fewer nonfinite subordination than monolingual speakers of Turkish in Turkey, and second, they prefer paratactic clause combining and/or finite subordination over nonfinite subordination (Backus 2004, Onar Valk 2015, Schroeder 2016, Iefremenko & Schroeder 2019.

However, among the three main strategies of nonfinite subordination which Turkish employs (see above), findings regarding converbs in heritage Turkish do not quite fit this broad generalization. Studies focusing on converbs in heritage

Turkish disagree on the degree to which these forms are open or vulnerable to change in the heritage language setting, quantitatively, as well as qualitatively.

On the one hand, in an investigation of adolescent and young adult HS of Turkish living in Germany in comparison with three groups of speakers, namely returnees who had gone back to Turkey recently, returnees who had gone back to Turkey seven or eight years earlier and Turkish monolinguals, Treffers-Daller, Özsoy & Van Hout (2007) found that there were no quantitative differences in the use of converbs across the groups. The results in Rehbein & Herkenrath (2015), who compared the use of Turkish converbs in bilingual German–Turkish child speech and monolingual Turkish child speech, and also in Bohnacker & Karakoç (2020), who investigated Swedish–Turkish bilingual children, point in a similar direction. They found that converbs are relatively robust with respect to contact-induced language change. However, Rehbein & Herkenrath (2015) note that HS acquire converbs later than monolinguals. The bilingual children between four and eight years of age who they investigated used fewer converbs than their monolingual peers of the same age, but at the age of nine, the HS of Turkish in Germany seemed to catch up with the monolinguals.

On the other hand, a recent study by Turan et al. (2020) rather supports converbs to be in line with the more general results for nonfinite subordination in heritage Turkish in Germany, that is fewer use of nonfinite structures and higher use of paratactic clause combining strategies. They concentrate on the production of two types of converbs (-(y)Ip and -(y)IncA,[4] see Section 4.2 for the details on converbs in Turkish in narratives of 18–20-year-old HS and compare them with their production by monolingual peers. The study concludes that HS use significantly fewer converbs than monolinguals and instead use a higher number of finite forms. Turan et al. (2020) also note unconventional uses of the converb -(y)Ip by HS. These unconventional uses pertain to issues of coreferentiality, aspectuality and coordination. That is, the HS in their study used different subjects with the verb in the main clause and with the converb; moreover, they used this converb in aspectual functions which differed from monolingual Turkish, or they connected the converb to the main clause by means of the coordinate conjunct *ve* 'and'.

As for research on nonfinite means of subordination, and converbs in particular, in heritage Turkish in the U.S., there has been no research, to our knowledge.

3. Research questions

Our research questions, set out at the end of the present section, are motivated by a number of theoretical considerations and expectations which shape our approach and methodology.

First, as we have seen in Section 2, previous findings with regard to the development of converbs in heritage Turkish are contradictory in terms of frequency distributions of converbs, and research with regard to functional differences does not go beyond pointing out 'unconventional uses'. We intend to fill a research gap with regard to frequency distributions, as well as with regard to possible (new) systematicities of use.

Second, our contrastive approach (i.e. Turkish in Germany versus Turkish in the U.S.) allows us to address the question of to what extent cross-linguistic influence is a driving force of language change in heritage languages. Our expectation here is based on usage-based approaches, which argue that bilingual speakers have a 'pool' of resources from two languages at their disposal which are simultaneously active (Matras 2007, Rehbein, Herkenrath & Karakoç 2009, Schroeder 2016, Aalberse et al. 2019). In the sociolinguistic context of heritage languages, where there is an unbalanced dominance relation between the two languages, the contact (majority) language functions as a 'catalyst language' (Rehbein et al. 2009) which leads the bilingual speakers to prefer those structures in their heritage language which have both a functional and a structural correspondence in the contact language, and to disprefer those structures that do not have a parallel in the contact language. Both German and English as contact languages share the preference for finite over non-finite subordination. However, English makes more extensive use of nonfinite adverbial constructions than German (see Section 4.3). We expect these differences between the contact languages to reflect on the use of converbs in the respective speaker groups.

Third, we distinguish between two age groups, namely adults and adolescents. According to Aalberse et al. (2019), following Labov (1994), there are two aspects to a linguistic comparison of two age groups: No differences point to either stability or communal change; with differences between the groups, we can infer generational change.[5] Sociolinguists furthermore emphasize that in the identification of tendencies for language change, a central group to look at is adolescents (13–19 years old) (Tagliamonte 2016). This is because adolescents are a group which is in a phase of life when they develop physically, socially, physiologically, and intellectually. And their increasing independence, numerous new social contacts, separation from parents and solidarity with peers impact the language they use.

Fourth, following again Aalberse et al. (2019), we expect sociolinguistic factors on two levels, individual and communal, to play a role. Individual variation among speakers will be correlated to particular features in the sociolinguistic profiles of speakers (see Section 6.3 below for details). On the community level, we expect sociolinguistic differences between the two groups of Turkish HS, i.e. those in Germany and those in the USA, to have explanatory power regarding differing patterns in the use of converbs. While it goes beyond the aim of this paper to consider in detail the vitality parameters put forward in the literature (Giles, Bourhis & Taylor 1977, Extra, Yağmur & van der Avoird 2004, Yağmur 2011),[6] the following observations can clearly be made: The Turkish community in Germany is large (a Turkey-related population of nearly five million, according to Karanfil & Şavk 2014) and sociologically tightly-knit, especially in urban areas. In contrast, the Turkish community in the U.S. is not only smaller in number (estimated to be around 500,000, according to Grabowski 2005), but is also scattered throughout the much bigger country. As a consequence of this demoscopic, sociological and geographical situation, Turkish is used in more social domains in Germany than in the U.S., i.e. people use it in informal public domains (markets, cafes, shops, during leisure times, etc.), while in the U.S., heritage Turkish is used mainly at home. Moreover, Turkish is taught as a heritage language in many public schools in Germany (see Schroeder & Küppers 2016), while Turkish HS in the U.S. have an opportunity to study

Turkish essentially only in Sunday schools organized by Turkish embassies and other authorities. Finally, Turkish media are more present in Germany than in the U.S.

Our research questions, then, are as follows: Are there quantitative differences (in terms of frequency distributions) and systematic qualitative differences (in terms of aspectual and modificational functions and coreferentiality) in the use of converbs in heritage Turkish in Germany and the U.S., as compared to the Turkish in Turkey? And if there are such differences, to what extent can they be related to the contact languages (viz. German and English), and to extralinguistic factors such as the age of the speakers and/or the sociolinguistic profiles of the individual speakers and/or the speaker communities?

