Variation Revisited
Syntactic and Morphosyntactic Variation in Heritage Speakers of German in the United States

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Table of Contents

Note: The page numbers listed in this table of contents only apply to the frame text as the four articles in the present collection are individually numbered.

List of Publications

Note: The four articles are presented in order of conceptualization and not chronologically with regard to the publication date to ensure coherence.

Article 1: Syntactic Optionality in Heritage Language Use: Clause Type Preferences of German Heritage Speakers in a Majority English Context

Pashkova, T., Tsehaye, W., Allen, S., & Tracy, R. (2022). Syntactic Optionality in Heritage Language Use: Clause Type Preferences of German Heritage Speakers in a Majority English Context. *Heritage Language Journal*, 19. doi:10.1163/15507076-12340022

Article 2: Deconstructing the Native Speaker: Further Evidence From Heritage Speakers for Why This Horse Should Be Dead!

Tsehaye, W., Pashkova, T., Tracy, R., & Allen, S. E. M. (2021). Deconstructing the Native Speaker: Further Evidence From Heritage Speakers for Why This Horse Should Be Dead! *Frontiers in Psychology,* 12. doi: 10.3389/fpsyg.2021.717352

Article 3: Light-weights placed right: post-field constituents in heritage German.

Tsehaye, W. (2023). Light-weights placed right: post-field constituents in heritage German. *Frontiers in Psychology*, 14. doi: 10.3389/fpsyg.2023.1122129

Article 4: Best case scenario: Case marking in prepositional phrases in heritage German

Tsehaye, W. (submitted). Best *case* scenario: Case marking in prepositional phrases in heritage German. *Zeitschrift für Sprachwissenschaft*

Introduction

Over the last two decades, research on heritage speakers (HSs) and heritage languages (HLs) has experienced a substantial upsurge and is now an established and autonomous field of interest within the realms of research on bi- and multilingualism. This is not surprising, as investigations of HL grammars provide us with important insights on language acquisition (e.g., Tracy & Gawlitzek, 2023), language contact (e.g., Aalberse et al., 2019), and language change (e.g., Kupisch & Polinsky, 2022), hence on issues fundamental to linguistic concerns across theoretical approaches.

While in the past HSs had often been considered *semi speakers*, *unbalanced bilinguals,* or *language attritors* who undergo *incomplete acquisition*, perspectives have shifted. Research now provides plenty of evidence for the claim that HSs undergo *differential* rather than incomplete acquisition (Kupisch & Rothman, 2018) and show *divergent attainment* (Polinsky & Scontras, 2019, 2020) in their HL compared to monolingually-raised speakers (MSs) of the same language. Furthermore, it has been shown that HL grammars are coherent and follow specific patterns and rules, and that variation within them falls within the realms of native grammars (Aalberse et al., 2019; Guijarro-Fuentes & Schmitz, 2015).

HSs are largely characterizable as a heterogeneous speaker population exhibiting different degrees of non-canonical[1] variation across linguistic domains in their HL. A multitude of factors – and their interplays – have been identified for capturing differences between HSs and monolingual comparison groups. Language contact phenomena, such as transfer (e.g., Albirini & Benmamoun, 2014; Clyne, 2003; Montrul & Ionin, 2010) or input quality and frequency (e.g., Kupisch & Rothman, 2018; Montrul, 2016a, pp. 117–119; Polinsky & Scontras, 2019) have largely been attested as causes for variation. A preference for more transparent and salient structures in the HL (e.g., Polinsky, 2018, p. 166; Putnam et al., 2021; Westergaard & Kupisch, 2020), or differences in the acquisition timing of specific phenomena (Tracy & Gawlitzek, 2023; Tsimpli, 2014; Westergaard & Kupisch, 2020) also contribute to increased variation. While the HL productions of HSs have often been compared to the productions of MSs or second language (L2) speakers of that language, research comparing HSs' productions across their two languages, the HL and the majority language (ML), is scarce.[2]

In addition to the outlined contact-related and system-specific sources of variation, differences between HSs and monolingual comparison groups can furthermore result from individual variation (Guijarro-Fuentes & Schmitz, 2015; Özsoy & Blum, 2023; Polinsky, 2018b). This is not surprising given the heterogeneous background under which HSs acquire their HL (i.e., input frequency, type of exposure, HL prestige, etc.), which creates 'noise' in comparisons across individual HSs subsumed under the same speaker group (Rothman et al., 2023). Capturing individual variation with the help of qualitative analyses is thus essential for understanding

[1] Throughout this collection, the concept of *canonicity* is used to describe phenomena which are in line with codified German Standards according to contemporary grammars. Hence, *non-canonicity* refers to phenomena which differ from codified norms.

[2] See Paspali (2023) for a recent study that compares HSs' heritage Greek and majority German productions.

heterogeneity in HSs (Tsehaye et al., to appear). An additional factor which has not been listed yet and has not received much attention in past research, is the role of register in HS variation.[3]

The targeted HL throughout this dissertation is German in an English-speaking majority context. Thus, the presented research follows in the tracks of a long-lasting tradition of research on heritage German varieties. The focus therein lies predominantly on older speakers who are part of established Heritage Language Islands (HLIs), such as Pennsylvania or Texas German, to only mention two (Boas, 2009b, 2016; Fuller, 2001; Fuller & Glenn, 2003; Huffines, 1980; Louden, 2008; Stolberg, 2015a). Relatively little is known, however, about younger speakers from more recent generations of immigrants who are not part of HLIs.

To close various empirical and theoretical research gaps, this collection:

(1) focuses on adolescent 2nd generation immigrant HSs of German who are not part of a larger HL community (Articles 1-4) by raising – and answering – the questions *Can we confirm the existence of stable and variable domains in HL grammars in the group of HSs under consideration, and do we see patterns of non-canonical variation?*
(2) introduces the construct of *register* as an additional source of non-canonical variation in HS productions and as a reason for differences between HSs and MSs (Articles 1-3) in answer to the question *Which role does register play in the productions of HSs and MSs?*
(3) analyzes HSs' productions across their HL, German, and their ML, English, (Articles 1+2) to respond to the question *How do HSs' HL productions compare to those of their ML?*

The individual contributions in this dissertation investigate syntactic and morphosyntactic variation in HSs. *Article 1* focuses on the role of register and language dominance by investigating optionality of three different clause types across registers. It compares HSs' German and English productions to those of MSs of German and English respectively, and HSs' HL productions to their ML productions. *Article 2* extends the investigations on register and language dominance on clause types performed in Article 1 and zooms in on the phenomenon of subordinate clause types. This article also compares HSs' productions in German and English to those of MSs of German and English and draws comparisons across HSs' productions in their HL and ML. *Article 3* analyzes the role of language contact and register by investigating the variational spectrum at the right sentence periphery in HSs and MSs, specifically in form of non-clausal light-weight constituents in the post-field. *Article 4* focuses on the effects of language contact, on patterns of non-canonical variation, and on HS heterogeneity by investigating morphological realizations of the accusative and the dative case in prepositional phrases in HSs and MSs.

The four articles are interconnected methodologically as well as regarding the nature of the investigated phenomena (see Figure 1). The data stems from the same participant population and were elicited with the same method. All contributions focus on interface phenomena, which are proven to evoke increased variation in bilingual speakers (Sorace, 2011; Tsimpli,

[3] The role of register is a focal point that is explored in the DFG funded *Research Unit Emerging Grammars in Language Contact Situations* (FOR2537) out of which the research presented in this dissertation emerged. RUEG's main objectives will be addressed in the following paragraphs of this introduction, and I will refer to ongoing research on HSs that acknowledges the role of register in the section *Sources of non-canonical variation in HSs* of this frame text. For detailed information on RUEG, visit https://www.linguistik.hu-berlin.de/en/institut-en/professuren-en/rueg/.

2014) and thus provide an excellent starting point to investigate variational differences between the two speaker groups. The phenomena investigated throughout the articles vary in terms of their acquisition timing in relation to existing research on acquisition in monolingual (L1) and simultaneous bilingual (2L1) children (A. Müller et al., 2018; Schulz & Tracy, 2018; Tracy, 2011; Tracy & Lemke, 2011). Articles 1-3 focus on early acquired word order phenomena in combination with later acquired register knowledge, and Article 4 focuses on the later acquired[4] inflectional morphology of case. Methodologically, all articles investigate HSs and MSs, Articles 1-3 additionally include comparisons across registers, while Articles 1+2 furthermore incorporate productions across the HL and ML of HSs.

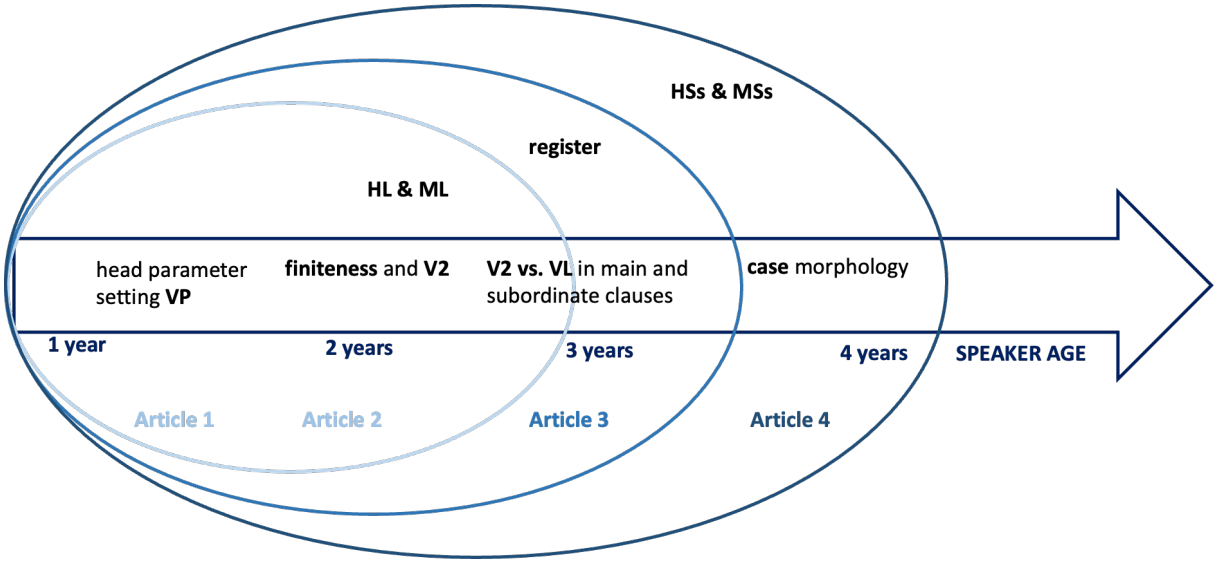

Figure 1: Overview of methodological and thematic connections between individual contributions

The individual articles illustrate findings on specific aspects studied within the Research Unit RUEG (see footnote 3). The research group is unique in its approach to HSs and HLs as it conducted large-scale, cross-linguistic comparisons of HSs and MSs from five different languages using a unified method to elicit speaker variation in various linguistic domains across communicative situations. Consequently, specific methodological and conceptual focal points of this dissertation (e.g., the elicitation method, the age groups under consideration, or the concept of register) are rooted in the joint RUEG venture.

The remainder of this volume is structured as follows. First, I provide a theoretical frame for existing research on HSs by outlining the construct and range of HSs investigated in the literature, followed by a section on sources of non-canonical variation. In a next step, I present the collection of individual articles, which form the core of this dissertation, first summarized with regard to main objectives and results, and then in full length. Subsequently, I resume the conclusions of the individual articles, also relating them to the three questions identified in this introduction and discuss potential implications of HL research. Last, I address limitations and provide suggestions for future research directions.

[4] The outlined phenomena are all acquired during childhood. 'Later' in this context is to be understood in relation to core syntactic features which are acquired even earlier. Additionally, distinctions between early and late acquired phenomena can only be made in relation to specific languages, as they depend on the transparency and complexity of the linguistic system (Tsimpli, 2014). Thus, the outlined distinctions are specific for German as case marking in other languages (i.e., Turkish or Russian) appears considerably earlier due to clearer form-function mappings.

Theoretical Background: Research on Heritage speakers

The Construct of a Heritage Speaker

In this section, I outline the construct of HSs by providing a brief overview of HS definitions that find application in HL research. I additionally identify differences between the HSs analyzed in this collection in contrast to HSs of German in the English-speaking diaspora investigated in the literature to date.

Even though, the term *heritage speaker* is by now well-established and frequently used, a variety of speakers with different degrees of HL proficiency is subsumed under it. Some definitions take a socio-cultural stance and include speakers who only have cultural affiliations with the HL[5] without taking into account actual proficiency in comprehension and production, such as childhood overhearers[6]. Other definitions are stricter in terms of linguistic competence and thus require HSs to actively understand and produce the HL.[7] Accounts that follow this narrower perspective have defined HSs as individuals who grow up speaking their HL at home while living in a country where another language has majority status (Montrul, 2016; Polinsky, 2018b; Rothman, 2007, 2009). They are either simultaneous or early sequential bilinguals who experience a dominance shift from the HL to the ML once formal education commences (Benmamoun et al., 2013; Pascual Y Cabo & Rothman, 2012). After the dominance shift to the ML has taken place, HSs usually feel more comfortable in their ML than their HL. Typically, the ML becomes the medium that is used with more conversational partners, applicable in more conversational situations, and therefore often perceived as the dominant language by HSs themselves.

The data presented in this collection stems from HSs who fall under this latter definition: They are the bilingual offspring of 1st generation immigrants to the United States. They were born in the United States or immigrated there during early childhood and hence acquired their HL while growing up in an English-dominant society. At the time of data collection, the HSs investigated were adolescent speakers living with their parents, and most of them had limited active exposure to their HL, sometimes only speaking German to one parent.[8] This particular exposure scenario makes them speakers of what colleagues and I defined as *Tiny Language Islands* (Tsehaye et al., to appear).

Why study heritage German?

German is among the better-explored languages in the context of HL research. Therefore, current explorations of heritage German can look back at considerable research, especially in countries where English is the ML (e.g., Boas, 2009b, 2009a, 2010, 2016; Clyne, 2003; Fuller, 2001; Fuller & Glenn, 2003; Hopp & Putnam, 2015; Huffines, 1980; Johannessen & Salmons, 2015; Louden, 2008; Stolberg, 2015a, 2015b, 2019; Yager et al., 2015). A lot of this research, however, focused on older speakers of established HLIs, who belong to the 3rd, 4th, or 5th

[5] These speakers can be understood as HSs in the 'broad sense' of Polinsky & Kagan (2007).
[6] The literature shows that even as little exposure as overhearing an HL during childhood is beneficial for HSs who seek to learn their HL later on as they have better accents than L2 learners of the same language (Au et al., 2002).
[7] See Ortega (2020) for an overview of definitional features.
[8] In our corpus of 29 adolescent German HSs, eleven participants grew up in a household with only one German-speaking parent.

generations of HSs, and who range from speakers of moribund, end-state varieties of German to speakers of reviving and still vital German-speaking communities[9].

Thus, the 2nd generation immigrants, and therefore 1st generation HSs of Tiny Language Islands (TLIs) discussed here differ from speakers of established HLIs with respect to three major aspects[10]:

1) *Historical*: The initial settlers of German HLIs were oftentimes forced to leave their home country due to war, religious persecution, or comparable predicaments. As refugees, many of them settled in specific communities, sharing the same language and similar experiences. In contrast, 2nd generation immigrant HSs of German live in the United States because their parents immigrated mainly due to work-related reasons, and they are spread throughout the country.
2) *Sociolinguistic*: In established HLIs, speakers are – or at least usually were – part of a larger HL speaking community in which the HL was or is perceived as prestigious. Intergenerational language transmission was or is desired, and competence in the HL was or still is a positively connotated identity marker. Additionally, due to the existence of an HL community, speakers of HLIs usually experience(d) higher and more varied levels of exposure to the HL and its registers, for instance in form of religious sermons, newspapers, and other written materials. Until the beginning of the 20th century, German schools were also common in HLIs (e.g., Baker, 2011; Tracy, 2015). In contrast, speakers of TLIs have limited input and output opportunities in the HL since the focus often lies on acquiring the ML in order to succeed in the country of residence.
3) *Linguistic*: In established HL communities, HSs experience increasing periods of language contact, which lead to baselines that show diachronic contact phenomena. Additionally, due to limited technological resources and fewer or less affordable options to fly back to the home country in the past, contact with the homeland was limited and speakers of HLIs had reduced access to contemporary varieties of German after immigration.[11] HSs of TLIs, conversely, have more opportunities to visit the home country and, in theory, have access to contemporary German varieties overseas via various technological advancements.

Another branch of research on German in the United States focuses on 1st generation immigrants who came to the United States as adolescents or adults and whose data was collected 50-70 years after immigration (Keller, 2014; Lattey & Tracy, 2001; Münch & Stolberg, 2005; Schmid, 2011; Stolberg & Münch, 2010; Tracy, 2022; Tracy & Lattey, 2010; Tracy & Stolberg, 2008). HSs of TLIs significantly differ from this speaker population regarding their acquisition of German. After all, 1st generation immigrants started out as monolingual German-speaking children growing up in a country where their L1 had majority status. The population of HSs investigated in this collection acquired German on a continuum of bilingualism with clear dominance in English as the ML. Consequently, with respect to their HL biography, the HSs in this collection can be placed in between speakers of established HLIs and 1st generation immigrants.

[9] For the importance of HL communities in HL proficiency, see among others Nagy (2018) and Westergaard & Kupisch (2020).

[10] The following references to speakers of established HLIs are non-comprehensive and radically reduced as they only serve the purpose of outlining the differences between HLIs and TLIs.

[11] This, of course, presupposes the possibility that speakers could visit their home countries without the threat of ongoing persecution.

The analyses in this dissertation focus on the highly under-represented speaker population of adolescent HSs since they significantly contribute to research on heritage German with respect to the following aspects. In terms of their HL exposure and proficiency, adolescent HSs can be placed between children and adults speaking the same language. We are thus looking at speakers who have not yet left their homes and, even though HL elaboration might have slowed, may have not yet experienced attrition in a strict sense (i.e., loss or slowed access to what was acquired before) comparable to adults[12]. Nevertheless, their HL is typically surpassed by their dominant ML, which continues to flourish. The data of adolescent HSs offers further information on differences in acquisition and retention of early and especially of late acquired phenomena under reduced input, such as register knowledge (Articles 1-3) or the German case paradigm (Article 4), which are not acquired before the start of formal schooling.[13] Overall, adolescent HSs provide us with valuable information relevant for identifying stable and vulnerable areas of specific HLs and grammars in general.[14]

Throughout the articles in this collection, adolescent HSs will be compared to MSs of German and English, which is why I want to address the inclusion of MSs as comparison groups in light of current discussions of a suitable baseline (Polinsky, 2018b; Polinsky & Kagan, 2007; Polinsky & Scontras, 2019). As mentioned before, HSs' productions in their HL are often compared to MSs of the same language owed to the fact that actual baseline data – the input that HSs receive in their HL – is hardly ever taken into account, or even available. As has lately been stressed by many, assumptions of monolingual normativity (Cook, 2016; Rothman et al., 2023) are highly problematic, not only because MSs are by no means a homogeneous speaker group[15] (e.g., Guijarro-Fuentes & Schmitz, 2015; Shadrova et al., 2021) but also because HSs and MSs can be rightly considered 'native speakers' of their first languages, independently of levels of attainment (see also Kupisch & Rothman, 2018; Montrul, 2013; Rothman & Treffers-Daller, 2014; Wiese et al., 2022).

The analyses in this collection compare HS productions to those of MSs due to two reasons: Firstly, the integration of both HSs and MSs of the same language serves to present the spectrum of variation (e.g., Guijarro-Fuentes & Schmitz, 2015; Nagy, 2015) and production patterns available to both speaker groups in the same communicative contexts. This enables us to account for language-internal dynamics and heterogeneity noticeable in MSs of German. Secondly, a large part of my analyses aims at discovering which linguistic domains and phenomena remain stable even under language contact and which show variation. In doing so, I explore various reasons for existing variation, one of them being German-English bilingualism. Without the inclusion of MSs, conclusions about the influence of language contact cannot be drawn. Therefore, while MSs were included in the analyses throughout the articles, they were not interpreted as the baseline of HS productions. The productions of both

[12] This does not apply to adult HSs who engage in HL learning.

[13] In addition to these phenomena, reading and writing skills are also not formed until school age. While the latter skills are not the focus of this dissertation, they are addressed in other publications (Tsehaye et al., to appear).

[14] Across the RUEG project, two age groups of participants were targeted: adolescents and adults. As we were unable to collect enough data of adult HSs (a total of seven), this dissertation focuses exclusively on adolescent participants. For adult HSs of other RUEG-wide elicited HLs, see amongst others Iefremenko et al. (2021) and Özsoy et al. (2022).

[15] Although I refer to MSs as one group, the theoretical concept of monolingualism needs to be approached critically as MSs often move on a spectrum of 'internal multilingualism' with respect to standard varieties, regional or urban contact dialects, and registers (e.g., Kerswill & Wiese, 2022; Tausch & Tsehaye, 2023; Tracy & Gawlitzek, 2023, pp. 27–30).

speaker groups were compared against a codified German standard and only subsequently to each other.

Sources of non-canonical variation in HSs

The analyses across each individual article aimed at providing further insights into the intricate interplay of sources leading up to non-canonical variation in HSs. This section lays out three major areas which the articles in this collection focused on – language contact, language acquisition, and register.

Language Contact

German and English – the two languages in contact in this dissertation – are both Germanic languages which share substantial typological features, that can result in (surface) parallelism across languages. Finite root clauses with intransitive or transitive verbs, for instance, show similar surface patterns (e.g., *Es regnet.* 'It rains.'; *Sie liebt Hunde.* 'She loves dogs.'). These similarities vanish once clauses become more complex including auxiliaries, finite and non-finite, as well as ditransitive verbs (e.g., *Wer hat dem Hund ein Leckerli gegeben?* 'Who has the dog a treat given?' *Er hat zu wenig gegessen.* 'He has too little eaten.'), resulting in substantial differences between German and English (e.g., Haider, 2010; König & Gast, 2007; Platzack, 1986; Weerman, 1989). The interplay between similarities and differences – in addition to inhibition – results in potential cognitive and linguistic 'conflict' and leads to increased non-canonical variation in phenomena that differ between the two languages at play in HSs.

The linguistic phenomena dealt with in this dissertation are (i) verb placement and clause-type selection (Articles 1+2), (ii) syntactic linearization at the right sentence periphery (Article 3), and (iii) accusative and dative case marking (Article 4). The following paragraphs focus on the relevant cross-linguistic similarities and differences between English and German and highlight potential consequences of language contact with regard to transfer from English.

Head directionality within the VP: German is head-final within the verb phrase (VP), resulting in OV_{-fin} structures with non-finite verbs or verbal elements (i.e., infinitives, participles, separable particles) following the complement (e.g., *Ich möchte einen Hund haben.*). English, on the other hand, is head-first within the VP, hence the verb, regardless of its finiteness, precedes complements (e.g., *I want to have a dog.*), with only particles able to shift (*The dog picked up the bone/picked the bone up.*).

V2 effects and verb placement in main vs. subordinate clauses: A metaphor to approach German syntax and especially verb placement in a linear way is the topological model, and essentially, the sentence bracket (Drach, 1963; Höhle, 1986; Zifonun et al., 1997). The basic structure is illustrated in Figure 2.

		sentence bracket			
	forefield	**left**	**middle-field**	**right**	**post-field**
main clauses	X	$V2_{+fin}$	…	V elements$_{-fin}$	Y
subordinate clauses	X	COMP/REL	…	VL_{-fin}	Y

Figure 2: Basic structure of the topological model

German exhibits asymmetric verb placement across clause types. In main clauses, finite verbs canonically surface in second position (V2), i.e., in the left sentence bracket, while non-finite verbal elements appear in the last position (VL), i.e., the right sentence bracket. German main clauses exhibit a full range of V2 effects, essentially allowing almost any constituent to appear in preverbal position (X), the main exception being the placement of more than one constituent before the finite verb, resulting in verb-third (V3) structures[16]. In subordinate clauses, the left sentence bracket is filled with a complementizer (COMP) or relative pronoun (REL) and the finite verb surfaces in the right sentence bracket, resulting in SOV structures. In complex constructions with main and subordinate clauses, the latter can either be pre-posed into the forefield (X) (e.g., *Dass er Hunger hat, war mir sofort klar.*) or extraposed into the post-field (Y) (e.g., *Mir war sofort klar, dass er Hunger hat.* 'It was immediately clear to me that he was hungry.').

English, on the other hand, has canonical SVO structure across main and subordinate clauses, with subjects preceding the verb (finite or non-finite), regardless of the presence of a complementizer or relative pronoun. English additionally exhibits so-called 'residual' V2 effects in structures with specific triggers, such as directional adverbials, and non-transitive verb classes (e.g., *Out of the castle walked the princess.*). Wh-phrases and negative expressions trigger subject-auxiliary inversion (e.g., *What did she see? Never would he believe that.*).

Inflectional morphology for case: The typological differences between German and English outlined for syntax intensify in the domain of inflectional morphology. German and English differ in their number and realization of cases. Standard German distinguishes between four cases: nominative, accusative, dative, and genitive, and uses rich inflectional morphology to do so. The German case paradigm is characterized by high levels of syncretism involving gender and number marking, which oftentimes obscure clear form-function distinctions. In addition to syncretism, phonological closeness between case suffixes can lead to difficulty in discriminating between case paradigms – especially if encountered orally (e.g., differentiations of indefinite articles in the nominative and accusative paradigm: *ein* /ain/ vs. *einen* /ainən/, *nen* /nən/*, en* /ən/).

In comparison, overt case marking in modern English is highly reduced. The identification of grammatical relations predominantly relies on constituent linearization and prepositions. In the nominal domain, English draws case distinctions between the common case, i.e., subject and object case, and the genitive, i.e., possessive case. Last remnants of a three-way distinction in case marking become visible in a subclass of pronouns (e.g., *he, him, his*). Possessives can be indicated morphologically (*'s*) or by prepositional elements.

These cross-linguistic differences yield predictions for non-canonical variation. With respect to word order, an increase in (non-)canonical extrapositions – including direct objects – as well as in non-canonical V2 subordinations is expected due to the stability of English VO structure across clauses. Regarding case morphology, predictions range from reduction to complete loss of case paradigms in the HL. Similar predictions have been explored in research on heritage German varieties in HLIs in the past. Studies reported a general robustness of the asymmetry between V2 placement in main clauses and VL in subordinate clauses, despite extended

[16] Investigations of V3 structures are not integrated in this collection but were analyzed beyond it (Tsehaye et al., to appear.). See also Bunk (2020), Freywald et al. (2015), S. Müller (2003), Rocker (2022), Wiese & Müller (2018), among others for detailed accounts on V3 structures across monolingual and multilingual varieties of German.

periods of language contact. However, some researchers also observed tendencies of convergence towards SVO patterns (Clyne, 2003) and complementizer-specific non-canonical variation in subordinate clauses (Boas, 2009b; Hopp & Putnam, 2015; Louden, 2008). Additionally, a preference for extraposing non-clausal constituents and direct objects is characteristic for heritage German in majority English contexts (Clyne, 2003). Regarding the production of morphosyntactic phenomena in HSs of established HLIs, researchers reported increased non-canonical variation, realized in the form of leveling or the complete loss of case paradigms (e.g., Boas, 2016; Clyne, 2003; Johannessen & Salmons, 2015; Yager et al., 2015).

Language Acquisition

Linguists studying HSs are in the fortunate position of being able to rely on decades of research on monolingual and bilingual child language acquisition. Investigations of HSs need to acknowledge the existence of variation patterns throughout acquisitional stages to guard themselves against hasty attributions of non-canonical variation in HSs to language contact or deficient input. The following paragraphs serve as an overview of L1 and 2L1 child language acquisition of the phenomena investigated throughout this collection. It is by no means an exhaustive account of all acquisitional steps but serves to highlight the differences in acquisition timing to ensure coherent interpretations of the results in this collection. More detailed information is provided in the individual articles of this dissertation.

With regard to word order, research has shown that the first indices of canonical head parameter setting in German children become visible around one and a half years, with complements preceding verbs or verbal particles, the precursors of the right sentence bracket. The appearance of main verbs in V2, i.e., indication of the left sentence bracket, correlates with canonical finiteness markings, such as subject-verb agreement, and stabilizes around the age of two (Clahsen, 1990; Fritzenschaft et al., 1990; Tracy, 2011). In German-English bilingual children, the distinction between head parameter setting across languages emerges equally early (Döpke, 1998, 2000; Gawlitzek-Maiwald & Tracy, 2005; N. Müller, 1998; N. Müller & Hulk, 2000). Notably, even child L2 learners of German, with age of onset around age 3, regardless of their L1, are able to acquire the basic structure of German main clauses between six to twelve months after they enter kindergarten, and the structure of subordinate clauses after about two years after initial contact with German (Rothweiler, 2006; Tracy & Thoma, 2009). This provides further evidence for the early accessibility of core syntactic features, even in cases where two languages coexist from birth or where a second language joins the first language in early childhood.[17]

Canonical productions of main and subordinate clauses presuppose (implicit) knowledge of the asymmetric placement of finite verbs across clause types to form syntactically complex structures. Children acquiring German need to navigate through the possible placement options of verbs and verbal elements (e.g., participles, infinitives, separable prefixes) across the sentence bracket. Research shows that children move the finite verb to VL once complementizers appear in the left sentence bracket, with very few individual temporal exceptions. Regardless of differences in individual paths, the acquisition of finite verb placement in subordinate clauses stabilizes between three and three and a half years (Fritzenschaft et al., 1990; A. Müller et al., 2018; Rothweiler, 1993, 2006; Tracy, 2011).

[17] This, of course, is only possible if L2 input is available.

Concerning the acquisition of specific subordinate clause types, researchers have proposed different acquisition orders. The present collection positions itself amongst those who argue that the order of acquisition depends on their position at external or internal interfaces. Accordingly, subordinate clause types involving external interfaces are acquired later than those which are located at internal interfaces. Thus, complement clauses emerge earlier as they only require knowledge of verb complement selection (internal interface). Adverbial and relative clauses are acquired later because they lie at the external discourse-pragmatic interface and require discourse management skills, such as knowledge of the pragmatic need to specify a referent via relative clauses (Armon-Lotem, 2005; Diessel, 2004; Mastropavlou & Tsimpli, 2011; Paradis et al., 2017; Vasilyeva et al., 2008).

In contrast to the relatively quick and stable acquisition of German core syntax, the complex mapping of syntactic function and morphological form required to mark constituents for case requires time.[18] In their initial productions, children do not mark case due to missing carrier systems (e.g., articles, adjectives, etc.). Once children start to acquire determiners, nominative forms emerge. Binary case distinctions between the nominative and the accusative case appear around two and a half years. This is followed by the emergence of dative morphemes and the acquisition of form-function relationships between case and prepositions as additional governing heads when children are older than three and a half years. The complete case paradigm, including the genitive case is not acquired until children reach school age (Clahsen, 1984; Meisel, 1986; Tracy, 1984).

Acquisition paths are typically described in terms of 'stages', which is, however, an idealization and artefact due to sampling intervals. Transitioning between the stages, children go through phases of non-canonical variation and vacillation between older and more progressive patterns (Tracy, 2011).[19] The L1 literature shows, for instance, occasional non-canonical finite V2 placement in subordinate clauses, non-canonical placement of complements in post-verbal position, or non-canonical accusative overgeneralization in dative contexts – even in children who are not affected by influence from an additional language (e.g., Fritzenschaft et al., 1990; Gawlitzek-Maiwald et al., 1994; Tracy, 1984, 1991, 2011).

Register

After having addressed acquisition-, language-, and contact-specific sources of variation, the focus now shifts to the discussion of register. The next section introduces the construct of register, discusses its often lacking integration in HL research in the past, and argues for its benefits in the inclusion in HL research.

Linguists have been analyzing the influence of registers on production patterns for decades (Biber & Conrad, 2001; Ferguson, 1983; Goulart et al., 2019; Halliday, 1985; Koch & Oesterreicher, 2012; Poole & Field, 1976). In line with contemporary accounts, this collection adopts the definition of register as the linguistic variety resulting from situational and functional parameters, such as the purpose of communication, the interlocutors involved, or the mode and formality of communication, which lead to systematic production patterns (Biber & Conrad, 2001, p. 175, 2009, p. 6; Goulart et al., 2019, p. 436; Lu et al., 2023, p. 2;

[18] High levels of syncretism in German also pose challenges for researchers, as it is difficult and sometimes impossible to clearly or reliably tease apart case or gender marking as the origin of non-canonical inflections.

[19] Catching such transition phenomena is, however, only possible through longitudinal and qualitative studies, which is why HL research, which is predominantly cross-sectional, benefits from the integration of such findings.

Lüdeling et al., 2022, p. 3). Research on register, thus, investigates the functional relationship between language-external, situational parameters and linguistic features and variation (Goulart et al., 2019, p. 436).

The interplay between production mode and formality in different registers is intricate and often subtle (Biber et al., n.d.; Biber & Conrad, 2001; Lu et al., 2023). Researchers have however identified specific structures and phenomena which can be attributed to different registers. Written formal registers are, for instance, associated with higher syntactic complexity[20] (e.g., via complex clauses), syntactic condensation (e.g., via embeddings), and enhanced planning activity compared to spoken and informal registers (Biber & Conrad, 2001; Poole & Field, 1976; Schleppegrell & Colombi, 1997).

Speakers typically acquire a broad register repertoire and an awareness of the conditions under which specific registers have to be used (Halliday, 1975, 1978). Initially acquirable in rich conversational contexts and broadened with the help of increasing social interactions, the acquisition of formal registers usually begins with the onset of formal education (Polinsky, 2018b, p. 234) and speakers elaborate their register repertoires over the course of adolescence. In HSs, this development can be expected in the ML. In their HL, however, HSs are typically exposed to a more restricted range of communicative situations, mostly limited to informal and spoken registers (Aalberse et al., 2019, p. 148; Flores & Rinke, 2020; Polinsky, 2018b, pp. 323–324). In many cases, they cannot acquire an equally broad register spectrum in the HL as in the ML (Olfert, 2022; Pires & Rothman, 2009), which is why we cannot expect register competence, let alone active use of register features, if speakers have had no access to differentiated discourse-pragmatic resources.

In the past, scholars have analyzed HS productions within specific registers, such as academic writing (Schleppegrell & Colombi, 1997) or have focused on HSs' competence across registers via self-assessment tasks (Olfert, 2022). Few if any studies have systematically investigated how different registers manifest themselves in the HL, and scholars have highlighted the necessity of analyzing productions across a spectrum of formal and informal varieties (Flores & Rinke, 2020; Wiese et al., 2022). The inclusion of register variation is essential in HL research in order to investigate whether differences in HS and MS productions originate from varying underlying grammars or from register levelling (i.e., reduced distributional variation across register); the first resulting in distinct grammatical patterns across speaker groups, and the latter leading to quantitative production differences between those speaker groups (Wiese et al., 2022). Furthermore, comparisons of register variation across HSs' HL and ML provide substantial insight into the possible transfer of register knowledge from the ML to the HL. As a result, the RUEG research group has largely dealt with the systematic analysis of HSs' and MSs' productions across registers in a collective venture to close this gap in the literature (e.g., Alexiadou et al., 2022; Alexiadou & Rizou, 2023; Labrenz, 2023; Özsoy et al., 2022; Wiese et al., 2022; see also Articles 1-3 in this collection).

Now that the theoretical, terminological, and contextual grounds are laid out, the following section presents the method with which the data across individual articles has been collected as well as four short summaries of the respective articles followed by their complete versions.

[20] For accounts that offer a more distinguished differentiation of text complexity see, for instance, Biber et al. (in press) and Biber & Gray (2016).

The Present Collection

As mentioned in the *Introduction*, the data throughout the four contributions originates from the RUEG research group. Data collection took place from 2018 to 2019 and HSs of German and MSs of English were tested in the Unites States, while MSs of German were tested in Germany. The data was obtained using the Language Situations Method (Wiese, 2020), which elicits spontaneous, quasi-naturalistic data across registers differing in production mode (spoken vs. written) and formality of setting (formal vs. informal).[21] The stimulus consisted of a short video of a rear-ending car accident which the participants were asked to retell in four different communicative situations: a spoken testimony to the police, a written accident report to the police, a spoken retelling of the events to a friend, and a written instant message to a friend – leading to a total of four narrations per speaker. All participants also engaged in 10-15 minutes of task-unrelated conversation before the elicitation of the informal productions. Obtaining several narrations of the same event across registers – and essentially also across languages – from the same individuals enabled us to distinguish between singular performance errors and steadily recurring patterns. It further helped to determine effects of language contact and resulting transfer phenomena. MSs took part in one session and HSs in two, one for each of their languages, with three to five days in between sessions in order to minimize priming effects. The order of production modes and formality as well as the order of languages was counter-balanced across participants (for detailed descriptions of the methodology, see the individual articles of this dissertation). The application of this method resulted in high levels of data comparability across speakers and languages and yielded a broader spectrum of productions from individual speakers. To further increase this production spectrum, we additionally administered three extra studies with German HSs. All participants took part in a spoken sentence completion immediately following the RUEG-wide elicitations in the United States. 12 participants additionally took part in a written sentence completion and a written sentence correction task, which were sent out to them via an online questionnaire a few months after the initial elicitations. The stimulus sentences across the three extra studies were based on the elicitation video. We were thus able to administer HL productions across five tasks (informal conversations, Language Situation narrations, spoken sentence completion, written sentence completion, written sentence correction) varying in production constraints placed on the participants. This allowed for an exhaustive investigation of individual variation. Findings pertaining to variation across these tasks are not included in this dissertation but will be addressed in the conclusion (see also Tsehaye et al., to appear).

The elicitation design required the participants to be willing and able to speak and especially write in their HL, which presupposes increased levels of HL proficiency.[22] Due to the complexity and time expenditure of the applied method, which required HSs to come in for elicitation on two different days, further examinations of HL proficiency with the help of additional tasks were not performed.

[21] As the data throughout the individual collection was obtained from the same speakers and elicited with the same method, parts of the methodological sections in each article are unavoidably redundant. Yet, each article looks at a new phenomenon and adapts its theoretical frameworks accordingly.

[22] This hypothesis was corroborated by the fact that some HSs, after initially agreeing to participating in the study, decided against it, as they felt uncomfortable writing in their HL.

The data is publicly available via the RUEG corpus[23], which was specifically constructed for the purpose of this project. It is a multi-layer annotated corpus of spoken and written productions, which is continuously expanding in terms of additional annotation layers[24]. The complete corpus contains subcorpora for productions in English, German, Greek, Russian, and Turkish. It additionally includes metadata[25] of each individual participant. For the purposes of this collection, the English and German subcorpora were consulted.

In the following section, I provide summaries of the individual articles including the main objectives and the results and relate them to previous findings and gaps in the literature.

Article Summaries

Article 1:

Pashkova, T., Tsehaye, W., Allen, S., & Tracy, R. (2022). Syntactic Optionality in Heritage Language Use: Clause Type Preferences of German Heritage Speakers in a Majority English Context. *Heritage Language Journal*, 19. doi:10.1163/15507076-12340022

Note: This paper contains a mix-up in the presentation of the results which could lead to misinterpretation. On p. 21 it is supposed to say "[…] HSs produced more IMCs in the written than in the spoken mode […]". The correct results are visible in the subsequent Figure 7.

The overarching aim of Article 1 was to investigate how HSs and MSs use their syntactic and pragmatic resources to structure discourse across different registers and how language dominance affects these choices. The article focused on clause type optionality defined as "[…] the possibility of realizing the same semantic content by means of several otherwise competing grammatical expressions […]" (Boyd, 2007, p. 1). In line with the Systemic Functional Linguistics framework which argues that speech is a product of distinct choices of individual speakers (e.g., Halliday, 1976, 2013; Schleppegrell, 2013), we[26] investigated speakers' choices between three clause types – independent main clauses (IMCs), coordinate main clauses (CMCs), and subordinate clauses (SCs) – to express identical or similar semantic meaning.

The literature repeatedly points out that HSs have reduced register repertoires in their HL, often resulting from limited input in the HL and a dominance shift to the ML (see Aalberse et al., 2019, p. 148; Polinsky, 2018, p. 324 for comments on this). However, to the best of our knowledge, no study had focused on register variation across different registers in HSs and MSs and across HSs' two languages at that time. To address these gaps, we consulted the data of 60 adolescent participants (20 HSs of German, 20 MSs of German, and 20 MSs of English) and conducted three comparisons: between heritage and monolingual German, between majority and monolingual English, and between heritage German and majority English. We used binomial linear regression models with the independent variables of speaker group (heritage/monolingual), setting (formal/informal), mode (spoken/written), and language

[23] A detailed documentation of the corpus and its annotation layers can be found here: https://korpling.german.hu-berlin.de/rueg-docs/v0.2/.

[24] Additional annotation layers were also specifically created for the data analyses conducted for this dissertation and added to the RUEG corpus. Detailed information can be retrieved from the individual articles.

[25] The metadata contain information on the speakers' language use, language dominance (via self-assessments), the languages used within the family, parental education, etc.

[26] In the article summaries, *we* is used when the contribution resulted from cross-project collaborative work in RUEG, and *I* is used in individual publications.

status (heritage/majority), as well as their interactions and the dependent variable of clause type.

We wanted to assess whether HSs and MSs differ in their production of clause types across registers. Importantly, we wanted to explore whether HSs would produce less SCs due to typological differences between English and German (OV vs. VO) and higher syntactic complexity of SCs (Housen et al., 2019; Neary-Sundquist, 2017; Peristeri et al., 2017; Sánchez Abchi & De Mier, 2017). We further wanted to investigate, whether HSs can transfer their register knowledge from their ML to their HL as was found in a previous study on academic writing in 2 HSs of Spanish (Schleppegrell & Colombi, 1997).

The comparisons between heritage and monolingual German showed that HSs and MSs performed similarly regarding their distribution of IMCs. Concerning CMCs, both speaker groups showed similar distributional patterns, but HSs produced overall more CMCs than MSs. SCs were overall produced less by HSs than by MSs. Additionally, HSs only accounted for formality differences in SCs in written productions, while MSs did so in both spoken and written productions.

The results additionally underlined the retention of canonical finite verb placement across main and subordinate clauses in HSs as only seven out of 169 SCs illustrated non-canonical V2 structures in the heritage German productions.[27] Four of those structures (see example below[28]) highlight transfer from English which was probably triggered by phonetic closeness between German and English.

weder	des	auto	hatt	ihrgendwehrman	wegetahn
whether	the	car	had	somebody	hurt

'whether the car had injured somebody'

The non-canonical structure in this example is taken to be prompted by the calque of the English complementizer *whether* instead of canonical *ob* (if, whether) to introduce the SC, resulting in surface parallelism. *Weder* was the complementizer in three non-canonical V2 structures and *wenn* (when, conditional) instead of canonical *als* (when, temporal) led to one non-canonical V2 structure.

The comparison between majority and monolingual English showed that HSs and MSs performed similarly regarding the overall frequency and the distribution across registers in all three clause types.

The comparison between heritage German and majority English showed that HSs performed similarly regarding the distribution of IMCs and CMCs across registers in both languages but produced overall more IMCs and CMCs in heritage German than in majority English. In contrast, we found more SCs in the majority English productions. Additionally, HSs differed in their SC distributions across registers in the two languages. In majority English, SCs were

[27] In Articles 1+2, *weil*-V2 clauses were not counted as SCs, as *weil* lost its status as subordinating conjunction in those constructions (Antomo & Steinbach, 2010; Reis, 2013).

[28] This written example sentence, which was kept in its original form, also illustrates orthographical inconsistencies – attributable to reduced exposure to written German – as well as semantic infelicitousness in the choice of the verb *wehgetan* (hurt) instead of *verletzt* (injured).

distinguished across formality in both spoken and written productions, whereas in German, formality discrimination was only visible in the written productions.

Article 2:

Tsehaye, W., Pashkova, T., Tracy, R., & Allen, S. E. M. (2021). Deconstructing the Native Speaker: Further Evidence From Heritage Speakers for Why This Horse Should Be Dead! *Frontiers in Psychology,* 12. doi: 10.3389/fpsyg.2021.717352

Article 2 extended the investigations on register and language dominance in the domain of SCs with respect to two aspects: firstly, we increased the participant number in the analyses of SCs and secondly, we zoomed in on specific SC types, therefore adding to the literature as different types of SCs were previously not systematically analyzed across formal and informal registers.

The objective of this article was to critically analyze the term *native speaker* based on the premise that it fails to be a meaningful descriptor. We positioned ourselves among scholars who claim that HSs are native speakers of both their ML and HL (Kupisch & Rothman, 2018; Montrul, 2016; Rothman & Treffers-Daller, 2014, p. 96; Wiese et al., 2022) and argued that HSs and MSs – two subgroups of native speakers – differ from one another, especially in comparisons across heritage and monolingual language productions.

To investigate the extent of native speaker variation, we analyzed the frequency of SCs and SC types (complement clauses, adverbial clauses, and relative clauses) across registers in 91 adolescent speakers (27 HSs of German, 32 MSs of German, and 32 MSs of English). As in the first contribution, we compared HSs' heritage German productions to those of German MSs and their majority English productions to those of English MSs. The three investigated SC types vary regarding their acquisition time and their position at external interfaces. We thus wanted to assess whether the results of Article 1 could be replicated in a larger speaker group and whether differences in acquisition timing of SCs would manifest in different distributions in HSs' HL.

We used binomial linear regression models with the independent variables being bilingualism (heritage bilingual/monolingual), setting (formal/informal), and mode (spoken/written), as well as their interactions, and the dependent variable being clause type in the first analysis. For the second analysis, the independent variables were bilingualism (heritage bilingual/monolingual) and setting (formal/informal), as well as their interactions, and the dependent variable was SC type. We did not account for mode in the second analysis as the inclusion of it led to overfitting of the models.