4. Adverbial subordination (in contrast)

In this section, we briefly look at adverbial subordination in Turkish in general (Section 4.1), then concentrate on converbs in Turkish (Section 4.2) and give an overview of English and German contrasts (Section 4.3).

4.1 Adverbial subordination in Turkish

Generally speaking, Turkish uses three structural types of adverbial subordination, i.e. finite clauses, postpositional phrases with nominalizations as complements, and converb clauses (Kornfilt 1997, 2001, 2003; Göksel & Kerslake 2005). Finite clauses include conditional clauses, where a conditional marker is attached to the subordinate clause, and two types of other clauses: one headed by the frozen converb form *diye* and the other introduced by the form *ki*, a multi-purpose form. Postpositional phrases with nominalizations as complements form various types of temporal and modal adverbial clauses. Converb clauses are the most specific strategy of adverbial subordination in Turkish, when it comes to the expression of temporal-aspectual relations between two events, and the most frequent strategy for this type of subordination.

4.2 Converbs in Turkish

According to Nedialkov (1995), and in particular Johanson (1995), the canonical system of Turkish converbs can best be described along three parameters, namely (i) the aspectual relation between the converb clause and the superordinate clause, (ii) the modificational relation which the converb clause exerts on the superordinate clause, and (iii) the subject relation between the converb and the superordinate clause.

With respect to (i), the aspectual relation can be either intra-terminal, that is it expresses the event occurring within the limits of the event in the superordinate clause, or it can be post-terminal, where the event is expressed as having begun before the event in the main clause unfolds, or it can be terminal, where the event is expressed as coming to an end before the event in the superordinate clause has begun. However, it is 'not unusual for aspectual units to combine or to vacillate between post-terminality and terminality' (Johanson 1995:319).

Table 1. Features of converbs in canonical Turkish. Parentheses indicate a marginal and more restricted use.

Converb form	Aspectual relation		Modificational relation		Subject relation	
	Intra-terminal	(Post-)terminal	Modifying	Non-modifying	Same-subject	Varying subject
-(y)Ip		x		x	x	(x)
-(y)IncA		x	x			x
-(y)ArAk	x	(x)	x	(x)	x	(x)
-(y)ken	x	(x)	x			x
-DIğIndA	x		x			x
-mAdAn		x	x			x

As for (ii), the converb clause can either modify the superordinate clause in the sense that it provides further information about the event, its purpose or cause, the conditions under which it occurred, the degree, manner and means of realizations, or it can be non-modifying, i.e. it simply expresses a sequentiality of events.

Finally, with respect to (iii), there are some converb forms which only allow same-subject relations between the converb clause and the superordinate clause, while some other converbs allow varying subject relations between the converb and the superordinate clause.

Table 1 provides an overview of the features of the most frequent converbs, which also appear in our data. On the basis of what has been said above, we combine terminality and post-terminality. Entries in brackets indicate a marginal and more restricted use, which we discuss below.

We now turn to the converb forms and their features in more detail. Consider the following examples (converbs in bold):

(1) a. Ali ev-e **gel-ince** anne-m yemek yap-ma-ya
 Ali home-DAT come-CVB mother-POSS.1SG food do-ANOM-DAT
 başla-dı.
 begin-PST(3SG)
 'When Ali came home, my mother started preparing food.'

 b. Beş dakika-dan fazla ayak-ta **dur-unca** bel-im-de
 five minute-ABL more foot-LOC stand-CVB waist-POSS.1SG-LOC
 kasılma-lar başlı-yor.
 spasm-PL begin-PRS(3SG)
 'After having stood for more than five minutes, I start getting spasms in my waist.'

In example (1a), the converb clause *Ali eve gelince* 'when Ali came home' adds information to the superordinate clause *annem yemek yapmaya başladı* 'my mother started preparing food', namely it provides the time when the mother started cooking. In other words, the converb clause adds a feature which makes the meaning of the superordinate clause more specified (Johanson 1995:321), i.e. *-(y)IncA* is modifying, and it is terminal, since the event of coming home has come to an end when the event expressed in the superordinate clause started. Besides, *-(y)IncA* also often

implies causality. In example (1b), the reason for having pain in one's waist is standing for more than five minutes, and this is expressed through the selection of the converb -(*y*)*IncA*, which is post-terminal here, since the event expressed in the converb starts before the event the superordinate clause unfolds. Both examples also show that the converb -(*y*)*IncA* can be used with different subjects in the converb and superordinate clauses.

Consider now example (2):

(2) Çocuk   top-la   **oyna-yarak**   gid-iyor-du.
     child   ball-INS   play-CVB   go-PROG-PST(3SG)
     'The child was going home playing with a ball.'

Here, the converb clause *topla oynayarak* 'playing with a ball' provides modifying information to the superordinate clause *çocuk gidiyordu* '(the) child was going', namely it specifies the manner of the action. In such an example, the converb -(*y*)*ArAk* is modifying and it is intra-terminal, since the event expressed in the converb has no temporal limitations in itself, but these are provided by the superordinate clause. Furthermore, in example (2), the converb -(*y*)*ArAk* is used with the same subject *çocuk* 'child', and the converb -(*y*)*ArAk* is usually used with the same subject.

Another modifying converb, which is predominantly intra-terminal, is -(*y*)*ken*. It diverges from the other converb forms because it is an invariant clitic which may also attach to nouns and adjectives. Verbal stems which combine with -(*y*)*ken* always carry a temporal-aspectual suffix. When combining with past-tense forms, -(*y*)*ken* has a post-terminal reading. However, the most frequent use is with the present-tense habitual aorist (and the combination with a verb carrying the aorist is the only use we have in our data).

As shown in Table 1, Turkish also possesses a non-modifying converb which has equal narrative rank with the events in the superordinate clauses. This is the converb -(*y*)*Ip*. Consider the following example:

(3) Sabah   erken   **kalk-ıp**   iş-e   git-ti.
     morning   early   get up-CVB   work-DAT   go-PST(3SG)
     'He/She got up early in the morning and went to work.'

Example (3) has a reading typical for a coordinate clause in Indo-European languages, and thus could be translated into English or German with the help of the coordinate conjunction 'and'. Thus, in the example above, -(*y*)*Ip* functions as a non-modifying terminal converb. Kornfilt (1997:52) even goes so far as to call -(*y*)*Ip* a verbal conjunction marker. The sequential reading of -(*y*)*Ip* allows for the narrative chaining of events, as in example (4):

(4) Sabah   **kalk-ıp**   makyaj   **yap-ıp**   kahvaltı   **ed-ip**
     morning   get up-CVB   make up   do-CVB   breakfast   do-CVB
     iş-e   git-ti-m.
     work-DAT   go-PST-1SG
     'In the morning, I got up, did my make-up, had breakfast, and went
     to work.'

The converb *-(y)ArAk* is also sometimes used in such narrative chaining, see (5):

(5) Erken **kalk-ıp** kahvaltı **ed-erek** yol-a çık-malı-yız
     early get up-CVB breakfast do-CVB way-DAT leave-MOD-1PL
     'We should get up early, have breakfast, and leave.'

<div align="right">(Banguoğlu 1986:429)</div>

Thus, there is a certain functional overlap between *-(y)Ip* and *-(y)ArAk* (Johanson 1995:334).

As for referential control, as shown in Table 1, in Turkish most converbs are varying-subject converbs (e.g. *-(y)IncA*, *-(y)ken*, *-mAdAn*). Out of the converbs we consider, only *-(y)Ip*, *-(y)ArAk* are exclusively same-subject converbs. However, certain provisions have to be made with regard to these (Brendemoen & Csató 1987; Göksel & Kerslake 2005:405–406; Bárány & Nikolaeva 2019): Varying-subject uses are indeed possible when the predicate of the converb clause is a passive verb, as in (6), or an unaccusative verb, as in (7):

(6) Silah-lar **çek-il-ip** kavga başla-dı
     gun-PL pull-PASS-CVB fight start-PST(3SG)
     'The guns were pulled and the fight started.'

<div align="right">(Csató & Johanson 1998:232)</div>

(7) Göz-ler-in-den yaş-lar **ak-arak** anlat-ma-ya
     eye-PL-POSS.3SG-ABL tear-PL drop-CVB explain-ANOM-DAT
     devam et-ti
     continuation do-PST(3SG)
     'Tears running from his eyes, he continued to explain.'

<div align="right">(Brendemoen & Csató 1987:124)</div>

Kornfilt (1997:391) also points out that varying subjects with *-(y)Ip* are possible when the superordinate clause is nonfinite itself, as in (8):

(8) [Ali-nin sınıf-ın-ı **geç-ip** Oya-nın tembelliğ-i yüzünden
      Ali-GEN class-POSS.3SG-ACC pass-CVB Oya-GEN laziness-POSS.3SG due.to
     sınıf-ta kal-dığ-ın-ı] duy-du-m.
     class-LOC fail-FNOM-POSS.3SG-ACC hear-PST-1SG
     'I heard that Ali passed the class and Oya failed the class due to her laziness.'

Last but not least, it has to be mentioned that *-mAdAn* has a negative meaning, i.e. the event in the converb is expressed as not having occurred. *-mAdAn* and *-DIğIndA* occur very infrequently in our data (see Section 6.1 below).

4.3 Adverbial subordination in English and German

Adverbial subordination in English and German stands in sharp contrast to that of Turkish. Both languages prefer finite subordination over nonfinite subordination, and a system of subordinating conjunctions defines the aspectual relation between

the adverbial clause and the superordinate clause, as well as the type of modification involved. With finite subordinate adverbial clauses, varying-subject relations are always possible. The meaning of the converb clauses we discussed in the previous sub-section could always be expressed using finite subordination in English and German, with the exception of -(y)Ip, where the counterpart would be a coordinate clause.

The main difference between English and German in the domain of adverbial subordination does not lie so much with finite clauses, but with nonfinite clauses: English has a nonfinite verb-based form ending in -ing. One of its functions is that of converbs (Kortmann 1995, Nedjalkov 1995). The clauses which converbal -ing forms head allow the binding of direct objects and adverbial phrases, and can, in the form of 'absolute' small clauses, also have subjects that are different from the subjects of the superordinate clause (e.g. *Dodo joined him, two laden bellboys following*; see Kortmann 1995:217 and the discussion therein). Converbal -ing forms can be intra-terminal, where -ing is attached to the lexical verb (e.g. *following*), and they can be a (post-)terminal, where -ing combines with the auxiliary *have* and forms a complex form with the perfect form of the lexical verb (e.g. *having followed*). The German counterpart, where -end attaches to the root of the lexical verb (e.g. *lachend* 'laughing'), is not only much less frequent than -ing, but the clauses it forms are also much more reduced. For example, in a German sentence *Julia ging singend zur Schule* 'Julia went to school singing', an expansion of the converb *singend* into a clause with a direct object or even another constituent is dispreferred; whereas in English '*Julia went to school quietly singing a song*' is rather unproblematic. In addition, the German converb -end can only be same-subject and intra-terminal (see König & Gast 2009:71ff.).

5. Method

5.1 Participants

We analyse data from three countries, with two age groups in each: 33 adult and 32 adolescent HS of Turkish in Germany (Berlin), 26 adult and 30 adolescent HS of Turkish in the U.S. (New York City and New Jersey), and 32 adult and 32 monolingual speakers of Turkish in Turkey (from the towns of Izmir and Eskişehir, both in the west). The age of the adult participants varies from 23 to 35 years, while adolescent participants are 15–18 years old (see Table 2). All HS were born and raised in Germany or the U.S., or had arrived there before the age of five. Thus, most of the HS belong to the second generation, some even to the third generation of immigrants. All of them speak Turkish (and sometimes the ML) at home and we did not conduct the experiment with those participants who had additional family languages (e.g. Kurdish). Some of the HS participants received HL education to a limited extend; however, none of them attended a bilingual school. The adolescent participants were still at high school at the time of testing, while the educational background of adult participants varied from secondary school graduates to master's degree holders.

Table 2. Mean age of participants.

Adult participants	Number	Mean age (years)	Adolescent participants	Number	Mean age (years)
Germany	33	27.14	Germany	32	16
U.S.	26	28	U.S.	30	16
Turkey	32	27.63	Turkey	32	16.09

5.2 Data collection

In the elicitation of the data, we used the 'Language Situations' method (Wiese 2020). This method combines controlled elicitation with spontaneous data, and thus is suitable for systematic comparisons across contact-linguistic constellations as well as different languages. It captures quasi-naturalistic productions across different communicative situations, including informal versus formal, and written versus spoken settings.

The elicitation comprised two sessions (one in the heritage language and one in the majority language), with at least three days between the sessions. Participants were shown a short video of a car accident and were asked to imagine themselves having witnessed it. After that they were asked to recount the incident in four different imagined situations: to a friend via a WhatsApp voice message (informal spoken), to a friend via a WhatsApp text message (informal written), to the police via a voice mail (formal spoken), to the police in a form of a written witness report (formal written). To exclude a possible effect of priming, we balanced the order of the situations and the order of the languages.