The comparisons of SCs between heritage and monolingual German showed that HSs and MS differed with respect to overall SC frequency and distribution across registers. HSs produced fewer SCs than MSs. Additionally, HSs only discriminated between formality in written productions, while MSs did so in both spoken and written productions. The comparison of SC types across heritage and monolingual German showed that HSs behaved similarly regarding the overall frequency and distribution across formal and informal productions in all three SC types.

The comparisons of SCs between majority and monolingual English showed that HSs and MSs were similar with respect to overall SC frequency but differed in distributional patterns. HSs

discriminated between formality in both spoken and written productions, while MSs only did so in the written productions. This finding is in line with studies that report differences between majority and monolingual speakers (see among others Böttcher & Zellers, 2023; Scontras et al., 2017). The comparison of SC types between majority and monolingual English showed that HSs and MSs behaved similarly regarding the overall frequency and distribution across production modes in all three SC types.

Article 3:

Tsehaye, W. (2023). Light-weights placed right: post-field constituents in heritage German. *Frontiers in Psychology*, 14 doi: 10.3389/fpsyg.2023.1122129

Note: This study reports the results as percentages while the studies in Articles 1+2 report them as proportions. Within this collection, these terms are used interchangeably.

The main objective of this article was to investigate (non-)canonical variation at the right sentence periphery in HSs and MSs. Research on the right sentence periphery had until recently received comparably little attention, and few if any studies investigated the post-field outside of speakers of HLIs. Researchers who have investigated this area identified it as a domain of increased variation – especially in spoken and informal productions – even among MSs of German and, therefore, called for more differentiated analyses (Frey, 2015; Roelcke, 1997; Vinckel-Roisin, 2012, 2015; Zifonun, 2015). Research on HSs of established HLIs attested increased extraposition in spoken productions of HSs in comparison to MSs (Westphal Fitch, 2011), as well as extrapositions of direct objects (Clyne, 2003). These differences were attributed to transfer from English and a preference for parallel structures across languages (Clyne, 2003; Flores, 2013; Hopp & Putnam, 2015; Kupisch & Rothman, 2018; Westphal Fitch, 2011) which would emerge if constituents appeared in the post-field. Thus, a higher variety and higher frequencies of extraposed constituents were expected in HSs.

In contrast to Articles 1+2, this article investigated the role of language contact in a phenomenon which already shows increased levels of variation across mode and formality in monolingual varieties (e.g., Vinckel-Roisin, 2015). To address the gaps in the literature, I adopted the topological framework (e.g., Wöllstein, 2014; Zifonun et al., 1997) to focus on the placement of non-canonical light-weight constituents (LWCs) in the post-field.

I searched for post-field LWCs across registers in 61 adolescent speakers of German (29 HSs and 32 MSs) using descriptive as well as inferential statistics. LWCs were subdivided into six constituent types (prepositional phrases, adverbial phrases, determiner phrases, adjectival phrases, discourse markers, and non-canonically placed direct objects in the form of determiner phrases). I ran one binomial linear regression model with the independent variables being speaker group (HS/MS), setting (formal/informal), and mode (spoken/written), and the dependent variable being LWC. An additional model zoomed in on the most frequent LWC type – prepositional phrases – and was used to investigate differences in frequency across speaker groups. This model did not include setting and mode distinctions due to scarceness of datapoints (a total of 74 prepositional phrases).

The analyses revealed an equally broad spectrum of LWC types and similar LWC frequencies across speaker groups, the only exception being two non-canonically placed direct objects in the post-field, produced by an individual HS. The results also showed no distributional differences for LWCs in HSs and MSs across spoken and written productions. Both speaker

groups produced more post-field LWCs in speech than in writing, providing further evidence that post-field LWCs remain a spoken phenomenon, regardless of language contact. Regarding their post-field LWCs across formal and informal productions, the two speaker groups differed. HSs did not differentiate between formal and informal productions, while MSs produced more LWCs in informal productions. Concerning the frequency of post-field prepositional phrases as one type of LWC, HSs and MSs did not differ, which could point to an increasing proneness of placing prepositional phrases in the post-field in contemporary German (Haider, 2010, p. 191; Zifonun, 2015).

I additionally qualitatively assessed the production of the individual who placed two direct objects in the post-field. The structure of these clauses provided evidence of transfer from the ML. This was further supported by the fact that this speaker produced the same structures in their majority English productions. Therefore, while language contact did not play a significant role in the productions across HSs, English seemed to provide the template clausal matrix in cases where deviations from standard German grammar occurred.

Article 4:

Tsehaye, W. (submitted). Best *case* scenario: Case marking in prepositional phrases in heritage German. *Zeitschrift für Sprachwissenschaft*

In contrast to the phenomena analyzed in the previous articles, Article 4 focused on the later acquired phenomenon of case morphology in HSs. The domains of morphology and morphosyntax show increased levels of non-canonical variation in HSs across various languages (Benmamoun et al., 2013; Montrul, 2011, 2016, pp. 55–61; Polinsky, 2018b; Putnam et al., 2021). Language contact, dominance shift, limited exposure to written accounts in the HL, as well as preferences for unambiguous and perceptually salient forms have been identified as possible sources for non-canonical variation (Polinsky, 2018b, p. 166; Putnam et al., 2021; Westergaard & Kupisch, 2020).

Therefore, the objective of this article was to contribute to research on case marking in HSs by focusing on the morphological realization of the accusative and the dative case in determiner phrase (abbreviated as DP from now on) complements of prepositional phrases in 61 adolescent speakers of German (29 HSs and 32 MSs). I wanted to explore whether previous findings on speakers of HLIs, such as accusative overgeneralization, restructuring, or loss of the dative (Boas, 2009b, p. 174 ff., 2009a, 2016; Putnam et al., 2021; Yager et al., 2015) could be replicated in 2nd generation immigrant HSs of German who are not part of established HLIs. Additionally, the influence of preposition type (single case preposition vs. two-way preposition) on canonical case marking was investigated. In single-case prepositions, case marking lies at the interface of syntax and morphology as speakers must map syntactic function with morphological form, but only one specific case presents a canonical option, whereas two-way prepositions additionally touch upon the interface of semantics. Hence, speakers must choose between two cases depending on the semantic reading of the situation (two-way preposition plus accusative for a directional reading and two-way preposition plus dative for a locative reading). Furthermore, the systematicity of HL grammars was investigated in the pursuit of identifying patters of variation.

This article additionally explored HS heterogeneity via quantitative analyses across speakers to account for in-group variation, and by qualitative analyses in a subpopulation of HSs, namely

three siblings. In-depths analyses of sibling data served to investigate HS heterogeneity in a more 'contained' group of HSs and allowed for the integration of additional socio-linguistic parameters. Consequently, this study provided a methodological extension in comparison to Articles 1-3.

I conducted quantitative and qualitative descriptive analyses, with the independent variables being preposition type (single-case, two-way accusative, two-way dative) and speaker group (HSs/MSs), and the dependent variable being DP canonicity. The investigated DPs were coded as canonical or non-canonical with respect to codified German standard. Comparisons were conducted between HSs and MSs, across HSs, and between three siblings.

The results showed that HSs produced slightly fewer non-canonical DP complements of single-case prepositions than of two-way prepositions, underlining the fact that the absence of semantic constraints of case marking options in single-case prepositions result in higher canonicity. Additionally, HSs showed fewer non-canonical DPs in dative contexts compared to accusative contexts, which is in clear contrast to previous findings on HSs of established HLIs. An identical pattern, with overall smaller frequencies became apparent in the productions of MSs. The analyses furthermore revealed three systematic patterns of non-canonicity in DPs following single-case prepositions in HSs: (1) morphological underspecification of DPs in which HSs produced a 'simplified' or uninflected version of the DP; (2) overgeneralization of the suffix *-(e)n* on determiners, which can be interpreted as accusative overgeneralization in canonically dative contexts; and (3) *-(e)m* overmarking on the determiners of feminine nouns, which can be interpreted as an extension of the perceptually salient and transparent *-(e)m* suffix on determiners of masculine and neuter nouns in the dative paradigm to feminine determiners.

Qualitative analyses of the sibling data showed that they followed the patterns of non-canonical case marking outlined above. Additionally, non-canonical variation in the context of specific two-way prepositions emerged, which could be interpreted as idiosyncratic restructuring of two-way prepositions to single-case prepositions, a trend that is also visible in HSs of established HLIs (Boas, 2009b, Chapter 5, 2009a, 2016). However, these were too infrequent to categorize them as patterns. Quantitative comparisons across siblings furthermore showed that they differed in the quantity and canonicity of inflected DPs: the older siblings produced overall more case-marked DP complements as well as higher frequencies of canonical inflections.

Analyses on HS heterogeneity showed that HSs can be subdivided into three groups on a continuum of low, medium, and high levels of non-canonicity across preposition types. Morphological canonicity seemed to be influenced by the number of German-speaking parents, as most speakers who showed low levels of non-canonicity had two German-speaking parents. Within the group of speakers who showed high levels of non-canonicity, most speakers reported living with only one German-speaking parent. Additionally, bilingual education, which was attested in four participants, unsurprisingly also correlated with higher canonicity. The pertaining heterogeneity in the sibling data was explained by birth order effects on HSs' HL proficiency, as younger siblings usually receive less HL input and have fewer production opportunities in the HL since the likelihood that older siblings and parents use the ML at home increases (Aalberse et al., 2019, pp. 123–124; Bridges & Hoff, 2014; Shin, 2002).

Complete Articles

Syntactic Optionality in Heritage Language Use: Clause Type Preferences of German Heritage Speakers in a Majority English Context

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Abstract
This study focuses on the syntactic and pragmatic resources heritage speakers (HSs) use to structure their discourse according to register. Drawing on a corpus of narratives produced by German HSs living in the United States, as well as by monolingually-raised speakers (MSs) of English and German, we investigated HSs' syntactic resources by analyzing how they approached clause type optionality across registers. Concerning overall clause type frequencies, HSs performed similarly to MSs in their majority English, but showed differences in their heritage German compared to German MSs. This can be attributed to the majority language dominance and different complexity of clause types in the heritage language. However, regarding the pattern of clause types across registers, HSs' productions are similar to those of German MSs, and across HSs' two languages. This suggests an underlying register awareness that HSs can draw upon in their heritage language.

Keywords: heritage speakers - heritage German - majority English - syntactic optionality – register - independent main clause - coordinate main clause - subordinate clause

1 Introduction

Heritage speakers (HSs) are an interesting population for various types of linguistic research. They are broadly defined as bilinguals who acquire a heritage language (HL) at home and, after the onset of formal education, shift towards the majority language (ML) of their country of residence (Pascual Y Cabo & Rothman, 2012). It is often pointed out that their ML is used in a wider range of communicative situations than their HL. Many studies have addressed HSs' morphosyntax (Montrul & Sánchez-Walker, 2013; Polinsky, 2008), lexicon (Hulsen, 2000; Montanari et al., 2020), semantics (Krause, 2020; Montrul & Ionin, 2010), and syntax (Brehmer & Usanova, 2015; Kim et al., 2009). Less attention has been paid to the syntactic resources HSs employ in structuring their discourse according to register, both in speech and writing. The current paper aims at filling this gap.

In monolingual L1 acquisition, learners acquire a broad repertoire of register varieties, and the more or less tacit awareness of the conditions of their use (Halliday, 1975, 1978). Since HSs might be exposed to a smaller range of communicative situations than monolingually-raised speakers of the same age and comparable socioeconomic background, it is an intriguing question of how they cope with the challenge of mapping grammatical form and communicative function in various situations (Schleppegrell & Colombi, 1997, p. 494).

Within the overall context of research on heritage languages and language variation, this paper explores the syntactic options used by HSs in narrative reports on the same event across registers.[1] We define syntactic optionality as "the possibility of realizing the same semantic content by means of several otherwise competing grammatical expressions" (Boyd, 2007, p. 1). Our analysis focuses on three grammatical alternatives: independent main clauses (IMCs), coordinate main clauses (CMCs), and subordinate clauses (SCs).

One theoretical framework for studying optionality has been developed within Systemic Functional Linguistics, with language perceived as a system from which speakers choose alternatives to convey their ideas in different situations (Halliday, 1976). Different situational parameters can be subsumed under the term register (Biber & Conrad, 2001, p. 175). According to Halliday (1978, pp. 31-32), the theory of register attempts to "uncover the general principles which govern this variation, so that we can begin to understand what situational factors determine what linguistic features." While the proponents of the model did not have HSs in mind, they were open to dialectal variation (e.g. Halliday, 1978, p. 34).

This study aims at a systematic analysis of clausal options across four registers: formal spoken (voicemail to the police), formal written (written testimony to the police), informal spoken (voice message to a friend), and informal written (text message to a friend), all based on the same event. To obtain a comprehensive picture of HSs' linguistic repertoires, we investigated both of their languages—majority English and heritage German—and compared them to monolingually-raised speakers of English and German tested on the same materials. We refer to the latter groups as "monolinguals" for ease of reference, although most of them had learned one or more foreign languages in school and report speaking them with varying degrees of proficiency.

[1] A video of the event may be accessed at https://osf.io/szfhd/.

In this paper, we tackle the following research questions:

RQ 1: With respect to the three clause types, do HSs make similar use of structural options in their ML (English) compared to English monolinguals and their HL (German) compared to German monolinguals?

RQ 2: Do HSs use comparable structural options in their ML (English) and their HL (German) in different registers?

RQ 3: Do certain registers reveal preferences for particular structural options?

2 Theoretical and conceptual background

2.1 *Heritage Speakers*

Heritage speakers are bilinguals—either early second language learners or, as in our case, simultaneous acquirers of two first languages (2L1). One of their languages is the ML of their country of residence, while the other language is mainly spoken within the family or even to just one parent. By early adulthood, speakers have typically become dominant in their ML (Pascual Y Cabo & Rothman, 2012). This shift in dominance happens because, after HSs start kindergarten/preschool, their ML repertoires gradually expand due to a widening spectrum of communicative situations, whereas their HL typically becomes increasingly restricted to interactions with family members. One relevant question, then, is what features of the HL grammar and its registers can develop despite this decrease of exposure to HL variants—a question we pursue with respect to the three clause types mentioned above—IMCs, CMCs, and SCs.

Our research contributes to current approaches to HSs' repertoires in several respects. First, we target a specific group of HSs—adolescent HSs of German, children of first-generation immigrants to the United States—thereby expanding previous research on heritage German, which mainly focused on senior HSs from established German "language islands" (e.g., Boas, 2009; Hopp & Putnam, 2015; Putnam & Salmons, 2013). Second, we consider syntactic phenomena reaching across clausal boundaries, namely selection of clause types. So far, the main focus of HL syntax research has been on intra-clausal structures, especially on word order variation (Brehmer & Usanova, 2015; Larsson & Johannessen, 2015), and on the comprehension as well as the production of subject and object relative clauses (Albirini & Benmamoun, 2014; Polinsky, 2011, 2018). In this study, we argue that the selection of clause types provides insight into HSs' repertoires because it lies at the interface of syntax and discourse, both of which are sources of variation in HSs' productions (Sorace, 2011).

2.2 *Syntax and discourse knowledge of heritage speakers*

Syntactic knowledge of HSs may result in variation for two reasons. The first one relates to the differences between the languages involved. Although German and English are closely related Germanic sisters, there are striking differences between them (e.g., Haider, 2010; Platzack, 1986; Weerman, 1989). First, German is head-final within the VP, with non-finite verbal elements (infinitives, participles, separable particles) following complements. In English, on the other hand, the verb, finite or non-finite, precedes its complements. Second, German, alongside all other Germanic languages except for English, is a Verb Second (V2) language. This means that in main clauses, the finite verb canonically raises to the second position, the head position of CP in generative terms, with maximally one constituent preceding it in SpecCP. English is typologically SVO and only shows "residual" V2 effects in subject-verb and subject-auxiliary inversion. Third, English maintains SVO across main and subordinate clauses. In German, on the other hand, word order is asymmetric: V2 in main clauses and V-final in clauses introduced by complementizers or

relative pronouns since verb raising is blocked by their presence. Despite this asymmetry in the placement of finite verbs in German, there remains an important parallel across main and subordinate clauses, as the non-finite verb always follows its complement. In the present study, we mainly focus on the third English-German contrast, positing that V-final word order in SCs may present additional difficulty to HSs and cause them to use fewer SCs than German monolinguals.

We argue that, although V2 word order requires additional movement compared to finite V-final constructions in generative approaches (Los & Starren, 2012; Platzack, 1986; Weerman, 1989), finite V-final in German might actually be more complex than V2 from a German-English bilingual perspective. This might be due to the parallel activation of two languages in a bilingual mind (Abutalebi & Green, 2016), which calls for a constant inhibition of one language. The structures that do not overlap in both languages, and thus require inhibition of one structure, can be more complex for a bilingual speaker. English and German do not overlap in the finite V-final in SCs, consequently, this structure might present additional cognitive load to bilingual speakers, causing them to use fewer SCs than German monolinguals do. On the other hand, English and German exhibit a structural overlap when the subject precedes a finite main verb of main clauses: in this case, the superficial clause structure is parallel in English and German, namely SVO. This may lead to a preference for such parallel structures (Heine, 2008; Hulk & Müller, 2000), and possibly, to a higher proportion of IMCs and CMCs in HSs' compared to German monolinguals' productions.

The second reason for potential variation in HSs' syntactic knowledge lies in SCs, since they have often been viewed as an indicator of syntactic complexity across languages (Housen et al., 2019; Neary-Sundquist, 2017; Peristeri et al., 2017; Sánchez Abchi & De Mier, 2017). Syntactic complexity is a multi-faceted construct, which has been defined, among other things, as the extent to which speakers use syntactic embedding and subordinate clauses (Housen et al., 2012).

However, the association of SCs with complexity has been called into question: several researchers found no correlation between the number of SCs and text complexity but did so for mean length of nominal phrases and clauses (Bulte & Housen, 2014; Lu, 2011; Wang & Tao, 2020). Overall, the evidence is conflicting. Nevertheless, if SCs indicate the complexity of a text to some extent, we would expect to find fewer SCs in HSs' productions in their HL compared to monolingual speakers of that language or even compared to HSs' ML due to language dominance shift.

In addition to the syntactic factors outlined above, discourse knowledge of registers is another locus of variation for HSs in their HL because they most likely have not been exposed to as wide a range of registers as encountered by monolingual speakers of the same language (Polinsky, 2018, pp. 323-324). Register is a variety definable in terms of situational parameters such as participants, channel, purpose and formality of communication (Biber & Conrad, 2001, p. 175). In this study, we operationalize formality as spoken or written communication with public institutions, and informality as spoken or written communication with friends and family. We expect HSs to be less familiar with formal registers of the HL, but to be more fluent in informal registers. At the same time, HSs' ML typically follows a different trajectory: HSs use it in a wider range of communicative situations and thus develop formal and informal register repertoires comparable to monolinguals.

The interaction of these two knowledge types (core grammatical features and register repertoire) is essential because registers systematically influence language choices, including clause type selection in accordance with the register norms of their social and cultural environment (Schleppegrell, 2013, p. 22; Schleppegrell & Colombi, 1997, p. 494). While the relevance of social

and cultural determinants of registers has been acknowledged, investigators have not always approached registers and their influence on structural choice from a comprehensive perspective. Some researchers have attributed specific linguistic features solely to mode differentiation (i.e. speech vs. writing) and have argued that written language is more complex than spoken language (Poole & Field, 1976). Alternatively, Halliday (1985) argues that spoken and written productions differ in type of complexity and that one should not be pitted against the other. Biber and Conrad (2001) stress the importance of distinguishing mode and setting, as not all written productions are expected to be similarly complex. For example, academic writing is a complex register that involves a lot of planning and syntactic condensation (Biber & Conrad, 2001; Schleppegrell & Colombi, 1997) while texting usually does not require much planning as further information can be added at any point.

Miller and Fernandes-Vest (2006) provided an overview of various studies addressing clause type selection in the context of spoken and written productions. Their focus was on one register in the spoken mode, namely spontaneous everyday conversations, and its comparison with written productions. Different written registers were not considered. The authors emphasize that spontaneous speech contains less subordination than coordination, as well as fragmented and unintegrated syntax with less complex phrases and clausal constructions (Miller & Fernandes-Vest, 2006, p. 13).

Similarly, Koch and Oesterreicher (2012) outlined syntactic features of the language of immediacy, defined as spontaneous face-to-face dialogues between familiar speakers, and the language of distance, defined as carefully planned interactions between strangers in the public sphere. The language of immediacy is characterized by errors in congruence, holophrastic utterances and parataxis. On the other hand, the language of distance is associated with compactness, complexity and density of information, and hypotaxis.

The above-mentioned studies suggest variation in the distribution of clause types among registers. However, to the best of our knowledge, there has not yet been a systematic study of clause types across written and spoken modes in formal and informal settings in descriptions of the same event, which is what we set out to do here.

2.3 *Optionality and Systemic Functional Linguistics*

We investigated the register-related choice of clause types on the basis of narratives where the same event could be expressed in various ways (with no or minimal changes in meaning). The alternatives considered here include (1) several independent main clauses (IMCs), (2) a compound sentence with several coordinate main clauses (CMCs), or (3) a complex sentence with a main and a subordinate clause (SC), as shown below:

(1) I was walking down the street. I saw a couple.

(2) I was walking down the street, and I saw a couple.

(3) While I was walking down the street, I saw a couple.

The existence of grammatical alternatives to express the same or similar meaning is termed optionality (Boyd, 2007). Two types can be identified (Dufter et al., 2009). We refer to the first type as optionality *A or 0,* defined in terms of presence or absence of a certain linguistic item, which does not change the construction it is embedded in (McGregor, 2013). For example, a speaker may use or omit the complementizer *that* in an English SC (Bakovic & Keer, 2001; Biber & Conrad, 2001). Our second type of optionality, *A or B*, includes two alternating variants of the same argument structure: their propositional meaning is identical, even though they may differ in information structure, and they use nearly identical lexical resources (Boyd, 2007; Sorace, 2000). For example, a speaker may alternate between two realizations of complements in ditransitive VPs

(*gave John the book* vs. *gave the book to John*; e.g., Bresnan & Ford, 2010). Compared to previous research (Alexiadou, 2014; Prentza & Tsimpli, 2013), which focused mostly on two alternatives and on clause-internal structures, such as argument realization or empty categories, we extend the pool of options to three and include structural alternatives crossing clausal boundaries.

Within Systemic Functional Linguistics theory, Halliday (1976) defines speech as a product of distinct choices that are simultaneously and successively carried out by any speaker of a language. He argues that there are three components in the process of choosing: "a specified condition under which the choice is available," "a specified realization of whichever of the options is selected," and "a specifiable likelihood that any one choice will be made" (Halliday, 2013, p. 19). For example, if speakers choose between an IMC and SC, they can consider to whom they are speaking and in what situation (specified conditions), they have to choose one of the syntactic forms (specified realization), and we can estimate how likely the speaker is to choose one clause type over the other in a given situation (specifiable likelihood).

2.4 *Syntactic optionality in heritage speakers*

In the following section, we discuss two studies addressing similar questions regarding clause type optionality in HSs' productions. The first study, by Sánchez Abchi and De Mier (2017), illustrates the influence of language typology on SC frequency in HSs' productions. They tested 118 child HSs of Spanish living in a French- and a German-speaking area of Switzerland and analyzed types and frequencies of SCs in their Spanish written narratives. The results demonstrate an important dissimilarity between SC frequency of HSs with German as the ML and HSs with French as the ML: HSs of Spanish with German ML produced significantly fewer SCs than those with French ML, who performed like Spanish monolinguals. The authors attribute this to the typological differences in SC word order between their majority German (V-final in SCs), and heritage Spanish (absence of V-final in SCs). Since the same typological difference applies to German (V-final in SCs) and English (absence of V-final in SCs), we expect differences in the frequencies of SCs in the German productions of HSs and German monolinguals. Since the researchers only investigated SCs in the written mode in the HL, more clause types as well as more strictly defined registers should be considered, in addition to the performance of HS in both their languages.

In the second study, Schleppegrell and Colombi (1997) analyzed three clause types (paratactic, hypotactic and embedded) produced in academic essays by two HSs of Spanish in the United States. The results show inter-individual variation concerning their clause chaining strategies: one participant used more hypotactic (adverbial) and non-restrictive relative clauses than the other. Interestingly, the two HSs adopted the same clause-combining strategies in academic essays in both majority English and heritage Spanish. This is particularly remarkable because they had received no formal education in Spanish and were not exposed to academic registers. Presumably, they had developed language-independent register awareness that they could draw from even in their less dominant HL (Schleppegrell & Colombi, 1997, p. 493). Since the authors only examined two speakers, additional quantitative research is called for. Furthermore, their study focused on just one mode and one setting, namely formal written. Broader registers including different modes and settings need to be investigated to account for register variation.

To address the gaps in the literature just discussed, the present study investigates three research questions (RQs) concerning syntactic optionality in HSs' productions. Based on findings from that literature, we also lay out hypotheses and predictions for each question:

RQ 1: With respect to the three clause types, do HSs make similar use of structural options in their ML (English) compared to English monolinguals and their HL (German) compared to German monolinguals?

Hypothesis 1: HSs will be similar to monolinguals in English, and dissimilar to monolinguals in German since HSs are normally more proficient in their dominant ML than in their HL.

Prediction 1: German SCs are more difficult for HSs due to the asymmetrical placement of finite verbs and the general complexity of SCs. Hence, we would expect fewer subordinations in the German productions of HSs compared to monolinguals.

RQ 2: Do HSs use comparable structural options in their ML (English) and their HL (German) in different registers?

Hypothesis 2a: We expect HSs to rely on their underlying register awareness in both of their languages.

Prediction 2a.1: Following Schleppegrell and Colombi (1997), we expect HSs to show similar clause type patterns across both languages.

Prediction 2a.2: The similarity in clause type patterns does not mean, however, that they show identical frequencies. Similar to Prediction 1, we expect fewer SCs in heritage German compared to majority English.

Hypothesis 2 competes with the claim that HSs have limited register awareness in their HL, which stems from using their HL mostly in informal conversations (Polinsky, 2018). Therefore, we suggest the following alternative hypothesis:

Hypothesis 2b: HSs apply their knowledge of informal registers in formal situations in their HL.

Prediction 2b: We expect register levelling in the German productions of HSs and differentiation between registers in their English productions.

RQ 3: Do certain registers reveal preferences for particular structural options?

Hypothesis 3: Following Systemic Functional Linguistics, we expect an association between the three clause types and the two settings and two modes, which we take to represent four registers.

Prediction 3.1: We expect more SCs in formal than in informal registers in all speaker groups because SCs are associated with higher syntactic complexity.

Prediction 3.2: For HSs, we expect less influence of formality in the spoken mode than in the written mode. We predict that HSs account more for formality variation in the spoken mode than in the written mode because they typically have better speaking than writing skills (Montrul, 2011).

3 Method

3.1 *Participants*

We tested 60 adolescent participants aged 14 to 18 years (mean age=16.16, SD =1.17, 33 females), with 20 in each of three language groups:

1. HSs of German with ML English (mean age=15.95, SD=1.28, 10 females)
2. Monolingual speakers of German (mean age=16.45, SD=0.83, 11 females)
3. Monolingual speakers of English (mean age=16.06, SD=1.35, 12 females)

The HSs of German grew up in the United States in a majority English environment, speaking German with at least one native German-speaking parent in the household (four HSs had two German-speaking parents, and 16 had one). All speakers were either born in the United States or moved there before age 2. They had not received bilingual education, but may have participated in German "Saturday schools" or other German-speaking activities. Speakers of established German "language islands" (e.g., Moundridge Schweitzer German, Pennsylvania German) were excluded from the study. Monolinguals were defined as individuals whose native language was the only language spoken at home, but who might have acquired further languages through foreign language instruction.

German HSs were recruited in Boston, MA, Madison, WI, and St. Paul, MN by contacting German organizations and institutions as well as via social media platforms. German monolinguals were recruited via contacting German high schools in Berlin. English monolinguals were recruited in the same cities as German HSs (and in Long Island, NY) via social media platforms or through personal contacts. The socio-economic status of HSs' families was slightly higher than that of English and German monolinguals (see Appendix A[2] for detailed information on parental education) due to the nature of our HS participant pool, which mostly consisted of professionals whose move to the United States was work-related.

The German and English productions of the HSs as well as those of the English monolinguals were elicited in the United States and the productions of the German monolinguals were elicited in Germany. The data was retrieved from the openly accessible RUEG 0.4.0 corpus (Wiese et al., 2020). Both English and German productions of HSs were compared to the productions of monolingual speakers of each language.

3.2 *Materials and Procedure*

Data collection followed the Language Situations methodology (Wiese & Pohle, 2016), which elicits controlled, comparable, and quasi-naturalistic productions across registers. Participants watched a short non-verbal video depicting a minor car accident and recounted what they saw, imagining themselves witnesses to the accident. The procedure took place in two settings. In a formal setting, the elicitor was formally dressed and met with the participant in a room set up like an office. In the informal setting, the elicitor was casually dressed and met with the participant in a more relaxed setting, with snacks and beverages offered. In order to enhance an easy-going, comfortable atmosphere, the elicitor and the participant engaged in 10-15 minutes of task-unrelated conversation in the target language at the beginning of the informal session. The participant watched the video three times in total (twice in the first setting, once in the second setting) and was asked to recount it in two different modes: spoken and written.

The formal recounting was operationalized as a voice message to a police hotline (spoken) and a witness report to the police (written), while the informal recounting comprised a WhatsApp

[2] All Appendices to which we refer in this study may be accessed at https://osf.io/h7uac/.

voice message (spoken) and a WhatsApp text message (written) to a friend. The order of settings (formal/informal) and modes (spoken/written) was balanced across participants. The monolingual participants completed all tasks in one session. The HSs completed the tasks in two sessions—one for their ML (English) and one for their HL (German)—with an interval of three to five days in between to minimize priming effects. The order of language sessions was counterbalanced across participants. Upon completion of all the narrative tasks, the participants filled out an online questionnaire[3] about their language background as well as a self-assessment of their abilities in each language on a 5-point Likert scale. Self-assessment showed that HSs rated their speaking and writing skills higher in their majority English (speaking mean = 5, SD = 0; writing mean = 4.95, SD = 0.22) than in heritage German (speaking mean = 3.65, SD = 0.88; writing mean =2.7, SD = 0.26). English monolinguals rated their skills comparably high (speaking mean = 4.7, SD = 0.57; writing mean = 4.4, SD = 0.6) to German monolinguals (speaking mean = 4.95, SD = 0.22; writing mean = 4.75, SD = 0.55).

3.3 *English Data Coding*

We investigated syntactic optionality on the basis of the three clause types: IMC, CMC, and SC. Each of these is described in detail below, in this section for English, and in the next section for German.

In both languages we examined only finite clauses (4a-b). Clauses were included in our analyses even when the subject was omitted (4c), since subject omission is a typical feature of informal registers. Supplement clauses, i.e. as syntactically unintegrated clauses inserted in others (4d), were also included in our analyses (Huddleston & Pullum, 2002, p. 1350). Each structure in square brackets in (4) was counted as one clause.

(4) a. [A man was walking with a soccer ball] [which bounced off of his foot] [when he was crossing the street] (USmo72ME_fsE)[4]

b. [There was like a ball] [that flew into the road] [and a dog jumped out] [and chased it] (USmo74ME_isE)

c. [Just saw a car crash] (USbi65MD_isE)

d. [He was walking with his wife]—[I'm assuming it was his wife$_{supplement}$], [but I'm not sure$_{supplement}$]—[and bouncing a ball] (USbi55FD_isE)

In both English and German, morphologically non-canonical clauses, i.e. deviations with respect to person and number agreement paradigms, were still included, since they do not interfere with the structural options relevant here. Subordinations missing complementizers or relative pronouns were included because a large proportion of the data stems from spoken productions and omitting complementizers or relative pronouns is common in spoken productions (Biber & Conrad, 2001). To constrain the nature of the question and emphasize a particular English-German word order difference, namely finite verb position as discussed in Section 2.2, we restricted our attention to finite clauses.

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[3] Questionnaire for adolescent participants of *Research Unit Emerging Grammars* may be accessed at https://umfrage.hu-berlin.de/index.php/761648

[4] The participant code in the examples includes the following information:
US/DE - country of elicitation, United States or Germany; bi/mo - bilingual/monolingual speaker; 01 - speaker number; M/F - speaker's sex; D/E - HS's HL (Deutsch for German) or monolinguals' L1 (English or German); f/i - formal/informal setting; s/w - spoken/written mode; D/E - language of elicitation, D for German or E for English

Therefore, non-finite constructions, such as infinitives (5a), present participles (5b), and past participles (5c) were excluded.

(5) a. [They turned a corner on the sidewalk *to walk into the parking lot*] (USbi54FD_fwE)
b. [There was a blue car *driving across the parking lot*] (USbi50FD_fsE)
c. [A blue car drove down the road *followed by a white car*] (USbi52FD_fwE)

Table 1 shows the total number of English clause productions per speaker group and register.

TABLE 1. English clause productions by speaker group and register

Register	**Heritage Speakers**	**Monolinguals**
Formal Spoken	366 (32%)	314 (30%)
Formal Written	305 (27%)	292 (28%)
Informal Spoken	293 (25%)	268 (25%)
Informal Written	185 (16%)	174 (17%)
Total	**1149 (100%)**	**1048 (100%)**

3.3.1 English independent main clauses

Independent main clauses are not introduced by a coordinating conjunction, i.e. *and, or, but* (syndetic coordination), or by coordination without an overt linker (asyndetic coordination) (Haspelmath, 2007; Quirk et al., 1985). Typical examples are shown in (6a). We also considered clauses introduced by linking adverbs and conjuncts as IMCs, including *however*, *therefore*, *then*, *moreover*, resultative *so*, and *yet*. This is because these linkers do not pass Quirk et al.'s (1985) tests for coordination (Appendix B); either they can be moved within a clause, they can co-occur with a coordinator, or they do not allow subject ellipsis in the subsequent clause. An example of such a clause is (6b). Each clause in square brackets in (6) was counted as one IMC.

(6) a. [I saw a car accident today in the parking lot of an apartment building$_{IMC}$]. [A couple were walking with a stroller down the side of the road$_{IMC}$]. (USbi64MD_fwE)
b. [Then he goes over to the other drivers$_{IMC}$] (USbi57FD_iwE)

3.3.2 English coordinate main clauses

Coordinate main clauses are defined as IMCs with the exception of being introduced by a coordinating conjunction. We included three coordinating conjunctions—*and*, *or*, and *but*—because they pass all coordination tests by Quirk et al. (1985, Appendix B) and are classified as the most representative coordinators. As noted in 3.3.1, we did not consider linking adverbs and conjuncts as coordinators since they do not pass all coordination tests (Haspelmath, 2007, pp. 48-49; Quirk et al., 1985, p. 927). We differentiated three subtypes of CMCs. CMCs with overt subjects are composed of a subject and a predicate, and are independent of other clauses (7a). In contrast, CMCs with omitted subjects only contain a finite verb or predicate (7b). The subject, though omitted, can be retrieved from the previous clause. If the subject is dropped but not shared with the previous clause, the clause is classified as IMC. Finally, some CMCs with omitted subjects show asyndetic coordination, where the coordinate clause is not introduced by an overt linker but

still shares the subject of the previous clause (7c). Each clause in square brackets in (7) was counted as one CMC.

(7) a. It was kinda crazy [but thankfully no one was hurt$_{CMC}$] (USbi55FD_isE)
b. Two cars were driving [and turned the corner into the parking lot$_{CMC}$] (USbi51FD_fwE)
c. The male whose soccer ball went into the road helped the woman with her dog and groceries [then called 911 to get the police at the scene$_{CMC}$] [then went to make sure$_{CMC}$] the passengers in the car were ok and unharmed (USmo56FE_fwE)

3.3.3 English subordinate clauses

Subordinate clauses are dependent on another clause. We divided subordinations into three subcategories: complement, relative, and adverbial clauses. Complement SCs function as arguments of a predicate (8a) (Biber et al., 1999, p. 658; Noonan, 2007) or as noun complements (Biber et al., 1999, pp. 645-656). Complement SCs should not be confused with what follows multi-word discourse markers (DMs) *I think, I guess, I mean*, which look like epistemic expressions. In order to differentiate a DM from an epistemic expression, a complementizer test was applied: if a complementizer/wh-pronoun was present or could be added after the expression in question, it was not taken to be a DM and, hence, the following part was annotated as a complement SC (8b). If a complementizer was absent and could not be added, the expression was taken to be a DM with no complement SC (8c). Each clause in square brackets in (8), (9), and (10) was counted as one SC.

(8) a. They weren't looking and then realized [a car was coming$_{SC}$] (USbi52FE_fwE)
b. I don't know [what else happened$_{SC}$] (USbi50FD_isE)
c. And then these two cars came by and like *I dunno*$_{DM}$ they came to the intersection and the guy dropped his ball (USmo64FE_isE)

Relative SCs modify an NP (Andrews, 2007) (9a) or an entire proposition (Biber et al., 1999, p. 867) (9b), while adverbial SCs modify main clauses similarly to adverbs modifying a proposition (Thompson et al., 2007) (10a-b).

(9) a. it tried to like stop for this dog [that was running into the street$_{SC}$] (USmo65FE_isE)
b. The dog saw the ball and ran for it, [which caused the car in the front to stop$_{SC}$]. (USbi51FD_fwE)

(10) a. I witnessed the crash [as I was walking along the side of a street$_{SC}$] (USbi55FD_fwE)
b. The car stopped short [because there was a dog trying to get the ball$_{SC}$] (USmo59FE_iwE)

3.4 *German data coding*

Table 2 shows the total number of German clause productions per speaker group.

TABLE 2. German clause productions by speaker group and register

Register	**Heritage Speakers**	**Monolinguals**
Formal Spoken	346 (33%)	491 (31%)
Formal Written	271 (26%)	422 (26%)
Informal Spoken	277 (26%)	438 (27%)
Informal Written	160 (15%)	258 (16%)
Total	**1054 (100%)**	**1609 (100%)**

3.4.1 German independent main clauses (IMC)

Parallel to English, German IMCs are not introduced by a coordinating conjunction or by coordination without an overt linker (Haspelmath, 2007; Quirk et al., 1985). Canonical German has V2 word order in main clauses and V-final word order in SCs. Therefore, only clauses observing V2 were coded as IMCs (11a-b). V2 clauses beginning with the causal connective *weil* were also counted as IMCs (11c) since *weil* has lost its status of a subordinator in V2 clauses (Antomo & Steinbach, 2010; Reis, 2013). It also does not qualify as a prototypical coordinator because it does not allow subject ellipsis in the subsequent clause. We also considered clauses introduced by linking adverbs and conjuncts as IMCs, including *denn, ebenso, also* and *doch* (11d). This is because these linkers do not pass one or several of Quirk et al.'s (1985) tests for coordination (Appendix B): they can be moved within a clause, can co-occur with a coordinator, or they do not allow subject ellipsis in the subsequent clause. Other clauses that were conceptualized as SCs but that showed V2 instead of V-final word order were treated as SCs, as will be discussed in section 3.4.3. We included two deviating instances in IMCs (11e-f). In these examples the SC precedes the main clause in preverbal position, which would call for the verb to immediately follow, i.e. surface as V2, but the verb non-canonically follows the subject. These two cases were still coded as IMCs, even though the verb is superficially in V3 position there (Alexiadou & Lohndal, 2018; Wiese & Müller, 2018). Each clause in square brackets in (11) was counted as one IMC.[5]

(11a) [Neben ihr stand an der Leine ihr Hund_{IMC}].
Next her stood on the leash her dog
'Her dog was on a leash next to her.' (DEmo53FD_fwD)

[5] The original orthography of the written productions was preserved.

(11b) [es gab auch eine junge familie mit vater
it gave too a young family with father
mutter, und kleinkind auf der rechten seite vom
mother, and small child on the right side of the
parkplatz$_{IMC}$].
parking lot
'There was also a young family with a father, a mother, and a baby on the right side of the parking lot.' (USbi74MD_fwD)

(11c) [weil es hat auf einmal so richtig laut gekracht und so$_{IMC}$]
because it has suddenly so really loudly crashed and so
'Because there suddenly was a loud crashing noise and stuff.' (DEmo57FD_isD)

(11d) Und weil dort gerade zwei Autos langfuhren, kam es
and because there just two cars along-drove came it
zu einem Unfall, [denn das erste Auto musste stark
to an accident since the first car had-to strongly
einem Unfall, [denn das erste Auto musste stark bremsen$_{IMC}$]
an accident since the first car had-to strongly brake
'And because two cars were driving there, an accident happened, since the first car had to brake hard.' (DEmo59FD_iwD)

(11e) so wenn sie hat gehaltet [sie *hat* dien erste des erste auto geschlagt$_{IMC}$]
so when sie has stopped sie has the first the first car hit
'So when she stopped, she hit the first car.' (USbi77FD_fsD)

(11f) und alse die autos ge stopt van [ein hunt *is* veck gerant.$_{IMC}$]
und when the cars stopped had a dog is away run
'And when the cars had stopped, a dog ran away.' (USbi73MD_fwD)

3.4.2 German coordinate main clauses

We considered three coordinating conjunctions in German: *und* (and), *oder* (or), and *aber* (but) because they pass all coordination tests (Appendix B). We differentiated three subtypes of CMCs. CMCs with overt subjects (12a-b), syndetic CMCs with omitted subjects (12c) and asyndetic CMCs with omitted subjects (12d). Each clause in square brackets in (12) was considered one CMC.[6]

(12a) da war ein man und eine frau [und der mann hatte einen fussball$_{CMC}$].
There was a man and a woman and the man had a soccer ball
'There was a man and a woman and the man had a soccer ball.' (USbi58FD_iwD)

(12b) ihr wisst ja nicht genau wo [aber ich bin grade halt da
you know prt not exactly where but I am just prt here
und da hingelaufen$_{CMC}$]
and here along-walked
'You don't really know where but I just like walked there and there.' (DEmo57FD_isD)

(12c) auf der anderen straßenseite war eine frau am auto [und hat
on the other street side was a woman at the car and has
ihren einkauf eingepackt$_{CMC}$]
her shopping in-packed
'On the other side of the road, a woman was at her car and loaded her shopping into her car.' (DEmo55FD_fsD)

(12d) der hund hat dann den ball gesehen [is dem ball hinterhergerannt$_{CMC}$]
the dog has then the ball seen is the ball after-run
'The dog then saw the ball, ran after it' (DEmo55FD_fsD)

3.4.3 German subordinate clauses

Subordinate clauses are dependent on another clause. In the German productions, most SCs showed V-final structures (13a-b). We also counted two types of V2 structures as SCs: canonical unintroduced complement clauses without a complementizer (13c), and non-canonical V2 clauses clearly conceptualized as SCs (14a-b, seven instances in total). Each clause in square brackets in (13-15) was counted as one SC.

[6] German particles lacking direct English translation are glossed as "prt" in (12b).

(13a) und konnte daher nicht wissen [ob nach der Ball ein
and could therefore not know whether after the ball a
Mensch kommen würde$_{SC}$]
human come would
'And due to this (the driver) could not know if a person would come after the ball.' (USbi64MD_fwD)

(13b) Anschließend ging der Mann, [der zuvor der Frau
subsequently went the man who before the woman
geholfen hatte$_{SC}$], zu ihnen.
helped had to them
'Subsequently, the man who had previously helped the woman, went to them.' (DEmo69MD_fwD)

(13c) Ich hoffe [ich konnte ihnen behilflich sein$_{SC}$]!
I hope I could you helpful be
'I hope I could be of help to you!' (DEmo54FD_fwD)

(14a) und der mann hat ein ball [das er er hat gespielt mit$_{SC}$]
and the man has a ball that he he has played with
'And the man had a ball, with which he played.' (USbi57FD_fsD)

(14b) Die hatten beiden rausgekommen zu sehen [weder des auto
they had both out-come to see whether the car
hatt ihrgenwehrmand wegetahn$_{SC}$].
had somebody hurt
'They both got out to see whether the car had hurt anybody.' (USbi53MD_fwD)

We subdivided SCs into three categories: complement (15a), relative (15b), and adverbial (15c):

(15a) Es begab sich so, [dass ein Hund auf der Straße lief$_{SC}$]
it went itself so that a dog on the street walked
'It so happened that a dog walked on the street' (DEmo63ME_fwD)

(15b) Ein Mann [der anscheinend mit seiner Frau spazieren war$_{SC}$] prellte
a man who apparently with his wife walk was bounced
einen Fußball.
a soccer ball
'A man who was walking apparently with his wife bounced a soccer ball.'
(DEmo69MD_fwD)

(15c) [Als sie die straße überqueren wollten$_{SC}$], ist der Mann den Ball aus
as they the street cross wanted is the man the ball out
dem Hand gefallen.
the hand fallen
'As they wanted to cross the street, the ball dropped out of the man's hand.'
(USbi64MD_fwD)

3.5 *Data Analysis*

After the data was coded for each clause type, we recoded the dependent variable "Clause type" with three levels (IMC, CMC, and SC) into three separate dependent variables "IMC", "CMC", and "SC" with two levels (1 and 0). Then, each clause type was analyzed independently from the other two types using generalized binomial linear mixed effect models in R (R Core Team, 2019) and the lme4 package (Bates et al., 2015). We maximally specified the fixed effects by including all theoretically relevant independent variables and their interactions: speaker group (heritage/monolingual), setting (formal/informal), mode (spoken/written), and language status (heritage/majority). We contrast-coded the factors using sum contrast coding (-.5/.5). The random effect of participants was also maximally specified and included the random slopes for setting and mode (Barr et al., 2013). In the next section, we report the z- and p-values of the models, for full model summaries, see Appendix C.

4 Results

4.1 *Comparison of clause patterns in majority English vs. monolingual English*

4.1.1 English independent main clauses

For English IMCs, we observed a main effect of mode (z = -8.05, p < .001): speakers produced more IMCs in the written than in the spoken mode (Fig. 1).[7] German HSs and English monolinguals performed similarly in their production of IMCs in each of the four conditions, and both groups produced more IMCs in the written than in the spoken mode.

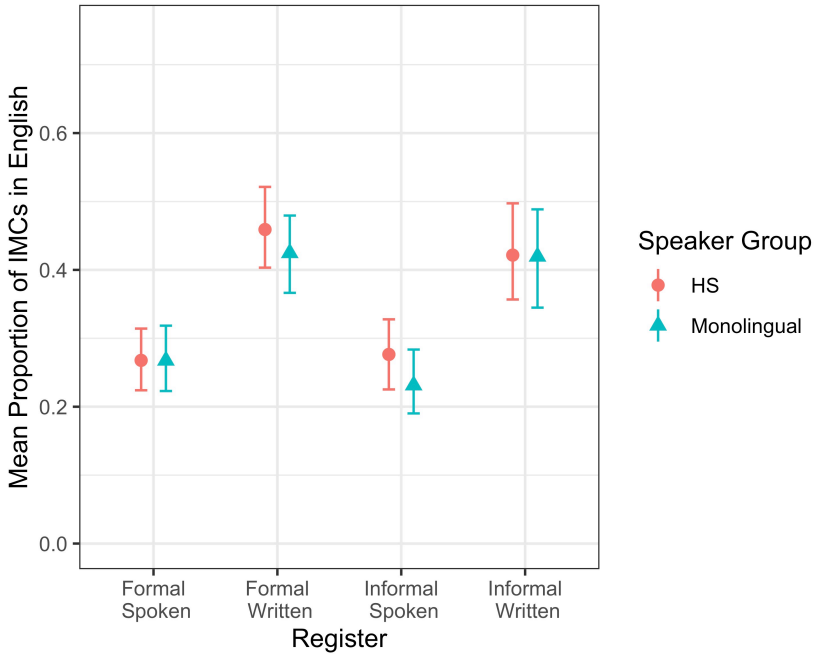

Figure 1: Mean proportion of IMCs in English by speaker group and register

4.1.2 English coordinate main clauses

For English CMCs, we observed two main effects and one interaction. First, there was a main effect of setting (z = -3.90, p < .001): speakers produced more CMCs in the informal than in the formal setting (Fig. 2). Second, there was a main effect of mode (z = 8.11, p < .001): speakers produced more CMCs in the spoken than in the written mode (Fig. 2). In addition, there was a significant two-way interaction between setting and mode (z = 2.45, p = .014). Tukey's multiple comparison test (MCT), run with the *emmeans* package (Lenth, 2020), revealed no difference between the formal and informal settings in the spoken mode ($mean_{fs}$ = 0.47, $mean_{is}$ = 0.51[8]; *estimate* = -0.17, *SE* = 0.12, z = -1.40, p = .498), but a significant difference between the two settings in the written mode, with more CMCs in the informal than in the formal written condition ($mean_{fw}$ = 0.24; $mean_{iw}$ = 0.38; *estimate* = -0.63, *SE* = 0.15, z = -4.14, p < .001). This indicates that German HSs and English monolinguals performed similarly regarding the production of CMCs overall, and that both groups were sensitive to the setting and mode, with a significant difference between the informal and formal settings in the written mode (more CMCs in informal), and no such difference in the spoken mode.

[7] Error bars represent bootstrapped CIs in all figures

[8] fs – formal spoken, is – informal spoken, fw – formal written, iw – informal written

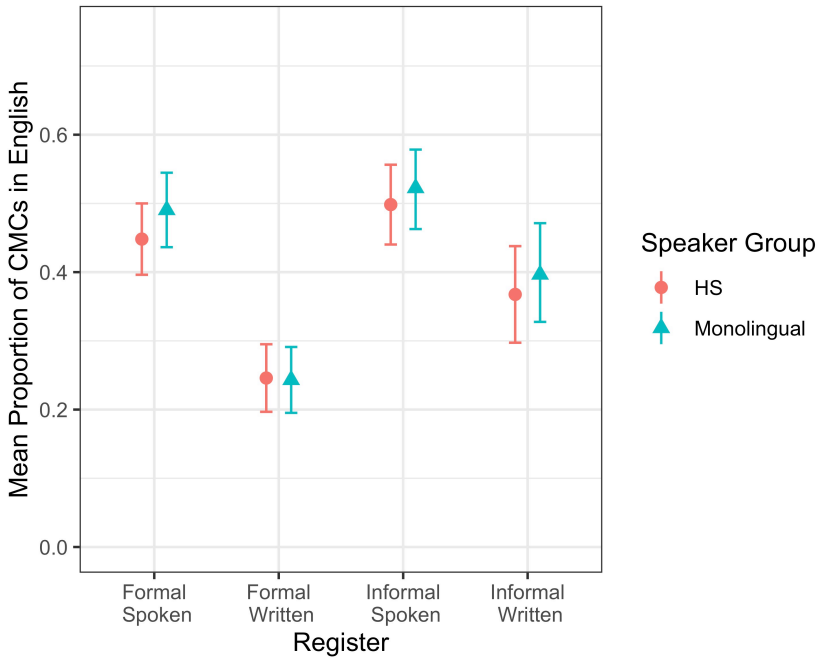

Figure 2: Mean proportion of CMCs in English by speaker group and register

4.1.3 English subordinate clauses

For English SCs, we observed a main effect of setting ($z = 3.90$, $p < .001$): speakers produced more SCs in the formal than in the informal setting (Fig. 3). There was also a significant two-way interaction between setting and mode ($z = -1.96$, $p = .050$). Similarly to CMCs, Tukey's MCT revealed no difference between the formal and informal settings in the spoken mode ($mean_{fs} = 0.26$; $mean_{is} = 0.23$; *estimate* = 0.21, *SE* = 0.14, $z = 1.56$, $p = .401$), but a significant difference between the two settings in the written mode, with more SCs in the formal than informal ($mean_{fw} = 0.31$; $mean_{iw} = 0.20$; *estimate* = 0.62, *SE* = 0.16, $z = -4.14$, $p = .001$). These results show that German HSs and English monolinguals performed similarly regarding the production of SCs, and both groups were sensitive to the setting and mode, with a significant difference between the informal and formal settings in the written mode (more SCs in formal), and no such difference in the spoken mode.

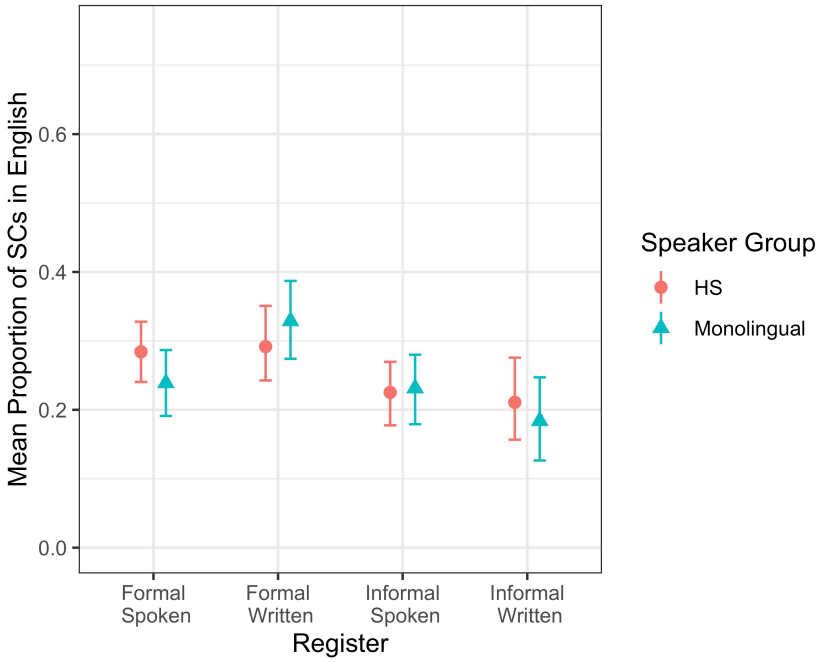

Figure 3: Mean proportion of SCs in English by speaker group and register

4.2 Comparison *of clause patterns in heritage German vs. monolingual German*

4.2.1 German independent main clauses

For German IMCs, we observed a main effect of mode (z = -8.61, p < .001): speakers produced more IMCs in the written than in the spoken mode (Fig. 4). This shows that German HSs and German monolinguals performed similarly in their production of IMCs in each of the four conditions, and both groups produced more IMCs in the written than in the spoken mode.

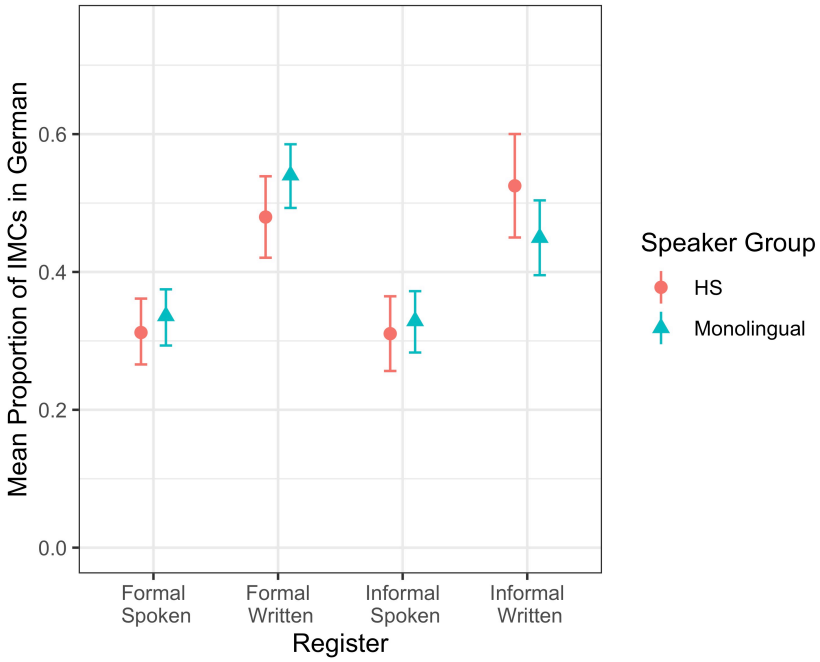

Figure 4: Mean proportion of IMCs in German by speaker group and register

4.2.2 German coordinate main clauses

For German CMCs, we observed three main effects and two interactions. First, there was a main effect of group ($z = 3.11$, $p = .002$): German HSs produced more CMCs than German monolinguals (Fig. 5). Second, there was a main effect of setting ($z = -6.10$, $p < .001$): both speaker groups produced more CMCs in the informal than in the formal setting (Fig. 5). Third, there was a main effect of mode ($z = 9.27$, $p < .001$): both speaker groups produced more CMCs in the spoken than in the written mode (Fig. 5).

In addition, there was a significant two-way interaction between group and setting ($z = 1.97$, $p = .049$). Tukey's MCT revealed a significant difference between German HSs and monolinguals in the formal setting, with HSs producing more CMCs than monolinguals (*estimate* = 0.60, *SE* = 0.17, $z = 3.55$, $p = .002$), but an absence of such a difference in the informal setting (*estimate* = 0.25, *SE* = 0.16, $z = 1.59$, $p = .387$; Fig. 5).

Finally, there was a significant two-way interaction between setting and mode ($z = 2.84$, $p = .004$). Tukey's MCT revealed a significant difference between the formal and informal settings in both spoken and written modes, with more CMCs in the informal than in the formal setting. However, the difference between the settings was greater in the written mode ($mean_{fw} = 0.22$; $mean_{iw} = 0.39$; *estimate* = -0.80, *SE* = 0.14, $z = -5.63$, $p < .001$) than in the spoken mode ($mean_{fs} = 0.44$; $mean_{is} = 0.53$; *estimate* = -0.30, *SE* = 0.11, $z = -2.77$, $p = .029$). This indicates that German HSs and German monolinguals performed differently regarding the production of CMCs, especially in the formal setting, where HSs produced more CMCs than monolinguals. At the same time, both groups were equally sensitive to the setting (informal always greater than formal) and mode, with a more pronounced difference between the settings in the written than in the spoken mode.

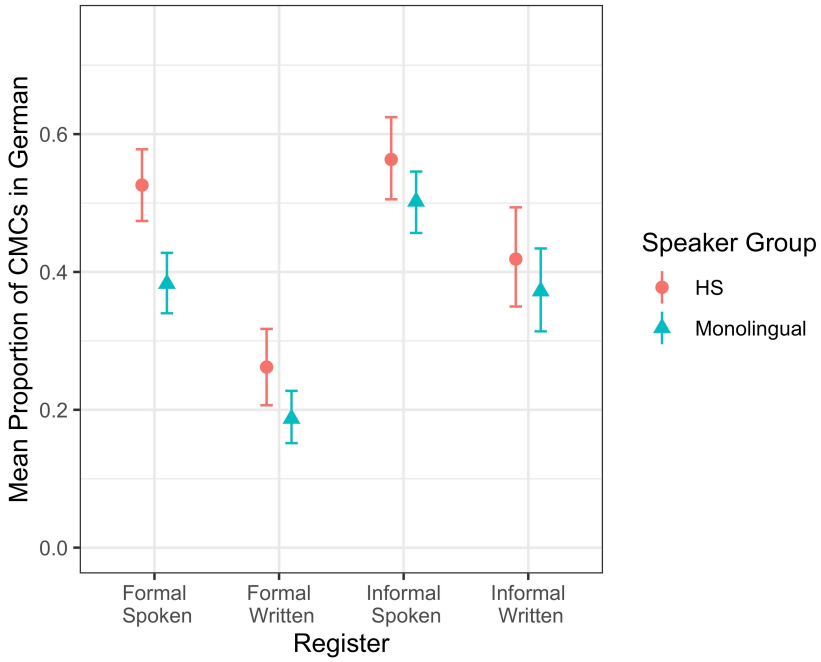

Figure 5: Mean proportion of CMCs in German by speaker group and register

4.2.3 German subordinate clauses

For German SCs, we observed two main effects and two interactions. First, there was a main effect of group (z = -3.10, p = .002): German monolinguals produced more SCs than HSs (Fig. 6). Second, there was a main effect of setting (z = 5.18, p < .001), with more SCs in the formal than in the informal setting (Fig. 6).

There was also a significant two-way interaction between setting and mode (z = -2.49, p = .013). Tukey's MCT revealed a significant difference between the formal and informal settings in both spoken and written modes, with more SCs in the formal than in the informal setting. However, the difference between the settings was greater in the written mode ($mean_{fw}$ = 0.27; $mean_{iw}$ = 0.13; *estimate* = 1.08, *SE* = 0.23, z = 4.77, p < .001) than in the spoken mode ($mean_{fs}$ = 0.23; $mean_{is}$ = 0.15; *estimate* = 0.43, *SE* = 0.16, z = 2.71, p = .034).

Finally, there was a significant three-way interaction between group, setting, and mode. To interpret it, we ran separate models for the HS and monolingual groups. In the HSs' productions, we observed a main effect of setting (z = 4.34, p < .001), with more SCs in the formal than in the informal setting. In addition, there was a two-way interaction between setting and mode (z = -3.17, p = .002). Tukey's MCT revealed a significant difference between the formal and informal settings in the written mode, with more SCs in the formal than in the informal setting (*estimate* = 1.71, *SE* = 0.38, z = 4.44, p < .001), and the absence of this difference in the spoken mode (*estimate* = 0.28, *SE* = 0.24, z = 1.16, p = .653). In the monolinguals' productions, we only observed a main effect of setting (z = 3.19, p = .001), with more SCs in the formal setting (Fig. 6).

These results show that German HSs and German monolinguals performed differently regarding the production of SCs, with HSs producing fewer SCs than monolinguals. HSs were sensitive to the interaction of setting and mode, with a significant difference between the informal and formal settings in the written mode (more SCs in formal), and no such difference in the spoken mode. At the same time, monolinguals were only sensitive to the setting (more SCs in the formal setting).

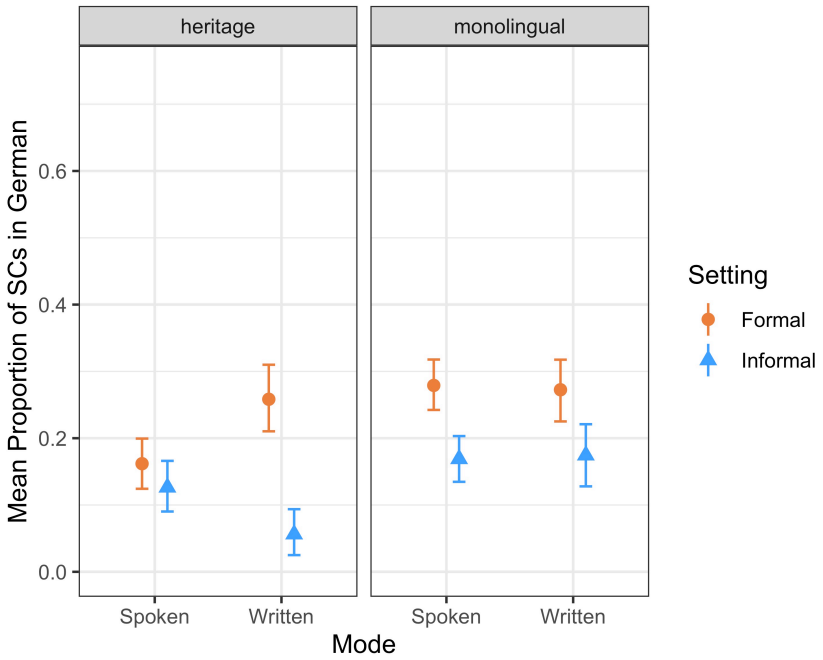

Figure 6: Mean proportion of SCs in German by mode and setting, faceted by speaker group

4.3 *Comparison of clause patterns in majority English and heritage German of HSs*

4.3.1 Independent main clauses in majority English and heritage German

For HSs' IMCs, we observed a main effect of language (z = -2.35, p = .019): HSs produced more IMCs in German than in English (Fig. 7). We also observed a main effect of mode (z = -8.27, p < .001): HSs produced more IMCs than in the spoken than in the written mode (Fig. 7). This shows that HSs performed differently in their majority English and heritage German, with overall more IMCs in German. At the same time, in both languages more IMC appeared in the written than in the spoken mode.

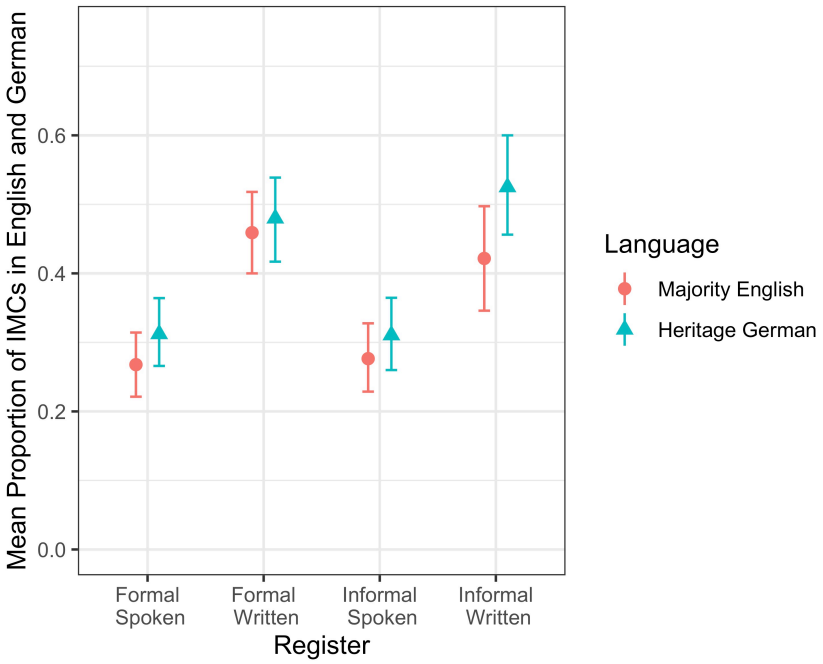

Figure 7: Mean proportion of IMCs in HSs' productions by language and register

4.3.2 Coordinate main clauses in majority English and heritage German

For HSs' CMCs, we observed a main effect of language (z = -2.58, p = .010): HSs produced more CMCs in German than in English (Fig. 8). We also observed a main effect of setting (z = -3.48, p = .001), with more CMCs in the informal than formal setting (Fig. 13). In addition, there was a main effect of mode (z = 8.20, p < .001): HSs produced more CMCs in the spoken than in the written mode (Fig. 8).

Finally, there was a significant two-way interaction of setting and mode (z = 2.51, p = .012). Tukey's MCT revealed a significant difference between the settings in the written mode, with more CMCs in the informal setting ($mean_{fw}$ = 0.25; $mean_{iw}$ = 0.39; *estimate* = -0.60, *SE* = 0.12, z = -3.85, p = .001), but an absence of such difference in the spoken mode ($mean_{fs}$ = 0.49; $mean_{is}$ = 0.53; *estimate* = -0.12, *SE* = 0.12, z = -1.01, p = .744). The same test also revealed a significant difference between the spoken and written modes in both formal and informal settings, with more CMCs in the spoken than written mode. However, the difference between the modes was greater in the formal setting ($mean_{fs}$ = 0.49; $mean_{fw}$ = 0.25; *estimate* = 1.07, *SE* = 0.13, z = 8.19, p < .001) than in the informal setting ($mean_{is}$ = 0.53; $mean_{iw}$ = 0.39; *estimate* = 0.60, *SE* = 0.15, z = 4.11, p < .001). This shows that HSs performed differently in their majority English and heritage German, with overall more CMCs in German. At the same time, both setting and mode played a role in CMC production, with a complex interplay between them.

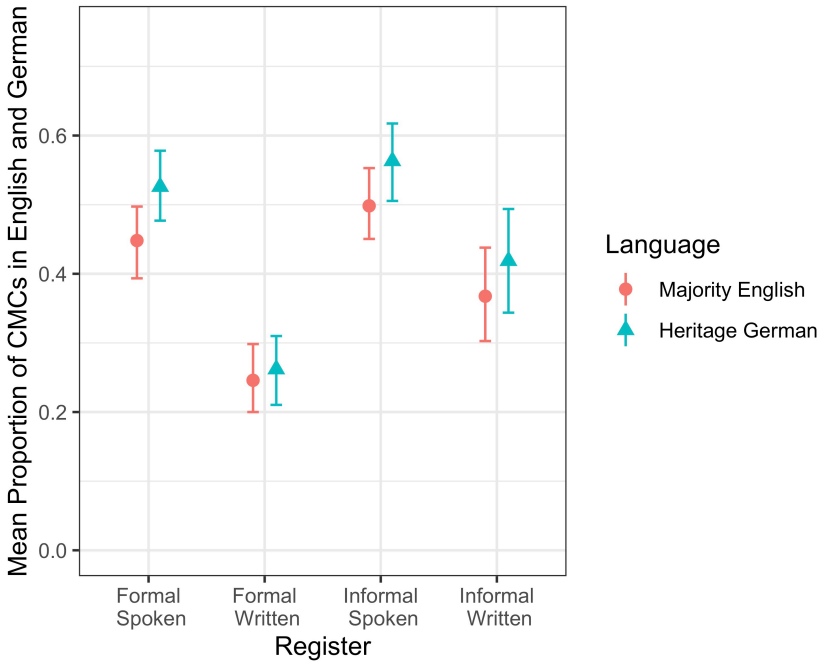

Figure 8: Mean proportion of CMCs in HSs' productions by language and register

4.3.3 Subordinate clauses in majority English and heritage German

For HSs' SCs, we observed a main effect of language ($z = 5.52$, $p < .001$): HSs produced more SCs in English than in German (Fig. 9). We also observed a main effect of setting ($z = 5.00$, $p < .001$), with more SCs in the formal than informal setting (Fig. 9).

In addition, we observed three interactions. First, there was a significant two-way interaction of language and setting ($z = -2.26$, $p = .024$). Tukey's MCT revealed that the difference between English and German was bigger in the informal setting ($mean_{Eng\ informal} = 0.22$; $mean_{Ger\ informal} = 0.10$; *estimate* = 0.67, *SE* = 0.18, $z = 3.78$, $p = .001$) than in the formal setting ($mean_{Eng\ formal} = 0.29$; $mean_{Ger\ informal} = 0.20$; *estimate* = 1.27, *SE* = 0.26, $z = 4.96$, $p < .001$), with both differences being significant. In addition, the same test showed a significant difference between the settings both in English and German, with more SCs in the formal setting. However, this difference was more pronounced in German (*estimate* = 0.98, *SE* = 0.23, $z = 4.33$, $p < .001$) than in English (*estimate* = 0.38, *SE* = 0.15, $z = 2.59$, $p = .047$, Fig. 9).

Second, there was a significant two-way interaction of setting and mode ($z = -2.92$, $p = .003$). Tukey's MCT revealed a significant difference between the settings in the written mode, with more SCs in the formal setting ($mean_{fw} = 0.28$; $mean_{iw} = 0.14$; *estimate* = 1.06, *SE* = 0.22, $z = 4.83$, $p < .001$), but an absence of such difference in the spoken mode ($mean_{fs} = 0.22$; $mean_{is} = 0.18$; *estimate* = 0.29, *SE* = 0.15, $z = 1.89$, $p = .232$).

Finally, there was a significant three-way interaction between language, setting, and mode ($z = 2.53$, $p = .011$). To interpret it, we ran two models, one on the English productions of HSs, and one on the German productions. In the English productions, we observed only the main effect of setting ($z = 2.63$, $p = .009$), with more SCs in the formal setting (Fig. 9). At the same time, in the German productions there was a main effect of setting ($z = 4.34$, $p < .001$), with more SCs in the formal setting, and an interaction between setting and mode ($z = -3.17$, $p = .002$), with no difference between the settings in the spoken mode (*estimate* = 0.29, *SE* = 0.24, $z = 1.16$, $p = .653$) but more SCs in the formal than informal setting in the written mode (*estimate* = 1.71, *SE* = 0.38, $z = 4.44$, $p < .001$; Fig. 9). These results show that HSs performed differently in their majority English and

heritage German, with overall more SCs in English. At the same time, both setting and mode played a role in SC production, with a complex interplay between them.

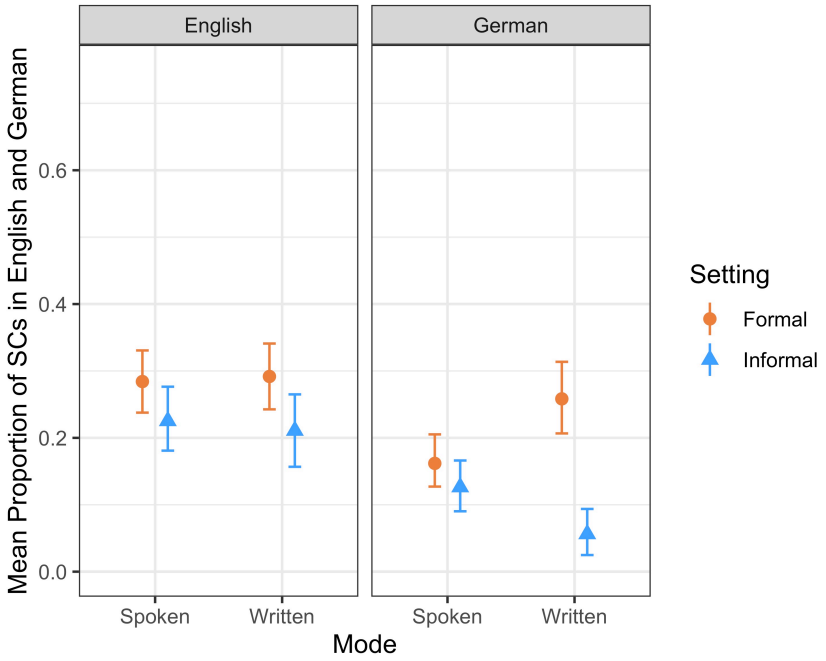

Figure 9: Mean proportion of SCs in HSs' productions by setting and mode, faceted by language

5 Discussion

The aim of this study was to investigate the syntactic and pragmatic resources used by HSs to structure their discourse according to register, and to find out whether the smaller range of communicative situations in which HSs experience their HL influences their choice of options. In order to do so, we analyzed clause type optionality in German HSs living in the United States. We examined three grammatical alternatives (IMCs, CMCs, and SCs) in their narratives in four different registers (formal spoken, formal written, informal spoken, informal written).

All HSs were able to produce the three grammatical alternatives in heritage German (i.e. acquired the syntactic structures of the clause types). This is not surprising even for HSs because clause structures are a core syntactic phenomenon that is acquired early and is robust. Research on L1 German and 2L1 including German shows that canonical SCs emerge between the ages of 3-4 after V2 has been established (Rothweiler, 2006; Sanfelici et al., 2020; Tracy, 2011). Since our bilingual participants were L1 learners of German and produced the whole range of patterns, it is safe to assume that their acquisition history matches what we know from L1 and 2L1 acquisition of German.

Our first research question focused on whether HSs make similar use of the structural options for expressing events (i.e. three clause types) in each of their languages as compared to monolingual speakers. Our data confirms Hypothesis 1, which stated that HSs are similar to monolinguals in English, and dissimilar to monolinguals in German, most likely since HSs are typically more dominant in their ML than in their HL. In English, German HSs and English monolinguals make similar use of structural options, at least in this domain of their ML. Researchers found differences between HSs and monolinguals in other areas, e.g., phonology (Polinsky, 2018) and scope assignment (Scontras et al., 2017). The discrepancy between previous

work and our results can be explained by the nature of the investigated phenomena and by the methodological approach: while Polinsky (2018) and Scontras et al. (2017) looked at subtle differences in a strict experimental setting, we considered less subtle differences in more naturalistic discourse. Therefore, while our results point to the similarity of the global syntactic organization of discourse in HSs and monolinguals, we cannot exclude more fine-grained differences.

In their German narratives, HSs differed from monolinguals. They produced the same frequencies in IMCs and similar overall patterns but different frequencies in CMCs and SCs. HSs produce more CMCs and fewer SCs than monolinguals, thus confirming Prediction 1, which expected fewer SCs in HSs' German productions.

Our results support those of Sánchez Abchi and De Mier (2017), who found that Spanish HSs with German ML produced fewer SCs in Spanish than Spanish monolinguals, possibly due to the typological difference between German and Spanish. Our data reveal the same pattern for a different language pair (English ML and German HL), thus suggesting an influence of ML-HL typological difference on SC use.

Our second question focused on whether HSs use comparable structural options across their two languages, i.e. their ML (English) compared to their HL (German). We had two competing hypotheses based on different lines of argumentation in the literature. Hypothesis 2a expected clause type patterns of HSs to look similar in English and German, since they rely on the same underlying register awareness in both languages. Hypothesis 2b expected register levelling in HSs' German narratives but not in their English ones because they would use their informal spoken register awareness across all registers for German but not for English.

Overall, our results support Hypothesis 2a. Figures 7-9 illustrate that the overall clause type patterns show similar trends in English and German. This could be evidence for transferable register awareness, which can be retrieved from the ML and applied to the HL, supporting Schleppegrell and Colombi (1997) and confirming Prediction 2a.1, which expected similar clause type patterns across HSs' languages. However, the results also show that HSs produce more IMCs and CMCs in German than in English. In addition, HSs use fewer SCs in German than in English. This can be attributed to HSs' dominance in English, absence of formal instruction in German, and absence of parallel structures in English and German SCs. HSs might face higher cognitive load producing SCs in German since its finite V-final word order does not overlap with English SVO and thus requires the inhibition of this option. The increased cognitive load, along with the limited exposure to German, may cause HSs to use fewer SCs in German. The results confirm Prediction 2a.2, which expected different frequencies of clause types in ML and HL, especially more SCs in majority English than in heritage German.

We found no support for Hypothesis 2b and Prediction 2b; if anything, they were contradicted by the interaction between language and setting in SCs. We observed a more pronounced difference in SC frequency between the two settings (formal/informal) in German than in English: HSs do not transfer the patterns of informal spoken register to other registers in heritage German.

Our third research question focused on whether certain registers reveal preferences for particular structural options. Confirming Hypothesis 3, which predicts an association between the clause types and registers, our results show that specific registers indeed have an effect on the choice of structural options in both languages and speaker groups. In the English and German data, mode has an effect on the distribution of IMCs in both speaker groups, with more IMCs in written than in spoken productions.

Interestingly, IMCs seem to be in complementary distribution with CMCs which appear more frequently in spoken modes for both speaker groups. One explanation could be an additional discourse function of coordinating conjunctions such as establishing a smoother discourse and assuring coherence. Previous studies on spoken conversations found that coordinating *and* is used to repair thematic discontinuity (Turk, 2004), is part of the syntax of repairs (Levelt, 1989) and facilitates temporal organization (Keevallik, 2020; Nevile, 2007). Further qualitative discourse analysis should be performed to establish the exact discourse functions of coordinating conjunctions in spoken narratives.

Setting was another factor contributing to the distribution of CMCs (more in the informal setting) and SCs (more in the formal setting) in both languages. Again, this seems to be a complementary pattern: SCs are more frequent in the formal setting while CMCs are more frequent in the informal setting. This could confirm the connection between increased syntactic complexity of SCs compared to CMCs and the formal register norms. In formal contexts, speakers are expected to use more complex syntax and thus prefer SCs, while in informal contexts such an expectation is absent so speakers use CMCs. This aligns with Koch and Oesterreicher's (2012) model: they suggested a wider use of hypotaxis in the language of distance, which is close to our formal registers, and a wider use of parataxis in the language of immediacy, which is similar to our informal registers. Hence, Prediction 3.1, which associated SCs with formal register and high syntactic complexity, is confirmed.

The results show an interaction between setting and mode in English and German CMCs and SCs. For both clause types, a general trend is that when there is an interaction of these two parameters, mode seems to outweigh setting. For CMCs, in the spoken mode the differences between the settings either are reduced (in German) or completely disappear (in English) compared to the written mode. All participants seem to be more "relaxed" in the spoken mode and do not discriminate as extensively between settings compared to the written mode. This trend is, however, stronger in English, leading us to the conclusion that the participants might feel less obliged to adhere to the formality distinction in the "relaxed" spoken mode in English than German. This could be potentially attributed to different norms of formal spoken register in English and German, even though our study did not address the question of register norms directly.

For SCs, the situation is more complex. Accounting for the three-way interactions between speaker group, setting and mode in German, as well as between HSs' language, setting and mode, we observed the following patterns in SC frequencies in English and German productions:

German monolinguals: fs > is, fw > iw[9]

HSs in majority English: fs > is, fw > iw

HSs in heritage German: fs ~ is, fw > iw

With respect to SC frequencies, German monolinguals differentiate between the settings in both modes. HSs differentiate between the settings in both modes in their majority English. In their heritage German, although they do differentiate between the settings in the written mode, there is no evidence that they do so in the spoken mode, unlike German monolinguals. A reason for the discrepancy in SCs between German monolinguals and HSs might be due to the fact that HSs are less dominant in their HL. For them, cognitive load in spoken productions might be higher (e.g. Miller & Fernandes-Vest, 2006, p. 13) taking their mental resources away from register differences. This is not as prominent in their written production due to its offline nature and the possibility for

[9] As above, fs – formal spoken, is – informal spoken, fw – formal written, iw – informal written; ~ – no evidence for differentiation

revisions. This is in clear contradiction with Prediction 3.2, which expected more formality differentiation in the spoken mode of HSs due to their better speaking skills. Thus, Prediction 3.2 is not confirmed.

One limitation of the present study is that we have only looked at one ML-HL pair. In order to evaluate our results and test claims about global discourse structures, it would be interesting to see whether these clause type patterns across registers can be replicated for other MLs and HLs (see Scontras & Putnam, 2020 for a commentary on lesser-studied HLs). The RUEG corpus (Wiese et al. 2020), which provided the data analyzed here, is a useful resource for this next step because it contains productions of HSs of Russian, Greek and Turkish with English and German as MLs, all collected using the same method.

Another possible extension of this study is the analysis of the three types of SCs (complement, relative, adverbial). Sánchez Abchi and De Mier (2017) provide evidence that HSs use different SC types compared to monolinguals. Research on the interaction between clause types and registers also shows general preferences for specific subordinations in certain registers. Biber and Conrad (2001), for instance, argue that relative clauses are more prominent in written expository registers because they further elaborate on referential information. Hence, further investigation of SC types across registers is likely to provide insightful findings, especially in HSs.

A further consideration that could be addressed in future research is the inclusion of other registers with the same setting and mode parameters. Having teenage participants produce police reports could be a limitation of this study because the scenario might lack ecological validity. Therefore, we suggest adding a different communicative task for the formal setting, such as writing a newspaper article.

6 Conclusion

This study investigated syntactic optionality in HSs' productions across registers. We assessed the occurrence of three clause types in four registers and compared HSs' majority English and heritage German productions with each other and with those of German and English monolinguals. We provided evidence for the similarity of clause type patterns and clause type frequencies in HSs and monolinguals in the ML, in contrast with clear differences in the HL. Our results show that, in line with Systemic Functional Linguistics, registers have an effect on clause type choices in all speaker groups. Moreover, we showed that HSs successfully employ both syntactic and discourse knowledge to differentiate registers in their heritage German productions, despite their non-dominance in this language and their limited exposure to its formal registers. Our research thus contributes to the understanding of how HSs structure their discourse in terms of syntactic choices. We also added to previous work in this field by looking at several registers available to a speaker, thereby advancing our insights into the linguistic repertoires of HSs.

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References

Abutalebi, J., & Green, D. W. (2016). Neuroimaging of language control in bilinguals: Neural adaptation and reserve. *Bilingualism: Language and Cognition*, *19*(4), 689–698. https://doi.org/10.1017/S1366728916000225

Albirini, A., & Benmamoun, E. (2014). Aspects of second-language transfer in the oral production of Egyptian and Palestinian heritage speakers. *International Journal of Bilingualism*, *18*(3), 244–273. https://doi.org/10.1177/1367006912441729

Alexiadou, A. (2014). Active, middle, and passive: The morpho-syntax of voice. *Catalan Journal of Linguistics*, *13*, 19–40. https://doi.org/10.5565/rev/catjl.153

Alexiadou, A., & Lohndal, T. (2018). V3 in Germanic : A comparison of urban vernaculars and heritage languages. In M. Antomo & S. Müller (Eds.), *Non-canonical verb positioning in main clauses* (pp. 245–265). Buske Verlag.

Andrews, A. D. (2007). Relative clauses. In T. Shopen (Ed.), *Language typology and syntactic description* (pp. 206–236). Cambridge University Press. https://doi.org/10.1017/CBO9780511619434.004

Antomo, M., & Steinbach, M. (2010). Desintegration und Interpretation: Weil-V2-Sätze an der Schnittstelle Zwischen Syntax, Semantik und Pragmatik. *Zeitschrift für Sprachwissenschaft*, *29*(1), 1–37. https://doi.org/10.1515/ZFSW.2010.001

Bakovic, E., & Keer, E. (2001). Optionality and ineffability. In G. Legendre, J. Grimshaw, & S. Vikner (Eds.), *Optimality theoretic syntax*. The MIT Press.

Barr, D. J., Levy, R., Scheepers, C., & Tily, H. J. (2013). Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language*, *68*(3), 255–278. https://doi.org/10.1016/j.jml.2012.11.001

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

Biber, D., & Conrad, S. (2001). Register variation: A corpus approach. In D. Schiffrin, D. Tannen, & H. E. Hamilton (Eds.), *The handbook of discourse analysis* (pp. 175–196). Blackwell Publishers.

Biber, D., Johansson, S., Leech, G., Conrad, S., & Finegan, E. (1999). *Longman grammar of spoken and written English*. Pearson Education Limited.

Boas, H. C. (2009). *The life and death of Texas German*. Duke University Press.

Boyd, J. K. (2007). *Comparatively speaking: a psycholinguistic study of optionality in grammar* (Doctoral dissertation). University of California, San Diego. https://escholarship.org/uc/item/1wq3j7bk

Brehmer, B., & Usanova, I. (2015). Let's fix it? Cross-linguistic influence in word order patterns of Russian heritage speakers in Germany. In H. Peukert (Ed.), *Transfer effects in multilingual language development* (pp. 161–188). John Benjamins Publishing Company. https://doi.org/10.1075/hsld.4.08bre

Bresnan, J., & Ford, M. (2010). Predicting syntax: Processing dative constructions in American and Australian varieties of English. *Language*, *86*(1), 168–213. http://www.jstor.com/stable/40666302

Bulte, B., & Housen, A. (2014). Conceptualizing and measuring short-term changes in L2 writing complexity. *Journal of Second Language Writing*, *26*, 42–65. https://doi.org/10.1016/j.jslw.2014.09.005

Dufter, A., Fleischer, J., & Seiler, G. (2009). Introduction. In A. Dufter, J. Fleischer, & G. Seiler (Eds.), *Describing and modeling variation in Grammar* (pp. 1–18). Mouton de Gruyter. https://doi.org/10.1515/9783110216097

Haider, H. (2010). *The syntax of German*. Cambridge University Press. https://doi.org/10.1017/CBO9780511845314

Halliday, M. A. K. (1975). Learning how to mean. In E. H. Lenneberg & E. Lenneberg (Eds.), *Foundations of language development* (pp. 239–265). The UNESCO Press. https://doi.org/10.1016/B978-0-12-443701-2.50025-1

Halliday, M. A. K. (1976). A brief sketch of systemic grammar. In G. Kress (Ed.), *Halliday: system andfFunction in language. Selected papers.* (pp. 3–6). Oxford University Press.

Halliday, M. A. K. (1978). *Language as a social semiotic: The social interpretation of language and meaning*. Edward Arnold.

Halliday, M. A. K. (1985). *Spoken and written language*. Deakin University Press.

Halliday, M. A. K. (2013). Meaning as choice. In L. Fontaine, T. Bartlett, & G. OGrady (Eds.), *Systemic functional linguistics: Exploring choice* (pp. 15–36). Cambridge University Press. https://doi.org/10.1017/CBO9781139583077.003

Haspelmath, M. (2007). Coordination. In T. Shopen (Ed.), *Language typology and syntactic description* (2nd ed., pp. 1–51). Cambridge University Press.

Heine, B. (2008). Contact-induced word order change without word order change. In P. Siemund & N. Kintana (Eds.), *Language contact and contact languages* (pp. 33–60). John Bejamins.

Hopp, H., & Putnam, M. T. (2015). Syntactic restructuring in heritage grammars. *Linguistic Approaches to Bilingualism*, *5*(2), 180–214. https://doi.org/10.1075/lab.5.2.02hop

Housen, A., De Clercq, B., Kuiken, F., & Vedder, I. (2019). Multiple approaches to complexity in second language research. *Second Language Research*, *35*(1), 3–21. https://doi.org/10.1177/0267658318809765

Housen, A., Kuiken, F., & Vedder, I. (2012). Complexity, accuracy and fluency. In A. Housen, F. Kuiken, & I. Vedder (Eds.), *Dimensions of L2 Performance and proficiency: Complexity, accuracy and fluency in SLA* (pp. 1–20). John Bejamins. https://doi.org/10.1075/lllt.32.01hou

Huddleston, R., & Pullum, G. K. (2002). *The Cambridge grammar of the English language*. Cambridge University Press. https://doi.org/10.1017/9781316423530

Hulk, A., & Müller, N. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition*, *3*(3), 227–244. https://doi.org/10.1017/S1366728900000353

Hulsen, M. E. H. (2000). *Language loss and language processing: Three generations of Dutch migrants in New Zealand* (Doctoral dissertation). Radboud University. https://hdl.handle.net/2066/18901

Keevallik, L. (2020). Grammatical coordination of embodied action. In Y. Maschler, S. Pekarek Doehler, J. Lindström, & L. Keevallik (Eds.), *Emergent syntax for conversation: Clausal patterns and the organization of action* (pp. 221–244). John Benjamins Publishing Company. https://doi.org/10.1075/slsi.32.08kee

Kim, J.-H., Montrul, S., & Yoon, J. (2009). Binding interpretations of anaphors by Korean heritage speakers. *Language Acquisition*, *16*(1), 3–35. https://doi.org/10.1080/10489220802575293

Koch, P., & Oesterreicher, W. (2012). *Language of immediacy - language of distance: Orality and literacy from the perspective of language theory and linguistic history*. http://dx.doi.org/10.15496/publikation-20415

Krause, E. (2020). High sensitivity to conceptual cues in Turkish heritage speakers with dominant German L2. In B. Brehmer & J. Treffers-Daller (Eds.), *Lost in transmission: The role of attrition and input in heritage language development* (pp. 198–228). John Benjamins Publishing Company. https://doi.org/10.1075/sibil.59.08kra

Larsson, I., & Johannessen, J. B. (2015). Embedded word order in heritage Scandinavian. In M. Hilpert, J.-O. Östman, C. Mertzlufft, M. Rießler, & J. Duke (Eds.), *New trends in Nordic and general linguistics*. Mouton de Gruyter. https://doi.org/10.1515/9783110346978.239

Lenth, R. (2020). *emmeans: Estimated marginal means, aka least-squares means* (R package version 1.4.7). https://cran.r-project.org/package=emmeans

Levelt, W. J. M. (1989). *Speaking: From intention to articulation*. The MIT Press.