We include data from different settings for two main reasons: First, it allows us to capture a wider range of linguistic structures available to the speakers and produced by them, whether monolingual or HL speakers. Even an HL speaker who does not use structures belonging to formal and/or written registers might have them at his or her disposal, and may use them when given the opportunity of an appropriate setting. Second, with informal settings, we avoid a problem which sometimes occurs in contact linguistic studies where data from monolingual speakers are related to data from bilingual speakers. Namely, data from bilingual speakers are misinterpreted as contact-induced, while the relevant features in fact also show up in the informal registers of monolingual speakers (see Poplack & Levey 2010, as well as Wiese 2020 for a justification of the 'Language Situations' method in this respect). Also, since the focus of the study is converbs in Turkish, we do not include speakers' productions in the majority languages in the analysis.

In addition to the elicitation, participants were asked to fill out an extensive questionnaire at the end of the second session. The questionnaire comprised 10 sections: administration (with the information about the project number, country of elicitation, etc.), the participants' general information, the educational background of the participants, the participants' languages, their family information, self-assessment of their language skills (in ML, HL as well as foreign languages, on a five-point scale), the participants' language use with family members and peers, a section concerning media use and free time (texting WhatsApp messages or writing emails in ML, HL as well as foreign languages, three scores of frequency), questions concerning

personal character traits, and feedback on the participation in the study. There were two versions of the questionnaire, one for adults and one for adolescents. The latter one also included questions regarding the school and grade, and excluded questions concerning jobs and spouses. The questionnaire was available in three languages; thus, participants from Germany filled it out in German, participants from the U.S. in English, and those from Turkey filled it out in Turkish. It was always filled out online by the participants in the presence of an elicitor.[7]

The collected data were transcribed in the Praat program (Boersma & Weenink 2021), anonymized, normalized to Standard Turkish and annotated using a highly differentiated part-of-speech inventory, including also converbs as a category.[8] Both spoken and written productions were segmented into communication units (CUs), defined as independent clauses with their modifiers and dependent (subordinate) clauses.[9] The annotated and transcribed data constitute the RUEG Turkish (Wiese et al. 2020).[10] The subcorpus comprises 748 texts that consist of 9805 CUs and 74157 tokens.

6. Analysis

6.1 Quantitative analysis

We start with a quantitative analysis, where we first investigate overall frequencies of converbs in the age groups and then turn to frequency distributions of the different converb forms.

Figure 1 presents the number of converbs per 100 tokens in monolinguals and HS across the two age groups and includes all instances of the use of converbs. The figure shows that in the adult groups, HS in the U.S. use more converbs than mono-linguals; however, statistically there is no significant difference between the groups ($\chi^2(2) = 1.4$, $p = .48$). In the adolescent groups, the monolinguals use the highest number of converbs, followed the by HS in the U.S. and the HS in Germany. Again, statistically there is no significant difference in the number of converbs in the mono-lingual and heritage adolescents in the U.S. ($\chi^2(2) = 2.6$, $p = .26$).

As for HS in Germany, the pattern is different. While the difference between adult HS in Germany and monolingual adults in Turkey is not statistically signifi-cant ($\chi^2(2) = 2.2$, $p = .32$), the difference between adolescent HS in Germany and monolingual adolescents in Turkey is highly significant ($\chi^2(2) = 33.5$, $p < .001$).

We will discuss the age differences later and now turn to frequency distributions of the different converb forms.

Figure 2 shows that in all groups, the two most frequent converb forms are -(y)ken and -(y)IncA, and they constitute almost 70% of all converbs used in the pro-ductions. However, -(y)IncA is less frequent among HS in Germany. In fact, in both adult and adolescent age groups, the use of the converb -(y)IncA is considerably less frequent than in monolinguals. This difference is particularly marked for adoles-cents in Germany, who use only 0.21 converbs formed with -(y)IncA per 100 tokens, compared to 0.81 in adolescent HS in the U.S. and 0.9 in monolingual adolescents in Turkey ($\chi^2(2) = 35.1$, $p < .001$ and $\chi^2(2) = 42.9$, $p < .001$, respectively). Thus, of the two most frequent converbs, -(y)ken remains the only converb which adolescent speakers in Germany use with a frequency similar to that in the other groups.
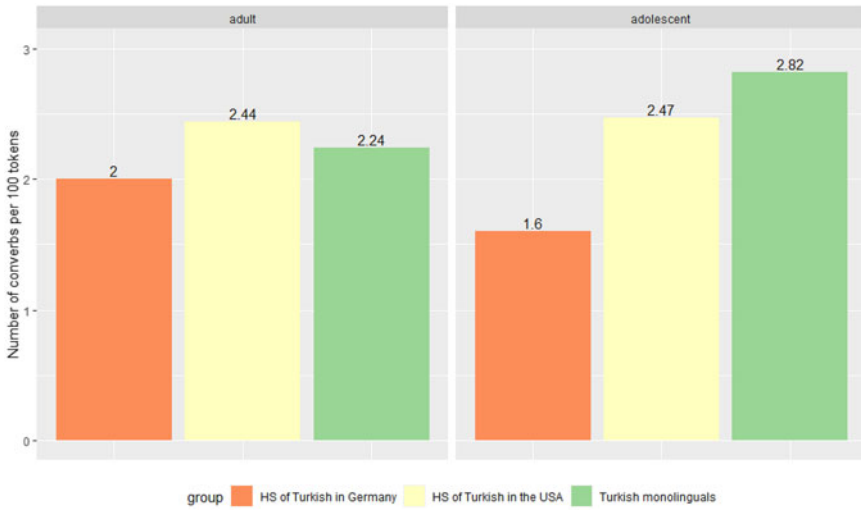
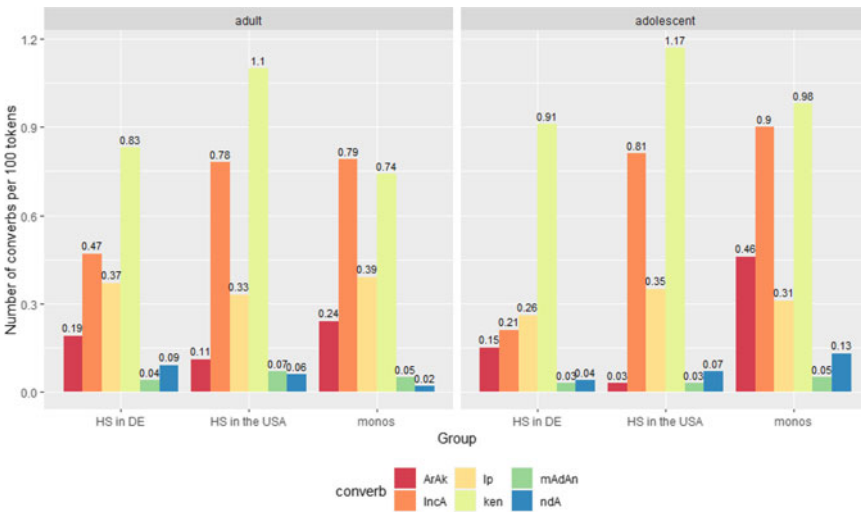**Figure 1.** Number of converbs per 100 tokens in monolinguals and HS.