Los, B., & Starren, M. (2012). A typological switch in early Modern English - and the beginning of one in Dutch? *Leuvense Bijdragen - Leuven Contributions in Linguistics and Philology*, *98*, 98–126. https://doi.org/10.2143/LB.98.0.2990720

Lu, X. (2011). A corpus-based evaluation of syntactic complexity measures as indices of college-level ESL writers' language development. *TESOL Quarterly*, *45*(1), 36–62. https://doi.org/10.5054/tq.2011.240859

McGregor, W. B. (2013). Optionality in grammar and language use. *Linguistics*, *51*(6), 1147–1204. https://doi.org/10.1515/ling-2013-0047

Miller, J., & Fernandes-Vest, J. M. (2006). Spoken and written language. In G. Bernini & M. L. Schwartz (Eds.), *Pragmatic organization of discourse in the languages of Europe* (pp. 9–66). Walter de Gruyter.

Montanari, E. G., Abel, R., Tschudinovski, L., & Graßer, B. (2020). Vocabulary development in the heritage languages Russian and Turkish between ages 6 and 10: How do parental input and socio-economic status account for differences within and between the cohorts? In B. Brehmer & J. Treffers-Daller (Eds.), *Lost in transmission: The role of attrition and input in heritage language development* (pp. 152–170). John Benjamins Publishing Company.

Montrul, S. (2011). Morphological errors in Spanish second language learners and heritage speakers. *Studies in Second Language Acquisition*, *33*(2), 163–192.

Montrul, S., & Ionin, T. (2010). Transfer effects in the interpretation of definite articles by Spanish heritage speakers. *Bilingualism*, *13*(4), 449–473. https://doi.org/10.1017/S1366728910000040

Montrul, S., & Sánchez-Walker, N. (2013). Differential object marking in child and adult Spanish heritage speakers. *Language Acquisition*, *20*(2), 109–132. https://doi.org/10.1080/10489223.2013.766741

Neary-Sundquist, C. A. (2017). Syntactic complexity at multiple proficiency levels of L2 German speech. *International Journal of Applied Linguistics*, *27*(1), 242–262. https://doi.org/10.1111/ijal.12128

Nevile, M. (2007). Action in time: Ensuring timeliness for collaborative work in the airline cockpit. *Language in Society*, *36*(02). https://doi.org/10.1017/S0047404507070121

Noonan, M. (2007). Complementation. In T. Shopen (Ed.), *Language typology and syntactic description* (pp. 52–150). Cambridge University Press. https://doi.org/10.1017/CBO9780511619434.002

Pascual Y Cabo, D., & Rothman, J. (2012). The (IL)logical problem of heritage speaker bilingualism and incomplete acquisition. *Applied Linguistics*, *33*(4), 450–455. https://doi.org/10.1093/applin/ams037

Peristeri, E., Andreou, M., & Tsimpli, I. M. (2017). Syntactic and story structure complexity in the narratives of high- and low-language ability children with Autism spectrum disorder. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.02027

Platzack, C. (1986). COMP, INFL, and Germanic word order. In L. Hellan & K. K. Christensen (Eds.), *Topics in Scandinavian syntax: Studies in natural language and linguistic theory* (pp. 185–234). Springer.

Polinsky, M. (2008). Gender under incomplete acquisition: Heritage speakers' knowledge of noun categorization. *Heritage Language Journal*, *6*(1), 40–71. https://doi.org/10.46538/hlj 6.1.3

Polinsky, M. (2011). Reanalysis in adult heritage language: New evidence in support of attrition. *Studies in Second Language Acquisition*, *33*(2), 305–328. https://doi.org/10.1017/S027226311000077X

Polinsky, M. (2018). *Heritage languages and their speakers*. Cambridge University Press. https://doi.org/10.1017/9781107252349

Poole, M. E., & Field, T. W. (1976). A comparison of oral and written code elaboration. *Language and Speech*, *19*(4), 305–312. https://doi.org/10.1177/002383097601900401

Prentza, A., & Tsimpli, I. M. (2013). On the optionality in L2 pronominal production and interpretation: What (more) can VP-coordination structures tell us? *EUROSLA Yearbook*, *13*, 22–46. https://doi.org/10.1075/eurosla.13.04pre

Putnam, M. T., & Salmons, J. C. (2013). Losing their (passive) voice. *Linguistic Approaches to Bilingualism*, *3*(2), 233–252. https://doi.org/10.1075/lab.3.2.05put

Quirk, R., Greenbaum, S., Leech, G., & Svartvik, J. (1985). *A comprehensive grammar of the English language*. Longman.

R Core Team. (2019). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.r-project.org/

Reis, M. (2013). „Weil-V2"-Sätze und (k)ein Ende? Anmerkungen zur Analyse von Antomo & Steinbach (2010). *Zeitschrift für Sprachwissenschaft*, *32*(2), 221–262. https://doi.org/10.1515/zfs-2013-0008

Rothweiler, M. (2006). The acquisition of V2 and subordinate clauses in early successive acquisition of German. In C. Lleó (Ed.), *Interfaces in multilingualism: Acquisition and representation* (pp. 91–113). John Bejamins. https://doi.org/10.1075/hsm.4.05rot

Sánchez Abchi, V., & De Mier, V. (2017). Syntactic complexity in narratives written by Spanish heritage speakers. *Vigo International Journal of Applied Linguistics*, *14*, 125–148.

Sanfelici, E., Féry, C., & Schulz, P. (2020). What verb-final and V2 have in common: Evidence from the prosody of German restrictive relative clauses in adults and children. *Zeitschrift für Sprachwissenschaft*, *39*(2), 201–230. https://doi.org/10.1515/zfs-2020-2011

Schleppegrell, M. J. (2013). Systemic functional linguistics. In J. P. Gee & M. Handford (Eds.), *The Routledge handbook of discourse analysis*. Routledge. https://doi.org/ 10.4324/9780203809068.ch2

Schleppegrell, M. J., & Colombi, M. C. (1997). Text organization by bilingual writers. *Written Communication*, *14*(4), 481–503.

Scontras, G., Polinsky, M., Tsai, C.-Y. E., & Mai, K. (2017). Cross-linguistic scope ambiguity: When two systems meet. *Glossa: A Journal of General Linguistics*, *2(1)*(36), 1–28. https://doi.org/10.5334/gjgl.198

Scontras, G., & Putnam, M. T. (2020). Lesser-studied heritage languages. *Heritage Language Journal*, *17*(2), 152–155. https://doi.org/10.46538/hlj.17.2.2

Sorace, A. (2000). Syntactic optionality in non-native grammars. *Second Language Research*, *16*(2), 93–102. https://doi.org/10.1191/026765800670666032

Sorace, A. (2011). Pinning down the concept of "interface" in bilingualism. *Linguistic Approaches to Bilingualism*, *1*(1), 1–33. https://doi.org/10.1075/lab.1.1.01sor

Thompson, S. A., Longacre, R. E., & Hwang, S. J. J. (2007). Adverbial clauses. In *Language typology and syntactic description: Complex constructions* (2nd ed., Vol. 2) (pp. 237–300). Cambridge University Press. https://doi.org/10.1017/CBO9780511619434.005

Tracy, R. (2011). Konstruktion, Dekonstruktion und Rekonstruktion: Minimalistische und (trotzdem) konstruktivistische Überlegungen zum Spracherwerb. In S. Engelberg, A. Holler, & K. Proost (Eds.), *Sprachliches Wissen zwischen Lexikon und Grammatik* (pp. 397–428). De Gruyter. https://doi.org/10.1515/9783110262339.397

Turk, M. J. (2004). Using and in conversational interaction. *Research on Language & Social Interaction*, *37*(2), 219–250. https://doi.org/10.1207/s15327973rlsi3702_5

Wang, Y., & Tao, S. (2020). The dynamic co-development of linguistic and discourse-semantic complexity in advanced L2 writing. In G. G. Fogal & M. H. Verspoor (Eds.), *Complex dynamic systems theory and L2 writing development* (pp. 49–78). John Benjamins Publishing Company. https://doi.org/10.1075/lllt.54.03wan

Weerman, F. (1989). *The V-2 conspiracy – a synchronic and diachronic analysis of verbal positions in Germanic languages.* Foris Publications.

Wiese, H., Alexiadou, A., Allen, S., Bunk, O., Gagarina, N., Iefremenko, K., Jahns, E., Klotz, M., Krause, T., Labrenz, A., Lüdeling, A., Martynova, M., Neuhaus, K., Pashkova, T., Rizou, V., Tracy, R., Schroeder, C., Szucsich, L., Tsehaye, W., Zerbian, S., Zuban, Y. (2020). *RUEG Corpus*. https://doi.org/10.5281/zenodo.3236068

Wiese, H., & Müller, H. G. (2018). The hidden life of V3: An overlooked word order variant on verb-second. In M. Antomo & S. Müller (Eds.), *Non-canonical verb positioning in main clauses* (pp. 201–224). Buske Verlag.

Wiese, H., & Pohle, M. (2016). "Ich geh Kino" or "… ins Kino"? Usage restrictions of noncanonical local expressions. *Zeitschrift für Sprachwissenschaft*, *35*(2), 171–216. https://doi.org/10.1515/zfs-2016-0012

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Deconstructing the Native Speaker: Further Evidence From Heritage Speakers for Why This Horse Should Be Dead!

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The category "native speaker" is flawed because it fails to consider the diversity between the speaker groups falling under its scope, as highlighted in previous literature. This paper provides further evidence by focusing on the similarities and differences between heritage speakers (HSs) and monolingually-raised speakers (MSs) of their heritage and majority languages. HSs are bilinguals who acquire a family (heritage) language and a societal (majority) language in early childhood. Naturalistic exposure from early childhood qualifies them as native speakers of their heritage language. Some HSs are simultaneous bilinguals, which makes them native speakers of their majority language as well. Others are early second language acquirers who may be indistinguishable from simultaneous bilinguals. Previous research shows that the heritage language productions of German HSs in the United States do not completely overlap with those of German MSs, who are, by default, native speakers. In overall clause type selection (independent main, coordinate main, and subordinate), the HSs differ from German MSs in German but are similar to English MSs in English. The present study examines the distribution of finite subordinate clauses and their types (relative, complement, and adverbial) across registers in 27 adolescent HSs of German in the United States, compared to 32 adolescent MSs of German and 32 MSs of English. All participants described a short video in two settings (formal/informal) and two modes (spoken/written). Results demonstrate that, even with respect to a specific phenomenon (subordinate clauses), HSs show similarities and differences to MSs of both languages. Concerning the distribution of subordinate clause types, HSs behave similarly to both English and German MSs. Concerning subordinate clauses in general, HSs use them less frequently than MSs in German. In English, the difference is more nuanced: HSs differentiate between settings in both modes, while MSs do so only in the written mode. This indicates that the category "native speaker" is not a meaningful descriptor since it covers speakers with varying production patterns. We propose that studies including native speakers should assure transparency and replicability of research by specifying and taking into account speaker characteristics such as bilingualism, proficiency, exposure and dominance.

Keywords: native speakers, heritage speakers, subordinate clauses, heritage German, majority language

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INTRODUCTION

The category "native speaker" has been used to characterize a particular speaker population for many years (see Hopp, 2016; Azar et al., 2019; Ionin et al., 2021; Redl et al., 2021 as recent cases in point). What most researchers seem to agree on is that a native speaker is defined as a speaker who acquires their language naturalistically in early childhood (Cook, 1999; Davies, 2004, 2013). Despite its popularity, this definition can be questioned. It has been criticized for being a political and ideological construct (Bonfiglio, 2010; Dewaele, 2018) and for discrediting late second language (L2) speakers as "deficient versions of natives" (Cook, 2016, p. 186). Another point of criticism is that the category is underspecified because it does not reflect the variation within the subgroups under its scope (Davies, 2004; Lowe, 2020). This criticism holds for the specific native speaker population considered in the present study, namely heritage speakers (HSs). They are broadly defined as "bilinguals who have acquired a family (heritage language) and a majority societal language naturalistically in early childhood" (Pascual et al., 2012, p. 450). Therefore, they are native speakers of both of their languages (Montrul, 2016; Kupisch and Rothman, 2018) irrespective of them being simultaneous bilinguals or early L2 acquirers of the majority language (Rothman and Treffers-Daller, 2014, p. 96).

Comparisons of HSs with monolingually-raised speakers (MSs) reveal areas of difference and similarity (Montrul, 2016, p. 208). The similarities with MSs can be found in both their heritage language (Nagy, 2015; Nagy and Lo, 2019; Łyskawa and Nagy, 2020) and their majority language (Kupisch et al., 2014; Pashkova et al., in press). The differences also become apparent in both their languages (Rothman, 2007; Polinsky, 2018; Scontras et al., 2018 for the heritage language; Scontras et al., 2017; Polinsky, 2018; Paradis, 2019 for the majority language). It is important to mention that the differences are not clear-cut but rather gradient. For example, in a study on clause-type use across registers, we found that German HSs with majority English showed similar distributional patterns in their heritage German productions in independent main clauses and different patterns in coordinate main clauses and subordinate clauses, compared to German MSs (Pashkova et al., in press). These results illustrate a more nuanced difference in clause type productions of MSs and HSs in their heritage language. Taken together, these findings indicate that the category "native speaker" fails to adequately reflect the variation between the speaker groups who fall under its scope, in this case, HSs and MSs.

Consequently, if a linguistic study states that it examined a group of native speakers, we cannot be absolutely certain who these speakers were and if their individual patterns of language use were comparable. The native speaker group could comprise for example MSs, HSs, or late L2 acquirers who emigrated and whose first language (L1) is undergoing attrition. Unquestionably, these speakers use their native language differently. Thus, further specification of the category "native speaker" is necessary to ensure transparency and replicability of research.

In the current study, we continue to address similarities and differences between two groups of native speakers, namely HSs and MSs. Focusing on finite subordinate clauses (SCs), we investigate their general use and the use of their types (complement, adverbial, and relative) across registers. This structural spectrum offers a promising area of variation in the two native speaker sub-groups because it is located at the interface of syntax and discourse (Sorace, 2011).

On the syntactic level, mastery of SCs is a potential source of variation in heritage language due to the complexity of SCs and different word order constraints in SCs in HSs' heritage and majority language (Pashkova et al., in press). Regarding SC types, differences in acquisition timing, paths, and the language input may play a key role in their later production (Andreou et al., 2020a). Researchers have suggested different acquisition trajectories of subordinate clause types (Vasilyeva et al., 2008; Paradis et al., 2017). In heritage language contexts, HSs and MSs presumably have similar acquisition conditions during infancy and early childhood, which then start to diverge once exposure to the majority language increases (around preschool/kindergarten), and especially once formal schooling sets in. Hence, for the heritage language, we can expect that the earliest acquired SC types will be similar in HSs' and MSs' productions, while the later acquired types might show more variation. In the majority language, HSs might experience a delay in late-acquired phenomena but eventually catch up with MSs (Schulz and Grimm, 2019), so we expect, apart from timing, no pronounced qualitative differences between HSs and MSs.

On the discourse level, register awareness creates another source of variation in heritage language use since HSs might not have sufficient exposure to a similarly wide range of registers as MSs of the same language (Polinsky, 2018, pp. 323–324; Aalberse et al., 2019, p. 148). HSs usually experience their heritage language in informal settings, most likely in oral interactions with family members, and might not be as familiar with formal registers. On the other hand, they use their majority language in a greater variety of communicative situations, so they develop a nuanced register awareness comparable to that of MSs of the majority language. Our research has shown that HSs can transfer their register awareness from their majority language to the heritage language, at least while choosing between independent main, coordinate main, and subordinate clauses (Pashkova et al., in press) when all options are available, in principle. What is yet unclear is whether and how this register awareness will manifest itself in a larger speaker sample and within specific sub-domains, such as the use of SC types.

In comparing HSs and MSs in their use of SCs and their types, we will argue that applying the category "native speaker" as a cover term for both these groups obscures a meaningful description of the variation in their patterns of language use. We address this terminological difficulty and propose adding further specification to the category "native speaker," such as presence of bilingualism, to enhance transparency and replicability. We furthermore briefly explore other variables, such as proficiency, exposure and dominance as potential characteristics for specification.

THEORETICAL AND CONCEPTUAL BACKGROUND

The Native Speaker Spectrum

A native speaker has been defined as "a person who learns a language as a child and continues to use it fluently as a dominant language" (Richards and Schmidt, 2013, p. 386). Other characteristics include grammatical and appropriate usage of the native language, self-identification with the community where it is spoken, and intuitions about (un)grammatical structures in that language. Davies (2013) adds creative performance and the ability to translate and interpret into the native language to the list of native speaker characteristics.

However, within these (extra-)linguistic features included in native speaker definitions, only one is uncontroversial and straightforward, namely the childhood acquisition of their L1 (Cook, 1999, p. 187; Davies, 2003, p. 436). Many of the other features mentioned can also be found in L2 speakers: they can use their L2 fluently, grammatically, appropriately, and intuitively, and be creative performers and translators/interpreters. This is the first point of criticism of the category "native speaker": how helpful is the category to group people with similar patterns of language use if the majority of its defining features appears in non-native speakers' productions as well (Lowe, 2020, pp. 21–22)?

Beyond linguistic considerations of fluency, accuracy, and intuition, the category "native speaker" has also been criticized for being politically and ideologically charged. It is noted that being a native speaker is associated with power, language ownership, and even positive personality traits (Bonfiglio, 2010). Race, background, and identity play a role in deciding whether a speaker could be a member of the native speaker group. Holliday (2009) writes that a prototypical English native speaker is a white Anglo-Saxon from an English-speaking western country, and those who do not fit this image might be excluded from native speakerhood. Bonfiglio (2010, p. 12) argues that, in some cases, nativeness is judged based on the speaker's ethnic/immigrant family background and not their language, for instance, Turkish HSs in Germany might not be readily viewed as German native speakers, even though they grew up in Germany and acquired German as one of their L1s.

Monolinguals and Heritage Speakers on the Native Speaker Spectrum

Monolingual speakers are the least disputed speaker population subsumed under the category "native speaker" as they only acquire their L1 naturalistically. HSs, however, have not always been included in the group of native speakers (Polinsky and Scontras, 2020). On the one hand, this might be surprising because HSs fit the criterion of naturalistic acquisition from early childhood. Some researchers might have excluded HSs from native speakers since they equate nativeness with high proficiency and dominance instead of seeing it as a product of naturalistic L1 acquisition (Kupisch and Rothman, 2018). On the other hand, such a confusion is understandable since we do frequently see differences in HSs' heritage language productions compared to MSs'. This is, however, an insufficient criterion for excluding HSs from the native speaker continuum as they are not the only group that might differ from a prototypical, highly proficient monolingual native speaker. We also find these differences in MSs with limited experience with the standard language and in late L2 bilinguals who have migrated and shifted dominance to the L2 and are experiencing L1 attrition (Dewaele, 2018; Kupisch and Rothman, 2018).

If the differences between HSs' and MSs' productions are not due to HSs being non-native speakers, what could they be attributed to? Many researchers agree that differences in amount and quality of input play a very important role in the eventual outcomes of heritage language acquisition (Montrul, 2016, pp. 117–119; Kupisch and Rothman, 2018; Aalberse et al., 2019, pp. 146–149). These differences in input could lead to variation in heritage language productions, for example, case marking in heritage German (Yager et al., 2015; Zimmer, 2020), inflected infinitives in heritage Brazilian Portuguese (Rothman, 2007), or the encoding of motion events in heritage Turkish (Goschler et al., 2020). However, some areas of the heritage language still display substantial similarity with MSs' productions, for example, voice onset times in heritage Italian (Nagy, 2015), case morphology in heritage Polish, Russian, and Ukrainian (Łyskawa and Nagy, 2020), or use of classifiers in heritage Cantonese (Nagy and Lo, 2019).

Yet, it would be too simplistic to say that one domain of heritage language grammar and use would show only similarities to MSs' productions, while another domain would be likely to show only differences. Some areas show both differences and similarities with MSs' productions. For instance, Brehmer and Usanova (2015) report that verb placement in heritage Russian in Germany is different in SCs compared to monolingual Russian, with an increase in use of the verb in clause-final position, which would be an expected transfer from German. However, main clauses in heritage Russian do not feature more use of the verb in second position (V2, required in German) than those in monolingual Russian. Thus, verb placement in heritage Russian exhibits difference and similarities with monolingual Russian. In a similar vein, our own previous research demonstrated that clause type use across different registers in heritage German also shows a combination of differences and similarities with monolingual German. While independent main clauses are used in the same manner by both speaker groups, coordinate main and subordinate clauses exhibit variation: HSs prefer coordinate main clauses, while MSs choose subordinate clauses more frequently (Pashkova et al., in press).

Concerning HSs' majority language, their linguistic behavior in everyday interactions is oftentimes comparable to that of MSs, especially once HSs reach early adulthood (Paradis, 2019). For example, HSs have been reported to not have a foreign accent in their majority language (Kupisch et al., 2014). Further, Pashkova et al. (in press) found no evidence that German HSs use different clause type patterns across registers in their majority English, compared to English MSs—overall, both groups used more independent main clauses in the written mode, more coordinate main clauses in the spoken mode, and more subordinate clauses in the formal setting. However, there is experimental evidence

that HSs might exhibit more fine-grained differences to English MSs in their majority English, for instance in the release of final stops (Polinsky, 2018, pp. 141–144), grammaticality judgments of subject–verb agreement (Paradis, 2019), and scope assignment (Scontras et al., 2017).

Summing up, HSs are typically native speakers of both of their languages since they typically acquire both languages naturalistically in early childhood. This does not mean, however, that HSs' linguistic performance is identical to that of prototypical, highly proficient MSs. These two groups of native speakers show differences and similarities in the patterns of their language use. Therefore, we propose further specification of the category "native speaker" in order to reflect this variability. Our study illustrates that an important variable to specify is the presence of bilingualism; additional specifications can include proficiency, exposure, and dominance.

Subordinate Clauses

The use of SCs and their types across registers is complex in that the speaker requires both syntactic knowledge and register awareness to decide on the appropriateness of SCs according to communicative situations (as explained in section "Register Characteristics of Subordinate Clauses," SCs are often more preferred in formal contexts). As specified in the Interface Hypothesis, structures involving both syntactic and pragmatic choices are particularly open to variation in terms of acquisition timing and/or cross-linguistic influence (Sorace, 2011; Tsimpli, 2014), thus leading to potentially different patterns across different types of natives speakers. We thereby add subordinate clause choice to the phenomena considered in interface research, given that register is a part of pragmatics, a language-external component (Tsimpli, 2014, p. 301). In the following section, we will examine the syntactic mastery of SCs and register awareness in both speaker groups.

Syntactic Characteristics of Subordinate Clauses

Subordinate clauses in general

Syntactically, SCs have the following features (Diessel, 2004, p. 48): they are integrated in the matrix clause, they are dependent structures that are formally incomplete without the matrix clause, and they are part of the same processing and planning unit as the associated matrix clause. This last feature is one of the reasons why SCs have been associated with higher syntactic complexity than juxtaposed matrix clauses (Polinsky, 2008; Neary-Sundquist, 2017; Peristeri et al., 2017; Sánchez Abchi and De Mier, 2017; Housen et al., 2019). Syntactic complexity has been defined, among other things, as the extent to which language users resort to syntactic embedding and SCs or as a structure which requires more steps in the syntactic derivation (Housen et al., 2012; Sanfelici and Schulz, 2021). However, the direct link between SCs and syntactic complexity has also been questioned: several researchers reported that textual complexity correlated not with the number of SCs but rather with mean length of nominal phrases and clauses (Lu, 2011; Wiese et al., 2020; Wang and Tao, 2020). Overall, the evidence for high complexity of SCs appears conflicting. Nevertheless, if SCs reflect textual complexity to some extent, we would expect fewer SCs in HSs' productions in their heritage language compared to MSs of that language.

In addition to the general complexity of SCs across languages, different word order constraints in HSs' heritage and majority language might play a role in SC production. This study examines HSs of German with English as their majority language. German and English differ in SC word order: In finite clauses introduced by complementizers and relative pronouns, German canonically exhibits subject-object-verb (SOV) structure,[1] while English has subject-verb-object (SVO) structure. This typological mismatch between the two languages of HSs might make the production of SCs in German harder for HSs than for MSs due to higher cognitive load because of the inhibition of one structure in the bilingual mind—in this case, SVO (Abutalebi and Green, 2016). This may lead to avoidance of SCs in the German productions of HSs (see Pashkova et al., in press, for a more detailed discussion).

Subordinate clause types

This section focuses on the syntactic characteristics of SC types and on how they might contribute to the variation between HSs and MSs. We follow previous researchers (e.g., Beaman, 1984; Diessel, 2004; Thompson et al., 2007; Paradis et al., 2017; Andreou and Tsimpli, 2020) in subdividing finite SCs into three categories: complement, adverbial, and relative clauses. In the following, we describe each clause type in detail and provide an overview of their L1 acquisition patterns.

Complement clauses are SCs that function as arguments of a predicate in the matrix clause (e.g., *She saw that a car was coming.*) (Biber et al., 1999, p. 658; Diessel, 2004, p. 1; Noonan, 2007; Lust et al., 2015, p. 301). Some researchers have suggested that complement clauses emerge early in L1 acquisition (Vasilyeva et al., 2008; Paradis et al., 2017), one of the reasons proposed for this being that they are narrowly syntactic structures that only require the knowledge of verb complement selection patterns and no pragmatic skills in discourse management (Mastropavlou and Tsimpli, 2011; Andreou, 2015; Andreou et al., 2020a). In child HSs, the accurate repetition of complement clauses in a sentence repetition task at the ages of 8–12 was reported to be associated with the amount of exposure to the language between ages 0 and 3 and at the age of 6 (Andreou et al., 2020a). This suggests that there are crucial periods for the development of complement clauses that correlate with their production later on. Hence, in the heritage language, we would expect similar production patterns in HSs and MSs because they received similar input at an age when language exposure could affect their emergence.

Adverbial clauses are SCs that modify main clauses similarly to adverbs and adverbial adjuncts modifying a proposition (e.g., *While she was walking, she saw an accident*) (Diessel, 2004, p. 1; Thompson et al., 2007). Contrary to narrowly syntactic structures, adverbial clauses, along with relative clauses, involve the syntax–discourse interface because they rely on discourse and pragmatics and call for discourse management skills (Peristeri et al., 2017, pp. 5, 11; Andreou et al., 2020a,b). For this

[1]Unintroduced subordinate clauses require verb-raising into second position, as in main clauses. Those cases are also accounted for in this study, see section "Data Coding."

reason, it has been argued that adverbial clauses are acquired later than complement clauses. Moreover, in child HSs, the accurate repetition of adverbial clauses at the ages of 8–12 was shown to be influenced by current language exposure (Andreou et al., 2020a). This suggests that adverbial clause use might be a locus for greater variation between heritage language and monolingual productions due to differences in the speakers' current language exposure.

Relative clauses are SCs that modify a noun phrase (NP) (e.g., *A woman who was pushing a baby stroller was walking down the street*) (Andrews, 2007). They are characterized by a syntactic gap that is associated with a relative pronoun at their left periphery and requires as its antecedent the relativized constituent of the matrix clause (Biber et al., 1999, p. 608; Diessel, 2004, p. 117). Similar to adverbial clauses, relative clauses are also located at the syntax-discourse interface and require discourse management skills, i.e., the ability to determine what is needed for referent specification in particular contexts. Therefore, one might expect relative clauses to be more influenced by later exposure, hence leading to greater variation between HSs' heritage language productions and those of MSs.

In the current study, we investigate whether the suggested differences of the acquisition onset of SC types impacts their use in HSs who are older than those examined in previous research (Andreou et al., 2020a).

Register Characteristics of Subordinate Clauses

Register is a variety definable in terms of situational parameters such as participants, channel, purpose, spoken or written mode, and formality of communication (Biber and Conrad, 2001, p. 175). In this study, we operationalize formality as spoken or written communication with public institutions, and informality as spoken or written communication with friends and family. HSs normally do not have as frequent exposure to a variety of registers in their heritage language compared to MSs of that language (Polinsky, 2018, pp. 323–324; Aalberse et al., 2019, p. 148 for recent mention of this tendency). Since the use of the heritage language is mostly limited to interactions with family members and perhaps members of a heritage language community, HSs are usually expected to be more familiar with informal registers and less familiar with formal registers. At the same time, HSs' majority language typically follows a different trajectory: they use it in a wider range of communicative situations and thus develop formal and informal register repertoires comparable to those of MSs. It is an interesting question, then, how HSs approach formal registers in their heritage language: would they use language patterns from the informal registers of their heritage language or would they try to rely on the formal register patterns from their majority language? Schleppegrell and Colombi (1997) argued for the latter option: they showed that Spanish HSs used very similar clause types in academic essays in heritage Spanish and majority English, despite being unfamiliar with formal academic registers in their heritage language.

Our recent study (Pashkova et al., in press) identified a similar tendency: German HSs showed similar clause type patterns in formal and informal registers in heritage German and majority English, which we called "an underlying register awareness"—HSs were able to transfer their register awareness from their majority language to their heritage language. Crucially, HSs used similar clause type patterns in heritage German compared not only to majority English but also to monolingual German. This possibility of transfer appears viable when the heritage and majority languages have similar register-related language use of the phenomenon under scrutiny, as was the case for clause type use in German and English (in both languages, MSs preferred independent main clauses in the written mode, coordinate main clauses in the spoken mode, and subordinate clauses in the formal setting). It is as yet unclear if register awareness can be attested in a larger data sample and transferred to another phenomenon, such as SC types. However, it is important to note that similar patterns of SC use in heritage and monolingual German did not mean the same frequency of SCs—HSs still used overall fewer SCs than MSs, most likely due to the syntactic characteristics of SCs outlined above.

Subordinate clauses and their types show variation across registers, which makes them an interesting phenomenon to examine with respect to register-related linguistic behavior of HSs. For instance, Koch and Oesterreicher (2012) outlined syntactic features of the language of immediacy, i.e., spontaneous face-to-face dialogues between familiar speakers, and the language of distance, i.e., carefully planned interactions between strangers in the public sphere. The language of immediacy is characterized by parataxis, whereas the language of distance is associated with hypotaxis. Our previous study (Pashkova et al., in press) confirmed this claim: in both English and German, we found more SCs in formal registers, which were similar to the language of distance, than in informal registers, similar to the language of immediacy.

Subordinate clause types are also subject to register variation. In English, for example, Biber and Gray (2016, pp. 87–100) reported more complement and adverbial finite clauses in conversation than in academic writing, and more wh-relative clauses in academic writing than in conversation. Beaman (1984) showed that nominal and relative subordinations occur more often in spoken narratives than in written ones, while adverbial subordinations are more frequent in written productions. Even though these findings do not map directly on the registers examined in the current study (a formal report to the police vs. an informal message to a close friend), we can still expect a certain variation in SC type productions according to formality. Our data will serve as an addition to the research on register repertoires of HSs because, to the best of our knowledge, there has not been a study that focuses on the systematic analysis of SC types according to formality.

The Present Study

To address the gaps in the literature just discussed, we pursue the following research questions (RQs) concerning the use of SCs in HSs' productions. Based on findings from the literature, we also lay out hypotheses and predictions for each question.

RQ 1: Do HSs show similarities or differences in the use of SCs according to register in their majority language (English)

compared to English MSs and in their heritage language (German) compared to German MSs?

Hypothesis 1: Based on our previous study of clause type use in a smaller participant sample (Pashkova et al., in press), we expect HSs to show similarities to English MSs and to differ from German MSs due to syntactic complexity and SOV word order of German SCs.

Prediction 1: Comparing HSs' majority English to monolingual English, we expect to find similar frequencies of SCs in all registers. Comparing HSs' heritage German to monolingual German, we expect to find similar patterns across registers but overall fewer SCs in heritage German.

RQ 2: Do HSs show similarities or differences in the use of SC types (relative, complement, and adverbial) according to formality[2] in their majority language (English) compared to English MSs and in their heritage language (German) compared to German MSs?

Hypothesis 2: We expect HSs to show similarities with English MSs, and a combination of differences and similarities with German MSs due to the different acquisition periods of SC types.

Prediction 2.1: Comparing HSs' majority English to monolingual English, we expect to find similar frequencies of SC types across settings (formal/informal). Comparing HSs' heritage German to monolingual German, we expect to find similar frequencies of complement clauses but different frequencies of adverbial and relative clauses, since the latter two SC types are assumed to be acquired later than complement clauses.

Prediction 2.2: Concerning the heritage language, we also expect to observe larger differences between HSs and MSs in the formal setting since HSs are less familiar with formal registers and we have no previous evidence that they can transfer their register awareness from majority English to heritage German in the use of SC types.

MATERIALS AND METHODS

Participants

For this study we looked at 91 adolescents aged 14–18 years (mean age = 16.1, SD = 1.39, 50 females), with 32 in each of the monolingual groups and 27 in the heritage German group with English as their majority language.

1. HSs of German with majority language English (mean age = 15.6, SD = 1.58, 12 females)
2. MSs of German (mean age = 16.6, SD = 0.91, 19 females)
3. MSs of English (mean age = 16.1, SD = 1.49, 19 females).

The HSs of German grew up speaking German with at least one L1 German-speaking parent in the household (21 HSs had one German-speaking parent, five had two, and one participant provided no answer). All speakers were either born in the United States, or moved there before age two. They did not receive bilingual education, but may have participated in German "Saturday schools" or other German-speaking activities in the community. Speakers of established German "language islands" were excluded from the study. We defined monolinguals as speakers whose L1 was the only language spoken at home, but who might have acquired further languages through foreign language instruction.

German HSs were recruited in Boston, Massachusetts; Madison, Wisconsin; and St. Paul, Minnesota by contacting German organizations and institutions as well as via social media platforms. German MSs were recruited via contacting German high schools in Berlin. English MSs were recruited in the same cities as German HSs (and in Long Island, New York) via social media platforms or through personal contacts. The socio-economic status of HSs' families was slightly higher than that of English and German MSs (see **Supplementary Appendix A** for detailed information on parental education) due to the nature of our HS participant pool, which mostly consisted of professionals whose move to the United States was work-related.

The German and English productions of the HSs as well as those of the English MSs were elicited in the United States and those of German MSs in Germany. The data for this study is openly accessible via the Research Unit Emerging Grammars (RUEG) 0.4.0 corpus (Wiese et al., 2020). Both English and German productions of HSs were compared to the productions of MSs of the respective language.

Materials and Procedure

The data was collected using the Language Situations methodology (RUEG group, 2018; Wiese, 2020), which elicits controlled, comparable, and quasi-naturalistic productions across registers. Participants watched a short non-verbal video depicting a minor car accident and recounted what they saw, imagining themselves witnesses to the accident. The procedure was divided into two settings. In the formal setting, the elicitor was formally dressed and met with the participant in a room set up like an office. In the informal setting, the elicitor was casually dressed and met with the participant in a more relaxed setting, with snacks and beverages offered. In order to enhance an easy-going, comfortable atmosphere, the elicitor and the participant engaged in 10–15 min of task-unrelated conversation in the target language at the beginning of the informal session. The participant watched the video three times in total (twice in the first setting, once in the second setting) and was then asked to recount it in two different modes: spoken and written.

The formal recounting was operationalized as a voice message to a police hotline (spoken) and a witness report to the police (written), while the informal recounting comprised a WhatsApp voice message (spoken) and a WhatsApp text message (written) to a friend. The order of settings (formal/informal) and modes (spoken/written) was balanced across participants. The MSs completed all tasks in one session. The HSs completed the tasks in two sessions—one for their majority language (English) and one for their heritage language (German)—with an interval of 3–5 days in between to minimize priming effects. The order of language sessions was counterbalanced across participants. Upon completion of all the narrative tasks, the participants filled out

[2]Due to the small sample size of SC types, we decided to collapse the four registers (formal spoken, formal written, informal spoken, informal written) into two formality conditions—formal vs. informal.

an online questionnaire[3] about their language background as well as a self-assessment of their abilities in each language. Self-assessment showed that HSs rated their speaking and writing skills higher in their majority English (speaking mean = 5, SD = 0; writing mean = 4.96, SD = 0.19) than in heritage German (speaking mean = 3.66, SD = 0.78; writing mean = 2.81, SD = 1.27). English monolinguals rated their skills comparably high (speaking mean = 4.75, SD = 0.51; writing mean = 4.53, SD = 0.57) to German monolinguals (speaking mean = 4.96, SD = 0.17; writing mean = 4.66, SD = 0.66).

Data Coding

As mentioned above, we investigated the use of SCs and their types (complement, adverbial, and relative) in narratives in English and German. In both languages, we examined only clauses that contained finite verbs to constrain the nature of the question. Morphologically non-canonical clauses, i.e., deviations with respect to person and number agreement, were still included, since they do not affect the type that the clause is assigned to. Subordinations missing complementizers or relative pronouns were included because a large proportion of the data stems from spoken productions and omitting complementizer "that" or relative pronouns "who" and "which" (in English) is common in spoken productions (Biber and Conrad, 2001). Non-finite constructions, such as infinitives, present participles, and past participles were excluded. All narratives were split into finite clauses, and each clause was coded for being an SC or a matrix clause. In German, SCs mostly exhibited finite verb-final structures, with the exception of unintroduced complement clauses (see below).[4] Weil V2 clauses were not coded as SCs since *weil* has lost its status of a subordinator in those constructions (Antomo and Steinbach, 2010; Reis, 2013).

Each SC was coded for its type: complement, adverbial, or relative.[5] We included both verb and noun complement clauses in our analysis even though the majority of L1 acquisition literature focuses on verb complements. Noun complement clauses usually complement a certain set of nouns such as *question, thought, report*, *argument* (Biber et al., 1999, pp. 645–656), and therefore appeared quite rarely in our data due to the content of the video. Since there were not enough cases to group them into a separate category, they were collapsed with verb complement clauses. Verb complement clauses (1a) should not be confused with what follows multi-word discourse markers *I think, I mean, I don't know, you know*, which look like epistemic expressions. In order to differentiate a discourse marker from an epistemic expression, a complementizer test was applied: if a complementizer/wh-pronoun was present or could be added after the expression in question, the expression was not taken to be a discourse marker and, hence, the following part was annotated as a complement clause (1b). If a complementizer was absent and could not be added, the expression was taken to be a discourse marker with no complement clause (1c). Each clause in square brackets in (1) was counted as one complement clause.

(1) a. They weren't looking and then realized [a car was coming$_{complement}$] (USbi52FE_fwE)[6]

b. I don't know [what else happened$_{complement}$] (USbi50FD_isE)

c. And then these two cars came by and like I dunno$_{discoursemarker}$ they came to the intersection and the guy dropped his ball (USmo64FE_isE)

In complement clauses, German exhibits finite verb-final structures (2a), but also allows for canonical V2 structures, if the complementizer is omitted after verbs of saying and thinking (2b). Each clause in square brackets in (2) was counted as one complement clause.

(2) a. und konnte daher nicht wissen [ob nach der Ball ein Mensch kommen würde$_{complement}$]

(USbi64MD_fwD)

"And due to this (the driver) could not know if a person would come after the ball."

b. Ich hoffe [ich konnte ihnen behilflich sein$_{complement}$]![7] (DEmo54FD_fwD)

"I hope I could be of help to you!"

All types of adverbial clauses (e.g., temporal, locative, causative, conditional, concessive) were put into one category. Each clause in square brackets in (3) was counted as one adverbial clause.

(3) a. I witnessed the crash [as I was walking along the side of a street$_{adverbial}$] (USbi55FD_fwE)

b. The car stopped short [because there was a dog trying to get the ball$_{adverbial}$] (USmo59FE_iwE)

c. [Als sie die straße überqueren wollten$_{adverbial}$], ist der Mann den Ball aus dem Hand gefallen.

(USbi64MD_fwD).

"As they wanted to cross the street, the ball dropped out of the man's hand."

As for relative clauses, we included not only those modifying an NP (4a,b) but also those modifying an entire proposition (4c,d) (Biber et al., 1999, p. 867). The reasoning here was similar to the inclusion of noun complement clauses: even though the majority of L1 acquisition literature focuses on NP-modifying relative clauses, there were a few cases of proposition-modifying relative clauses, which were, however, not numerous enough to form their own category, so they were collapsed with NP-modifying relative clauses. Even though there has been extensive research on different types of relative clauses in HSs (e.g., Polinsky, 2011; Albirini and Benmamoun, 2014), we did not distinguish between object and subject relative clauses because

[3]Questionnaire for adolescent participants of the Research Unit Emerging Grammars; https://osf.io/qhupg/

[4]We also included seven non-canonical V2 clauses clearly conceptualized as SCs: three complement clauses, two adverbial clauses, two relative clauses. We did not conduct a separate analysis V2 SCs due to their low frequency.

[5]We did not conduct fine-grained qualitative analyses of SC types such as examining word order, choice of complementizers or verb placement, although these characteristics are definitely worth exploring in further research. We did so since any further subdivision on the data would result in a too low number of data points in each subcategory to conduct a statistical analysis.

[6]The participant code in the examples includes the following information: US/DE, country of elicitation, United States or Germany; bi/mo, bilingual/monolingual speaker; 01, speaker number; M/F, speaker's sex; D/E, HS's heritage language (Deutsch for German) or monolinguals' L1 (English or German); f/i, formal/informal setting; s/w, spoken/written mode; D/E, language of elicitation, D for German or E for English.

[7]We preserved the original orthography of the written productions.

TABLE 1 | English clause productions by speaker group and register/formality.

Register	Formal spoken		Formal written		Informal spoken		Informal written	
Speaker group	HS	MS	HS	MS	HS	MS	HS	MS
All clauses	494	511	424	459	393	430	257	290
Subordinate clauses	145	128	119	144	88	95	58	50

Formality	Formal		Informal	
Speaker group	HS	MS	HS	MS
Complement clauses	41	49	40	44
Adverbial clauses	105	114	55	49
Relative clauses	118	109	51	52

TABLE 2 | German clause productions by speaker group and register/formality.

Register	Formal spoken		Formal written		Informal spoken		Informal written	
Speaker group	HS	MS	HS	MS	HS	MS	HS	MS
All clauses	448	732	358	625	370	638	219	399
Subordinate clauses	77	201	90	178	51	114	15	69

Formality	Formal		Informal	
Speaker group	HS	MS	HS	MS
Complement clauses	74	138	19	53
Adverbial clauses	22	65	23	69
Relative clauses	71	176	24	61

we did not have sufficient data points to perform a separate comparison of the two types. Each clause in square brackets in (4) was counted as one relative clause.

(4) a. it tried to like stop for this dog [that was running into the street$_{relative}$] (USmo65FE_isE)

b. Ein Mann [der anscheinend mit seiner Frau spazieren war$_{relative}$] prellte einen Fußball.

(DEmo69MD_fwD)

"A man who was walking apparently with his wife bounced a soccer ball."

c. The dog saw the ball and ran for it, [which caused the car in the front to stop$_{relative}$].

(USbi51FD_fwE)

d. und is dem ersten auto dann raufgefahren [was zu dem unfall geführt hat$_{relative}$]

(DEmo65FD_fsD)

"and drove into the first car which lead to the accident"

Tables 1, **2** show the total number of clause productions in English and German respectively.

Data Analysis

First, the data was coded for SCs and matrix clauses, resulting in a dependent variable "Clause type" with two levels (1 for SC and 0 for matrix clause). We analyzed the use of SCs vs. matrix clauses using generalized binomial linear mixed effect models in R (R Core Team, 2021) and the lme4 package (Bates et al., 2015). We maximally specified the fixed effects by including all theoretically relevant independent variables and their interactions: bilingualism (heritage bilingual/monolingual), setting (formal/informal), mode (spoken/written). We contrast-coded the factors using sum contrast coding (–0.5/0.5). We attempted to maximally specify the random effect of participants and included the random slopes for setting and mode (Barr et al., 2013). The maximal specification worked for German SCs, but not for English SCs, where it led to overfitting, so we removed the random slopes and left only the random intercept.

Second, each SC was coded for its type, resulting in a dependent variable "SC type" with three levels (complement, adverbial, and relative). Then, we recoded the dependent variable "SC type" into three separate dependent variables "Complement clause", "Adverbial clause", and "Relative clause" with two levels (1 and 0). After this manipulation, each SC type was analyzed independently from the other two types also using generalized binomial linear mixed effect models. Due to the small sample size of each SC type (**Tables 1**, **2**), we collapsed the spoken and written modes within each setting and only included the independent variables of bilingualism (heritage bilingual/monolingual) and setting (formal/informal) and their interaction. We contrast-coded the factors using sum contrast coding (–0.5/0.5). Where possible, we maximally specified the random effect of participants by including the random slopes for setting. If this led to a perfect correlation of fixed effects or a random effect variance estimated at 0 or 1, we removed the random slope. In the next section, we report the z- and p-values of the models, for full model summaries, see **Supplementary Appendix B**.

RESULTS

Majority and Monolingual English

Subordinate Clauses in English

For English SCs, we observed a main effect of setting ($z = 4.70$, $p \leq 0.001$): speakers produced more SCs in the formal setting more than in the informal setting (**Figure 1**). In addition, we observed a three-way interaction between bilingualism, setting, and mode ($z = 2.02$, $p = 0.043$). To interpret this interaction, we ran separate models for HSs and MSs. HSs showed a main effect of setting ($z = 2.71$, $p = 0.007$), while MSs showed a main effect of setting ($z = 4.04$, $p \leq 0.001$) and an interaction between setting and mode ($z = -2.46$, $p = 0.014$). Tukey's multiple comparison test (MCT, run with *emmeans* package, Lenth, 2021) revealed a significant difference between the formal and the informal settings in the written mode (estimate = –0.51, SE = 0.16, $z = -3.26$, $p = 0.006$) and an absence of such a difference in the spoken mode (estimate = 0.19, SE = 0.16, $z = 1.24$, $p = 0.602$). This shows that German HSs and English MSs partially overlapped in their SC productions. While they behaved similarly in the written mode, they diverged in the spoken mode: HSs distinguished between the settings whereas MSs did not. Additionally, for both speaker groups, setting played a key role in SC production.