Figure 2. Number of different converb forms per 100 tokens in monolinguals and HS.

The next most frequent forms in all the groups are -(*y*)*Ip* and -(*y*)*ArAk*. However, the latter is used significantly less often in HS in the U.S., particularly in adolescents, than in monolingual adolescents ($\chi^2(2) = 35.7$, $p < .001$). Moreover, monolingual adolescents exhibit twice as many instances of -(*y*)*ArAk* compared to monolingual adult speakers. The least frequent forms in our data are -*DIğIndA* and -*mAdAn*. Together, they constitute only around 5% of all converb forms used.

To sum up, there are no significant quantitative differences in the use of converbs between HS in the U.S. and monolinguals in both age groups (see Figure 1).

Table 3. Raw number of converbs used by the speakers in different groups with the same or different subjects.

	-(y)IncA		-(y)ken	
	Same subject	Varying subjects	Same subject	Varying subjects
Monolingual adults in Turkey	28	51	23	4
Adult HS in Germany	32	32	35	76
Adult HS in the U.S.	27	36	30	62
Monolingual adolescents in Turkey	34	50	26	74
Adolescent HS in Germany	9	9	23	65
Adolescent HS in the U.S.	41	33	41	65

However, adolescent HS in Germany use significantly fewer converbs than mono-linguals. Furthermore, adolescent HS in Germany use every converb form less frequently than the two other adolescent groups, but particularly, the differences are significant in the use of the form -(y)IncA, as the data in Figure 2 show.

6.2 Qualitative analysis

6.2.1 Referential control in heritage Turkish

6.2.1.1 (y)IncA and (y)ken. In principle, both -(y)IncA and -(y)ken allow both a same subject and a varying subject use, and Table 3 shows that they are indeed used both ways in all groups. However, as far as -(y)IncA is concerned, the number of varying subjects in monolinguals is almost twice the number of same subjects, while HS seem to use -(y)IncA with varying and same subjects in a relatively balanced way.

As noted in Section 4.2 above, there are two converbs in canonical Turkish, namely -(y)Ip and -(y)ArAk, where varying-subject relations are highly restricted. We now look at these two converbs in more detail in the heritage data.

6.2.1.2 (y)Ip. With respect to the converb -(y)Ip, we do not find examples where it is used with different subjects in the data of monolinguals. However, even though infrequently, such examples are found in all heritage groups, and they do not stay within the restrictions we discussed in Section 4.2 above: In (9a), we have a subject switch from 'the man' in the subordinate clauses to 'the ball' in the superordinate clause, and in (9b), translated as a coordinate sentence, the subject switches from 'blue car' in the subordinate clause to the 'white car' in the superordinate clause.

(9) a. adam (-) futbol-la **oyna-yıp** (-) sektir-me-ye çalış-tığ-ın-da
        man   *football-INS play-CVB* *bounce-ANOM-DAT try-FNOM-POSS.3SG-LOC*
        el-in-den (-) **düş-ür-üp** (-) top (-) yol-a gel-miş-di[11]
        hand-POSS.3SG-ABL drop-CAUS-CVB ball road-DAT come-PRF-PST(3SG)
        'When the man played with the ball and tried to juggle it, he dropped it and the ball went onto the road.'

        (DEbi27MT_fsT)[12]

b. Mavi araba ani   firen **yap-ip** arka-da-ki   beyaz araba
    blue   car   suddenly break do-CVB behind-LOC-ATTR white car
    arka-si-na   carp-ti
    behind-POSS.3SG-DAT hit-PST(3SG)
    'The blue car braked suddenly and the white car at the back hit it from behind.'
                    (DEbi56FT_fwT)

While in the data of HS in the U.S. there are only a few of such examples, they are more in the data of HS in Germany. There are differences between adult and adolescent speakers in Germany, however. With adult HS in Germany, the examples come from two speakers, so it seems safe to say that these are cases of individual variation. On the other hand, in adolescent HS in Germany, out of 25 examples containing the converb -(y)Ip, six were used with different subjects in subordinate and superordinate clauses, and all six examples were produced by different speakers. Thus, we can conclude that varying-subject constructions with -(y)Ip are a fairly common feature with adolescent HS in Germany.

6.2.1.3 -(y)ArAk. Similarly, we find examples of noncanonical uses of the converb -(y)ArAk in the heritage data. Again, they go beyond the restrictions described in Section 4.2 above for canonical Turkish. We find such examples, like (10), only in the heritage data in Germany, in both the adults and adolescents groups.

(10) o   köpek de   top-u   **gör-ünce** (--) eee (3.7) adam-ın   taraf-ı-na
     that dog   also ball-ACC see-CVB   man-GEN   side-POSS.3SG-DAT
     (-)**kaç-arak** (--) kadın-ın   torba-sı   düş-tü
     run-CVB   woman-GEN bag-POSS.3SG fall-PST(3SG)
     'And that dog ran toward the man when it saw the ball and the woman's bag fell.'
                    (DEbi29FT_fsT)

Note, however, that such examples are rare. Two out of 26 examples of -(y)ArAk in adult HS in Germany and one out of 15 examples in adolescent HS in Germany show varying-subject relations between the converb clause and the superordinate clause.

6.2.2 Aspectual functions

We now turn to analysing the aspectual use of the four most frequent converbs in the data from all the groups.

6.2.2.1 -(y)ken. Overall, in most instances, the functions of -(y)ken in heritage Turkish and monolingual Turkish correspond. However, there are several examples in each HS group where HS seem to use -(y)ken to express succession of the actions, i.e. where the aspectual function seems to shift from intra-terminal to terminal. See example (11):

(11)   karşı-da-ki   adam (-) top-u   yol-a   **düş-er-ken** (-) gel-en
        across-LOC-ATTR man   ball-ACC road-DAT fall-AOR-CVB   come-PART
        araba-lar birden   **fren yap-ıp** (-) ee (-) araban/araba-lar birbirin-e
        car-PL   suddenly brake-CVB   car   car-PL   each other-DAT
        vur-du-lar
        hit-PST-3PL
        'As the man's ball across the street was falling on the ground, the cars driving
        braked suddenly and hit each other.'

                                                              (USbi23FT_fsT)

In canonical Turkish, the above example reads as a simultaneity of events, i.e.
while the ball falls, the car (in front) suddenly breaks and the two cars bump into
each other. However, the video shown to the participants (see Section 5.2) clearly
depicts a succession of events, i.e. first the man drops the ball from his hands, then
the ball rolls onto the road, then a dog runs for the ball from the other side of the
road, and throws himself on top of the ball, upon which an approaching car has to
stop, and a second car bumps into it.

Furthermore, there are examples where the converb -(y)ken is used in combina-
tion with verbs where, in canonical Turkish, the lexical aspect (aspectuality) of the
verb would not allow this combination because it does not express a continuous
action. The inchoative verb *kaybet-* 'to lose' is such a case, see (12):

(12)   ve aile   ol-arak anne   baba ve   çocuk (-) ee yol-u **geç-er-ken**
        and family be-CVB mother dad and child   road-ACC cross-AOR-CVB
        top-u: k/kaybet-miş-ler top-u   **kaybed-ir-ken** köpek saldır-dı
        ball-ACC lose-PRF-3PL   ball-ACC lose-AOR-CVB dog   attack-PST(3SG)
        dışarı:
        outside
        'While the mother, father, and kid were crossing the street as a family, they lost
        the ball. As they were losing the ball, the dog attacked outside (onto the street).'

                                                              (USbi21FT_fsT)

In canonical Turkish, the verb *kaybetmek* 'to lose' cannot be used in combination
with -(y)ken, since the event of losing something is punctual. Also, the video clearly
depicts a succession of events here. In canonical Turkish, a succession of events is
expressed with the help of the converb -(y)IncA.

There are several examples of a similar type in the data, mostly in the data of HS
in Germany, produced by both adults and adolescents.

6.2.2.2 -(y)IncA. -(y)IncA is the second most frequent converb in the data (after -(y)
ken). As shown in Section 6.1 above, adolescent HS in Germany use the converb -(y)
IncA nearly four times less often than HS in the U.S. and monolingual adolescents in
Turkey.

The converb -(y)IncA is (post-)terminal and modifying (see Section 4.2 above).
As with -(y)ken, regarding the functions, the converb -(y)IncA seems to be fairly
stable in heritage Turkish. However, we have found several examples in our corpus,
such as (13), where HS seem to use the converb -(y)IncA in intra-terminal function:

(13) ben bugün okul-dan   ev-e   **gel-ince** bir kazah
      I   *today*   *school-ABL* *home-DAT* *come-CVB* *one accident*
      gör-dü-m
      see-PST-1SG
      'When I came home from school today, I saw an accident.'

<div align="right">(DEbi80MT_iwT)</div>

Again, the aspectual relationship between the converb and the superordinate clause is of interest here. In canonical Turkish, (13) reads as if the speaker saw the accident AFTER he came home (which is, obviously, pragmatically impossible). However, the video views the accident from the roadside, in other words the event of witnessing it could only have occurred on the way (e.g. WHILE coming home), and not AFTER having come home. Canonical Turkish would require -(y)ken here. However, let us stress again that there are only a few such examples in the data of HS in Germany (both age groups) and adolescent HS in the U.S.

6.2.2.3 (y)Ip. The next most frequently used converb in the data is -(y)Ip, which we have described as a (post-)terminal, non-modifying converb. However, in the heritage data, we have found several examples, like (14), where -(y)Ip is used in a modifying function. The number of such examples in the data of HS in Germany is much higher than in the U.S.

(14) adam   top-u   el-in-den   **kaç-ır-ıp** (-)
      man   *ball-ACC*   *hand-POSS.3SG-ABL*   *slip-CAUS-CVB*
      yol-a   gid-iyo (-)   top
      road-DAT   *go-PROG-PRS(3SG)*   *ball*
      'The man lets the ball slip from his hands and the ball goes on the road.'

<div align="right">(DEbi53MT_isT)</div>

We have translated example (14) as a coordinate sentence since it would read like that in canonical Turkish. However, in this example, the converb clause *adam topu elinden kaçırıp* 'the man lets the ball slip from his hands' should modify the superordinate clause *yola gidiyor top* 'the ball goes on the road' by emphasizing the succession of the actions and the causal relation between the two events. Thus, -(y)Ip is used here with different subjects in the subordinate and the superordinate clauses (i.e. with 'the man' as the subject of the subordinate clauses and with 'the ball' of the superordinate clause); also, the -(y)Ip clause is used here in a modifying function. In canonical Turkish, this would be conveyed by the converb -(y)IncA.

Note that in fact, all examples from HS in Germany where -(y)Ip performed a noncanonical function were examples where the converb and superordinate clauses had two different subjects.

6.2.2.4 -(y)ArAk. The least frequently used converb out of the most frequent four in our data is -(y)ArAk, an intra-terminal modifying converb, whose function is to present two situations as part of one event. However, we have found examples like (15), where -(y)ArAk is used as a (post-)terminal converb, but only in the data of HS in Germany (both adults and adolescents).

(15) ve sokağ-a   sap-an   mavi marka renault araba (-) ani
      and street-DAT turn-PART blue brand renault car   sudden
      fren **yap-arak** arka-sın-dan   gel-en   beyaz (-) ee
      brake do-CVB   behind-POSS.3SG-ABL come-PART white
      araba (--) çarp-tı
      car   hit-PST(3SG)
      'and the blue Renault car entering the street braked suddenly and the car
      coming behind it hit it'

(DEbi07MT_fsT)

In example (15), the converb -(*y*)*ArAk* does not present two situations as a part
of one event; rather, it underlines that the event in the converb clause occurs prior to
the event in the superordinate clause. Even though we noted a certain overlap
between the functions of -(*y*)*Ip* and -(*y*)*ArAk* in canonical Turkish as well (see
Section 4.2), our monolingual speakers clearly prefer -(*y*)*IncA* in this relationship
because of the causal link between the two successive events, namely the breaking
of the car and the accident which it caused.

Like (14) above, (15) includes varying subjects in subordinate and superordinate
clauses. As with -(*y*)*Ip*, all examples where -(*y*)*ArAk* performed a noncanonical
function in terms of aspectual relations were also noncanonical examples with
regard to subject relations.

6.3 Regression analysis

In order to understand whether the noncanonical use of converbs by HS in
Germany and the U.S. could be related to common patterns in the participants' indi-
vidual sociolinguistic background, we asked whether there is a correlation between
particular factors and the noncanonical use of converbs.

The first factor that we checked for is the migrant generation to which the
participants belong, i.e. mother's and father's place of birth. We assumed that
if speakers belong to the third generation of migrants (i.e. their parents were also
born and raised in Germany or the U.S.), and thus acquire heritage Turkish in
their families, they might be more inclined towards using converbs noncanoni-
cally than the speakers who belonged to the second generation (i.e. their parents
were born and raised in Turkey). We also looked at the frequency of visits to
Turkey. Finally, we reviewed the factors of HL education and HL use in daily
life (how frequent participants read books/magazines, listen to music/podcasts,
watch movies/series/videos, or correspond via text messages/SMS in Turkish).
We supposed that absence of HL education and an occasional use of Turkish
in everyday life might be the reason for the participants to use noncanonical
structures.