Subordinate Clause Types in English

For English complement clauses, we observed a main effect of setting ($z = -3.73$, $p \leq 0.001$): there were fewer complement

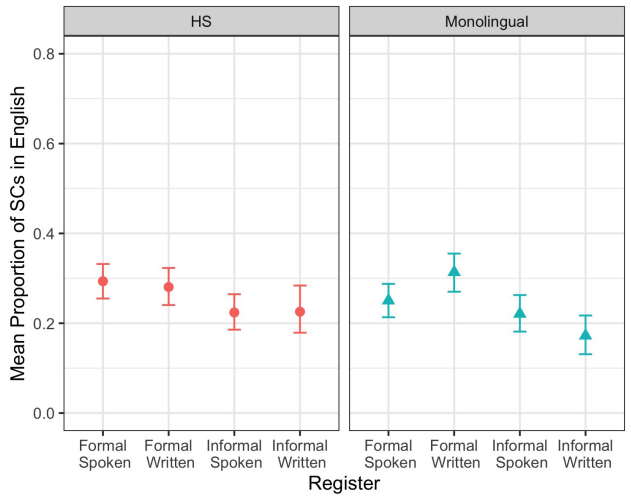

FIGURE 1 | Mean proportion of SCs in English by speaker group and register.

clauses in the formal setting than in the informal one (**Figure 2A**). For English adverbial clauses and relative clauses, we did not observe any main effects or interactions (**Figures 2B,C**). These results indicate that German HSs and English MSs performed similarly regarding the production of all SC types, and formality played a role only for complement clauses, with fewer complement clauses in the formal setting.

Heritage and Monolingual German

Subordinate Clauses in German

For German SCs, we observed two main effects and two interactions. First, there was a main effect of bilingualism ($z = -3.55$, $p \leq 0.001$), with HSs producing fewer SCs than MSs (**Figure 3**). Second, we found a main effect of setting ($z = 6.35$, $p \leq 0.001$): there were more SCs in the formal setting than in the informal setting. Then, we observed an interaction of setting and mode ($z = -2.98$, $p = 0.003$), with a greater difference between the formal and informal settings in the written mode (estimate = 1.08, SE = 0.18, $z = 5.94$, $p \leq 0.001$) than in the spoken mode (estimate = 0.45, SE = 0.13, $z = 3.37$, $p = 0.004$), according to Tukey's MCT. Finally, we observed a three-way interaction between bilingualism, setting, and mode. To interpret it, we ran separate models for HSs and MSs. The HS model indicated a main effect of setting ($z = 4.61$, $p \leq 0.001$), with more SCs in the formal setting than in the informal setting. In addition, there was an interaction of setting and mode. Tukey's MCT revealed a difference between the formal and informal setting in the written mode (estimate = 1.45, SE = 0.30, $z = 4.84$, $p \leq 0.001$) but not in the spoken mode (estimate = 0.22, SE = 0.20, $z = 1.09$, $p = 0.698$). The MS model showed only a main effect of setting ($z = 4.36$, $p \leq 0.001$). This shows that German HSs and MSs differed in the overall SC productions: while HSs distinguished between the settings only in the written mode, MSs did so in both modes. In addition, for both speaker groups, setting played a key role in SC production.

Subordinate Clause Types in German

For German complement clauses, we observed a main effect of setting ($z = -5.74$, $p \leq 0.001$), with fewer complement clauses in the formal setting than in the informal setting (**Figure 4A**). For adverbial clauses, we observed a main effect of setting ($z = 2.90$, $p = 0.004$), with more adverbial clauses in the formal setting than the informal setting (**Figure 4B**). For relative clauses, we observed a main effect of setting ($z = 2.30$, $p = 0.022$), with more relative clauses in the formal setting than the informal setting (**Figure 4C**). These results indicate that German HSs and German MSs performed similarly regarding the production of all SC types. Formality played a role for both speaker groups: they produced fewer complement clauses but more adverbial clauses and relative clauses in the formal setting than the informal setting.

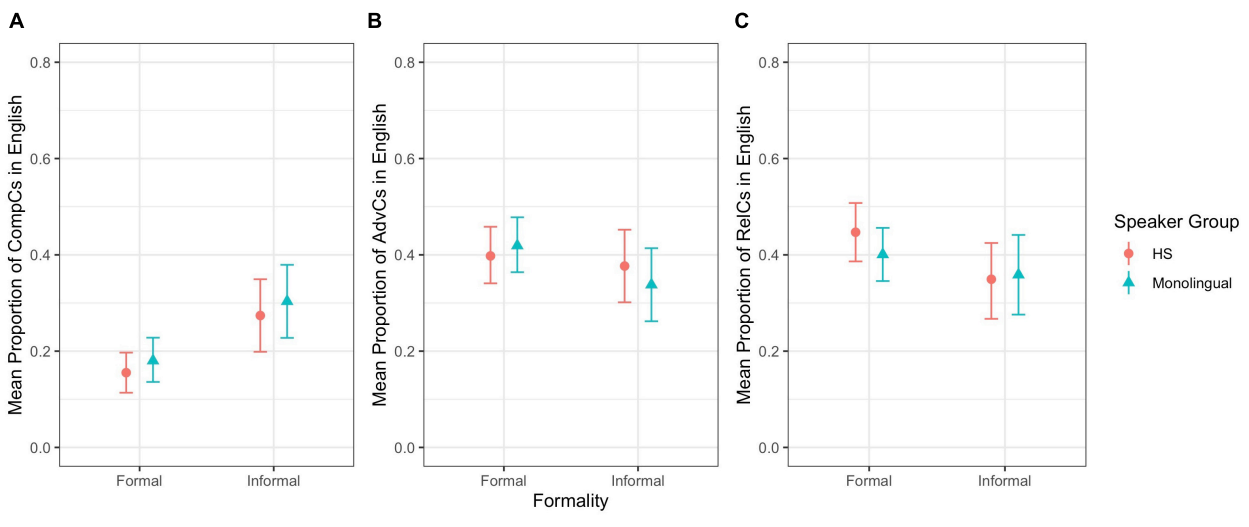

FIGURE 2 | Mean proportion of SC types in English by speaker group and formality: **(A)** Complement Clauses, **(B)** Adverbial Clauses, **(C)** Relative Clauses.

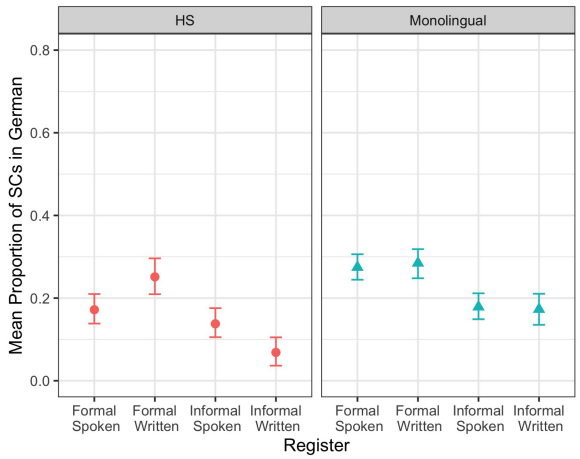

FIGURE 3 | Mean proportion of SCs in German by speaker group and register.

DISCUSSION

This study aimed at presenting reasons for why the category "native speaker" is flawed and should be further specified to account for the variation between the groups that fall under its scope. Such a specification would enhance transparency and replicability of research. We analyzed two native speaker groups—HSs and MSs—to argue that there are differences and similarities, as well as a combination of both, between the groups. In particular, we compared German HSs residing in the United States with English and German MSs. We looked at the use of SCs and their types (complement, adverbial, and relative) in spoken and written narratives across registers.

Our first research question focused on whether HSs use finite SCs in a similar or different way in their majority language compared to English MSs and in their heritage language compared to German MSs. With respect to HSs' majority language, our data does not confirm Hypothesis 1 and Prediction 1, which state that in their majority language, German HSs will perform similarly to English MSs. Overall, both speaker groups produce more SCs in the formal setting, confirming previous results, thus exhibiting similarity (see Pashkova et al., in press). This similarity is however only partial because a closer look at SC productions across registers reveals that HSs distinguished between the settings in spoken and written modes while MSs did so only in the written mode. With respect to HSs' heritage language, our data confirms Hypothesis 1 and Prediction 1, which state that in their heritage language, German HSs will produce significantly fewer SCs than German MSs. Additionally, HSs distinguished between the settings only in the written mode, while MSs did so in both modes. This can be attributed to the cognitive load of spoken online productions in combination with the general complexity of SCs and word order differences in SCs in English and German (Pashkova et al., in press).

Our second research question zoomed in on the use of finite SC types according to formality. We wanted to know whether HSs would show similarities or differences in their majority language compared to English MSs and in their heritage language compared to German MSs. With respect to HSs' majority language, our data confirms Hypothesis 2 and Prediction 2.1, which state that HSs and MSs should show similar frequencies of SC types across settings. With respect to HSs' heritage language, our data does not confirm Hypothesis 2 and Prediction 2.1, which expect a combination of differences and similarities between HSs and MSs, because both speaker groups in fact behaved similarly regarding the frequencies of SC types across settings. Consequently, we did not find any support for Prediction 2.2, which argued for a bigger difference between HSs and MSs in the formal setting.

Overall, the results show that the locus of variation between HSs and MSs is not where we predicted it to be. For English

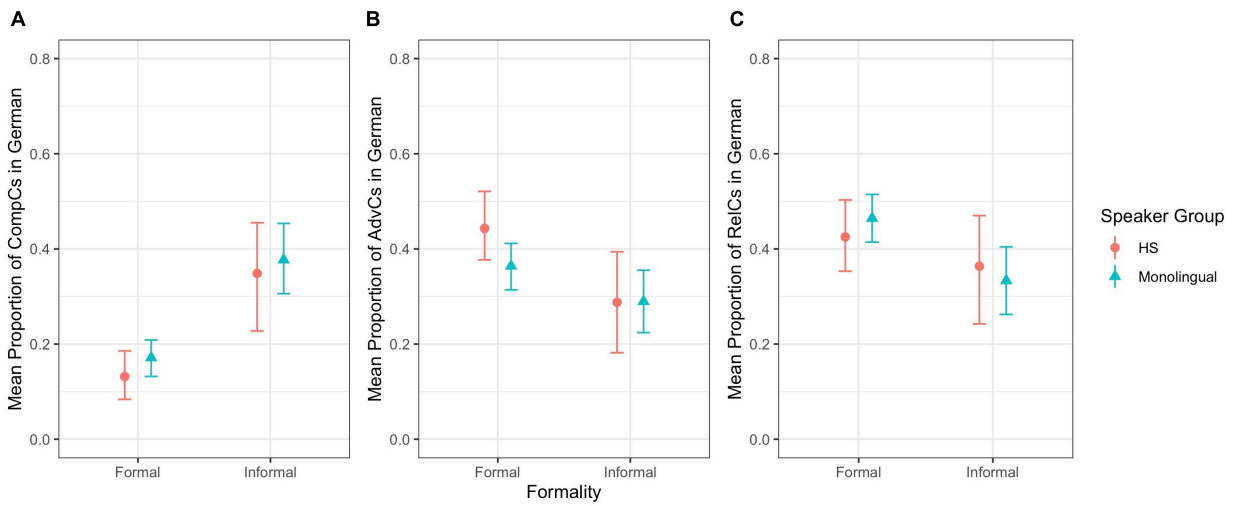

FIGURE 4 | Mean proportion of SC types in German by speaker group and formality: **(A)** Complement Clauses, **(B)** Adverbial Clauses, **(C)** Relative Clauses.

SCs, we expected to find only similarities between HSs and MSs, and instead we observed a combination of differences and similarities. HSs adhere to formality distinctions regardless of mode, unlike English MSs, who do so only in the written mode. This could be attributed to the different attitudes toward our study among HSs and MSs: HSs were well aware that their language competence was under scrutiny, and were probably trying to show their best language skills. This is especially true for the heritage language but could also have influenced their performance in the majority language, which might explain their strict adherence to the formality distinction in both modes. This illustrates that the two groups of native speakers show variation in their performance, potentially due to extralinguistic factors such as their perception of the situation. Therefore, the category "native speaker" groups together speakers with different patterns of language use and is not specific enough to allow comparability in a speaker population.

Another unpredicted result is that in German, HSs behave similarly to MSs with regard to all SC types, even adverbial and relative clauses, which we expected to differ between the speaker groups due to their later acquisition and location at the syntax-discourse interface. This is contrary to the previous findings by Andreou et al. (2020a), who showed that the current language exposure influences the production of adverbial clauses by child HSs in a sentence repetition task. However, their participants were much younger than ours (mean age 9.01 vs. mean age 15.6), which could be the reason for the discrepancy in our results. Perhaps, the use of adverbial clauses is influenced not only by the current language exposure but also by the overall cognitive maturity of the speaker (see Paradis et al., 2017 on the advantages of higher cognitive maturity in early L2 acquisition). Furthermore, the absence of difference could be attributed to the relatively small sample size in this study, which could have prevented us from capturing it. Productions of more speakers need to be analyzed to confirm our result. The analysis of SC types and SCs in German illustrated that we can still find similarities within a narrower phenomenon (SC types) between the sub-groups of native speakers even if a more general phenomenon (SCs) shows differences between the same speaker groups.

An additional unexpected finding was that concerning SC types, HSs behaved similarly to German MSs in their heritage language and similarly to English MSs in their majority language, even though the MSs of the respective languages behaved differently—in English, formality only had an effect on complement clauses, whereas in German, formality had an effect on all SC types. This shows that German and English differ in their formality-related language use and that HSs are able to adapt to the MS pattern in both their languages. This is surprising since the HSs' ability to adjust their SC type productions in their heritage language does not appear to originate from their exposure to formal registers in German or from transfer of their formality awareness from English into German. Further research is needed to pinpoint the source of this behavior.

The presented findings lead us to the conclusion that the category "native speaker" is too general to adequately define a speaker population because the speakers subsumed under this category may well differ in their linguistic behavior. Therefore, we argue for a more specific categorization, which provides more fine-grained information on their language background, allowing the possibility of capturing both group and individual variation, which are gradient (Ortega, 2020). Previous literature suggests that the category" "native speaker" should be replaced with "L1 user" (Dewaele, 2018). We argue for the necessity of further specification since even within L1 users, we can see differences as illustrated throughout this paper. This specification could include information on bilingualism, language exposure, proficiency, and dominance. In the current statistical analysis, we included only the variable of bilingualism in heritage language context. Further studies are needed to examine the influence of proficiency, language exposure, and dominance, which we expect to play a role in the variability among native speakers. Following this suggestion, for example, the majority of our German HSs could be described as bilinguals who are simultaneously raised in German and English, residing in the United States, with English as their current dominant language and German as their less dominant language. A typical German MS could be described as a monolingually-raised German speaker, residing in Germany, with German as their current dominant language.

One limitation of the present study, as already mentioned, is the relatively small sample size of the three SC types, which did not allow us to look into the interaction of bilingualism, formality and spoken/written mode. Since this interaction proved significant in the SC use, it would be very interesting to examine it in SC types as well. Due to a small sample size, we also were not able to assess potential qualitative differences in SC types (word order, choice of complementizer, or verb placement). Another possible extension of the current study is to examine further heritage-majority language pairs, probably typologically more distant, to see whether the patterns we describe here would manifest themselves in other native speaker groups. The RUEG corpus, which provided the data analyzed in this study, is a useful resource for such an extension since it contains comparable data for Greek, Turkish, and Russian HSs in Germany and the United States, plus data for their monolingual counterparts. Another aspect that could be addressed in future studies is the register-related language use in English, German, and possibly other languages. It is noteworthy that English and German MSs in our study did not behave similarly with respect to formality, and further research would be needed to uncover the possible sources of this difference. An additional step could be the inclusion of a wider range of registers with the same formality and mode distinctions, to see whether the formality sensitivity is tied to a particular situation (e.g., a police report) or if it is more general.

CONCLUSION

This study investigated the appropriateness of the category "native speaker" by comparing productions of two native speaker groups, namely heritage and monolingual speakers. We assessed the use of SCs and their types (complement, adverbial, and relative) in narratives produced by adolescent HSs of German

in the United States in comparison with adolescent German and English MSs. We provided evidence that there are similarities, differences, and a combination of both in the productions of HSs and MSs. Our results show similarities in the production of SC types between HSs' majority English and monolingual English, as well as between heritage and monolingual German. Differences were found in SC productions between heritage and monolingual German. A combination of differences and similarities was found in SC productions between majority and monolingual English. These findings support existing criticism of the category "native speaker" and further highlight its underspecification. As is, the category fails to adequately reflect the variation among speaker groups who fall under its scope. Therefore, we argue that we should enhance the category "native speaker" with more specific descriptions of speaker groups in order to provide unambiguous information about them.

DATA AVAILABILITY STATEMENT

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: RUEG corpus https://doi.org/10.5281/zenodo.3236068.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Deutsche Gesellschaft für Sprachwissenschaft ethics committee and the Institutional Review Board (IRB) University of Maryland at College-Park. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2021.717352/full#supplementary-material

REFERENCES

Aalberse, S., Backus, A., and Muysken, P. (2019). *Heritage languages: A language contact approach*, Vol. 58. Amsterdam: Benjamins, doi: 10.1075/sibil.58

Abutalebi, J., and Green, D. W. (2016). Neuroimaging of language control in bilinguals: neural adaptation and reserve. *Biling. Lang. Cogn.* 19, 689–698. doi: 10.1017/S1366728916000225

Albirini, A., and Benmamoun, E. (2014). Aspects of second-language transfer in the oral production of Egyptian and Palestinian heritage speakers. *Int. J. Bilingual.* 18, 244–273. doi: 10.1177/1367006912441729

Andreou, M. (2015). *The Effects of Bilingualism on Verbal and Non Verbal Cognition: The Micro- and Macro-Structure of Narratives in the Weak and the Dominant Language of the Bilingual Child.* Ph.D thesis. Thessaloniki: Aristotle University of Thessaloniki. doi: 10.13140/RG.2.2.11670.29767

Andreou, M., and Tsimpli, I. M. (2020). "Bilingualism, biliteracy and syntactic complexity: The role of crosslinguistic influence and cognitive skills," in *Language Acquisition, Processing and Bilingualism: Selected Papers from the Romance Turn VII*, eds A. Cardinaletti, C. Branchini, G. Giusti, and F. Volpato (Cambridge: Cambridge Scholars Publishing), 132–159.

Andreou, M., Torregrossa, J., and Bongartz, C. (2020a). "Sentence Repetition Task as a Measure of Language Dominance," in *BUCLD 45 Proceedings*, (Boston: Boston University).

Andreou, M., Tsimpli, I. M., Durrleman, S., and Peristeri, E. (2020b). Theory of Mind, Executive Functions, and Syntax in Bilingual Children with Autism Spectrum Disorder. *Languages* 5:67. doi: 10.3390/languages5040067

Andrews, A. D. (2007). "Relative clauses," in *Language Typology and Syntactic Description*, ed. T. Shopen (Cambridge: Cambridge University Press), 206–236. doi: 10.1017/CBO9780511619434.004

Antomo, M., and Steinbach, M. (2010). Desintegration und interpretation: Weil-V2-sätze an der schnittstelle zwischen syntax, semantik und pragmatik. *Zeitschrift Fur Sprachwissenschaft* 29, 1–37. doi: 10.1515/ZFSW.2010.001

Azar, Z., Backus, A., and Özyürek, A. (2019). General- and Language-Specific Factors Influence Reference Tracking in Speech and Gesture in Discourse. *Discourse Proces.* 56, 553–574. doi: 10.1080/0163853X.2018.1519368

Barr, D. J., Levy, R., Scheepers, C., and Tily, H. J. (2013). Random effects structure for confirmatory hypothesis testing: Keep it maximal. *J. Mem. Lang.* 68, 255–278. doi: 10.1016/j.jml.2012.11.001

Bates, D., Mächler, M., Bolker, B., and Walker, S. (2015). Fitting linear mixed-effects models using lme4. *J. Stat. Softw.* 67, 1–48. doi: 10.18637/jss.v067.i01

Beaman, K. (1984). "Coordination and subordination revisited: Syntactic complexity in spoken and written narrative discourse," in *Coherence in Spoken and Written Discourse*, eds D. Tannen and R. Freedle (Cambridge: Cambridge Scholars Publishing), 45–80.

Biber, D., and Conrad, S. (2001). "Register Variation: A Corpus Approach," in *The Handbook of Discourse Analysis*, eds D. Schiffrin, D. Tannen, and H. E. Hamilton (New Jersey, NJ: Blackwell Publishers), 175–196.

Biber, D., and Gray, B. (2016). *Grammatical Complexity in Academic English*. Cambridge: Cambridge University Press, doi: 10.1017/CBO9780511920776

Biber, D., Johansson, S., Leech, G., Conrad, S., and Finegan, E. (1999). *Longman Grammar of Spoken and Written English*. London: Pearson Educaiton Limited.

Bonfiglio, T. P. (2010). *Mother tongues and nations: The invention of the native speaker*. Berlin: De Gruyter.

Brehmer, B., and Usanova, I. (2015). "Let's fix it? Cross-linguistic influence in word order patterns of Russian heritage speakers in Germany," in *Transfer Effects in Multilingual Language Development*, ed. H. Peukert (Amsterdam: John Benjamins Publishing Company), 161–188. doi: 10.1075/hsld.4.08bre

Bulte, B., and Housen, A. (2014). Conceptualizing and measuring short-term changes in L2 writing complexity. *J. Second Lang. Writ.* 26, 42–65. doi: 10.1016/j.jslw.2014.09.005

Cook, V. (1999). Going beyond the Native Speaker in Language Teaching. *TESOL Quart.* 33:185. doi: 10.2307/3587717

Cook, V. (2016). Where Is the Native Speaker Now? *TESOL Quart.* 50, 186–189. doi: 10.1002/tesq.286

Davies, A. (2003). *The native speaker: Myth and reality*. Bristol: Multilingual Matters, doi: 10.21832/9781853596247

Davies, A. (2004). "The native speaker in applied linguistics," in *The Handbook of Applied Linguistics*, eds A. Davies and C. Elder (Oxford: Blackwell), 431–450. doi: 10.1002/9780470757000.ch17

Davies, A. (2013). *Native Speakers and Native Users*. Cambridge: Cambridge University Press, doi: 10.1017/CBO9781139022316

Dewaele, J. M. (2018). Why the Dichotomy "L1 Versus LX User" is Better than "Native Versus Non-native Speaker.". *Appl. Linguist.* 39, 236–240. doi: 10.1093/applin/amw055

Diessel, H. (2004). *The Acquisition of Complex Sentences*. Cambridge: Cambridge University Press, doi: 10.1017/CBO9780511486531

Goschler, J., Schroeder, C., and Woerfel, T. (2020). "Convergence in the encoding of motion events in heritage Turkish in Germany," in *Studies in Turkish as a Heritagae Language*, ed. F. Bayram (Amsterdam: John Benjamins Publishing Company), 87–103. doi: 10.1075/sibil.60.05gos

Holliday, A. (2009). "English as a lingua franca, 'non-native speakers' and cosmopolitan realities," in *English as an International Language: Perspectives and Pedagogical Issues*, ed. F. Sharifian (Bristol: Channel View Publications), 19–33. doi: 10.21832/9781847691231-005

Hopp, H. (2016). Learning (not) to predict: Grammatical gender processing in second language acquisition. *Second Lang. Res.* 32, 277–307. doi: 10.1177/0267658315624960

Housen, A., Kuiken, F., and Vedder, I. (2012). "Complexity, accuracy and fluency," in *Dimensions of L2 Performance and Proficiency: Complexity, Accuracy and Fluency in SLA*, eds A. Housen, F. Kuiken, and I. Vedder (Amsterdam: John Bejamins), 1–20. doi: 10.1075/lllt.32.01hou

Housen, A., De Clercq, B., Kuiken, F., and Vedder, I. (2019). Multiple approaches to complexity in second language research. *Second Lang. Res.* 35, 3–21. doi: 10.1177/0267658318809765

Ionin, T., Choi, S. H., and Liu, Q. (2021). Knowledge of indefinite articles in L2-English: Online vs. offline performance. *Second Lang. Res.* 37, 121–160. doi: 10.1177/0267658319857466

Koch, P., and Oesterreicher, W. (2012). "Language of immediacy – language of distance: orality and literacy from the perspective of language theory and linguistic history," in *Communicative Spaces: Variation, Contact, Change. Papers in Honour of Ursula Schaefer,* eds C. Lange, B. Weber, and G. Wolf (Frankfurt: Peter Lang), 441–473.

Kupisch, T., and Rothman, J. (2018). Terminology matters! Why difference is not incompleteness and how early child bilinguals are heritage speakers. *Int. J. Bilingual.* 22, 564–582. doi: 10.1177/1367006916654355

Kupisch, T., Barton, D., Hailer, K., Klaschik, E., Stangen, I., Lein, T., et al. (2014). Foreign Accent in Adult Simultaneous Bilinguals. *Heritage Lang. J.* 11, 123–150. doi: 10.46538/hlj.11.2.2

Lenth, R. V. (2021). *emmeans: Estimated Marginal Means, aka Least-Squares Means. R Package Version 1.6.1.* Available online at: https://CRAN.R-project.org/package=emmeans

Lowe, R. J. (2020). *Uncovering Ideology in English Language Teaching*. Berlin: Springer.

Lust, B., Foley, C., and Dye, C. D. (2015). "The first language acquisition of complex sentences," in *The Cambridge Handbook of Child Language*, eds E. L. Bavin and L. R. Naigles (Cambridge: Cambridge University Press), 298–323.

Łyskawa, P., and Nagy, N. (2020). Case Marking Variation in Heritage Slavic Languages in Toronto: Not So Different. *Lang. Learn.* 70, 122–156. doi: 10.1111/lang.12348

Mastropavlou, M., and Tsimpli, I. M. (2011). Complementizers and subordination in typical language acquisition and SLI. *Lingua* 121, 442–462. doi: 10.1016/j.lingua.2010.10.009

Montrul, S. (2016). *The Acquisition of Heritage Languages*. Cambridge: Cambridge University Press, doi: 10.1017/CBO9781139030502

Nagy, N. (2015). A sociolinguistic view of null subjects and VOT in Toronto heritage languages. *Lingua* 164, 309–327. doi: 10.1016/j.lingua.2014.04.012

Nagy, N., and Lo, S. (2019). Classifier use in Heritage and Hong Kong Cantonese. *Asia Pacific Lang. Variat.* 5, 84–108. doi: 10.1075/aplv.17001.nag

Neary-Sundquist, C. A. (2017). Syntactic complexity at multiple proficiency levels of L2 German speech. *Int. J. Appl.* Linguist. 27, 242–262. doi: 10.1111/ijal.12128

Noonan, M. (2007). "Complementation," in *Language Typology and Syntactic Description*, ed. T. Shopen (Cambridge: Cambridge University Press), 52–150. doi: 10.1017/CBO9780511619434.002

Ortega, L. (2020). The Study of Heritage Language Development From a Bilingualism and Social Justice Perspective. *Lang. Learn.* 70, 15–53. doi: 10.1111/lang.12347

Paradis, J. (2019). "English Second Language Acquisition from Early Childhood to Adulthood: The Role of Age, First Language, Cognitive, and Input Factors," in *Proceedings of the 43rd Boston University Conference on Language Development*, eds M. M. Brown and B. Dailey (Somerville, MA: Cascadilla Press), 11–26.

Paradis, J., Rusk, B., Duncan, T. S., and Govindarajan, K. (2017). Children's Second Language Acquisition of English Complex Syntax: The Role of Age, Input, and Cognitive Factors. *Annu. Rev. Appl. Linguist.* 37, 148–167. doi: 10.1017/S0267190517000022

Pascual, Y., Cabo, D., and Rothman, J. (2012). The (IL)logical problem of heritage speaker bilingualism and incomplete acquisition. *Appl. Linguist.* 33, 450–455. doi: 10.1093/applin/ams037

Peristeri, E., Andreou, M., and Tsimpli, I. M. (2017). Syntactic and Story Structure Complexity in the Narratives of High- and Low-Language Ability Children with Autism Spectrum Disorder. *Front. Psychol.* 8:02027. doi: 10.3389/fpsyg.2017.02027

Polinsky, M. (2008). Gender under incomplete acquisition: heritage speakers' knowledge of noun categorization. *Herit. Lang. J.* 6, 40–71. doi: 10.46538/hlj.6.1.3

Polinsky, M. (2011). Reanalysis in Adult Heritage Language: New evidence in support of attrition. *Stud. Second Lang. Acquisit.* 33, 305–328. doi: 10.1017/S027226311000077X

Polinsky, M. (2018). *Heritage Languages and Their Speakers*. Cambridge: Cambridge University Press, doi: 10.1017/9781107252349

Polinsky, M., and Scontras, G. (2020). A roadmap for heritage language research. *Bilingual. Lang. Cognit.* 23, 50–55. doi: 10.1017/S1366728919000555

R Core Team (2021). *R: A Language and Environment for Statistical Computing*. Vienna: R Foundation for Statistical Computing.

Redl, T., Frank, S. L., de Swart, P., and de Hoop, H. (2021). The male bias of a generically-intended masculine pronoun: Evidence from eye-tracking and sentence evaluation. *PLoS One* 16:e0249309. doi: 10.1371/journal.pone.0249309

Reis, M. (2013). Weil-V2"-Sätze und (k)ein Ende? Anmerkungen zur Analyse von Antomo & Steinbach (2010). *Zeitschrift Fur Sprachwissenschaft* 32, 221–262. doi: 10.1515/zfs-2013-0008

Richards, J. C., and Schmidt, R. W. (2013). *Longman Dictionary of Language Teaching and Applied Linguistics*, 4th Edn. London: Routledge, doi: 10.4324/9781315833835

Rothman, J. (2007). Heritage speaker competence differences, language change, and input type: Inflected infinitives in Heritage Brazilian Portuguese. *Int. J. Bilingual.* 11, 359–389. doi: 10.1177/13670069070110040201

Rothman, J., and Treffers-Daller, J. (2014). A prolegomenon to the construct of the native speaker: Heritage speaker Bilinguals are Natives Too! *Appl. Linguist.* 35, 93–98. doi: 10.1093/applin/amt049

RUEG group (2018). *RUEG Language Situations Elicitation 2018/19*. Charlottesville,VA: OSF.

Sánchez Abchi, V., and De Mier, V. (2017). Syntactic complexity in narratives written by Spanish heritage speakers. *Vigo Int. J. Appl. Linguist.* 14, 125–148.

Sanfelici, E., and Schulz, P. (2021). Can frequency account for the grammatical choices of children and adults in nominal modification contexts? Evidence from elicited production and child-directed speech. *Languages* 6, 1–31. doi: 10.3390/languages6010035

Schleppegrell, M. J., and Colombi, M. C. (1997). Text Organization by Bilingual Writers. *Written Commun.* 14, 481–503.

Schulz, P., and Grimm, A. (2019). The age factor revisited: Timing in acquisition interacts with age of onset in bilingual acquisition. *Front. Psychol.* 9:02732. doi: 10.3389/fpsyg.2018.02732

Scontras, G., Polinsky, M., and Fuchs, Z. (2018). In support of representational economy: Agreement in heritage Spanish. *Glossa J. General Linguist.* 3:1. doi: 10.5334/gjgl.164

Scontras, G., Polinsky, M., Tsai, C.-Y. E., and Mai, K. (2017). Cross-linguistic scope ambiguity: When two systems meet. *Glossa J. General Linguist.* 2, 1–28. doi: 10.5334/gjgl.198

Sorace, A. (2011). Pinning down the concept of "interface" in bilingualism. *Linguist. Approaches Bilingual.* 1, 1–33. doi: 10.1075/lab.1.1.01sor

Thompson, S. A., Longacre, R. E., and Hwang, S. J. J. (2007). "Adverbial clauses," in *Language Typology and Syntactic Description, Second Edition: Volume II: Complex Constructions*, ed. T. Shopen (Cambridge: Cambridge University Press), 237–300. doi: 10.1017/CBO9780511619434.005

Tsimpli, I. M. (2014). Early, late or very late? *Linguist. Approac. Bilingual.* 4, 283–313. doi: 10.1075/lab.4.3.01tsi

Vasilyeva, M., Waterfall, H., and Huttenlocher, J. (2008). Emergence of syntax: Commonalities and differences across children. *Dev. Sci.* 11, 84–97. doi: 10.1111/j.1467-7687.2007.00656.x

Wang, Y., and Tao, S. (2020). "The dynamic co-development of linguistic and discourse-semantic complexity in advanced L2 writing," in *Complex Dynamic Systems Theory and L2 Writing Development*, eds G. G. Fogal, and M. H. Verspoor (Amsterdam: John Benjamins Publishing Company), 49–78.

Wiese, H. (2020). "Language Situations: A method for capturing variation within speakers' repertoires," in *Methods in Dialectology XVI*, ed. Y. Asahi (Bern: Peter Lang), 105–117.

Wiese, H., Alexiadou, A., Allen, S., Bunk, O., Gagarina, N., Iefremenko, K., et al. (2020). *RUEG Corpus*. doi: 10.5281/zenodo.3236068

Yager, L., Hellmold, N., Joo, H. A., Putnam, M. T., Rossi, E., Stafford, C., et al. (2015). New structural patterns in moribund grammar: Case marking in heritage German. *Front. Psychol.* 6:1–9. doi: 10.3389/fpsyg.2015.01716

Zimmer, C. (2020). Kasus im Namdeutschen. *Zeitschrift Für Germanistische Linguistik* 48, 298–335. doi: 10.1515/zgl-2020-2004

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Light-weights placed right: post-field constituents in heritage German

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This study focuses on the linearization of constituents at the right sentence periphery in German, specifically on non-clausal light-weight constituents (LWCs) in the post-field. Spoken and written productions of German heritage speakers (HSs) with English as their majority language (ML) and of monolingually-raised speakers (MSs) of German are analyzed in different registers. The right sentence periphery is an area comprising a lot of variation and it is therefore intriguing to see how the two speaker groups deal with the options available if faced with the same communicative tasks. The overall goal is to answer the question whether the production of post-field LWCs in German HSs and MSs can provide us with evidence for ongoing internal language change and for the role of language contact with English. The analyses show a similar variational spectrum of LWC types and frequencies across speaker groups but a different distributional variation. The results show effects of register-levelling in the HS group, as they do not differentiate between the formal and informal setting unlike the MS group. Therefore, rather than transfer from the ML, the source of differing distributional variation of LWCs lies in the diverging adherence to register norms due to different exposure conditions across speaker groups.

KEYWORDS

heritage German, right sentence periphery, post-field, light-weight constituents, German–English language contact, register

1. Introduction

Heritage speakers (HSs) are a theoretically most relevant speaker group for linguistic research across subdomains of their grammars. Their often very heterogeneous acquisition context and outcome makes them an excellent learner type to investigate bilingualism, interface phenomena, as well as synchronic and diachronic effects of language contact. Heritage speaker's linguistic competence and performance show considerable inter- and intraindividual variation and they often rate themselves better in spoken than in written productions (Montrul, 2016, p. 44ff.), especially where their heritage language (HL) is not supported within the educational system. Furthermore, specific linguistic areas are more prone to variation (e.g., morphology, discourse) than others (e.g., phonology, syntax). An explanation for variation across linguistic subdomains is found in the interface hypothesis (Sorace, 2011; Tsimpli, 2014), which states that "language structures involving an interface between syntax and other cognitive domains are less likely to be acquired completely than structures that do not involve this interface" (Sorace, 2011, p. 1).

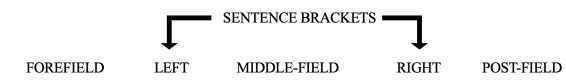

FIGURE 1
Illustration of the topological model.

Adopting a topological framework (see below), this paper focuses on the linearization of constituents at the right sentence periphery of German, specifically on post-field constituents in spoken and written productions of German HSs with English as their majority language (ML) and of monolingually-raised speakers (MSs) of German. I investigate the production of light-weight constituents (LWCs), i.e., non-clausal constituents which appear after the clause-final predicate, in the post-field (see Figure 1 and example 1). These particular clausal patterns diverge from the canonical pattern of German word order, and their status as more or less "marked" involves the interface of syntax and discourse-pragmatic factors.

In the topological model, constituents appear in different "fields" from which they can be moved either to the forefield, via topicalization, scrambled in the middle-field or extraposed into the post-field[1] (Drach, 1963; Zifonun et al., 1997; Wöllstein, 2014; Zifonun, 2015). While the forefield and the left clausal edge have received considerable attention (Müller, 2003; Freywald et al., 2015; Wiese and Müller, 2018; Bunk, 2020; Rocker, 2022; Wiese et al., 2022, among others), less attention has been given to the post-field and the right clausal edge. Researchers who have however worked on the right sentence periphery have identified it as a very heterogeneous domain and called for a more differentiated analysis with conceptually separable subdivisions (see Vinckel-Roisin, 2015 for an overview).

In example (1), the LWC in the post-field is realized as the adverbial phrase (ADVP) *ganz schnell* (very quickly) which appears after the participle *gestoppt* (stopped).

(1) das erste Auto hat gestoppt (**ganz schnell**$_{ADVP}$) (RUEG corpus informal spoken[2])

"*The first car had stopped very quickly*."

The post-field, broadly defined as the area following the right sentence bracket,[3] is typically considered an area reserved for heavy constituents such as subordinate clauses extraposed from the middle-field in order to reduce cognitive load[4] (Haider, 2010; Proske, 2015; Imo, 2016, p. 207). The realization of LWCs in the post-field as shown in example (1), while not ungrammatical, is often considered marked (e.g., Andersen, 2008; Vinckel-Roisin, 2012; Frey, 2015 among others). However, when we take into account different registers in speaking and writing, the situation is not as straightforward. Depending on the formality and mode of a production, we find a considerable range of constituents, like those in example (1), in the post-field not only of HSs but also of MSs of German. Therefore, the role and the effects of register variation need to be included in the analysis of LWCs in the post-field.

Previous research has shown that prepositional phrases (PPs) are particularly frequent in the post-field (Haider, 2010, p. 191; Zifonun, 2015; Imo, 2016). In German, PPs can occur before the verb, in the middle-field (example 2a), or after the verb, in the post-field[5] (example 2b).

(2a) weil das Auto (**wegen dem Hund**$_{PP}$) stoppen musste.

(2b) weil das Auto stoppen musste (**wegen dem Hund**$_{PP}$).

"*Because the car had to brake on account of the dog*."

In English, comparable PPs must follow the verb but cannot appear between the subject and the verb. Therefore, within the analysis of LWCs undertaken here, special emphasis is placed on the extraposition of PPs across speaker groups as it can provide us with information on the influence of language contact.

Even though English and German are both Germanic languages, they exhibit considerable typological differences in terms of word order. These differences make English and German an intriguing language pair to investigate the influence of language contact, language dominance and transfer potential. German is among one of the better-researched languages in the field of HL research. There is a long-standing history of investigations on Germanic varieties in English dominant environments, such as Australian German, Texas German, Pennsylvania German, and Moundridge Schweitzer German and existing research on these varieties, indeed, finds trends of increased frequencies of LWCs in the post-field attributable to language contact with English (e.g., Clyne, 2003; Westphal Fitch, 2011). However, there is so far little work on the type of HSs discussed here, namely second-generation immigrants born in the U.S. or early-childhood arrivers who are not part of a bigger German speaking Language Island community.

Overall, the phenomena investigated here have until recently been neglected in German linguistics, under-researched for different acquisition types, and, to the best of my knowledge, not pursued in research on German as a HL in second-generation immigrants under intense language contact with English as a ML. Section 2 provides the theoretical background and anchors the present analysis in previous studies. Section 3 introduces the participants, the corpus, and the applied methodology. Section 4 illustrates the results, followed by a discussion in Section 5. Section 6 summarizes the results and

1 Current research calls for further distinctions and additional fields, such as the pre-forefield, the extended post-field, and the right outer field (Zifonun, 2015), which only play a marginal role in the later discussion of this article.

2 This refers to one of the four narrations (formal spoken, formal written, informal spoken, informal written) which the participants were asked to produce. Section 3.2 provides a detailed explanation of the herein applied method for data collection.

3 The right sentence bracket can be realized or realizable (see Vinckel-Roisin, 2012, p. 144).

4 Especially long relative clauses, which are placed in the middle-field create a considerable distance between the subject and the finite verb, which makes them hard to process.

5 With the exception of resultative or directional predicates (e.g., Er hat es geschnitten [in kleine Stücke] (He has cut it into small pieces), Haider, 2010, p. 191).

addresses limitations of the current analysis as well as perspectives for follow-up research.

2. Theoretical background

2.1. Heritage speakers

One finds a plethora of HS definitions in the literature, depending on the theoretical research focus. According to the definition adopted here, HSs are bilinguals who grow up acquiring their HL within the family but are raised in an environment where another language has majority status (Rothman, 2007; Montrul, 2016; Polinsky, 2018). They can be considered either simultaneous bilinguals, exposed to two languages (the HL and the ML) from birth, or early sequential bilinguals who first acquire the HL and are then exposed to the ML of their country of residence. Intensive exposure to an early second language often results in a dominance shift from the HL to the ML (Pascual Y Cabo and Rothman, 2012; Kupisch and Rothman, 2018; Ortega, 2020 among others). Consequently, HSs usually use their ML in a wider range of communicative situations than their HL. In some cases, they may only be addressed in their HL by one other family member, in other cases, there may be an actual HL speaker community outside the family.[6]

Past research on HSs reveals a deficit-oriented view on their linguistic competence and performance, which resulted in labels such as semi-speakers or incomplete acquirers. However, this view has shifted due to a surge of interest in divergent attainment or differential acquisition (cf. Kupisch and Rothman, 2018) and led to extensive discussions of a suitable baseline, i.e., the actual input that HSs receive in the HL and not the variety spoken by MSs they are not exposed to (Polinsky, 2018, p. 3ff.; Rothman et al., 2022). Accordingly, recent studies argue that HSs are native speakers of their HL (Rothman and Treffers-Daller, 2014; Montrul, 2016; Kupisch and Rothman, 2018; Tsehaye et al., 2021; Wiese et al., 2022). In the current study, the data collected from German MSs is not used as a baseline, but as comparative data enabling us to identify contact-independent internal dynamics as well.

2.2. Syntactic linearization in German

The topological model, first conceptualized by Drach (1963), uses the metaphors of *sentence brackets* and *topological fields* to describe and investigate German sentences. It should be emphasized that using the topological model results in a purely linear analysis and not in hierarchical, binary-branching structures.[7] Table 1 illustrates the placement of constituents across topological fields with unmarked post-field constituents.

TABLE 1 Example sentences with unmarked post-field constituents.

3	Forefield	Left sentence bracket	Middle-field	Right sentence bracket	Post-field
a	Ich	habe	heute einen ziemlich heftigen Unfall	erlebt.[1]	
	'I have experienced a rather severe accident today.				
b	Ich	wollte	gerne über einen Unfall	berichten	den ich gesehen habe.
	'I would like to report about an accident which I have seen.'				
c	den		ich	gesehen habe.	
	'which I have seen'				
d	Ich	wollte	gerne über einen Unfall, den ich heute gesehen habe,	berichten.	
	'I would like to report about an accident which I have seen today.'				
e	Dann	fingen	die beiden Autofahrer	an,	den Unfall zu begutachten.
	'Then both drivers started to assess the accident.'				

[1]Most of the examples throughout this article have been taken from the RUEG corpus and were indicated as such (https://korpling.german.hu-berlin.de/annis3/#c=rueg). Some of the examples have been adapted to illustrate the variational spectrum of German sentences. They do, however mirror the syntactic patterns identified in the corpus.

In main and declarative clauses (examples 3a/b/d/e) the finite verb occurs in the left sentence bracket (LSB) while the rest of the verbal complex occurs in the right sentence bracket (RSB). In subordinate clauses (example 3c), complementizers[8] occupy the LSB while the finite predicate occurs in the RSB. The area in front of the LSB is called the forefield. It holds constituents that are pre-posed or topicalized from the middle-field, which is the field encompassed by the sentence brackets. The area after the RSB is labeled the post-field. The post-field can hold constituents that have been extraposed from the middle-field, including clausal adjuncts such as relative or complement clauses (see examples 3b/e).[9] While Table 1 showed the canonical, unmarked linearization of constituents in German sentences, Table 2 illustrates

6 For the participants presented in this research, no larger HL speaker community outside the family is present. Some participants, however, report regular visits to relatives in Germany.

7 See Haider (2010) for hierarchical approaches in post-field analyses.

8 Even though relative pronouns and relative adverbs also lead to VL clauses, they are not placed in the LSB. One line of argumentation is that relative pronouns and relative adverbs, unlike complementizers, function as constituents and are, thus, placed in the forefield (Wöllstein, 2014, p. 27ff.; Imo, 2016, p. 214).

9 From a generativist perspective, researchers still discuss the source of constituents appearing in the post-field (extraposition vs. base-generation). Some argue that movement as the source of extraposition is lacking in its explicatory nature (Haider, 2010), while others even go as far as saying that there is no movement to the right in German (Frey, 2015).

a different set of cases, thereby shifting the attention to the spectrum of constituents found in the post-field.

Although the clauses in Table 2 show canonical verb placement, we also see deviations from what are assumed to be orthodox—or stylistically "desirable"—constituent candidates in the respective fields. Example (4a) illustrates the extraposition of the PP *auf einem Parkplatz* (in a parking lot). Example (4b) exhibits the placement of the adverbial *heute* (today) in the post-field while example (4c) shows the extraposition of the DP *einen ziemlich heftigen* (a rather severe one).

TABLE 2 Example sentences with marked post-field constituents.

4	Forefield	LSB	Middle-field	RSB	Post-field
a	Ich	habe	heute einen Unfall	beobachtet	auf einem Parkplatz.
	'I have observed an accident in a parking lot today.'				
b	Ich	habe	einen ziemlich heftigen Unfall	beobachted	heute.
	'I have observed a rather severe accident today.'				
c	Ich	habe	heute einen Unfall auf einem Parkplatz	beobachtet	einen ziemlich heftigen.
	'I have observed a rather severe accident in a parking lot today.'				

All post-field constituents in Table 2 can be categorized as LWCs which, as in the case of (4a/b) could have easily "stayed" in the middle-field. Example (4c) functions as the specification of the DP antecedent *einen Unfall* (an accident) in the middle-field and, thus, could not have been realized in the middle-field. However, the DP could have been modified as *einen ziemlich heftigen Unfall* (a rather severe accident) within the middle-field, i.e., there is no syntactic demand to extrapose this information. Such occurrences show the existence of a variational spectrum that holds especially for spoken productions of German (cf. Zifonun et al., 1997; Imo, 2015; Zifonun, 2015). A greater variational spectrum in spoken or conceptually spoken[10] productions compared to written or conceptually written productions has been shown for other syntactic phenomena as well, suggesting that some linearization patterns might occur exclusively or more frequently in the spoken mode (Andersen, 2008, p. 2). However, variation is also found in written productions. Previous studies have attested considerable variation in the frequency of post-field productions in the written mode, with the least occurrences in scientific texts and most occurrences in informal productions (Roelcke, 1997, p. 158). This strengthens the fact that register differentiations need to be taken into account in investigations of post-field variation.

The availability of large synchronic and diachronic corpora of spoken and written German shows that even across MSs of German, the right sentence periphery is an area of considerable variation, with fluctuating degrees of markedness across registers. It is therefore intriguing to ask how both speaker groups, HSs and MSs, when faced with the same communicative challenge, deal with post-field options, given the fact that HSs of German have less contact with different registers than MSs and experience extensive language contact.

The existence of a post-field and its availability for various constituents in it is ultimately dependent on the formation of the sentence brackets. Only after the distinction of finite and non-finite verbs, and the asymmetric placement of finite and non-finite verbs in main and subordinate clauses is mastered, are we able to assess whether and with which constituents the post-field is filled. Head directionality within the verb phrase (VP), and hence, the RSB, are acquired early in L1, quickly followed by the discovery of the LSB and its canonical occupant, finite verbs (Tracy, 2011; Schulz and Tracy, 2018). The head parameters relevant for German main and subordinate clauses can be considered fixed around age three (Fritzenschaft et al., 1990; Rothweiler, 2006; Tracy, 2011; Müller et al., 2018). Once the post-field "exists", learners still need to figure out which constituents can access it. A study which looked at the emergence of the topological fields and the occurrence of constituents in the right sentence periphery in children around age two found instances of complements, i.e., direct objects in form of DPs, in the post-field, which is highly non-canonical in contemporary German. With time, children's productions converged on those of adults and became canonical (Elsner, 2015). The results of this study illustrate that even in monolingual L1 acquisition without contact with another language, one finds (non-) canonical variation in the linearization at the right sentence periphery.

After head directionality and finiteness are acquired, the placement of constituents in the post-field is furthermore influenced by register norms and discourse-pragmatic requirements of the communicative situation which will be outlined in the following. According to Biber and Conrad (2001, p. 175), a register is a variety which can be defined by specific communicative and contextual parameters, such as interlocutors involved, purpose, as well as mode and formality of the interaction. Previous research (Polinsky, 2018, pp. 323–324; Aalberse et al., 2019, p.148 to name but a few) has shown that HSs, who often do not learn to read and write in the HL, cannot be expected to have available the register spectrum, genres, or styles accessible to age-matched ML speakers of the same language in the country of origin. Dominance shift, the unavailability of a HL community, the greater social prestige of their ML, as well as the absence of formal education in the HL contribute to diverging levels of adherence to register norms between HSs and MSs as well as between the HL and the ML in individual speakers.

Discourse-pragmatic reasons for placing constituents in the post-field are manifold, and arguments for differentiating various subfields and ways for filling them (movement, free adjunction) are controversial, as shown in previous research (Zifonun et al., 1997; Frey, 2015; Vinckel-Roisin, 2015; Zifonun, 2015; Imo, 2016, among others). It has been argued that (a) the post-field cannot be a single undifferentiated field[11] and (b) not all constituents that appear in this

10 Spoken and written productions can be seen as part of a conceptual continuum. This means that, depending on the situation and the context, written productions can become conceptually spoken (e.g., a diary entry) and spoken productions can become conceptually written (e.g., a sermon, cf. Koch and Oesterreicher, 2012).

11 Due to scarceness of datapoints in this corpus, no distinction between the narrow and extended post-field (or post-field and right outer field) is applied in the quantitative analysis.

area seem to be extraposed from the middle-field but could also be more or less freely adjoined and base-generated (Vinckel-Roisin, 2012; Frey, 2015). Zifonun et al. (1997) propose subdividing the right sentence periphery into two fields: the post-field and the right outer field. The post-field contains syntactically integrated as well as non-integrated constituents such as subordinate clauses. The right outer field can be distinguished from the post-field insofar as its constituents are not syntactically integrated units of the preceding clause (Vinckel-Roisin, 2012). The right outer field can be occupied, regardless of whether or not the post-field is filled, and constituents in this position are typically prosodically or orthographically highlighted. The right outer field is usually reserved for constituents with discourse-pragmatic functions such as comments, verification of the audience's attention or requests for reactions (cf. Imo, 2016, p. 223 ff.) Example (5) illustrates this distinction with the relative clause *der ziemlich heftig war* (which was rather severe) in the post-field and the discourse marker *nicht wahr* (isn't that right) in the right outer field.

(5) Wir haben heute einen Unfall auf einem Parkplatz gesehen, der ziemlich heftig war, **nicht wahr**?

"*We saw an accident in a parking lot today, which was rather severe, isn't that right*?"

Depending on their placement within the overall area of the post-field (narrow vs. extended post-field), their clausal status, and the degree of phonetic integration,[12] functions addressed in the literature on MSs of German are the addition of detail to previously mentioned content, repairs, and evaluative afterthoughts in the service of discourse coherence.[13]

2.3. The influence of language contact

As already mentioned, the HSs in this study have English as their ML. For the phenomena under discussion in this paper, the most crucial difference between German and English consists in verb placement, with German being head-last within the VP, while English is head-first. German further exhibits an asymmetry in finite verb placement, with V2 structures in main clauses and VE structures in subordinate clauses, whereas English has an SVO structure across clauses apart from subject-auxiliary-inversion and highly restricted subject-main-verb-inversion with intransitive verbs (see Table 3).

TABLE 3 German and English word order.

	Contrasts	German	English
I	VP (across clauses)	[O....$V_{(-fin)}$]	[$V_{(-fin)}$ O ...]
II	main clauses	(X) $V2_{(+fin)}$ ….$V_{(-fin)}$	(X) $SV_{(+fin)}O$ + residual V2
III	subordinate clauses	COMP..... $V_{(+fin)}$	COMP $SV_{(+fin)}O$

12 Discourse structuring devices, i.e., hesitations, pauses, and intonational breaks (or punctuation in written productions) can provide relevant cues to the degree of connectedness to the previous clause and can be used to distinguish between functional differences of constituents in the right sentence periphery (e.g., Altmann, 1981; Frey, 2015 and the references therein; Imo, 2015).

13 The functional exploitation of the postverbal position is already visible in German-speaking children's early multiword utterances (Tracy, 1991, p.187).

One relevant question to ask, then, is the following: Given intensive language contact between German and English, to what extent do HSs observe these contrasts? Do we see an increase in extrapositions which could be due to cross-linguistic influence from English? Such trends have been observed in previous studies on speakers of German Language Islands. Westphal Fitch (2011) found increased numbers of extrapositions in spoken productions in speakers of Palatinate and Pennsylvania German in comparison to speakers of Standard German due to language contact with English.

Despite the variational spectrum documented especially in spoken German, a crucial restriction, as already mentioned, is that contemporary German, does not allow the placement of direct objects in the post-field[14] (Zifonun, 2015, p. 30), as in example (6).

(6) *Wir haben gesehen **einen Hund**.

"*We have seen a dog*."

The translation of example (6) demonstrates that English calls exactly for this linearization, with the verbal head immediately adjacent to its complement. Previous studies on heritage German in Australia also attested increased extrapositions of LWCs, including the extraposition of direct objects, which Clyne (2003), attributes to intense contact with English, see example (7).

(7) Mummy hat gesagt **die Wörter für mich**.

"*Mummy told me what to say*"(Clyne, 2003, p. 137).

Productions like the one in example (7) legitimize the question whether language contact with English enhances the non-canonical placement of direct objects in the post-field of HSs of German.

The typological differences between English and German also become apparent when looking at the linearization of PPs. In English for instance, PPs usually appear after the verb due to the strict VO serialization across clauses.[15] In German, due to the sentence brackets, the PP can occur in the middle-field (i.e., before the finite verb) or in the post-field (i.e., after the finite verb). Therefore, HSs have an additional option for PP placement in German in comparison to English. Choosing to extrapose the PP into the post-field results in clauses which are, in their surface syntactic realization, more parallel to the unmarked English linearization contrary to producing the PP in the middle-field, which is not possible in English. Research on German Language Islands in the USA has shown that if parallelism between structures exists, these structures may appear more frequently than

14 Diachronic analyses of the post-field show that (direct) objects are found in the post-field without jeopardizing the grammaticality of the sentence up until the era of New High German (Hinterhölzl, 2004; Coniglio and Schlachter, 2015).

15 PPs can also be topicalized in English, thus occurring before the subject (e.g., on the table, she placed a vase). In German, topicalization of PPs is also possible. The PP would then, however, be placed in the forefield (e.g., auf den Tisch platzierte sie eine Vase). This serialization would be ungrammatical in English (i.e., *on the table placed she a vase). Similar surface syntactic patterns in English are residual and restricted to transitive verbs (e.g., on the table stood a vase) and presentational there-constructions, both highly dependent on the preceding context.

non-parallel ones (Westphal Fitch, 2011, p. 374; Hopp and Putnam, 2015 and the references therein).[16]

Examples (8a/b) were produced by the same participant, once in the HL, German and once in the ML, English and illustrate this surface parallelism with the PP following the verb in both cases.

(8a) der Hund an der anderen Seite von der Straße ist vorgerannt (**zum Ball**$_{PP}$) RUEG corpus formal written.

"*The dog on the other side of the street ran towards the ball.*"

(8b) and the dog leaped forward (**to the ball**$_{PP}$) RUEG corpus formal written.

In the light of this typological difference between German and English, the question arises whether language contact with English facilitates the production of PPs in the post-field of German HSs, resulting in an overlapping surface structure across their languages—a question that explores the interplay of surface parallelism on the one hand and transfer or avoidance on the other hand.

An additional point—and analytical problem—paramount to the question of cross-linguistic influence and transfer phenomena due to surface parallelism is the fact that whenever we have a clause with an empty RSB (9a) or a clause with an empty RSB and a filled post-field (9b), the surface structure between German and English clauses becomes identical (see Table 4).

TABLE 4 Example clauses with empty RSB illustrating surface parallelism.

9	Forefield	LSB	Middle-field	RSB	Post-field
a	Ich	sah	einen Autounfall.	-	
	'I saw a car accident.'				
b	Ich	sah	einen Autounfall	-	gestern.
	'I saw a car accident yesterday.				

In the face of these partial overlaps and cross-linguistic parallels in surface structure, the question of whether contact with English boosts LWCs (including direct objects) in the post-field in HSs in comparison with MSs becomes particularly relevant.

2.4. The present study

The data presented in this article was not specifically elicited to investigate post-field productions. Nevertheless, it is highly suitable to investigate the variational spectrum at the right sentence periphery in different registers and the role of language contact: It contains the productions of MSs and HSs of German who were faced with the same communicative tasks, therefore allowing for adequate comparisons. The following research questions and hypotheses could therefore be formulated:

> *RQ1*: Which types of LWCs can be found in the post-field of HSs and MSs of German, and with which frequency?
>
> *H1*: Due to typological differences in the syntactic realization of constituents in German and English, HSs will show more various LWCs and increased frequencies of LWCs in their post-field productions.
>
> *RQ2*: Does register influence the type and frequency of constituents in the post-field of HSs and MSs of German?
>
> *H2*: Register will have an influence on the frequency of LWCs in the post-field across speaker groups with more constituents produced in the informal setting and the spoken mode.
>
> *RQ3*: Do HSs of German produce more PPs in the post-field than MSs of German?
>
> *H3*: HSs of German will have higher frequencies of PPs in their post-field than MSs of German due to extensive contact with English.

3. Method

3.1. Participants

The present study included 61 adolescent participants aged 13 to 19 years (mean age = 16.1, SD =1.35, 32 females). The overall number of participants can be subdivided into 29 HSs of German with ML English (mean age = 15.6, SD = 1.57, 12 females),[17] and 32 MSs of German (mean age = 16.6, SD = 0.91, 20 females). All HSs grew up in the USA in a majority English environment, speaking German with at least one native German-speaking parent in the household.[18] The participants in the MS group were defined as individuals whose L1, German, was the only language spoken at home, but who might have acquired further languages through foreign language instruction. The German and English productions of the HSs were elicited in the U.S., the productions of the German MSs in Germany. The data was retrieved from the openly accessible RUEG 0.4.0 corpus (Wiese et al., 2021).

3.2. Materials and procedure

The controlled and standardized data elicitation followed the language situations methodology (Wiese, 2020). Participants watched a short non-verbal video of a rear-ending car accident and recounted what they saw, imagining themselves witnesses to the accident in four different narrations, which we operationalized as productions in different registers. Data collection took place in two differently arranged rooms: a formal and an informal one with

16 As we also know from code-switching research, parallel surface structures may ease language mixing (Poplack, 1980; Muysken, 2000).

17 One adolescent HS did not enter their birthdate, therefore, the mean and standard deviation for the HS group was calculated for 28 participants only.

18 Participation requirements were that the HSs were either born in the U.S., or moved there before age two. The HS participants should not have received bilingual education but may have participated in German "Saturday schools" or other German-speaking activities. Speakers of established German Language Islands were excluded from the study.

different elicitors in each room. The elicitation of the formal productions took place in an office-like room, whereas the informal productions were elicited in a casual setting with snacks and beverages offered and following a 10–15 minute-long informal, task-unrelated conversation in the target language in order to create a more relaxed atmosphere. During one session, all participants watched the video three times in total (twice in the first setting, once in the second setting) and were asked to recount it in two different modes: spoken and written.

In the formal recounting, the participants were asked to send a voice message to a police hotline (spoken) and a witness report to the police (written). In the informal setting, they had to send a voice message (spoken) and a text message (written) to a friend via an instant messenger. The order of settings (formal/informal) and modes (spoken/written) was balanced across participants. The MSs completed all tasks in one session. The HSs completed the tasks in two sessions – one for each language – with an interval of three to five days in between to minimize priming effects and the order of languages counterbalanced across participants. Upon completion of all tasks, participants filled out an online questionnaire[19] about their language background as well as a self-assessment of their abilities in each language on a five-point Likert scale. Self-assessment showed that, in line with previous research, HSs rated their speaking skills higher than their writing skills in their heritage German (speaking mean = 3.71, SD = 0.79; writing mean = 3.03, SD = 1.29). German MSs rated their speaking skills at ceiling and their writing skills almost at ceiling (speaking mean = 4.96, SD = 0.17; writing mean = 4.6, SD = 0.64).

TABLE 5 List of constituents in the right sentence periphery with examples.

Constituent type	Example
SC: subordinate clause (finite)	hat den mann nicht gesehen ***[weil ein auto in sein sichtfeld war$_{SC}$]***[1] *'didn't see the man because a car was in his field of view'*
INF: subordinate clause (non-finite)	und ein hund hat versucht ***[ihn zu fangen$_{INF}$]*** *'and a dog tried to catch it'*
PP: prepositional phrase	die haben die Straße runtergelaufen ***[mit einem Ball$_{PP}$]*** *'they walked down the street with a ball'*
ADVP: adverbial phrase	das auto vorne hat angehalten ***[plötzlich$_{ADVP}$]*** *'the car in front had stopped suddenly'*
DP: determiner phrase	die haben irgendwelche Sachen fallen gelassen ***[Lebensmittel$_{DP}$]*** *'they have dropped some things, groceries'*
ADJP: adjectival phrase	und die Frau war sehr schockiert **[also bisschen perplex$_{ADJP}$]** *'and the woman was very shocked so a bit perplexed'*
DM: discourse marker	und die autofahrer sind dann auch gleich ausgestiegen ***[und so$_{DM}$]*** *'and the drivers immediately exited and so on'*
NONC: non-canonical direct object	die Mann geht zu helfen ***[die Mädchen [die essen aufzuholen]$_{NONC}$]*** *'the man goes to help the girl pick up the food'*

[1]All productions in this table have been kept in their original orthography, if written, and in their original structure, if spoken, while canonical morphosyntax and choice of auxiliary have been ignored.

3.3. Data analysis

The spoken and written productions of both speaker groups (HSs and MSs) were annotated according to the topological model based on the KiDKo annotation guidelines (Bunk et al., 2020). All post-field constituents were exported from the RUEG corpus and additionally annotated for their constituent type. Table 5 shows examples for each constituent type produced in the post-field. A total of 708 post-field constituents were annotated.

The corpus includes a total of eight different constituent types: finite subordinate clause (SC), non-finite subordinate clause (INF), prepositional phrase (PP), adverbial phrase (ADVP), determiner phrase (DP), adjectival phrase (ADJP), discourse marker (DM), and DP realized as non-canonical direct object (NONC) of which we found a total of two in the corpus, both produced by the same speaker.

As has already been established, the occurrence of (non-)finite subordinate clauses in the right sentence periphery is canonical and unmarked as it serves to avoid "overloading" the middle-field. Therefore, the focus of the current analysis lies on constituents that are not subordinations, i.e., LWCs. Due to scarceness of data points (a total of 140 LWCs) and, therefore, small numbers in certain categories, the eight constituent types were collapsed into subordinations and LWCs. This resulted in a dependent variable "constituent type" with two levels (1 for LWCs and 0 for SCs[20]). Generalized binomial linear mixed effects models in R (R Core Team, 2021) and the lme 4 package (Bates et al., 2015) were used to analyze the distribution and frequency of LWCs in the right sentence periphery. I specified the fixed effects by including the following dependent variables and their potential interactions: speaker group (HS/MS), setting (formal/informal), and mode (spoken/written) and I used treatment contrast and maximally specified the random effect of participants. To avoid overfitting, I performed backward ANOVAs to deduce the most suitable model. For each model, the *z*- and *p*-values are reported.

In order to answer the third research question, I additionally performed an analysis on the distribution of PPs across narratives and speaker groups. The dependent variable for this analysis was "PP" with two levels (1 for PP and 0 for no PP). Again, I maximally specified the fixed and random effects, used generalized binomial linear mixed effects models, and performed backward ANOVAs for model fitting.

19 Questionnaire for adolescent participants of *Research Unit Emerging Grammars*: https://osf.io/qhupg/.

20 The variable SC now includes both, finite and non-finite subordinations in the quantitative analysis.

The language situations method and the included task of recounting an accident, especially where a police report is called for, creates a bias in favor of a specific functional kind of extrapositions, namely providing expansions or specifications. Therefore, the post-field constituents can be categorized as:

i. constituents that can be placed in the middle-field or the post-field resulting in different degrees of markedness: less marked for extraposed heavy constituents such as subordinations with the function of decreasing cognitive load, and more marked for LWCs functioning as afterthoughts or specifications (except for direct objects),
ii. constituents which can only appear in the post-field as they have an antecedent in the middle-field which they semantically specify or elaborate, or
iii. syntactically non-integrated constituents that function as metacommentaries.

4. Results

4.1. Descriptives

Descriptive statistics show the mean percentages of LWC types in the post-field across speaker groups (Table 6), the absolute frequencies of LWC types in the post-field across speaker groups and narratives (Table 7) and the mean percentages of LWCs in the post-field across speaker groups and narratives (Table 8).

TABLE 6 Mean percentages of LWC types in the post-field across speaker groups.

Constituent type	Mean percent in HSs	Mean percent in MSs
PP	13.81	9.84
DP	2.86	1.81
DM	0.92	5.02
ADVP	2.86	2.01
ADJP	2.38	0.40
NONC	0.95	0.00

TABLE 7 Absolute frequencies of LWCs in the post-field across speaker groups and narratives.

Narrative	Spoken formal		Spoken informal		Written formal		Written informal	
Speaker group	HS	MS	HS	MS	HS	MS	HS	MS
PP	16	25	5	11	8	4	0	5
DP	3	3	1	4	1	0	1	2
DM	0	2	2	21	0	0	0	2
ADVP	2	3	1	5	2	1	1	0
ADJ	0	1	2	0	3	1	0	0
NONC	1	0	1	0	0	0	0	0

TABLE 8 Mean percentages of LWCs in the post-field across speaker groups and narratives.

Narrative	Speaker group	Mean percent of LWCs
Spoken formal	HS	30.5
Spoken formal	MS	21.8
Spoken informal	HS	24.5
Spoken informal	MS	31.8
Written formal	HS	19.4
Written formal	MS	5.4
Written informal	HS	11.8
Written informal	MS	13.8

4.2. LWCs across speaker groups and narratives

For the frequency of post-field LWCs, the model output (Appendix A) shows no significant difference between the two speaker groups ($z = -1.173$, $p = 0.241$). For the distribution of LWCs in the post-field across registers (i.e., settings and modes), the model output (Appendix B) shows a main effect of mode ($z = -4.677$, $p < 0.01$, Figure 2) with both speaker groups producing more post-field LWCs in spoken productions than in written productions, independently of the setting. The model additionally shows an interaction between speaker group and setting ($z = 3.226$, $p = 0.001$, Figure 3). To interpret this interaction, I ran Tuckey's multiple comparison test using the *emmeans* package (Lenth, 2020). Tuckey's multiple comparison test (Appendix C) revealed a significant difference between speaker group in the formal setting (estimate = 0.976, SE = 0.345, $z = 2.831$, $p = 0.024$) but no such difference in the informal setting (estimate = −0.559, SE = 0.429, $z = -1.305$, $p = 0.56$). This indicates that HSs and MSs overlap in their frequency and distribution of post-field LWCs in the informal setting but not in the formal setting. Furthermore, Tuckey's multiple comparison test (Appendix C) also revealed a

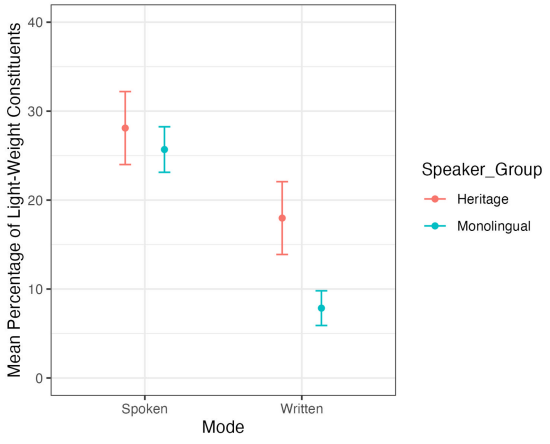

FIGURE 2
Mean percentage of post-field LWCs across speaker groups and modes.

significant difference in the setting of the MSs (estimate = −0.769, SE = 0.257, $z = -2.99$, $p = 0.0148$, Figure 3). MSs produced significantly more post-field LWCs in the informal setting than in the formal setting. In the HSs data, there is no significant difference in the production of post-field LWCs across settings. This shows that while mode plays a role in the production of post-field LWCs across speaker groups, setting only has an influence on the productions of MSs.

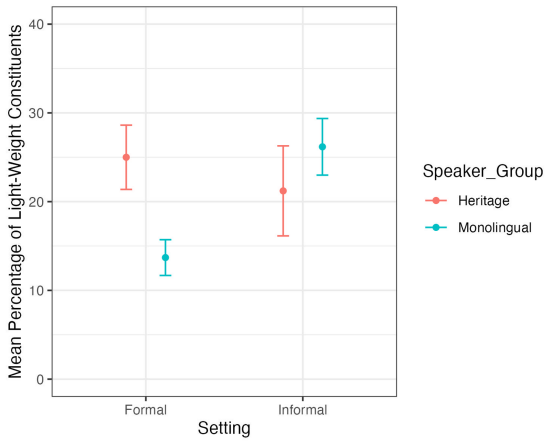

FIGURE 3
Mean percentage of post-field LWCs across speaker groups and settings.

4.3. PPs across speaker groups and narratives

For PPs in the post-field, the model output (Appendix D) shows no significant difference for the frequency of PPs between speaker groups ($z = -1.506$, $p = 0.132$, Figure 4). Hence, HSs and MSs do not differ significantly in their production of post-field PPs.

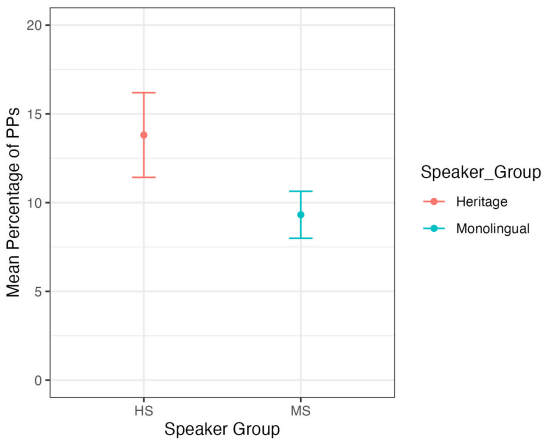

FIGURE 4
Mean percentages of PPs in the post-field across speaker groups.

4.4. Non-canonical placement of direct objects in the post-field

The corpus presents two instances of NONCs in the post-field which can be attributed to the influence of the ML, English on the HL, German. We find these two instances in both the formal spoken and the informal spoken productions of one HS (see example 10a/b[21]).

(10a) und die mann geht zu helfen[22] [**die mädchen$_{NONC}$**] (–) **die essen** (–) **äh aufzuholen**[23] (RUEG corpus formal spoken)

"*the man goes to help the girl pick up the food*"

(10b) diese mann: geht zu helfen [**diese** (–) **de: de frau$_{NONC}$**] **die essen** (–)**au**/(–) **aufzuheben** (RUEG corpus informal spoken)

"*this man goes to help this woman pick up the food*"

The examples consist of two DPs and two infinitive clauses (INFs) each. In both cases, not only the direct object *die Mädchen* or *diese Frau* (the girl, this woman) but also the two infinitival constructions *zu helfen* (to help) and *die Essen aufzuholen/aufzuheben* (to pick up the food) are placed after the finite verb *geht* (goes). The extraposition of the second INF is not problematic and can be considered unmarked in German. Colloquially, the example sentences in (10a/b) could have been canonically produced as in example (10c).

(10c) der Mann geht der Frau helfen, **das Essen aufzuheben.**

"*The man goes to help the woman pick up the food.*"

What is problematic, and ungrammatical in German, however, is the switched position of the infinitive *zu helfen* and the direct object *die Mädchen* or *diese Frau*. As a consequence, the direct object surfaces post-verbally, where it would be expected in English. The influence of English is not only visible in the linearization of the constituents but also in how the infinitive is realized. In this case, due to the collocation *helfen gehen* (help go, go to help), the infinitival particle *zu* (to) must be left out.[24]

It appears likely, then, that English provided the clausal matrix in these cases and that we are dealing with a calque. Support for this claim can be found in three corresponding English narrations of the very same speaker (see examples 11a–c).

21 The spoken and written productions in examples (10) and (11) were not corrected or normalized and the original orthography of the written productions was kept.

22 The undisrupted productions of the first infinitive construction *zu helfen* can be interpreted as a sign that the speaker does not question the fact that the matrix verb "help" needs to be produced with the particle *zu*. The second infinitive constructions *aufzuholen/aufzuheben* is accompanied by an increased number of non-verbal elements. Determining whether this is due to word finding issues or the production of the infinitive goes beyond the scope of this paper.

23 These are transcriptions of the spoken data that include non-verbal discourse elements, such as pauses "(–)", ruptures "/", prolongations ":", and hesitations "äh".

24 The German infinitive, sui generis, depends on the matrix verb. It can be realized as an infinitive without the particle *zu*, an infinitive with the particle *zu*, or an infinitive with the particle *um zu*. In examples (10a/b), the matrix verb "help" does not require the addition of the particle *zu* in German. An alternative canonical option would be *der Mann geht, um der Frau zu helfen, das Essen aufzuheben*. I am aware that this is a radically reduced explanation of the German infinitive, but it is merely to show the three options of infinitive-formation in German.

(11a) the man went to go help the lady pick up his food (RUEG corpus formal spoken)

(11b) the: guy he went to go help th(e)la(d)y pick (−) pick up the food (RUEG corpus informal spoken)

(11c) When he try to help the lady pick up her food (RUEG corpus informal written)

One further case of a seemingly highly marked LWC in the post-field is found in the formal written production of another HS (see example 12).

(12) Nichts ist passiert **zu die zwei Autofahrer**. (RUEG corpus formal written)

"*Nothing happened to the two drivers.*"

In German, *passieren* (happen) can be used with a dative complement with or without a PP (*etwas passiert* (*mit*) *jemandem*$_{DAT}$, something happens with to somebody/something happens to somebody). What makes the pattern in (12) look like a calque from English, at first sight, may just be due to the choice of *zu* instead of *mit* (with). Had the participant written *Nichts ist passiert mit den zwei Autofahrern*, one would simply consider it unusual in a written narrative.[25]

5. Discussion

This study investigated the production of post-field LWCs in spoken and written productions of HSs and MSs of German, taking into account different registers. The goal was to determine how the two speaker groups deal with the options available to them under the same communicative tasks.

The first research question focused on types of LWCs produced in the post-field across speaker groups, and on their relative frequencies. The analysis of the data shows that, apart from two instances of clearly non-canonically placed direct objects in the post-field produced by one HS, all listed constituent types were found with overall similar frequencies in the post-field productions of both speaker groups. Hence, hypothesis 1, which stated that the productions of HSs will show a greater variety and a higher frequency of LWCs in the post-field, is not confirmed. HSs and MSs do not differ with respect to the frequency and variety of LWCs in the right sentence periphery. So, even though we are looking at an interface phenomenon, HSs adhere to German canonicity requirements: the head position in the VP and the placement of finite verbs in main and subordinate clauses, phenomena acquired early and relatively stable even under intensive language contact.[26]

The second research question focused on the influence of register (i.e., different modes and settings) on the frequency of LWCs in the post-field. With respect to MSs, the data confirms hypothesis 2. Setting and mode had an influence on the production of post-field LWCs in the MS group. MSs produced significantly more post-field LWCs in the informal setting than in the formal setting and they produced significantly more post-field LWCs in the spoken mode than in the written mode. With respect to the HSs, the data just partly supports hypothesis 2. Only mode had an influence on the production of post-field LWCs in the HS group. HSs produced significantly more post-field LWCs in the spoken mode than in the written mode. However, the data shows no difference between post-field LWCs in the informal and the formal setting. Hence, while there is no group-specific difference in the overall frequency and variety of post-field LWCs, HSs and MSs show different distributions across registers, resulting in larger production differences between HSs and MSs in the written mode and in the formal setting. This result aligns with previous findings which observed register levelling across different phenomena in HSs (Polinsky, 2018, pp. 323–324; Tsehaye et al., 2021; Pashkova et al., 2022 among others) and can be traced back to HSs' limited exposure to communicative situations in their HL compared to their ML.

In order to test the influence of language contact and transfer more specifically, the third research question focused on the realization of PPs in the post-field. The goal was to investigate whether HSs of German produce more PPs in the post-field than MSs of German. The data does not confirm hypothesis 3, indicating that extensive contact with English does not lead to an increase in PP extraposition in HSs. This finding is not in line with the assumption that the availability of surface structure parallelism leads to an increase in converging patterns. Again, a possible explanation for this result might be that core syntactic features are acquired early both in monolingual children and simultaneous bilinguals (Müller and Hulk, 2000; Genesee, 2001; Gawlitzek-Maiwald and Tracy, 2005; Tracy, 2011 among others) and hence may prove to be particularly robust in HSs as well, even under increased contact with the ML and reduced contact with the HL. Another line of argumentation could be that we are witnessing language internal changes within German, with PPs being increasingly prone to extraposition among MSs.

The role of language contact and transfer was also addressed by a qualitative analysis of the two instances of NONCs in the post-field produced by a single speaker. The claim as to the influence of an English clausal pattern as the underlying matrix for these constructions has been corroborated by the English productions of this very speaker since they exhibit an identical pattern. These two instances, however, also indicate that even though a speaker produces non-canonical syntactic structures, these structures are systematic: they occur in two out of four German narrations and both times only in the spoken mode.

Concluding, we can say that the narrations produced by HSs and MSs exhibit different degrees of variation at the right sentence periphery. These differences, however, do not seem to be primarily due to bilingualism, language contact, or transfer, as we only find very marginal evidence (two cases in total) for NONCs in the post-field and no difference in PP productions. This finding is even more remarkable as we also find occasional non-canonically placed direct objects in the post-field productions of monolingually-raised

25 The non-canonical preposition in this example changes the semantics of the verb *passieren*, which may result in different interpretations (happen to somebody vs. happen with somebody). In the present analysis, this constituent was categorized as a PP.

26 Stability and retention of verb placement, but with considerable interindividual variation, have also been attested in research on German Language Islands, such as Pennsylvania German (Westphal Fitch, 2011), Moundridge Schweitzer German (Hopp and Putnam, 2015) or Texas German (Boas, 2009).

German children (Elsner, 2015). It is therefore the role of register variation or, rather, register-levelling that becomes apparent in the HSs data which leads to distributional differences between the two speaker groups.

Limitations of this study include the relatively small sample size of the different post-field constituents which did not allow for a more fine-grained quantitative analysis of the distribution of different types of LWCs. Moreover, the overall length of narrations per speaker and the constituents in the middle-field have not been taken into account. This could have influenced the results in two ways. Firstly, shorter, less detailed narratives provide less opportunity for the extraposition of constituents, plus the self-ratings of the HS group indicate lower proficiency in the written mode, which, in some cases, coincided with shorter written productions. Secondly, no conclusions about the overall number of constituents which have been placed in the post-field in proportion to those realized in the middle-field has been drawn. An additional limitation can be found in the research design. This study relied on the standardized elicitation of quasi-naturalistic productions and not on an experimental task geared to the elicitation of post-field items. Additionally, the elicitation task of recounting a car accident in as much detail as possible facilitated the production of LWCs in the post-field as participants tended to add further detail where they felt more information might be needed, like in the police report. Further research with different elicitation scenarios, including turn-taking, could enhance the production of a wider range of post-field LWCs and more diversified discourse functions.

6. Conclusion

This article investigated the linearization of constituents at the right sentence periphery in narrative productions of adolescent HSs of German and MSs of German. More specifically, the frequency of post-field LWCs in different registers was analyzed in order to shed further light on the variational spectrum found at the right clausal edge. Bilingualism, language contact, register variation, and internal dynamics were investigated as possible sources of variation. Analyses showed a similar variational spectrum of constituent types and their frequencies in HSs and MSs. Furthermore, HSs and MSs behaved similarly regarding the frequency and type of LWCs across modes, providing evidence that post-field LWCs are still more of a spoken phenomenon. The analyses for setting, however, showed effects of register-levelling in the HS group, as, unlike MSs, they did not differentiate between formal and informal settings. This suggests that diverging awareness of register norms due to different input conditions is the source of distributional differences observed rather than transfer from the dominant language.

Previous studies have considered PPs to be particularly affected by language contact and transfer. This, however, was not the case here, as the two speaker groups did not differ in their overall productions of PPs. But most importantly: While we find more variation in the right sentence periphery in different registers in the productions of HSs, the overall grammaticality of clausal syntax is not in jeopardy. Therefore, in the light of research on language change and language contact, we can say that the data discussed does not show evidence that heritage German is changing from an OV to a VO structure. Constituents placed right are still placed right.

Data availability statement

The data presented in this article is openly accessible via the RUEG corpus: https://zenodo.org/record/5808870.

Ethics statement

The studies involving human participants were reviewed and approved by the Deutsche Gesellschaft für Sprachwissenschaft ethics committee and the Institutional Review Board (IRB) of the University of Maryland at College-Park. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1122129/full#supplementary-material

References

Aalberse, S., Backus, A., and Muysken, P. (2019). *Heritage languages: a language contact approach*. Amsterdam: John Benjamins, vol. 58.

Altmann, H. (1981). *Formen der "Herausstellung" im Deutschen: Rechtsversetzung, Linksversetzung, freies Thema und verwandte Konstruktionen*. Berlin, New York: Max Niemeyer Verlag.

Andersen, C. (2008). *Topologische Felder in einem Korpus der gesprochenen Sprache. Probleme zwischen theoretischem Modell und Annotation*. 3, 1–15.

Bates, D., Maechler, M., Bolker, B., and Walker, S. (2015). Fitting linear mixed-effects models using lme4. *J. Stat. Softw.* 67, 1–48. doi: 10.18637/jss.v067.i01

Biber, D., and Conrad, S. (2001). "Register variation: a Corpus approach," in *The Handbook of Discourse Analysis*. eds. D. Schiffrin, D. Tannen and H. E. Hamilton (Hoboken: John Wiley & Sons, Inc.), 175–196.

Boas, H.-C. (2009). *The life and death of Texas German*. Durham, NC: Duke University Press for the American Dialect Society.

Bunk, O. (2020). "Aber immer alle sagen das" the status of V3 in German: use, processing, and syntactic representation. *PhD Dissertation*. Humboldt-Universität zu Berlin

Bunk, O., Hamm, S., Kostka, J., Popova, G., Reinhold, N., Visser, E., et al. (n.d.): *KiDKo 2.0 Annotationsrichtlinien*.

Clyne, M. (2003). *Dynamics of language contact*. Cambridge: Cambridge University Press.

Coniglio, M., and Schlachter, E. (2015). Das Nachfeld im Deutschen zwischen Syntax, Informations-und Diskursstruktur: Eine diachrone korpusbasierte Untersuchung. *Das Nachfeld im Deutschen. Theorie und Empirie*.

Drach, E. (1963). *Grundgedanken der deutschen Satzlehre*. Frankfurt: Moritz Disterweg.

Elsner, D. (2015). "Das Nachfeld in der Kindersprache: Möglichkeiten und Grenzen einer konstruktionsgrammatischen Analyse," in *Das Nachfeld im Deutschen*. ed. H. Vinckel-Roisin (Berlin, München, Boston: De Gruyter), 345–361.

Frey, W. (2015). "Zur Struktur des Nachfelds im Deutschen," in *Das Nachfeld im Deutschen: Theorie und Empirie*. ed. H. Vinckel-Roisin (Berlin, München, Boston: De Gruyter), 53–76.

Freywald, U., Cornips, L., Ganuza, N., Nistov, I., and Opsahl, T. (2015). "Beyond verb second - a matter of novel information-structural effects? Evidence from Norwegian, Swedish, German and Dutch," in *Language, Youth and Identity in the 21st Century: Linguistic Practices across Urban Spaces*. eds. J. Nortier and B. Svendsen (Cambridge: Cambridge University Press), 73–92

Fritzenschaft, A., Gawlitzek-Maiwald, I., Tracy, R., and Winkler, S. (1990). Wege zur komplexen syntax. *Z. Sprachwiss.* 9, 52–134. doi: 10.1515/zfsw.1990.9.1-2.52

Gawlitzek-Maiwald, I., and Tracy, R. (2005). The multilingual potential in emerging grammars. *Int. J. Biling.* 9, 277–297. doi: 10.1177/13670069050090020801

Genesee, F. (2001). Bilingual first language acquisition: exploring the limits of the language faculty. *Annu. Rev. Appl. Linguist.* 21, 153–168. doi: 10.1017/s0267190501000095

Haider, H. (2010). *The Syntax of German (Cambridge Syntax Guides)*. Cambridge: Cambridge University Press.

Hinterhölzl, R. (2004). "Language change versus grammar change," in *Diachronic Clues to Synchronic Grammar*. eds. E. Fuß and C. Trips (Amsterdam/Philadelphia: John Benjamins), 131–160.

Hopp, H., and Putnam, M. T. (2015). Syntactic restructuring in heritage grammars. *Linguist. Approaches Biling.* 5, 180–214. doi: 10.1075/lab.5.2.02hop

Imo, W. (2015). "Nachträge im Spannungsfeld von Medialität, Situation und interaktionaler Funktion," in *Das Nachfeld im Deutschen: Theorie und Empirie*. ed. H. Vinckel-Roisin (Berlin, München, Boston: De Gruyter), 231–254.

Imo, W. (2016). *Grammatik: Eine Einführung*. Stuttgart: J.B. Metzler.

Koch, P., and Oesterreicher, W. (2012). "Language of immediacy—language of distance: orality and literacy from the perspective of language theory and linguistic," in *Communicative Spaces: Variation, Contact, Change. Papers in Honour of Ursula Schaefer*. eds. C. Lange, B. Weber, and G. Wolf (Frankfurt: Peter Lang), 441–473.

Kupisch, T., and Rothman, J. (2018). Terminology matters! Why difference is not incompleteness and how early child bilinguals are heritage speakers. *Int. J. Biling.* 22, 564–582. doi: 10.1177/1367006916654355

Lenth, R. (2020). Emmeans: estimated marginal means, aka least-squares means. R package version 1.4.7. (R package version 1.4.7). Available at: https://cran.r-project.org/package=emmeans

Montrul, S. (2016). *The Acquisition of Heritage Languages*. Cambridge: Cambridge University Press.

Müller, S. (2003). Mehrfache Vorfeldbesetzung. *Dtsch. Sprache* 31, 29–61. doi: 10.1515/9783111671956.177

Müller, N., and Hulk, A. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Biling. Lang. Congn.* 8, 52–78. doi: 10.1075/eurosla.8.06mul

Müller, A., Schulz, P., and Tracy, R. (2018). "Spracherwerb," in *Konzepte zur Sprach- und Schriftsprachförderung entwickeln*. eds. C. Titz, S. Geyer, A. Ropeter, H. Wagner, S. Weber, and M. Hasselhorn (Stuttgart: Kohlhammer), 53–68.

Muysken, P. (2000). Bilingual speech: a typology of code-mixing. *J. Linguist.* 39, 678–683. doi: 10.1017/s0022226703272297

Ortega, L. (2020). The study of heritage language development from a bilingualism and social justice perspective. *Lang. Learn.* 70, 15–53. doi: 10.1111/lang.12347

Pascual Y Cabo, D., and Rothman, J. (2012). The (IL)logical problem of heritage speaker bilingualism 644 and incomplete acquisition. *Appl. Linguist.* 33, 450–455. doi: 10.1093/applin/ams037

Pashkova, T., Tsehaye, W., Allen, S., and Tracy, R. (2022). Syntactic optionality in heritage language use: clause type preferences of German heritage speakers in a majority English context. *Herit. Lang. J.* 19. doi: 10.1163/15507076-12340022

Polinsky, M. (2018). *Heritage languages and their speakers*. Cambridge: Cambridge University Press.

Poplack, S. (1980). Sometimes ill start a sentence in Spanish y termino en espaol. *Linguistics* 18, 581–618. doi: 10.1515/ling.1980.18.7-8.581

Proske, N. (2015). "Die Rolle komplexer Nachfeldbesetzungen bei der Einheitenbildung im gesprochenen Deutsch," in *Das Nachfeld im Deutschen. Theorie und Empirie*. Berlin: De Gruyter, 279–297.

R Core Team (2021). *R: A language and environment for statistical computing*. Vienna: R Foundation for Statistical Computing.

Rocker, M. (2022). Variation in finite verb placement in heritage Iowa low German: the role of prosodic integration and information structure. *PhD Dissertation*, Penn State University.

Roelcke, T. (1997). *Sprachtypologie des Deutschen: historische, regionale und funktionale Variation*. Berlin, New York: Walter De Gruyter.

Rothman, J. (2007). Heritage speaker competence differences, language change, and input type: inflected infinitives in heritage Brazilian Portuguese. *Int. J. Biling.* 11, 359–389. doi: 10.1177/13670069070110040201

Rothman, J., Bayram, F., DeLuca, V., Di Pisa, G., Duñabeitia, J. A., Gharibi, K., et al. (2022). Monolingual comparative normativity in bilingualism research is out of "control": arguments and alternatives. *Appl. Psycholinguist.* 44, 316–329. doi: 10.1017/s0142716422000315

Rothman, J., and Treffers-Daller, J. (2014). A prolegomenon to the construct of the native speaker: heritage speaker bilinguals are natives too! *Appl. Linguist.* 35, 93–98. doi: 10.1093/applin/amt049

Rothweiler, M. (2006). "The acquisition of V2 and subordinate clauses in early successive acquisition of German," in *Interfaces in Multilingualism: Acquisition and Representation*. ed. C. Lleó (Amerstdam: John Bejamins), 91–113.

Schulz, P., and Tracy, R. (2018). "Revisiting the tolerance of Universal Grammar," in *T.O.M. and Grammar. Thoughts on Mind and Grammar: A Festschrift in honor of Tom Roeper*. eds. B. Hollebrandse, J. Kim, J. A. T. Pérez-Leroux, and P. Schulz (University of Massachusetts, Graduate Linguistics Student Association. UMOP 41), 129–145.

Sorace, A. (2011). Pinning down the concept of "interface" in bilingualism. *Linguist. Approaches Biling.* 1, 1–33. doi: 10.1075/lab.1.1.01sor

Tracy, R. (1991). *Sprachliche Strukturenentwicklung: Linguistische und kognitionspsychologische Aspekte einer Theorie des Erstspracherwerbs*. Tübingen: Narr.