For this analysis, we ran binomial logistic regression. The dependent variable was
canonicity (canonical vs. noncanonical use of converbs, i.e. 0 and 1). Independent
variables were mother's place of birth, father's place of birth (coded as Turkey vs.
majority language country), HL formal education (i.e. attending heritage language
lessons) (yes vs. no), watching movies/series/videos in HL, listening to music/radio/
podcasts in HL, reading books/magazines in HL, texting messages/SMS in HL, and

frequency of visits to Turkey. The frequency of language use was coded on the range of three ('never' = 1, 'sometimes' = 2, 'often' = 3), while the frequency of visits to Turkey was coded on the range of two ('once a year and fewer' = 1, 'several times a year' = 2).

As a result of our analysis, we have found that there is no correlation between the canonical/noncanonical use of converbs and any of the independent individual sociolinguistic variables.[13]

6.4 Summary of data analysis

Our quantitative analysis shows that for HS of both age groups in the U.S. there are no significant differences in the frequencies of the use of converbs compared to monolinguals in Turkey. Frequencies are lower with adult HS in Germany, but not significantly, with one exception: Only the use of -(y)IncA is significantly lower in frequency. In contrast, adolescent HS in Germany use significantly fewer converbs overall than monolinguals. They use every converb form less frequently than other groups, but differences are significant in the use of the form -(y)IncA, which is (post-)terminal and modifying, leaving -(y)ken as the only converb which is frequently used in this group.

In the qualitative analysis, there are two major findings. First, our findings from the analysis of the converbs -(y)Ip, -(y)ArAk and -(y)ken in heritage Turkish (both age groups in Germany and the U.S.) point to the possible extension of the functionality of converbs. Unlike converbs in canonical Turkish, which are more restricted with regard to their aspectual and modifying functions, in heritage Turkish, these three converbs can be multifunctional. To be more specific, our data show that in heritage Turkish, -(y)Ip, -(y)ArAk and -(y)ken can also be modifying (post-)terminal and express succession of events with the emphasis on the causality of the action, i.e. the function that in canonical Turkish is expressed exclusively by the converb -(y)IncA. While -(y)Ip and -(y)ArAk as modifying terminal converbs are the most frequently used by the adolescent HS in Germany, the converb -(y)ken in the (post-)terminal function is used equally by all HS groups. However, the number of examples where -(y)ken is used in the function of succession of events is not high (around 5% in each group). In turn, -(y)IncA in heritage Turkish can also be intra-terminal, a function which in canonical Turkish would be expressed with the help of the converb -(y)ken.

The second finding from the qualitative analysis concerns the phenomenon of coreferentiality: Unlike monolinguals, HS tend to use the converbs -(y)Ip and -(y)ArAk with different subjects in converb and superordinate clauses. This is found in HS in both countries, but particularly in HS in Germany. To be more precise, while in adult HS in Germany the general use of -Ip and, in particular, its use with varying subjects seems to be mainly a matter of individual variation; in adolescent HS the use of the converb -(y)Ip with two subjects is rather systematic.

7. Discussion

The results of our quantitative analysis in relation to heritage Turkish in Germany give a more accurate picture in terms of frequency of converbs than previous studies

have provided, because we distinguish between two age groups and look closer at the individual types of converbs. Through these findings, our data both contradict and confirm the previous studies. Like Turan et al. (2020), we find a lower frequency of the use of converbs in heritage Turkish in Germany compared to Turkish in Turkey – however, only among the adolescent HS. At the same time, like Treffers-Daller et al. (2007), we find no significant differences between adult monolinguals and HS in Germany when we look at the overall number of converbs. However, differences again emerge when we take the individual types of converbs into account: Adolescents and adults in Germany alike use -(y)Inca significantly less frequently than monolingual speakers.

The results of the quantitative analysis for heritage Turkish in the U.S. are slightly different than for Germany. What is particularly interesting in our findings is that unlike in Germany, there are no significant differences in the frequencies of the use of converbs by HS in the U.S. compared to monolinguals.

Regarding the quantitative differences in converb use between heritage Turkish in Germany and the U.S. we suggest a cross-linguistic explanation. It takes as a starting point the differences between German, which makes only very limited use of converbs, and English, which does make use of converbs (i.e. the adverbial use of -ing forms). On the basis of the usage-based approach, which we briefly sketched in Section 3 above, we may assume that the German–Turkish contact setting results in a retreat in the use of converbs in heritage Turkish, while in the English–Turkish contact setting, converbs continue to be used as intensively as in monolingual Turkish.

From the qualitative analysis we found that both HS age groups in Germany and the U.S. tend to use converbs noncanonically. The noncanonical uses are at the same time systematic in an interesting way: We find a blurring of the system, in the sense that aspectual functions overlap more, as do modificational and subject relations. These overlaps show themselves more clearly in the case of those converbs, where overlaps are also allowed in canonical Turkish – albeit to a much more restricted extent. Thus, the polyfunctionality of -(y)Ip, -(y)ArAk, and -(y)ken converbs in heritage Turkish can be read as an extension or a further development in the heritage varieties of what is already existent in canonical Turkish. On the other hand, the converb form -(y)Inca is only marginally affected by this development. -(y)Inca is a converb that is not used outside its established function (post-terminal, modifying) in canonical Turkish either. This conservativeness of -(y)Inca, already present in canonical Turkish, leads to -(y)Inca losing ground in heritage Turkish, where the polyfunctionality of the other verb forms spreads at its expense.

In general, the extension of the functionality of converbs is found in both heritage groups, and this suggests that this is a general characteristic of heritage Turkish varieties in contact with Indo-European languages. However, although the number of noncanonical examples is not high in general, we cannot disregard the fact that the noncanonical use of converbs is most pronounced in HS in Germany, particularly in the adolescent group. At the same time the adolescent group in Germany uses the fewest converbs.

We turn here to extralinguistic factors: Individual sociolinguistic variables such as belonging either to the third or the second generation of migrants, visits to Turkey, HL education and using Turkish beyond oral communication, did not

appear to correlate with (non-)canonicity of converb use. This leaves us with two closely linked group-related extralinguistic explanations, which we tentatively suggest.