Tracy, R. (2011). "Konstruktion, Dekonstruktion und Rekonstruktion: Minimalistische und (trotzdem) konstruktivistische Überlegungen zum Spracherwerb" in *Sprachliches Wissen zwischen Lexikon und Grammatik*. eds. S. Engelberg, A. Holler and K. Proost (Berlin, Boston: De Gruyter), 397–428.

Tsehaye, W., Pashkova, T., Tracy, R., and Allen, S. E. M. (2021). Deconstructing the native speaker: further evidence from heritage speakers for why this horse should be dead! *Front. Psychol.* 12. doi: 10.3389/fpsyg.2021.717352

Tsimpli, I. M. (2014). Early, late or very late? *Linguist. Approaches Biling.* 4, 283–313. doi: 10.1075/lab.4.3.01tsi

Vinckel-Roisin, H. (2012). "Das 'Nachfeld' im Deutschen: Rechte Satzperipherie und Diskurstopik-Auszeichnung," in *Studia Linguistica XXXI*. Wroclaw: TOTEM, 143–163.

Vinckel-Roisin, H. (2015). *Das Nachfeld im Deutschen: Theorie und Empirie*. Berlin, München, Boston: De Gruyter.

Westphal Fitch, G. (2011). "Changes in frequency as a measure of language change," in *Studies on German-Language Islands*. ed. M. T. Putnam (Amsterdam: John Benjamins Publishing Company), 371–384

Wiese, H. (2020). "Language situations: a method for capturing variation within speakers' repertoires," in *Methods in Dialectology XVI*. ed. A. Yoshiyuki (Frankfurt a. M.: Peter Lang), 105–117.

Wiese, H., Alexiadou, A., Allen, S., Bunk, O., Gagarina, N., Iefremenko, K., et al. (2021). *RUEG Corpus (0.4.0) [Data set]. Zenodo*.

Wiese, H., Alexiadou, A., Allen, S., Bunk, O., Gagarina, N., Iefremenko, K., et al. (2022). Heritage speakers as part of the native language continuum. *Front. Psychol.* 12. doi: 10.3389/fpsyg.2021.717973

Wiese, H., and Müller, H. G. (2018). "The hidden life of V3: an overlooked word order variant on verb-second" in *Non-canonical verb positioning in main clauses*. eds. M. Antomo and S. Müller (Hamburg: Helmut Buske), 201–224.

Wöllstein, A. (2014). *Topologisches Satzmodell*. Heidelberg: Winter.

Zifonun, G. (2015). "Der rechte Rand in der IDS-Grammatik: Evidenzen und Probleme," in *Das Nachfeld im Deutschen: Theorie und Empirie*. ed. H. Vinckel-Roisin (Berlin, München, Boston: De Gruyter), 25–52.

Zifonun, G., Hoffmann, L., and Strecker, B. (1997). *Grammatik der deutschen Sprache*. Berlin, New York: De Gruyter.

Best *case* scenario:
Case marking in prepositional phrases in heritage German

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Abstract
This article investigates accusative and dative case marking in determiner phrase (DP) complements of prepositional phrases in adolescent heritage speakers (HSs) and monolingually-raised speakers (MSs) of German. Prepositions were subdivided into three types: single-case prepositions governing one case exclusively, two-way prepositions in accusative contexts, and two-way prepositions in dative contexts. Quantitative and qualitative analyses across speaker groups and within HSs were performed to additionally account for HS heterogeneity. The aim was to inquire whether a) participants differ in their canonical case marking of DP complements of single-case and two-way prepositions, b) the accusative or the dative are more prone to non-canonical case marking within two-way prepositions, and c) HSs' non-canonical DP complements of single-case prepositions follow specific patterns. Results show that HSs produce slightly fewer non-canonical DP complements of single-case prepositions. Additionally, less non-canonical DPs appear in dative contexts of two-way prepositions than in accusative contexts. across speaker groups. Lastly, HSs' non-canonical DP complements of single-case prepositions show systematic patterns of morphological underspecification and overgeneralization.

Key words: case marking, heritage German, accusative case, dative case, prepositional phrase

1. Introduction

Case is a grammatical category relevant for the distribution and identification of arguments and their thematic role within clauses (Blake 1994: 1; Czepluch 1996: 1–4; Haspelmath 2012; Chomsky 1981: 6; Zifonun, Hoffmann & Strecker 1997; Dürscheid 1999; Dudenredaktion 2016). Languages vary widely with respect to how they realize case and how many cases are overtly distinguished. Abstracting away from manner of realization, it can be argued that languages universally need case as pointers to argument function. Therefore, theoretical accounts divide case into abstract Case and overt, morphologically spelled-out case.[1]

In inflectional languages, like German, morphological case requirements may spread throughout a complete determiner phrase (DP), with articles, adjectives, and sometimes nouns agreeing in terms of case features. In languages with reduced or no overt inflections, the function of case marking is predominantly taken over by word order and pre- or postpositions.

Morphological case can be assigned structurally (structural case) or via inherent lexical features of governing heads (lexical case) such as verbs, prepositions, or nouns. Structural case marking depends on configurational relations such as government: the subject receives nominal case, the direct object usually accusative, and the indirect object usually dative case. Lexical case[2] is determined by properties of the governing head (Eisenberg 2013; Haspelmath 2012: 3;

[1] The question of whether morphological case is the direct spell-out of abstract Case (see McFadden 2004 for an exhaustive discussion) will not be discussed in the present article as it is irrelevant to the phenomena discussed.
[2] Depending on the theoretical framework, lexical case is also referred to as inherent case or quirky case (Eisenbeiss et al. 2005; Haspelmath 2012: 3).

Chomsky 1981: 170–172; Czepluch 1996: 26). In the following, all mention of 'case' will exclusively refer to morphological case.

Most discussions about structural vs. lexical case marking focus on verbs as governing heads. Once case is governed by prepositions, the situation becomes more complex as prepositions themselves are sensitive to features outside the prepositional phrase (PP) to match specific requirements of the verb, for instance with respect to the expression of path and location in verbs of motion. Single-case prepositions (single case, 1) leave no choice: they govern one case exclusively. In two-way prepositions, one head is compatible with more than one case – in German typically accusative vs. dative, and in a few cases the genitive. Hence, learners need to determine reasons responsible for the variation encountered in the input, which makes case marking after two-way prepositions more intricate. In these contexts, in addition to syntax (government) and morphological spell-out, another interface needs to be considered: the semantic dependence of PPs on their contexts with respect to either directional (accusative context, two-way$_{ACC}$, 2a) or locative reading (dative context, two-way$_{DAT}$, 2b). While both realizations of the PP in (2) are correct, the semantic felicitousness is restricted by the context. Hence, case marking can be considered an intriguing interface phenomenon in the sense of Sorace (2011) and Tsimpli (2014).

(1)

Der	Hund	spielt	[mit	[**einem**	**Ball**]$_{DP}$]$_{PP}$.[3]
The	dog	plays	with	a-DAT	Ball.

'The dog plays with a ball.'

(2)

(a)

Der	Hund	rennt	[auf	[**die**	**Straße**]$_{DP}$]$_{PPdirectional}$.
The	dog	runs	onto	the-ACC	street.

'The dog runs onto the street.'

(b)

Der	Hund	rennt	[auf	[**der**	**Straße**]$_{DP}$]$_{PPlocative}$.
The	dog	runs	on	the-DAT	street.

'The dog runs on the street.'

This paper investigates the morphological realization of the accusative and the dative case in DP complements of PPs in adolescent heritage speakers (HSs) of German with English as their majority language (ML). I also consider productions of adolescent monolingually-raised German speakers (MSs), not as a baseline for HS productions but to show the spectrum of variation encountered in both HSs and MSs given the same communicative task.

The acquisition of case marking in German is a challenge even in contexts where German is the only L1 (Clahsen 1984; Tracy 1986). It is sensible, then, to assume that difficulties in acquiring – and retaining – case marking intensify once a second language enters the scene in early childhood, as is the case in HSs (see Aalberse et al., 2019; Boas, 2009a; Montrul, 2011; Polinsky, 2018; Putnam et al., 2021 among others for accounts of difficulties in canonical case marking in HSs).

[3] All examples are retrieved from the RUEG corpus (https://doi.org/10.5281/zenodo.5808870).

In order to investigate case marking in DP complements of PPs, I pose the following research questions.

RQ1: Are there differences in canonical case marking of DP complements of single-case vs. two-way prepositions?

RQ2: Are there more non-canonical DPs in accusative or in dative contexts of two-way prepositions?

RQ3: Do HSs' non-canonical DP complements of single-case prepositions follow specific patterns?

The answers to these questions will be pursued in a speaker population for whom case marking has been identified as an acquisition challenge with heterogeneous outcome (cf. Aalberse et al. 2019; Boas 2009a; Montrul 2011; Polinsky 2018; Putnam et al. 2021). The aim is to ascertain whether previous observations in research on case marking in heritage German can be replicated in the present participant population of 2nd generation immigrant, 1st generation HSs. The study focuses on a seemingly small syntactic domain, namely PPs, which lie, however, at the interface of different grammatical levels: syntax (government), morphology (spell-out of paradigmatic choices), semantics (context-dependent interpretation), and phonology (phonological realization of morphological paradigms)[4]. Thus, while case marking in PPs seems to be a minor phenomenon at first sight, its scope reaches well beyond its domain. The paper also ties in with current discussions on heterogeneity in HSs by comparing results not only across groups but also within individuals. Consequently, inter- and intra-individual variability are accounted for. Section 2 provides the theoretical background and an overview of previous studies on morphological case marking in HSs of German. Section 3 outlines the methodology and the corpus, followed by the results in Section 4. Section 5 presents the discussion and Section 6 lays out the conclusion.

2 Theoretical Background

2.1 The German Case Paradigm and its Acquisition

German, belonging to the Indogermanic languages, largely retained its inflectional paradigms and marks case in various constituents across DPs.[5] The codified German standard has four cases: *nominative*, *genitive, dative,* and *accusative*, which are externally assigned by specific heads (mostly verbs and prepositions), and marked on determiners, adjectives, and occasionally on (specific) nouns. German, like other fusional languages, encodes case, gender, and number on a single exponent, resulting in substantial syncretism in inflectional paradigms (cf. Table 1).

	Masc.	**Fem.**	**Neut.**	**Plural**
Nom	der/ein	die/eine	das/ein	die
Gen	des/eines	der/einer	des/eines	der
Dat	dem/einem	der/einer	dem/einem	den
Acc	den/einen	die/eine	das/ein	die

Table 1: German case inflectional paradigm for (in-)definite articles

Various pathways of acquisition have been proposed, all of which agree that the dative and the genitive are acquired considerably later than the nominative and the accusative. Clahsen (1984:

[4] Phonological aspects of case marking are not focused on in this article.

[5] See McFadden (2020) for a summary on case in Germanic languages.

12) and Tracy (1984; 1986: 54) suggested the following acquisitional journey (with the exclusion of the genitive).

(i) no case markers present
(ii) appearance of nominative forms
(iii) binary case system (nominative and accusative forms)
(iv) emergence of dative morphemes
(v) the establishment of the appropriate relationship between prepositions and cases in prepositional phrases

There is general agreement that an early binary case system distinguishing between nominative and non-nominative forms becomes discernible between the ages two and three in normally developing children. Distinctions between nominative and accusative typically appear around age three, while the dative does not emerge until the end of age three or later (Tracy, 1986: 50).[6] The complete case paradigm, including the genitive, is usually acquired by age six (Clahsen 1984: 3). This drawn-out process can be explained by the fact that German shows considerable homonymy across case paradigms, rarely marks case via suffixation on the noun, and has no clear form function mappings (Tracy 1986: 50).

As the focus of this article lies on prepositions governing accusative and dative case, some additional words on the acquisition of case marking in these contexts (step v in the listing above) are in order. While the accusative is acquired earlier than the dative in DPs outside of a PP, it has been suggested that the order of case acquisition inside PPs is different (see Baten (2010) for a discussion). Since the dative governs most prepositions in German, it is arguably their default case (Eisenberg 2013: 183; Sahel 2018: 27; Wiese 2004: 20) and might be acquired earlier in DPs inside of a PP than in those outside of PPs (Baten 2010: 6). Other researchers argue that the accusative is first acquired in PPs (e.g., Mills 1985), while still others suggest that both cases are acquired almost simultaneously in PPs (Meisel 1986; Klinge 1990).

This brief excursion into acquisitional research already indicates that even in monolingual L1 acquisition, speakers of German are confronted with obstacles concerning the morphosyntactic realization of case. For HSs of German, additional interference in form of cross-linguistic influence from their ML has to be accounted for. Moreover, phonetic distinctions between case paradigms in spoken German (cf. Table 1) are subtle and not easily discernible due to assimilation, resulting in increased acquisition difficulty, especially for HSs who usually receive limited written input in the HL.

2.2. Case Marking in Heritage Speakers

Heritage speakers are bilinguals who acquire a family language at home, the heritage language (HL), while living in an environment where another language has majority status (Pascual Y Cabo & Rothman 2012). In the context of German as a HL, the term 'heritage speaker' is often used to refer to older speakers of historically established HL islands, who are among the 3rd, 4th, or 5th generation of speakers and who experienced extensive periods of language contact. In contrast, the data analyzed here stem from 2nd generation immigrant, thus 1st generation HSs who are not part of a larger HL speaking community. They predominantly use the HL within the immediate family or even just a single family member, which makes them speakers of "Tiny Language Islands" (Tsehaye et al. to appear).

Previous research has shown that HSs encounter difficulties with respect to morphological and morphosyntactic features (Boas 2009a; Putnam, Schwarz & Hoffman 2021; Yager et al. 2015;

[6] This can be attributed to the fact that children below age three do not regularly use ditransitive verbs with all their arguments (Tracy 1986: 59).

Montrul 2011; Polinsky 2018). Reduced exposure to the HL – especially in written domains – and decreasing opportunities for its use can result in "simplification and overgeneralization of complex morphological patterns" (Montrul 2011: 171). Overgeneralization can emerge as overregularization and overmarking of specific forms. In this article, *overregularization* is understood as the overapplication of unmarked forms, i.e., nominative and accusative, and *overmarking* as overapplication of marked forms, i.e., dative and genitive (e.g., Polinsky 2018: Ch. 5; Putnam et al. 2021: 616-618). Overmarking can be seen as the consequence of a tendency to increase transparency and perceptual salience (Polinsky 2018: 166). Further reasons responsible for non-canonical morphological variation in HSs were sought in transfer from the ML, input frequency, avoidance of ambiguity, and a preference for uniformity and simplicity (Polinsky 2018: Ch. 5). Especially the last point has been interpreted as an indication that HSs favor "one-to-one" form-function mappings (Polinsky 2018: 184) which, particularly in German, do not obtain.

In the HS group under discussion, the ML is English. English predominantly indicates grammatical relations via linear ordering and prepositions while German expresses them through inflections. Within the English DP, only subsets of pronouns have diachronically maintained overt distinctions between common case, i.e., subject case and (in)direct object case, and the genitive, i.e., possessive case. While the genitive is marked on nouns, other cases (nominative vs. non-nominative cases) have no overt exponents on nouns, only on pronouns. It is thus remarkable that – regardless of the contrast between German and English and especially against the backdrop of HL acquisition – HSs of German are aware that German DPs need to be morphologically marked for case in articles and prenominal modifiers.

In research on historically established language islands, case reduction in morphologically rich languages such as German has also been attributed to transfer resulting from language contact with morphologically impoverished languages such as English (Boas 2016). Counterexamples for this line of argumentation come from investigations involving two typologically equally rich languages where HSs show reduced case inflections in their HL (e.g., Leisiö 2006 for HSs of Russian in Finland; Rosenberg 2005 for varieties of heritage German across the globe). Consequently, the reduction in case marking paradigms – or even case loss – might be the result of "internally induced language change", as, at least in German, there is "a lasting development from synthetic to analytic structures" (Rosenberg 2005: 229).[7]

Essentially, research on case marking in German HSs of historically established language islands predominantly showed differences in the form of reduction and overgeneralization in case paradigms when compared to standard grammars of German or to MSs, especially for the dative case (Boas 2009a; Putnam, Schwarz & Hoffman 2021; Zimmer 2020; Yager et al. 2015; Boas 2016). With respect to the PP domain, similar findings were reported: Studies on Texas German (e.g., Boas 2009b: Ch. 5) showed decreasing dative use and overgeneralization of accusative forms with two-way prepositions in contexts canonically requiring the dative; this intensified diachronically so that speakers of Texas German completely abandoned the dative in these contexts. Such dative reduction – or accusative overregularization – can be interpreted as a functional shift from specific two-way prepositions to single-case prepositions.

At the same time, dative overgeneralization was observed with two-way prepositions in canonically accusative contexts (Boas 2009b: 197–202; Boas 2016; Boas 2009a). This can be traced back to patterns of overmarking; As *–em* suffixation exclusively appears in the dative

[7] Development from synthetic to analytic structures can, for example, be seen in the gradual loss of case marking inflections on German nouns. See also Putnam et al. (2021:628) for a comment on the "shift to analytical forms" in the morphology of fusional languages.

paradigm in German, it allows speakers to avoid ambiguity or underspecification (Polinsky 2018: 166; Putnam et al. 2021: 619). Since English does not have a morphological dative, the argument that bilingual speakers "amplify[…] the differences between their two languages" is further supported (Polinsky 2018: 135).

While increased non-canonical variation in case marking in HSs has been documented, scholars also emphasize that such variability or the reduction of inflectional paradigms may result from individual speakers and should not be generalized across all speakers (e.g., Polinsky 2018: 204). It is therefore of paramount importance to account for inter- and intra-individual variation in investigations of case marking. Thus, the analyses reported here will be performed on three levels: (1) inter-individual variation across HSs, (2) intra-individual variation within HSs, and (3) inter- and intra-individual variation in a subset of HSs, more specifically, in three siblings. Looking at HSs growing up in the same family provides a unique opportunity to control for extra-linguistic aspects, such as upbringing, parental education, visits to the home country, etc. However, effects of sibling order should be considered (Aalberse et al. 2019; Bridges & Hoff 2014; Shin 2002). First-born children are more likely to receive direct input from adults compared to younger siblings. In HL contexts, younger siblings usually receive less input in the HL and have fewer production opportunities in the HL because older siblings, friends (and sometimes gradually also parents) predominantly use the ML. Nevertheless, the analysis of sibling data helps us gain insights into variation and heterogeneity within a more 'contained' group of HSs.

On the basis of the findings outlined in this section and with the help of the current data, I now investigate the effect of preposition type on canonical case marking (RQ1), the canonicity of accusative and dative morphology inside two-way prepositions (RQ2), and observable patterns of non-canonicity in DP complements of single-case prepositions (RQ3) to contribute towards a more holistic picture of case marking in HSs.

3 Method

3.1 Participants

This study investigates the productions of 61 adolescent speakers of German (mean age = 16.1, SD = 1.35, 32 females) divided into 29 HSs[8] (mean age = 15.6, SD = 1.57, 12 females) and 32 MSs (mean age = 16.6, SD = 0.91, 19 females). HSs grew up speaking German with at least one German-speaking parent in the household and were either born in the United States or moved there during early childhood. Apart from four HSs who attended bilingual schools for certain periods, the HSs in this study did not receive regular bilingual education but may have received varying degrees of exposure to formal education via 'Saturday and Sunday schools', for instance. They may additionally have participated in German-speaking leisure activities and some reported that they paid (semi-)regular visits to Germany. MSs were defined as speakers whose L1 (in this case German) was the only language spoken at home but who might have learned further languages through foreign language education. The data used is openly accessible via the RUEG corpus (Wiese et al. 2021).

3.2. Stimulus Material and Elicitation Procedure

For collecting the data, I used the Language Situations methodology (Wiese 2020), designed to elicit controlled, comparable, and quasi-naturalistic productions across communicative situations. The participants were asked to imagine themselves a witness of a minor car accident

[8] The age of one participant was not recorded, therefore, the mean and standard deviation for the HS group was calculated for 28 participants only.

and to recount the happenings which they were shown in a stimulus video. Since the scenes reported on showed various animate protagonists (people, a dog) and objects (vehicles, a ball) moving on(to) grounds and along paths, the use of case marking to distinguish semantic interpretations according to the events observed could be studied.

Participants' narrations were elicited in two modes (spoken vs. written) distinguishable according to formality (formal vs. informal). They watched the video three times in total, twice in the first formality setting, once in the second formality setting. HSs took part in two sessions – one in their ML and one in their HL – with three to five days in between to minimize priming effects. MSs only took part in one session. The order of language sessions, modes, and formality was counterbalanced across participants. Upon completion of the elicitation, participants filled out an online questionnaire about their linguistic and social background as well as a self-assessment of their abilities in each language.[9]

3.3. Annotations

The data selected for this paper stem from the RUEG-DE-CGNP-2023-05-04 subcorpus which contains transcriptions of spoken and written narrations. Participant productions are presented on various tiers, specifically created to investigate phenomena across linguistic domains. All productions contain a *dipl*(omatic) and a *norm*(alized) tier. The *dipl* tier includes transcriptions of the participants' productions in their 'raw' form including production phenomena, such as capitalization and spelling errors, hesitations, and truncated forms. In the *norm* tier, the transcriptions were normalized to standard orthography of reference.[10]

For the analysis of case marking, information from two additional tiers was accessed, which I created for this purpose: *canon* and *canon:Case* (cf. Table 2). To determine how many morphologically (non-)canonical DPs were produced, I needed a *tertium comparationis* to distinguish between DPs that were actually produced by the speaker in *norm* and DPs in their canonical form regarding case according to standard German Grammar.[11] Therefore, the *canon* tier was created, which presents canonical DPs regarding case inflections. If speakers already produced canonical DPs in *norm* the content was simply duplicated in *canon*, if not, as is the case in the example DP in Table 2, the productions were corrected in *canon*. In a second step, the productions in *canon* were annotated for the respective case on the *canon:Case* tier.

dipl	Der	hat	mit	**ein**	**Ball**	geschpield…
norm	Der	hat	mit	**ein**	**Ball**	gespielt…
canon	Der	hat	mit	**einem**	**Ball**	gespielt…
canon:Case				**Dat**	**Dat**	

Table 2: Annotation tiers for the analysis of canonical case marking

[9] Questionnaire for adolescent participants can be accessed via: https://osf.io/x64tv/?view_only=2ef50d91a21c4dfda9dddbfde376c22f

[10] The complete annotation guidelines can be accessed via: https://korpling.german.hu-berlin.de/rueg-docs/standalone/cgnp-morphology/

[11] Standard grammar as a base for comparison for case marking behavior in HSs is problematic (Bousquette & Putnam 2020; Łyskawa & Nagy 2020). In this analysis, equal treatment of both speaker groups was ensured by comparing all productions to standard grammar forms, thus also putting contemporary productions of MSs into perspective. For these annotations, the DUDEN (2016) was used as reference work.

To create the datasets which serve as the basis for the quantitative analyses, I searched the corpus for single-case prepositions and their adjacent DPs on the *canon* tier. For two-way prepositions, I additionally specified the case of the adjacent DP to differentiate between two-way$_{ACC}$ and two-way$_{DAT}$. I focused on the ten most frequent prepositions within and across speaker groups. HSs and MSs overlapped in nine out of ten prepositions. HSs additionally used *hinter* 'behind' amongst their ten most frequent prepositions and MSs additionally used *um* 'around, to, about', resulting in the analysis of eleven prepositions.[12] The analyses are based on 2111 PPs with DP complements which I subdivided into the three datasets[13] according to preposition types:

Dataset 1: Single-case (N=828):		**Dataset 2: Two-way$_{ACC}$** (N=639):		**Dataset 3: Two-way$_{DAT}$** (N=644):	
aus$_{DAT}$	'out'	*auf$_{ACC}$*	'into', 'onto'	*auf$_{DAT}$*	'in', 'on'
von$_{DAT}$	'of'	*an$_{ACC}$*	'on'	*an$_{DAT}$*	'on'
mit$_{DAT}$	with'	*hinter$_{ACC}$*	'behind'	*hinter$_{DAT}$*	'behind'
um$_{ACC}$	'around', 'to', 'about'	*in$_{ACC}$*	'in'	*in$_{DAT}$*	'in'
zu$_{DAT}$	'to'	*über$_{ACC}$*	'across'	*über$_{DAT}$*	'across'
		vor$_{ACC}$	'in front of'	*vor$_{DAT}$*	'in front of'

Each dataset contains entries for individual DPs governed by the respective preposition including five tokens preceding and following the DP to ensure sufficient context. For each DP, I exported the *norm*, *canon*, and *canon:Case* entry and annotated the DP as either canonical (i.e., no correction from *norm* to *canon*) or non-canonical (i.e., correction from *norm* to *canon*). Since the corpus includes spoken productions, there are instances of phonologically reduced determiners in accusative contexts (e.g., *auf **ein(en)** Parkplatz*, 'into a parking lot). In such cases – nine in total – a clear categorization as (non-)canonical is phonetically almost impossible, which is why they were categorized as miscellaneous and not included in the analyses. Canonical DPs were coded as 0, non-canonical DPs as 1, and the calculations in Section 4 are based thereupon.

As indicated, canonical case marking in two-way preposition is semantically restricted by the context, in this case, our stimulus video. This was used as basis to determine whether the DP complement of a two-way preposition should be realized in the accusative or the dative, i.e., whether a motion event should be semantically understood as locative or directional. If a participant, for instance, produced (3a) instead of (3b), the sentence was annotated as non-canonical since the ball rolled from the sidewalk onto the street in the video.

(3)

(a)

Der	Ball	ist	[auf	[**der**	**Straße**]$_{DP}$]$_{PPlocative}$	gerollt.
The	ball	is	on	the-DAT	street	rolled.

'The ball rolled on the street.'

(b)

Der	Ball	ist	[auf	[**die**	**Straße**]$_{DP}$]$_{PPdirectional}$	gerollt.
The	ball	is	onto	the-ACC	street	rolled.

'The ball rolled onto the street.'

[12] This includes amalgamations of prepositions and articles (eg., *aufm → auf dem)*.

[13] All datasets can be accessed via: https://osf.io/x64tv/

4 Results

Table 3 illustrates the results for DP complements across speaker groups and preposition types. For HSs, the comparison between single-case and two-way prepositions shows fewer non-canonical DPs after single case (26.0%) than after two-way prepositions (mean percentage of two-way$_{ACC}$ and two-way$_{DAT}$: 29.2%). Additionally, the comparison of non-canonical productions across two-way prepositions shows fewer non-canonical DPs after two-way$_{DAT}$ (24.3%) than after two-way$_{ACC}$ (34.1%). Similar trends, albeit with considerably lower frequencies, can be found in MSs: less non-canonical case marking after two-way$_{DAT}$ (1.2%) than after two-way$_{ACC}$ (2.1%). Hence, preposition types can be ordered as two-way$_{DAT}$ < single-case < two-way$_{ACC}$ with decreasing canonicity across speaker groups.

	HSs$_{total}$	**HSs$_{non-canon}$**		**MSs$_{total}$**	**MSs$_{non-canon}$**	
single-case	277	72	(26.0%)	551	10	(1.8%)
two-way$_{ACC}$	223	76	(34.1%)	421	9	(2.1%)
two-way$_{DAT}$	226	55	(24.3%)	418	5	(1.2%)

Table 3: DP complements across speaker groups and preposition types

Next, I looked at the canonicity of DP complements of individual prepositions across preposition types. Table 4 illustrates the results for DP complements of single-case prepositions. Across speaker groups, *mit* 'with' was the most frequent preposition as well as the one with the highest proportion of non-canonical DPs in HSs. An in-depth analysis of non-canonical DP complements of *mit*-PPs shows that among the 43 non-canonical DPs, eight DPs (18.6%) were produced by a single speaker. The remaining 35 DPs were distributed among the other 23 HSs who also used this preposition. This shows the high inter-individual variation within HSs, an observation I return to below (cf. Figure 1).

	HSs$_{total}$	**HSs$_{non-canon}$**		**MSs$_{total}$**	**MSs$_{non-canon}$**	
aus$_{DAT}$	36	4	(11.1%)	47	0	(0.0%)
mit$_{DAT}$	121	43	(35.5%)	281	4	(1.4%)
um$_{ACC}$	14	0	(0.0%)	30	1	(3.3%)
von$_{DAT}$	64	15	(23.4%)	86	2	(2.3%)
zu$_{DAT}$	42	10	(23.8%)	107	3	(2.8%)

Table 4: DP complements of single-case prepositions across speaker groups

Moving on to two-way prepositions, Table 5 shows the results for DP complements of two-way$_{ACC}$. Within HSs, *in* 'in' is the most frequent preposition, while *auf* 'onto' is most frequent in MSs. The large difference between HSs and MSs in their usage of *auf* and *in* can be attributed to language contact with English. In English, *in* is the canonical preposition to describe where the events in the stimulus video took place, i.e., 'in the parking lot', whereas *auf* would be the canonical preposition in German. The use of *in* in *auf* contexts was not annotated as non-canonical seeing as both prepositions can govern the accusative.[14] Table 5 additionally shows

[14] In the HS data, *Parkplatz* 'parking lot' occurs 32 times with the preposition *in* (e.g., *Er ist **in** den Parkplatz gefahren.* 'He drove into the parking lot.').

that *an* 'on' is the least frequent preposition across speaker groups, resulting in exclusively non-canonical DPs in HSs.

	HSs_{total}	$HSs_{non\text{-}canon}$		MSs_{total}	$MSs_{non\text{-}canon}$	
an	4	4	(100%)	5	0	(0.0%)
auf	40	14	(35.0%)	254	6	(2.4%)
in	121	48	(39.7%)	76	2	(2.6%)
vor	18	5	(27.8%)	23	1	(4.3%)
über	40	5	(12.5%)	63	0	(0.0%)

Table 5: DP complements of two-way$_{ACC}$ prepositions across speaker groups

A comparison of the distribution of *an*-PPs in two-way$_{ACC}$ and two-way$_{DAT}$ (cf. Table 6 for results on DP complements of two-way$_{DAT}$) shows that both speaker groups use *an* more frequently in dative contexts. Additionally, HSs show fewer non-canonical DP complements of *an*-PPs in dative contexts. This can be indicative of a reinterpretation of *an* from a two-way to a single-case preposition in HSs.

	HSs_{total}	$HSs_{non\text{-}canon}$		MSs_{total}	$MSs_{non\text{-}canon}$	
an	27	3	(11.1%)	80	1	(1.3%)
auf	65	22	(33.8%)	178	2	(1.1%)
hinter	38	10	(26.3%)	36	0	(0.0%)
in	85	18	(21.2%)	97	2	(2.1%)
vor	8	0	(0.0%)	27	0	(0.0%)
über	3	2	(66.7%)	-	-	

Table 6: DP complements of two-way$_{DAT}$ prepositions across speaker groups

As a last step in the comparison of single-case and two-way prepositions, I investigated the inter-individual variation in HSs (cf. Figure1). I therefore calculated the percentages of non-canonical DPs (x-axis) of individual speakers (y-axis) for each preposition type (three columns). I additionally calculated the mean percentages of non-canonical productions by each speaker across preposition types and divided the speakers into three subgroups: speakers with low levels of non-canonicity (≤ 25%, green dots), speakers with medium levels of non-canonicity (25%-60%, yellow dots), and speakers with high levels of non-canonicity (≥ 60%, red dots). 13 speakers showed low levels of non-canonicity across prepositions. Out of those, three speakers produced exclusively canonical DPs. Nine speakers displayed medium levels of non-canonicity, and seven speakers showed high levels of non-canonicity. No speaker produced exclusively non-canonical DPs. Among the 13 speakers who showed low levels of non-canonicity, three received bilingual education[15] but only one was amongst the speakers who exclusively produced canonical DPs. Additionally, eleven speakers in this subgroup indicated that both their parents speak German at home. In the nine speakers who exhibited medium levels of non-canonicity, one received bilingual education and four lived with two German-

[15] This analysis only highlighted bilingual education (i.e., different subjects taught in the HL) and not formal education in the HL in general (i.e., HL classes), as bilingual education was assumed to lead to considerably higher exposure to the HL compared to individual lessons in the HL or Saturday and Sunday schools.

speaking parents. Among the seven speakers who displayed high levels of non-canonicity, only two had two German-speaking parents.

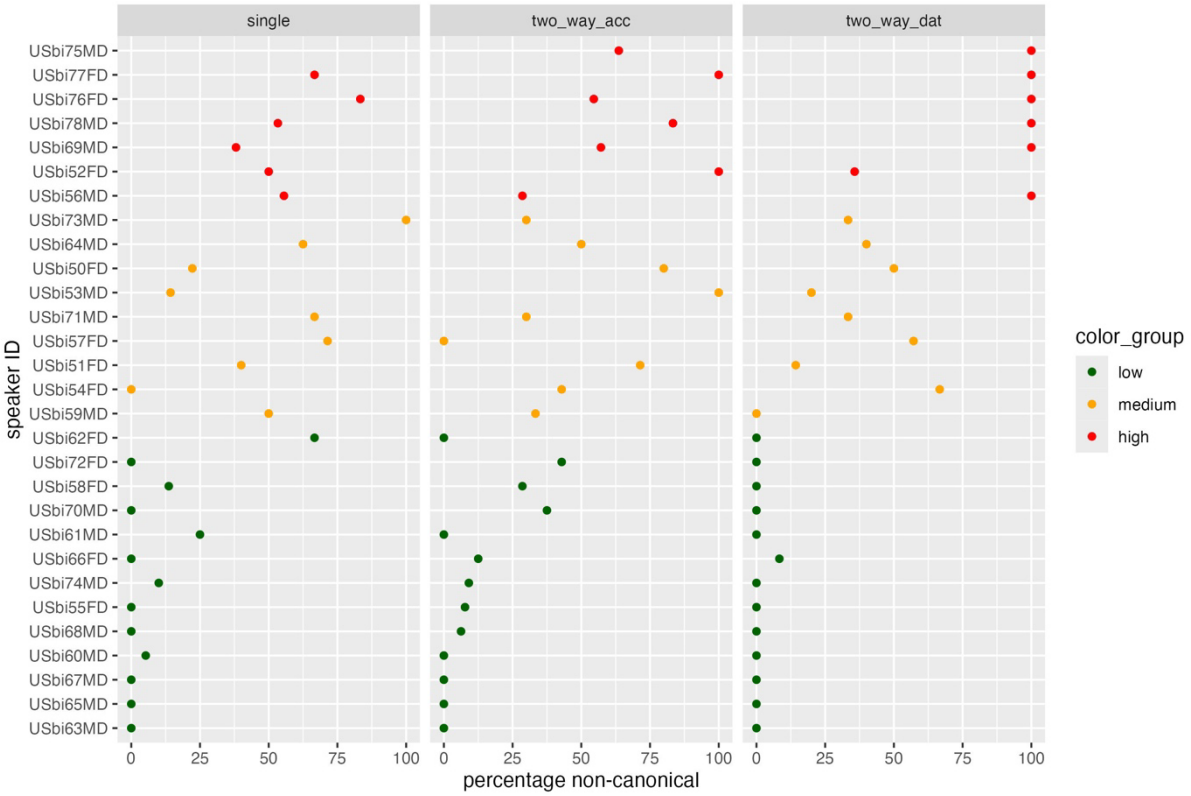

Figure 1: DP complements across individual speakers and preposition types

To investigate the realization of non-canonical productions and to detect patterns of non-canonicity in HSs, non-canonical DP complements of single-case prepositions were analyzed. HSs produced a total of 72 non-canonical DP complements of single-case prepositions (cf. Table 3). Since none of them occurred after the preposition *um*, analyses were performed on the other four prepositions which canonically govern the dative. Table 7 illustrates the most frequent patterns. Most non-canonical DP complements of single-case prepositions fall under the category *underspecification*, i.e., DPs that are morphologically not overtly marked for case. The second pattern is *-(e)n* suffixation in canonically *-(e)m* contexts. In a third group, instances of *-(e)m* suffixation on the determiners of feminine nouns are subsumed. The remaining 14 non-canonical DPs which were not included in Table 7 could not be unequivocally placed in any of the three patterns.

pattern	**occurrences**	**example clause**
underspecification	33 (45.8%)	mit **ein Ball** gespielt *'played with a ball'* (canonical: **einem**)
-(e)n suffixation	17 (23.6%)	die Frau mit **ihren Hund** '*the woman with her dog'* (canonical: **ihrem**)
-(e)m suffixation	8 (11.1%)	aus **dem Hand** gefallen *'fell out of the hand'* (canonical: **der**)

Table 7: patterns of non-canonical DP complements of single-case prepositions

As an additional investigation of the extent of HS heterogeneity, I now shift the focus to a subgroup of HSs. In the following, I discuss the data of three siblings: two brothers (18 and 14 years old) and one sister (17 years old).[16] All siblings considered themselves native speakers of both English and German and reported that their parents – the mother being a German immigrant and the father American – speak both languages at home. Furthermore, none of the siblings received formal education in German. Table 8 shows the results for DP complements across siblings and preposition types.

	Brother 1		**Sister**		**Brother 2**	
	total	**non-canon**	**total**	**non-canon**	**total**	**non-canon**
single-case	30	3 (10.0%)	12	0 (0.0%)	3	3 (100.0%)
two-way$_{ACC}$	11	1 (9.1%)	7	3 (42.9%)	10	3 (30.0%)
two-way$_{DAT}$	13	0 (0.0%)	15	0 (0.0%)	6	2 (33.3%)
all prepositions	54	4 (7.4%)	34	3 (8.8%)	19	8 (42.1%)

Table 8: DP complements across siblings and preposition types

A qualitative breakdown of the results shows that in the dataset of single-case prepositions, the oldest sibling produced three non-canonical DPs with the prepositions *mit*, *zu* 'to', and *von*. Two of those show instances of non-canonicity in combination with plural marking in which the noun was not correctly marked for number in the dative (4a). The third instance (4b) is a mixture of *-(e)m* suffixation plus the amalgamation of the preposition *von* and the article *dem*, which is non-canonical for feminine nouns. It can be argued that this speaker overcompensated the transparent *-(e)m* dative suffixation while simultaneously producing the canonically inflected determiner *der* for feminine nouns in the dative. In the group of two-way$_{ACC,}$ one DP was non-canonically realized after the preposition *in* (4c) resulting in a locative instead of a directional reading. Within two-way$_{DAT}$, only canonical DPs were produced.

(4)
(a) mit **ihren Lebensmittel** (canonical: **Lebensmittel-n**)
'with her groceries'
(b) der Vater vom **der Familie** (canonical: **von**)
'the father of the family'
(c) der Hund gebellt hat und in **dem Parkplatz** gerannt ist (canonical: **den**)
'the dog barked and ran in the parking lot'

The second sibling exclusively produced canonical DPs following single-case prepositions. Among two-way$_{ACC}$, she produced three non-canonical DPs after the preposition *in* (5a-b).

(5)
(a) ist nachm Ball in **der Straße** rausgerannt (canonical: **die**)
'ran out in the street after the ball'
(b) das Auto das gerade in **dem Parkplatz** reingefahren ist (canonical: **den**)
'the car that just drove into the parking lot'

[16] The participant codes under which the sibling data can be found in the RUEG corpus are: USbi74MD (Brother 1), USbi72FD (Sister), and USbi73MD (Brother 2).

None of the scrutinized DPs are ungrammatical. They are however non-canonical regarding the semantics of the given context concerning a directional reading of the events. Example (5a) is especially noticeable as the participant encoded various path information not only in the *in*-PP but also with the help of the preposition *nach* 'after' and the verbal prefix *raus* 'out' of the participle *rausgerannt* 'ran out'. This, contrary to the dative *in*-PP, implies a directional, hence, semantically canonical reading. One could argue that even though this participant did not manage to encode directional reading via case marking in this DP, she knew that the motions in the stimulus video contained the crossing of a boundary and used other linguistic means to indicate this. Among the group of two-way$_{DAT}$, all DPs were canonical.

The youngest sibling produced a total of three DPs with the preposition *von* all of which were non-canonical. Two DPs (6a/b) were morphologically underspecified and (6a) additionally illustrates non-canonical case marking in combination with plural marking. The third DP shows *-(e)n* suffixation in canonically dative *-(e)m* contexts for masculine nouns (6c).
(6)
(a) eins von **die Autofahrer** (canonical: **den Autofahrer-n**)
'one of the drivers'
(b) eine Tüte von **eine Frau** (canonical: **einer**)
'a woman's bag'
(c) von **den Hund** (canonical: **dem**)
'of the dog'

Among two-way$_{ACC}$, this participant produced three non-canonical DPs after *auf* and *in* (6d/e) in combination with the noun *Straße* 'street', resulting in a locative instead of a directional reading. Within two-way$_{DAT}$, two DPs were non-canonically realized after the preposition *hinter* (6f), these instances fall under the trend of underspecified DPs.
(d) die Sachen sind auf **der Straße** gefallen (canonical: **die**)
'the things fell on the street'
(e) sein Ball ist in **der Straße** gerolled[17] (canonical: **die**)
'the ball rolled in the street'
(f) das Auto hinter **das erste Auto** (canonical: **dem ersten**)
'the car behind the first car'

These results show that the older siblings produced fewer non-canonical DPs than the younger brother. Additionally, the comparison of all DPs (canonical and non-canonical) shows that the oldest brother produced almost twice as many DPs as the sister and almost three times as many as the youngest brother.

5 Discussion

This study explored accusative and dative case marking in DP complements of PPs in HSs of German. The intention was to investigate how this generation of HSs (1st generation HSs, 2nd generation immigrants) fits previous case marking trends in HL research specifically within the domain of PPs and to account for individual differences in HSs. The first research question focused on differences in canonical case marking after single-case and two-way prepositions. The results show slightly fewer non-canonical DP complements of single-case prepositions than of two-way prepositions in the productions of HSs. Thus, the expectation that case marking after single-case prepositions results in higher canonicity due to their constraint on case marking options is born out.

[17] Written productions were kept in their original orthography.

Research question two zoomed in on two-way prepositions and inquired whether participants produce more non-canonical DP complements of two-way prepositions in accusative or dative contexts. The results show that HSs produce fewer non-canonical DP complements of two-way prepositions in dative than in accusative contexts. The same pattern is visible – with overall lower frequencies – in MSs. Hence, contrary to previous findings, the HSs in this study actively – and over a third of them very canonically (cf. Figure 1) – produce the dative case. Thus, these findings do not confirm a general reduction or loss of the dative, at least in the domain of two-way prepositions.

The third research question focused on potential patterns in HSs' non-canonical case marking in DP complements of single-case prepositions and was rooted in previous findings that show dative case reduction and accusative case overgeneralization. To address this subject-matter, quantitative and qualitative analyses of non-canonical DP complements of single-case prepositions were conducted. The results show three systematic patterns. Firstly, *underspecification* of DPs. Here, participants opted for a 'simplified' version of the DP by not attaching case-specific inflections. Secondly, *-(e)n suffixation* in canonically *-(e)m* contexts. This can be interpreted as accusative overregularization in canonically dative contexts. Thirdly, *-(e)m* overmarking on the determiners of feminine nouns. In the dative paradigm, both masculine and neuter determiners show *-(e)m* suffixation, while feminine determiners are marked with *-(e)r*. Hence, one explanation for this trend might be the predominant *-(e)m* suffixation for the dative paradigm, and an extension of this suffix to determiners of feminine nouns. Additionally, participants could have chosen the more transparent and perceptually salient form to indicate the dative even if it came at the price of non-canonically marking the DP for gender. These results align with Polinsky's reports on preferences for increased perceptual saliency and overgeneralization, especially for phenomena that are only present in the HL. Additionally, the data show a few instances of non-canonical case marking in combination with plural marking. These instances were, however, too infrequent to be introduced as an additional pattern. The observed non-canonical patterns highlight the overall complexity of the inflectional paradigm in German and the syncretic interplay of case, gender, and number inflections.

Lastly, in order to take a closer look at intra- and inter-individual variation, the data of three siblings was analyzed. In this contained group of HSs, non-canonical DPs after single-case prepositions largely followed the patterns defined for the whole group of HSs. Within two-way prepositions, non-canonical productions could be traced back to idiosyncratic reinterpretations of specific two-way prepositions (e.g., *in, hinter,* and *auf*) to single-case prepositions. This was also visible in the distribution of non-canonical DP complements of the preposition *an* across two-way$_{ACC}$ and two-way$_{DAT}$ in the HS group. Not only prepositions but also nouns led to systematic variation patterns. In the productions of the youngest brother, for instance, non-canonical DPs occurred with specific nouns (e.g., street). In sum, these occurrences were however too infrequent to be interpreted as systematic restructuring. Altogether, the older siblings overall produced more DP complements of PPs and illustrated fewer non-canonical DPs than the youngest sibling. These results confirm previous findings on birth order effects in HSs' HL productions.

Regarding heterogeneity in HSs, the analyses additionally showed that while there is considerable in-group variation, individuals in the HS group can be subdivided into smaller groups which behave similarly (cf. Figure 1). The inclusion of number of German-speaking parents in the household correlated with inflectional canonicity as most of the speakers who produced low levels of non-canonicity, had two German-speaking parents while those who showed high levels of non-canonicity predominantly only lived with one German-speaking

parent. Bilingual education also seemed to have an effect as three out of the four individuals who received bilingual education were subsumed under the group that showed low levels of non-canonicity. Nevertheless, the correlation of these parameters has to be interpreted with caution. Additional factors pertaining to heterogeneous productions in HSs need to be investigated. A potential next step would be to retrieve further socio-linguistic information of the participants of each subgroup. This could include information such as visits to the home country, extent of received formal education in the HL, or media usage in the HL, which should be used to outline individual speaker profiles in order to detect possible similarities between subgroups of HSs.