The first of these are the sociolinguistic profiles of the German vs. the U.S. communities of speakers. In Section 3, we discussed that the Turkish community based in Germany is larger in numbers, the speakers live more tightly-knit together, especially in urban areas (such as Berlin, where we collected the data) and they have more opportunities to use Turkish outside of home, in (informal) public domains. The community in the U.S. on the other hand is much more disconnected and Turkish is used in the private domain of the family. HS in Germany are consequently more exposed to heritage Turkish than HS in the U.S., and this might be the reason why the changes in the system of converbs are more pronounced in the data of HS in Germany than with HS in the U.S.

Secondly, the changes in the system of converbs are most systematic in the adolescent HS in Germany. As we stated in the beginning of the paper, adolescents are identified as a central group for language change (Tagliamonte 2016) – given, of course, a situation, where the language at issue is actually used in the peer groups. This is much more likely the case in Germany than in the U.S.

From our data, we cannot yet conclude a language change in the community, since the number of noncanonical examples is not sufficient for clear conclusions. Also the extralinguistic factors we suggest are based on more general accounts of the characteristics of the Turkish heritage speaker communities in Germany and the U.S., and on sociolinguistic observations on the role of adolescents in language change. However, we do see a systematization of new forms in the adolescent group in Germany, and this points at a (slight) generational change.

8. Conclusion and outlook

Our findings suggest that there is a (slight) generational change in the system of converbs (in terms of functionality and co-referentiality) in heritage Turkish in Germany. Individual variation on the same line is present in both heritage Turkish in the U.S. and heritage Turkish in Germany; however, it is most systematic with adolescent speakers in Germany. We suggested an explanation which takes into account cross-linguistic differences, the particular sociolinguistic situation of heritage languages, the different characteristics of the speech community and the prominence of adolescents as 'forerunners' of change. Sociolinguistic variables relevant to individual speakers did not add to the explanation. We furthermore argued that the new structures in the converb system were already existent in monolingual Turkish, though much more restricted. In other words, language contact, at least in this case, does not create new patterns, but variation found in the homeland variety is extended or amplified in the heritage Turkish.

To corroborate our findings in future research, it might be appropriate and interesting to investigate the use of converbs by heritage Turkish speakers of other age groups and generations. Another possibility for a future research could be a longitudinal study with several Turkish HS, observing the use of their language, particularly in terms of the system of converbs, starting from early adolescence to

adulthood, tracing the possible emergence of noncanonical use of certain converbs (e.g. -(y)Ip, -(y)ArAk, -(y)ken) and its stabilization, as well as the gradual marginalization of certain other converbs (e.g. -(y)IncA). Furthermore, future research should situate the investigation of converbs within the broader domain of clause combining, in order to corroborate our cross-linguistic hypothesis: With regard to complement clauses and relative clauses, German and English are much closer to each other in their preference for finite clauses, hence the expectation would be that developments in heritage Turkish in Germany and the U.S. concerning nominalizations and participles would not differ to the extent they do in comparison to converbs.

Notes

1 Abbreviations, including symbols used in the transcription:

1, 2, 3	first, second, third person
ABL	ablative
ACC	accusative
ANOM	action nominal
AOR	aorist
ATTR	attributive
bi	bilingual
CAUS	causative
CVB	converb
CU	communication unit
DAT	dative
DE	Germany
f	formal
FNOM	factive nominal
GEN	genitive
HL	heritage language
HS	heritage speakers
i	informal
INS	instrumental
LOC	locative
ML	majority language
MOD	modal
PART	participle

PASS	passive
PL	plural
POSS	possessive
PRF	perfect
PROG	progressive
PRS	present
PST	past
s	spoken
SG	singular
T	Turkish
US	the U.S.
w	written
(-)	pause (in transcriptions), longer pauses with length in seconds
/	self-correction (in transcriptions)

2 While there is no monolithic definition of finiteness, we take 'nonfinite verb' to mean 'a verb which does not have a person and number marker and is able to head an embedded clause but not an independent clause'.

3 See Johanson (1992) for an overview, Matras & Tufan (2007) for Macedonian Turkish, Gulle (2011) and Bagriacik & Göksel (2016) for Greek–Turkish language contacts.

4 Turkish is a language with syllable harmonic alternation in suffixes. In the representation of suffixes, we follow the established convention of using a capital letter for consonants and vowels which may undergo an alternation. Furthermore, (*y*) is given where an intervocalic glide may occur.

5 Though Labov (1994) indicates that his model is not intended for contact situations.

6 See, in particular, Yağmur (2011), where the vitality of Turkish in Australia, France, Germany and the Netherlands is compared. The author makes it clear that the vitality of Turkish in Germany is the highest and that of Turkish in Australia is the lowest among these four countries. The vitality of Turkish in the U.S. may be regarded as similar to Australia.

7 The questionnaire was jointly developed in the research unit RUEG. It is based on a questionnaire developed in the research project MULTILIT (see Schellhardt & Schroeder 2015). We document the questionnaire together with an extensive explanation of the elicitation procedure in https://osf.io/qhupg/ (accessed 22 June 2021).

8 The part-of-speech distinctions for Turkish are drawn on the basis of Schellhardt & Schroeder (2015).

9 See for a summary of the discussion and the manual document: https://saltsoftware.com/media/wysiwyg/tranaids/CunitSummary.pdf (accessed 24 March 2021).

10 Note that for this study, we have used the data from a snapshot of the next RUEG corpus release (0.4.0).

11 The original spellings of the participants have been retained.

12 The participant codes we give provide the following information:

country:	DE – Germany; US – U.S.
bilingual speaker:	bi
speaker number incl. age group:	1–50 – adults; 51 onwards – adolescents
gender:	M(ale); F(emale) (there were no speakers who identified as non-binary)
heritage language for bilingual speakers	T – Turkish
communicative situation:	formal – f vs. informal – i; spoken – s vs. written – w
language of production:	T – Turkish

13 Call:

```
glm(formula = canon ˜ HL_education + Watching + Listening + Texting +
    Reading + visiting_Turkey + place_mother + place_father,
    family = binomial(link = "logit"), data = .)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
−1.2675	−0.6089	−0.4172	−0.2624	2.4665

Coefficients:

	Estimate	Std. Error	z-value	Pr($>$|z|)
(Intercept)	−2.0543	1.9503	−1.053	0.292
HL_educationyes	−0.9873	1.2020	−0.821	0.411
Watching	−1.0619	0.6684	−1.589	0.112
Listening	0.1208	0.6838	0.177	0.860
Texting	0.7454	0.7198	1.036	0.300
Reading	−0.3531	0.6252	−0.565	0.572
visiting_Turkey	1.2277	0.9469	1.297	0.195
place_motherTurkey	−1.3577	1.5973	−0.850	0.395
place_fatherTurkey	1.3970	1.2917	1.082	0.279

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