In essence, the performed analyses have shown that non-canonical productions in HSs are neither arbitrary nor chaotic, thus supporting previous claims that HSs follow patterns which should be described as "tendential rather than categorical" (Polinsky 2018: 197) in terms of oversimplification and reduction (Polinsky 2018; Łyskawa & Nagy 2020). Despite mostly oral, oftentimes idiosyncratic, and phonologically reduced input, HSs acquire and retain case marking in German and show high idiosyncratic systematicity.

Limitations of the research presented here include the relatively small participant number and sample size. Therefore, results must be interpreted with caution. The analyses did not account for differences in production mode (spoken vs. written) or formality (formal vs. informal). Furthermore, analyses on inter- and intra-individual variation and especially the analysis of sibling data could have greatly benefited from the inclusion of an appropriate baseline, i.e., the parental input. While participants indicated HL use and input frequency in the questionnaire, no actual baseline data could be taken into account as the parents of the participants were not included in the elicitations.

6 Conclusion

This paper investigated case marking in DP complements of PPs in adolescent HSs and MSs of German. More specifically, accusative and dative case inflections were quantitively and qualitatively analyzed across preposition types as well as across and within speakers. The aim was to investigate how the selected group of HSs ties in with previously discovered trends in case marking within the context of PPs. Additionally, the extent of HS heterogeneity in the domain of case marking was investigated.

The results showed slightly less non-canonical case marking in DP complements of single-case prepositions than of two-way prepositions in HSs, showing that a restriction on case marking options leads to higher canonicity. Additionally, HSs and MSs produced fewer non-canonical DP complements in dative contexts than in accusative contexts. Hence, this study does not confirm previous findings which reported a general reduction or loss of the dative case in HSs. In-depth analyses of case marking in DP complements of single-case prepositions in HSs showed three systematic patterns leading to non-canonicity: morphological underspecification of the DP, overregularization of the accusative case, and overmarking of the dative case on feminine nouns. Throughout the analyses, HS productions showed high levels of heterogeneity. Yet, it was possible to split speakers into three subgroups on a continuum of low, medium, and high levels of non-canonical case marking which seemed to be influenced by the number of German-speaking parents at home (i.e., two German-speaking parents correlated with lower levels of non-canonicity). Unsurprisingly, canonicity was furthermore attested more in speakers who received bilingual education. Analyses of sibling data, which were more controlled in terms of extralinguistic parameters, still yielded considerable variation in line with birth order effects on HL competence. In conclusion, however, despite increased heterogeneity, the

analyses in this article have shown that case marking is acquired, and more importantly retained, in 1st generation HSs outside of established heritage language islands. Additionally, non-canonical case marking variation within the domain of PPs, albeit observable in HSs, is highly systematic, which, all things considered, is an impressive achievement and, hence, the best case scenario.

7 References

Aalberse, S., A. Backus & P. Muysken. 2019. *Heritage languages: A language contact approach*. Vol. 58. https://doi.org/10.1075/sibil.58.

Baten, Kristof. 2010. Die Erwerbssequenzhypothese: Theorie und Praxis des Kasuserwerbs. *Deutsche Sprache* 38. 43–69. https://doi.org/10.37307/j.1868-775X.2010.01.04.

Blake, Barry. 1994. *Case*. Cambridge: Cambridge University Press.

Boas, Hans Christian. 2009a. Case loss in Texas German: The influence of semantic and pragmatic factors. In *The Role of Semantic, Pragmatic and Discourse Factors in the Development of Case*, 347–373. Jóhanna Barðdal and Shobhana L. Chelliah. https://doi.org/10.1075/slcs.108.18boa.

Boas, Hans Christian. 2009b. *The Life and Death of Texas German*. Duke University Press.

Boas, Hans Christian. 2016. Variation im Texasdeutschen: Implikationen für eine vergleichende Sprachinselforschung. In Alexandra N. Lenz (ed.), *German Abroad*, 11–44. Göttingen: V&R unipress. https://doi.org/10.14220/9783737005975.11.

Bousquette, Joshua & Michael T. Putnam. 2020. Redefining Language Death: Evidence From Moribund Grammars. *Language Learning* 70(S1). 188–225. https://doi.org/10.1111/lang.12362.

Bridges, Kelly & Erika Hoff. 2014. Older sibling influences on the language environment and language development of toddlers in bilingual homes. *Applied Psycholinguistics* 35(2). 225–241. https://doi.org/10.1017/S0142716412000379.

Chomsky, Noam. 1981. *Lectures on Government and Binding*. (Ed.) Jan Koster & Henk van Riemsdijk. Berlin, New York: Mouton de Gruyter.

Clahsen, Harald. 1984. Der Erwerb von Kasusmarkierungen in der deutschen Kindersprache. *Linguistische Berichte* 89. 1–31.

Czepluch, Hartmut. 1996. *Kasus im Deutschen und Englischen. Ein Beitrag zur Theorie des abstrakten Kasus*. *Linguistische Arbeiten*. https://doi.org/10.30965/25890859-00404010.

Dudenredaktion (ed.). 2016. *Duden. Die Grammatik*. 9. überarb. Aufl. Vol. 4. Mannheim: Dudenverlag.

Dürscheid, Christa. 1999. Der verbale Kasus des Deutschen. In Stefan Sonderegger & Oskar Reichmann (eds.), *Studia Linguistica Germanica*. Berlin, New York: Walter de Gruyter.

Eisenberg, Peter. 2013. *Grundriss der deutschen Grammatik Band 2: der Satz*. Stuttgart, Weimar: J. B. Metzler.

Haspelmath, Martin. 2012. Terminology of Case. *The Oxford Handbook of Case* (July). 1–13. https://doi.org/10.1093/oxfordhb/9780199206476.013.0034.

Klinge, Swantje. 1990. Prepositions in bilingual language acquisition. In Jürgen M. Meisel (ed.), *Two first languages*, 123–154. Dordrecht: Foris.

Leisiö, Larisa. 2006. Genitive Subjects and Objects in the Speech of Finland Russians. *Journal of Slavic Linguistics* 14(2). 289–316.

Łyskawa, Paulina & Naomi Nagy. 2020. Case Marking Variation in Heritage Slavic Languages in Toronto: Not So Different. *Language Learning*. Blackwell Publishing Ltd 70(S1). 122–156. https://doi.org/10.1111/lang.12348.

McFadden, Thomas. 2004. *The position of morphological case in the derivation: A study on the syntax-morphology interface*.

McFadden, Thomas. 2020. Case in Germanic. In *The Cambridge Handbook of Germanic Linguistics*, 282–312. Cambridge University Press. https://doi.org/10.1017/9781108378291.014.

Meisel, Jürgen M. 1986. Word order and case marking in early child language. Evidence from simultaneous acquisition of two first languages: French and German. *Linguistics* 24(1). 123–184. https://doi.org/10.1515/ling.1986.24.1.123.

Mills, Anne E. 1985. The acquisition of German. In D. I. Slibin (ed.), *The crosslinguistic study of language acquisition* , vol. Vol. 1, 141–254. Lawrence Erlbaum Associates, Inc.
Montrul, Silvina. 2011. MORPHOLOGICAL ERRORS IN SPANISH SECOND LANGUAGE LEARNERS AND HERITAGE SPEAKERS. *Studies in Second Language Acquisition* 33(2). 163–192.
Pascual Y Cabo, Diego & Jason Rothman. 2012. The (IL)logical problem of heritage speaker bilingualism and incomplete acquisition. *Applied Linguistics* 33(4). 450–455. https://doi.org/10.1093/applin/ams037.
Polinsky, Maria. 2018. *Heritage Languages and Their Speakers*. *Heritage Languages and Their Speakers*. https://doi.org/10.7765/9781526108555.00018.
Putnam, Michael T., Lara Schwarz & Andrew D. Hoffman. 2021. Morphology of Heritage Languages. In Silvina Montrul & Maria Polinsky (eds.), *The Cambridge Handbook of Heritage languages and linguistics*, 613–643. Cambridge: Cambridge University Press.
Rosenberg, P. 2005. Language Island Research. The Traditional Framework and some Sociolinguistic Questions. In Peter Auer, Frans Hinskens & Paul Kerswill (eds.), *Dialect Change. Convergence and Divergence in European Languages*, 221–235. Cambridge: Cambridge University Press.
Sahel, Said. 2018. *Kasus*. (Ed.) Jörg Meibauer & Markus Steinbach. Heidelberg: Universitätsverlag Winter.
Shin, Sarah J. 2002. *Birth Order and the Language Experience of Bilingual Children*. *Source: TESOL Quarterly*. Vol. 36. https://about.jstor.org/terms.
Sorace, Antonella. 2011. Pinning down the concept of "interface" in bilingualism. *Linguistic Approaches to Bilingualism* 1(1). 1–33. https://doi.org/10.1075/lab.1.1.01sor.
Tracy, Rosemarie. 1984. Fallstudien: Überlegungen zum Erwerb von Kasuskategorie und Kasusmarkierung. In Hartmut Czepluch & Hero Janßen (eds.), *Syntaktische Struktur und Kasusrelation*, 271–313. Tübingen: Gunter Narr Verlag.
Tracy, Rosemarie. 1986. The acquisition of case morphology in German. *Linguistics* 24(1). 47–78. https://doi.org/10.1515/ling.1986.24.1.47.
Tsehaye, Wintai, Rosemarie Tracy & Johanna Tausch. Inter- and intra-individual variation: how it materializes in Heritage German and why it matters. In Shanley E. M. Allen, Mareike Keller, Artemis Alexiadou & Heiek Wiese (eds.), *Linguistic dynamics in heritage speakers*. Language Science Press.
Tsimpli, Ianthi Maria. 2014. Early, late or very late? *Linguistic Approaches to Bilingualism* 4(3). 283–313. https://doi.org/10.1075/lab.4.3.01tsi.
Wiese, Bernd. 2004. Über Lokalisationssysteme. Zur Struktur des Inventars der deutschen Lokalpräpositionen mit Berücksichtigung finno-ungarischer Lokalkasussysteme. *Institut für deutsche Sprache* 1–69.
Wiese, Heike. 2020. Language Situations: A method for capturing variation within speakers' repertoires. In Y. Asahi (ed.), *Methods in Dialectology XVI*, 105–117. Peter Lang.
Wiese, Heike, Artemis Alexiadou, Shanley Allen, Oliver Bunk, Natalia Gagarina, Kateryna Iefremenko, Esther Jahns, et al. 2021. RUEG Corpus. https://doi.org/10.5281/ZENODO.5808870.
Yager, Lisa, Nora Hellmold, Hyoun A. Joo, Michael T. Putnam, Eleonora Rossi, Catherine Stafford & Joseph Salmons. 2015. New structural patterns in moribund grammar: Case marking in heritage German. *Frontiers in Psychology* 6(NOV). 1–9. https://doi.org/10.3389/fpsyg.2015.01716.
Zifonun, Gisela, Ludger Hoffmann & Bruno Strecker. 1997. *Grammatik der deutschen Sprache*. Berlin, New York: De Gruyter.
Zimmer, Christian. 2020. Kasus im Namdeutschen. *Zeitschrift für germanistische Linguistik* 48(2). 298–335. https://doi.org/10.1515/zgl-2020-2004.

Conclusion and Implications

In the following, I resume the conclusions of each article and relate them to knowledge gaps and methodological gaps identified, and questions raised in the *Introduction*. Subsequently, potential implications for HL research are laid out.

From the findings in Article 1 we concluded that HSs seem to have an underlying register awareness which they apply across their languages. Thus, even though the HL is the non-dominant language and the language which receives more limited exposure – especially in formal registers – HSs' productions indicated syntactic and discourse knowledge enabling them (and us) to differentiate their productions across registers. At the same time, performance appeared to be influenced by transfer phenomena, cross-linguistic parallels, and related inhibition efforts. We argued that the increased cognitive load of head parameter resetting in subordinations and their complexity led to register levelling in SC productions, especially in written productions.

The results of Article 2 illustrated that HSs and MSs, albeit native speaker populations, are different from each other. This affected comparisons between heritage and monolingual German speakers as well as between majority and monolingual English speakers, thus language dominance did not necessarily result in similarities between the two speaker groups. We therefore concluded that an additional locus of variation in the English productions lies in the different perceptions of the testing situation by both speaker groups and stricter adherence to register distinctions in HSs. Additionally, findings showed that consideration of acquisition timing of SC types did not lead to distributional differences between HSs and MSs. Furthermore, HSs successfully adapted to MS patterns in both languages regarding the distributional variation of SC types across registers, even though SC types were differently distributed across registers in German and English MSs. On the basis of these differences and similarities between HSs and MSs, we therefore proposed a more nuanced use of the term native speaker by including metalinguistic speaker characteristics such as bilingualism.

My findings in Article 3 showed that diverging awareness of register norms due to different input conditions is the source for distributional differences between speaker groups rather than transfer from the dominant language. Additionally, these results provided further evidence for the stability of head parameter setting in the VP in HSs of German (no substantial evidence for extraposed direct objects), even under intensive language contact and regardless of the involvement of an external interface. I therefore concluded: While HSs and MSs show varying degrees of register awareness in the production of post-field LWCs, the grammaticality of clausal syntax in the HS group is not in jeopardy.

In contrast, results of Article 4 on case-marked PPs showed non-canonical variation in HSs' German and clear differences between HSs and MSs. However, findings are in contrast with previous research on case marking where extensive dative case reduction or even loss were reported, which was not attested in the speaker group considered here. Heterogeneity was observed across HSs as well as within siblings and the analyses emphasized that the inclusion of additional biographical information of speakers is needed to further disambiguate possible parameters leading up to HS heterogeneity. Additionally, I was able to show that even though non-canonical variation is considerable, it is systematic, as illustrated by case marking patterns.

In sum, HSs are able to acquire and retain case marking in German. This is interesting because of the typically late mastery of case marking even in L1 German monolinguals. The complications mentioned in this frame text and in the article pertaining to syncretism, lack of perceptual salience, and reduced exposure to literacy in German did not prevent the construction of a case-marking system. Hence, we can conclude once more that HL grammars are systematic and can be learned in their essentials, namely with respect to grammatical signaling functions, even under reduced exposure conditions.

On the basis of the conclusions across individual articles and additional references to investigations that were performed beyond the present collection, I now return to the questions raised in the *Introduction*.

Can we confirm the existence of stable and variable domains in HL grammars in the group of HSs under consideration, and do we see patterns of non-canonical variation?

The short answer to both parts of this question is: yes. The findings in this dissertation have shown that phenomena which are acquired early and are located at internal interfaces, such as head directionality, verb placement, and word order (Articles 1-3) are stable and largely canonical in the German-English contact situations focused on here. In contrast, phenomena, which are acquired later, such as register knowledge, and which involve both internal and external interfaces, such as case morphology, show higher degrees of non-canonical variation (see also Benmamoun et al., 2013; Tracy & Gawlitzek, 2023; Westergaard & Kupisch, 2020). Moreover, findings have also shown that non-canonicity does not imply instability (Article 4). Results from additional studies, which were conducted beyond the collection of articles presented in this dissertation, provide further evidence for idiosyncratic systematicity of non-canonical patterns. In an exploratory analysis of the syntactic canonicity in three siblings (the same ones that were included in Article 4), we found systematic non-canonical V3 structures across spoken and written, as well as formal and informal productions of one sibling. While this resulted in non-canonical structures in the forefield, the participant still accounted for the separation of the main verb and its particles, thus underlining the stability of clausal architecture (Tsehaye et al., to appear). In sum, I conclude that non-canonical productions in HSs are intra-individually systematic. Hence my findings support the view that HL grammars are coherent systems and instantiate a variety of native language grammar (Polinsky & Scontras, 2019, 2020; Wiese et al., 2022).

Which role does register play in the productions of HSs and MSs?

In relation to the second question, all analyses which included register as an independent variable consistently showed that it substantially influences productions across speaker groups and languages. At the same time, we found interactions between language dominance, cross-linguistic differences, and online vs. offline nature of the task and register. Results indicated register levelling, mostly in heritage German productions when compared to monolingual German productions (Articles 1-3), but also in monolingual English productions when compared to majority English productions (Article 2). In cases where HSs and MSs differed in the distribution of phenomena across registers, a clear pattern became visible. HSs distinguished between formal and informal productions in their written narrations but not in their spoken ones. Effects of task type on non-canonical variation in HSs were additionally explored beyond this dissertation and results indicated similar patterns in terms of formality distinctions across written and spoken productions as the latter require immediate response from the participants, thus taking away mental resources to account for relevant distinctions

(Tracy & Tsehaye, 2023; Tsehaye et al., to appear; Tsehaye & Tracy, 2022). All things considered, the findings in this dissertation as well as findings within the larger context of the RUEG group show that differences between HSs and MSs do not result from differences in underlying grammars of the two speaker groups but from different distributional variation of phenomena across registers, which can be interpreted as differential form-function mapping between HSs and MSs.

How do HSs' HL productions compare to those of their ML?

In response to the last question, the findings in this dissertation have shown that HSs show considerably and unsurprisingly more non-canonical variation in their HL productions than in their ML productions. Importantly, however, the HSs were able to produce all phenomena that were investigated throughout this dissertation in their HL as well as in their ML. Differences in frequency and distribution of the respective phenomena seemed to be affected by language dominance and HL exposure. With respect to register variation across HSs' HL and ML productions, findings have shown that HSs' majority English productions are similar to those of MSs of English (Articles 1+2). Nevertheless, differences between the two speaker groups with regard to how they structure their discourse according to register were also attested (Article 2). However, this might not necessarily be due to different register awareness between these two speaker groups but can rather be explained by language external factors and an increased alertness of HSs regarding the testing of their linguistic productions.

In light of the outlined conclusions, I now want to address potential implications of HL studies. Implications of the accumulated findings reach beyond the realms of research on HLs and are relevant for addressing current problems regarding the educational sector. Research outlining the linguistic potential of bi- and multilingual speakers (e.g., Gawlitzek-Maiwald & Tracy, 2005; Krifka et al., 2014) is essential to decrease unfair treatment of bi- and multilingualism in the classroom and beyond, and its implementation into public discourse is crucial for addressing unsubstantiated fears and dismantling language discrimination.[29] This is especially relevant for countries like Germany, where a 'monolingual habitus' (Gogolin, 2008) prevails in formal contexts, despite vital multilingualism, and where HLs, especially those characterized by low prestige, are still perceived as societal hazards (Wiese et al., 2020).[30] Research on HLs and findings like the ones presented in this dissertation serve as additional evidence that bilingualism is not detrimental and that the languages in bi- and multilingual speakers do not get in each other's way.

The work presented in this dissertation and across further RUEG-related research aims at clearing up misunderstandings about HLs in the German context and follows common goals with respect to scientific transfer. Collaborations between linguists and educational institutions are vital as they encourage outreach and inform teachers and other actors in the educational sector about ongoing research. Together with current publications resulting from collaborative work within and beyond RUEG, the findings in this dissertation, contribute to the strengthening of scientific transfer (e.g., among others Gogolin & Tracy, 2021; Purkarthofer & Schroeder, 2023; Tausch & Tsehaye, 2023; Tracy, 2022, 2023; Vogel et al., 2021).[31]

[29] See also Adler & Plewnia (2021) for an analysis of how language is perceived by linguistic laypersons.

[30] For studies which discuss the linguistic diversity in Germany, see among others Adler & Silveira (2017) and Kupisch (2021)

[31] For details on the specific measures to implement the RUEG results into the educational sector, see the *RUEGram* website which includes information on workshops, video lectures, and interviews (www.ruegram.de).

Limitations and Future Research Directions

Despite the insights this dissertation has added to research on HLs, the approaches taken throughout the four contributions have several methodological shortcomings. This section addresses them and additionally lays out steps undertaken to overcome them. Furthermore, ongoing research and potential directions for future research are outlined.

One of the most obvious limitations is the relatively small sample size. Due to this, the analyses could not consistently account for a breadth of independent variables. Results were only reported across formal and informal settings (Article 2), phenomena had to be collapsed (Article 3), or comparisons were only made across speaker groups (Article 4). This limitation was, however, approached by additional qualitative analyses of individual speakers within and beyond the presented work, which were consulted to corroborate or critically interpret quantitative results (see Tsehaye et al., to appear).

Another limitation connected to the relatively small sample size is that no data from other age groups could be integrated. The inclusion of adult HSs in quantitative analyses to perform comparisons across age groups, as done in other RUEG projects, could not be implemented in this dissertation due to a small adult HS sample (only seven adult speakers). The integration of adult and also child HS data is essential for cross-sectional analyses of HLs in order to investigate potential attrition effects and should be addressed in future studies (Polinsky, 2018a).

A further limitation affecting research beyond this dissertation and throughout the research group, is the lack of baseline data. The project design did not include – and most likely would not have been able to include – detailed information on or samples of productions of the parental input. Since we collected data from adolescents (and, although not discussed here, adult HSs), parental productions would most likely have undergone changes as well. Theoretically, however, information about the actual parental input and the parents' grammar would highly enhance analyses and help to substantiate existing findings.

Analyses throughout this dissertation focused on comparisons between heritage and monolingual German. As a next step, comparisons should also be performed across bilingual speakers. The data of majority German speakers should be included in order to specify the influence of language dominance and acquisitional differences on non-canonical variation. The RUEG corpus presents a suitable starting point as it comprises data from majority German speakers with Greek, Russian, and Turkish as HL, thus additionally allowing for comparisons across languages which are typologically further apart than German and English. Within RUEG, comparisons across bilingual speakers with different levels of language dominance are currently underway (Labrenz, 2023; Pashkova et al., in prep).

An additional shortcoming, which only became evident after Articles 1+2 had been published, was that we assumed and therefore stated that none of the HSs had undergone bilingual education.[32] A renewed search of the speakers' metadata has revealed that two participants in Article 1 and four participants in Article 2 attended bilingual schools. The conceptualization

[32] Regardless of bilingual education, these speakers can still be characterized as HSs in contrast to HL learners, since they started to naturally acquire their HL in the realms of the family, as did the other speakers of the sample.

of the questionnaire which we used to elicit the speakers' metadata allowed for open answers, which made explicit searches and categorizations difficult. However, regarding the phenomena under investigation in the two articles, i.e., core syntactic parameters of verb placement, bilingual education was not expected to have a significant impact on the canonicity of verb placement across main and subordinate clauses.[33] A subsequent analysis on my part of the productions of these speakers, including the distributional variation of clauses across registers confirmed that they performed within the realms of the reported findings for the whole group. For the analyses on case marking, which would be expected to be affected by formal schooling, references pertaining to bilingual education were included in the article. However, due to the fact that metadata can sometimes be ambiguous or even missing, no systematic inclusions but only references to these parameters were possible throughout the four articles. Future research should provide clear and pre-defined answer possibilities in order to enhance the inclusion of biographical data in HL research and to allow for multivariate analyses.

While the findings in this dissertation confirmed the influence of language contact and acquisition in HS variation and additionally introduced the role of register, HS heterogeneity cannot be fully grasped with such global parameters. The limitation of performing quantitative analyses across small participant numbers surfaced and was addressed by additional qualitative analyses. Increased HS heterogeneity was especially attested in Article 4 but could not be disentangled satisfactorily. This pertains to the significance of analyzing individual speaker profiles in order to control for adequate comparison grounds, which is another part of ongoing work that has been conducted beyond this dissertation (Tsehaye et.al., to appear).

Lastly, I want to address limitations of the elicitation method that was applied across all four contributions. The Language Situations Method required an implicit willingness to play-act on part of the participants. This limited the options for eliciting spontaneous naturalistic data, as the participants were still aware of the fact that their language productions were examined, which consequently could have affected their production behavior, which we argued at various conferences (Tracy & Tsehaye, 2023; Tsehaye & Tracy, 2022).[34] Therefore, we cannot talk about truly naturalistic data but quasi-naturalistic data. Additionally, while eliciting spoken and written productions across formal and informal communicative situations is essential to assess register repertoires of speakers, the hypothetical scenarios could be improved with regard to two aspects. First, the scenarios chosen might lack ecological validity as participants might be unfamiliar with the different communicative situations. Especially adolescent participants are unlikely familiar with reporting an accident to the police or submitting any formal reports, and certainly not in their HL. Second, interactions with the police are a delicate topic due to cases of police brutality. Therefore, the participants might have experienced discomfort and an unwillingness during the formal spoken and written productions. Consequently, alternative formal communicative situations, which are more suitable for the age group of adolescents such as newspaper articles or news reports should be included in future studies.

[33] Effects of bilingual education in German were rather expected in HSs' lexicon and their orthography, which we did not analyze in these articles.

[34] In-person testing situations can evoke observer phenomena with regard to increased participant alertness which may affect their productions.

References for the Frame Text

Aalberse, S., Backus, A., & Muysken, P. (2019). *Heritage languages: A language contact approach* (Vol. 58). https://doi.org/10.1075/sibil.58

Adler, A., & Plewnia, A. (2021). Was denken linguistische Laien über Sprache? In *Laien, Wissen, Sprache* (pp. 249–277). De Gruyter. https://doi.org/10.1515/9783110731958-011

Adler, A., & Silveira, M. R. (2017). WELCHE SPRACHEN WERDEN IN DEUTSCHLAND GESPROCHEN? *Sprachreport*, *37*(3), 1–5. https://doi.org/10.14618/sr-3-2021-adl

Albirini, A., & Benmamoun, E. (2014). Aspects of second-language transfer in the oral production of Egyptian and Palestinian heritage speakers. *International Journal of Bilingualism*, *18*(3), 244–273. https://doi.org/10.1177/1367006912441729

Alexiadou, A., & Rizou, V. (2023). The use of periphrasis for the expression of aspect by Greek heritage speakers. *Register Studies*, *5*(1), 82–110. https://doi.org/10.1075/rs.20022.ale

Alexiadou, A., Rizou, V., & Karkaletsou, F. (2022). A Plural Indefinite Article in Heritage Greek: The Role of Register. *Languages*, *7*(2). https://doi.org/10.3390/languages7020115

Antomo, M., & Steinbach, M. (2010). Desintegration und Interpretation: Weil-V2-sätze an der Schnittstelle zwischen Syntax, Semantik und Pragmatik. *Zeitschrift Für Sprachwissenschaft*, *29*(1), 1–37. https://doi.org/10.1515/ZFSW.2010.001

Armon-Lotem, S. (2005). The Acquisition of Subordination: From Preconjunctionals to Later Use. In D. D. Ravid & H. Bat-Zeev Shyldkrot (Eds.), *Perspectives on Language and Language Development* (pp. 191–202). Springer US. https://doi.org/10.1007/1-4020-7911-7_15

Au, T. K., Knightly, L. M., Jun, S.-A., & Oh, J. S. (2002). *OVERHEARING A LANGUAGE DURING CHILDHOOD*. *13*(3), 238–243.

Baker, C. (2011). *Foundations of Bilingual Education and Bilingualism*. Multilingual Matters.

Benmamoun, E., Montrul, S., & Polinsky, M. (2013). Heritage languages and their speakers: Opportunities and challenges for linguistics. *Theoretical Linguistics*, *39*(3–4), 129–181. https://doi.org/10.1515/tl-2013-0009

Biber, D., & Conrad, S. (2001). Register Variation: A Corpus Approach. In D. Schiffrin, D. Tannen, & H. E. Hamilton (Eds.), *The Handbook of Discourse Analysis* (pp. 175–196). Blackwell Publishers.

Biber, D., & Gray, B. (2016). *Grammatical Complexity in Academic English*. Cambridge University Press. https://doi.org/10.1017/CBO9780511920776

Biber, D., Larsson, T., & Hancock, G. R. (n.d.). Dimensions of Text Complexity in the Spoken and Written Modes: A Comparison of Theory-Based Models. *Journal of English Linguistics*. https://www.researchgate.net/publication/377397662

Biber, Douglas., & Conrad, Susan. (2009). *Register, genre, and style*. Cambridge University Press.

Boas, H. C. (2009a). Case loss in Texas German: The influence of semantic and pragmatic factors. In *The Role of Semantic, Pragmatic and Discourse Factors in the Development of Case* (Issue 1972, pp. 347–373). Jóhanna Barðdal and Shobhana L. Chelliah. https://doi.org/10.1075/slcs.108.18boa

Boas, H. C. (2009b). *The Life and Death of Texas German*. Duke University Press.

Boas, H. C. (2010). On the equivalence and multifunctionality of discourse markers in language contact situations. In Th. Harder & E. Hentschel (Eds.), *Partikelforschung* (pp. 301–315). Staufenburg.

Boas, H. C. (2016). Variation im Texasdeutschen: Implikationen für eine vergleichende Sprachinselforschung. In A. N. Lenz (Ed.), *German Abroad* (pp. 11–44). V&R unipress. https://doi.org/10.14220/9783737005975.11

Böttcher, M., & Zellers, M. (2023). Hesitating with and without Language Heritage - Prosodic Aspects of Filler Particles in the RUEG Corpus. *20th International Congress of Phonetic Sciences*.

Boyd, J. K. (2007). *Comparatively speaking: a psycholinguistic study of optionality in grammar*. University of California, San Diego.

Bridges, K., & Hoff, E. (2014). Older sibling influences on the language environment and language development of toddlers in bilingual homes. *Applied Psycholinguistics*, *35*(2), 225–241. https://doi.org/10.1017/S0142716412000379

Bunk, O. (2020). *"Aber immer alle sagen das" The Status of V3 in German: Use, Processing, and Syntactic Representation*. Humboldt-Universität zu Berlin.

Clahsen, H. (1984). Der Erwerb von Kasusmarkierungen in der deutschen Kindersprache. *Linguistische Berichte*, *89*, 1–31.

Clahsen, H. (1990). Constraints on Parameter Setting: A Grammatical Analysis of Some Acquisition Stages in German Child Language. *Language Acquisition*, *1*(4), 361–391. https://doi.org/10.1207/s15327817la0104_3

Clyne, M. (2003). *Dynamics of language contact*. Cambridge University Press.

Cook, V. (2016). Where Is the Native Speaker Now? *TESOL Quarterly*, *50*(1), 186–189. https://doi.org/10.1002/tesq.286

Czepluch, H. (1996). *Kasus im Deutschen und Englischen: Ein Beitrag zur Theorie des abstrakten Kasus*. Berlin, Boston: Max Niemeyer Verlag. https://doi.org/10.1515/9783110955309

Diessel, H. (2004). *The Acquisition of Complex Sentences*. Cambridge University Press. https://doi.org/10.1017/CBO9780511486531

Döpke, S. (1998). Competing language structures: The acquisition of verb placement by bilingual German-English children. *Journal of Child Language*, *25*(3), 555–584. https://doi.org/10.1017/S0305000998003584

Döpke, S. (2000). Generation of and retraction from cross-linguistically motivated structures in bilingual first language acquisition. *Bilingualism: Language and Cognition*, *3*(3), 209–226. https://doi.org/10.1017/s1366728900000341

Drach, E. (1963). *Grundgedanken der deutschen Satzlehre*. Wissenschaftliche Buchgesellschaft.

Ferguson, C. A. (1983). Sports Announcer Talk: Syntactic Aspects of Register Variation. In *Source: Language in Society* (Vol. 12, Issue 2).

Flores, C. (2013). Understanding heritage language acquisition. Some contributions from the research on heritage speakers of European Portuguese. *Lingua*, *164*, 251–265. https://doi.org/10.1016/j.lingua.2014.09.008

Flores, C., & Rinke, E. (2020). The relevance of language-internal variation in predicting heritage language grammars. *Bilingualism*, *23*(1), 25–26. https://doi.org/10.1017/S1366728919000464

Frey, W. (2015). Zur Struktur des Nachfelds im Deutschen. In *Das Nachfeld im Deutschen* (pp. 53–76). DE GRUYTER. https://doi.org/10.1515/9783110419948-004

Freywald, U., Cornips, L., Ganuza, N., Nistov, I., & Opsahl, T. (2015). Beyond verb second – a matter of novel information-structural effects? Evidence from Norwegian, Swedish, German and Dutch. In J. Nortier & B. A. Svendsen (Eds.), *Language, Youth and Identity in*

the 21st Century : Linguistic Practices Across Urban Spaces (pp. 73–92). Cambridge University Press. https://doi.org/10.1017/CBO9781139061896.006
Fritzenschaft, A., Gawlitzek, I., & Tracy, R. (1990). Wege zur komplexen Syntax. *Zeitschrift Für Sprachwissenschaft*, *9*, 52–134.
Fuller, J. M. (2001). The principle of pragmatic detachability in borrowing: English-origin discourse markers in Pennsylvania German. *Linguistics*, *39*(372), 351–369. https://doi.org/10.1515/ling.2001.014
Fuller, J. M., & Glenn, G. G. (2003). *The Linguistic Atlas of Texas German Revisited* (W. Keel & K. J. Mattheier, Eds.; pp. 165–176).
Gawlitzek-Maiwald, I., & Tracy, R. (2005). The multilingual potential in emerging grammars. *International Journal of Bilingualism*, *9*(2), 277–297. https://doi.org/10.1177/13670069050090020801
Gawlitzek-Maiwald, I., Tracy, R., & Fritzenschaft, A. (1994). Language Acquisition and Competing Linguistic Representations: the Child as Arbiter. In *The Acquisition of Verb Placement. Functional Categories and V2 Phenomena in Language Acquisition.* (pp. 139–179). Kluwer.
Gogolin, I. (2008). *Der monolinguale Habitus der multilingualen Schule*. Waxmann.
Gogolin, I., & Tracy, R. (2021). Vom mehrsprachigen zum mehrstimmigen Klassenzimmer: eine Bildungsreise. In K. Karst, D. Thoma, J. Derkau, J. Seifried, & S. Münzer (Eds.), *Lehrer*innenbildung im Kontext leistungsbezogener Heterogenität von Schüler*innen* (pp. 163–181). Waxmann.
Goulart, L., Gray, B., Staples, S., Black, A., Shelton, A., Biber, D., Egbert, J., & Wizner, S. (2019). *Linguistic Perspectives on Register*. https://doi.org/10.1146/annurev-linguistics-011718
Guijarro-Fuentes, P., & Schmitz, K. (2015). The nature and nurture of heritage language acquisition. In *Lingua* (Vol. 164, pp. 239–250). Elsevier. https://doi.org/10.1016/j.lingua.2015.05.008
Haider, H. (2010). *The Syntax of German*. Cambridge University Press. https://doi.org/10.1017/CBO9780511845314
Halliday, M. A. K. (1975). Learning How to Mean. In E. H. Lenneberg & E. Lenneberg (Eds.), *Foundations of Language Development* (pp. 239–265). The UNESCO Press. https://doi.org/10.1016/B978-0-12-443701-2.50025-1
Halliday, M. A. K. (1976). A brief sketch of systemic grammar. In G. Kress (Ed.), *Halliday: System and Function in Language. Selected papers.* (pp. 3–6). Oxford University Press.
Halliday, M. A. K. (1978). *Language as a Social Semiotic: The Social Interpretation of Language and Meaning*. Edward Arnold.
Halliday, M. A. K. (1985). *Spoken and Written Language*. Deakin University Press.
Halliday, M. A. K. (2013). Meaning as Choice. In L. Fontaine, T. Bartlett, & G. OGrady (Eds.), *Systemic Functional Linguistics: Exploring Choice* (pp. 15–36). Cambridge University Press. https://doi.org/10.1017/CBO9781139583077.003
Höhle, T. N. (1986). Der Begriff “Mittelfeld”. Anmerkungen über die Theorie der topologischen Felder. In A. Schöne (Ed.), *Kontroversen alte und neue. Akten des 7. Internationalen Germanistenkongress Göttingen* (pp. 329–340). De Gruyter.
Hopp, H., & Putnam, M. T. (2015). Syntactic restructuring in heritage grammars. *Linguistic Approaches to Bilingualism*, *5*(2), 180–214. https://doi.org/10.1075/lab.5.2.02hop
Housen, A., De Clercq, B., Kuiken, F., & Vedder, I. (2019). Multiple approaches to complexity in second language research. *Second Language Research*, *35*(1), 3–21. https://doi.org/10.1177/0267658318809765

Huffines, M. L. (1980). Pennsylvania German. *International Journal of the Sociology of Language*, *25*, 43–57.
Iefremenko, K., Schroeder, C., & Kornfilt, J. (2021). Converbs in heritage Turkish: A contrastive approach. *Nordic Journal of Linguistics*, *44*(2), 130–154. https://doi.org/10.1017/S0332586521000160
Johannessen, J. B., & Salmons, J. (2015). The study of Germanic heritage languages in the Americas. In J. B. Johannessen & J. Salmons (Eds.), *Germanic Heritage Languages in North America: Acquisition, Attrition and Change* (pp. 1–18). John Benjamins.
Keller, M. (2014). *Phraseme im bilingualen Diskurs*. Peter Lang Verlag. https://doi.org/10.3726/978-3-653-04258-0
Kerswill, P., & Wiese, H. (2022). *Urban Contact Dialects and Language Change*. Routledge. https://doi.org/10.4324/9780429487958
Koch, P., & Oesterreicher, W. (2012). *Language of Immediacy - Language of Distance: Orality and Literacy from the Perspective of Language Theory and Linguistic History*. 441–473.
König, E., & Gast, V. (2007). *Understanding English-German Contrasts* (R. Ahrens & E. W. Schneider, Eds.; Vol. 29). Erich Schmidt Verlag.
Krifka, M., Błaszczak, J., Leßmöllmann, A., Meinunger, A., Stiebels, B., Tracy, R., & Truckenbrodt, H. (Eds.). (2014). *Das mehrsprachige Klassenzimmer: Über die Muttersprachen unserer Schüler*. Springer.
Kupisch, T. (2021). Heritage Languages in Europe. In *The Cambridge Handbook of Heritage Languages and Linguistics* (pp. 45–68). Cambridge University Press. https://doi.org/10.1017/9781108766340.004
Kupisch, T., & Polinsky, M. (2022). Language history on fast forward: Innovations in heritage languages and diachronic change. *Bilingualism*, *25*(1), 1–12. https://doi.org/10.1017/S1366728921000997
Kupisch, T., & Rothman, J. (2018). Terminology matters! Why difference is not incompleteness and how early child bilinguals are heritage speakers. *International Journal of Bilingualism*, *22*(5), 564–582. https://doi.org/10.1177/1367006916654355
Labrenz, A. (2023). Functional Variation of German Also across Registers and Speaker Groups. *Contrastive Pragmatics*, *4*(2), 289–320. https://doi.org/10.1163/26660393-bja10077
Labrenz, A., Wiese, H., Pashkova, T., & Allen, S. (2022). The three-dot sign in language contact. *Pragmatics & Cognition*, *29*(2), 246–271. https://doi.org/10.1075/pc.21021.lab
Lattey, E., & Tracy, R. (2001). Language Contact in the individual: a case study based on letters from a German immigrant in New Jersey. In P. Sture Ureland (Ed.), *Global Eurolinguistics: European Languages in North America - Migration, Maintenance and Death* (pp. 413–433). Niemeyer.
Louden, M. L. (2008). Synthesis in Pennsylvania German Language and Culture. In J. Raab & J. Wirrer (Eds.), *Die deutsche Präsenz in den USA* (pp. 671–699). LitVerlag.
Lu, X., Lan, G., Egbert, J., Pescuma, V. N., Serova, D., Knoeferle, P., Lukassek, J., Sauermann, A., Schäfer, R., Adli, A., Bildhauer, F., Egg, M., Hülk, K., Ito, A., Jannedy, S., Kordoni, V., Kuehnast, M., Kutscher, S., Lange, R., … Lüdeling, A. (2023). Situating language register across the ages, languages, modalities, and cultural aspects: Evidence from complementary methods. *Frontiers in Psychology*, *13*, 1–31. https://sfbbbbb.hu-berlin.de/projects/.
Lüdeling, A., Alexiadou, A., Adli, A., Donhauser, K., Dreyer, M., Egg, M., Feulner, A. H., Gagarina, N., Hock, W., Jannedy, S., Kammerzell, F., Knoeferle, P., Krause, T., Krifka, M., Kutscher, S., Lütke, B., Mcfadden, T., Meyer, R., Mooshammer, C., … Zeige, L. E. (2022).

Register: Language Users' Knowledge of Situational-Functional Variation. *Register Aspects of Language in Situation*, 1–58. https://doi.org/10.18452/24901
Mastropavlou, M., & Tsimpli, I. M. (2011). Complementizers and subordination in typical language acquisition and SLI. *Lingua*, *121*(3), 442–462. https://doi.org/10.1016/j.lingua.2010.10.009
Meisel, J. M. (1986). Word order and case marking in early child language. Evidence from simultaneous acquisition of two first languages: French and German. *Linguistics*, *24*(1), 123–184. https://doi.org/10.1515/ling.1986.24.1.123
Montrul, S. (2011). MORPHOLOGICAL ERRORS IN SPANISH SECOND LANGUAGE LEARNERS AND HERITAGE SPEAKERS. *Studies in Second Language Acquisition*, *33*(2), 163–192.
Montrul, S. (2013). How "Native" Are Heritage Speakers? *Heritage Language Journal*, *10*(2), 153–177. https://doi.org/10.46538/hlj.10.2.2
Montrul, S. (2016). *The Acquisition of Heritage Languages*. Cambridge University Press. https://doi.org/10.1017/CBO9781139030502
Montrul, S., & Ionin, T. (2010). Transfer effects in the interpretation of definite articles by Spanish heritage speakers. *Bilingualism*, *13*(4), 449–473. https://doi.org/10.1017/S1366728910000040
Müller, A., Schulz, P., & Tracy, R. (2018). Spracherwerb. In C. Titz, S. Geyer, A. Ropeter, H. Wagner, S. Weber, & M. Hasselhorn (Eds.), *Konzepte zur Sprach- und Schriftsprachförderung entwicklen* (Vol. 1, pp. 53–68). Kohlhammer.
Müller, N. (1998). Transfer in bilingual first language acqiusition. *Bilingualism. Language and Cognition*, *1*(3), 151–171.
Müller, N., & Hulk, A. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition*, *8*(3), 227–244. https://doi.org/10.1075/eurosla.8.06mul
Müller, S. (2003). Mehrfache Vorfeldbesetzung. *Deutsche Sprache*, *31*(1), 29–61. https://doi.org/10.1515/9783111671956.177
Münch, A., & Stolberg, D. (2005). "Zwei languages zusammenputten": Bilingual ways of expressing bicultural identities. In *The Consequences of Mobility: Linguistic and Sociocultural Contact Zones* (pp. 71–79).
Nagy, N. (2015). A sociolinguistic view of null subjects and VOT in Toronto heritage languages. *Lingua*, *164*, 309–327. https://doi.org/10.1016/j.lingua.2014.04.012
Nagy, N. (2018). Linguistic attitudes and contact effects in Toronto's heritage languages: A variationist sociolinguistic investigation. In *International Journal of Bilingualism* (Vol. 22, Issue 4, pp. 429–446). SAGE Publications Ltd. https://doi.org/10.1177/1367006918762160
Neary-Sundquist, C. A. (2017). Syntactic complexity at multiple proficiency levels of L2 German speech. *International Journal of Applied Linguistics*, *27*(1), 242–262. https://doi.org/10.1111/ijal.12128
Olfert, H. (2022). The concept of register in heritage language retention. *Register Studies*. https://doi.org/10.1075/rs.20017.olf
Ortega, L. (2020). The Study of Heritage Language Development From a Bilingualism and Social Justice Perspective. *Language Learning*, *70*(S1), 15–53. https://doi.org/10.1111/lang.12347
Özsoy, O., & Blum, F. (2023). Exploring individual variation in Turkish heritage speakers' complex linguistic productions: Evidence from discourse markers. *Applied Psycholinguistics*, *24*(2). https://doi.org/10.1017/S0142716423000267

Özsoy, O., Iefremenko, K., & Schroeder, C. (2022). Shifting and Expanding Clause Combining Strategies in Heritage Turkish Varieties. *Languages*, *7*(3), 242. https://doi.org/10.3390/languages7030242

Paradis, J., Rusk, B., Duncan, T. S., & Govindarajan, K. (2017). Children's Second Language Acquisition of English Complex Syntax: The Role of Age, Input, and Cognitive Factors. *Annual Review of Applied Linguistics*, *37*, 148–167. https://doi.org/10.1017/S0267190517000022

Pascual Y Cabo, D., & Rothman, J. (2012). The (IL)logical problem of heritage speaker bilingualism and incomplete acquisition. *Applied Linguistics*, *33*(4), 450–455. https://doi.org/10.1093/applin/ams037

Pashkova, T., Lee, H., Murphy, M., Allen, S.E.M. (in prep). Left Dislocations across discourse types in monolinguals' and bilinguals' English.

Paspali, A. (2023). THE GREEK AND GERMAN NARRATIVE MICRO-STRUCTURE OF HERITAGE SPEAKERS: A CORPUS STUDY. *Journal of Applied Linguistics*, *36*, 75–98. https://doi.org/10.26262/jal.v0i36.9914

Peristeri, E., Andreou, M., & Tsimpli, I. M. (2017). Syntactic and Story Structure Complexity in the Narratives of High- and Low-Language Ability Children with Autism Spectrum Disorder. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.02027

Pires, A., & Rothman, J. (2009). Disentangling sources of incomplete acquisition: An explanation for competence divergence across heritage grammars. *International Journal of Bilingualism*, *13*(2), 211–238. https://doi.org/10.1177/1367006909339806

Platzack, C. (1986). COMP, INFL, and Germanic word order. In L. Hellan & K. K. Christensen (Eds.), *Topics in Scandinavian syntax: Studies in natural language and linguistic theory* (pp. 185–234). Springer.

Polinsky, M. (2018a). Bilingual children and adult heritage speakers: The range of comparison. *International Journal of Bilingualism*, *22*(5), 547–563. https://doi.org/10.1177/1367006916656048

Polinsky, M. (2018b). Heritage Languages and Their Speakers. In *Heritage Languages and Their Speakers*. https://doi.org/10.7765/9781526108555.00018

Polinsky, M., & Kagan, O. (2007). Heritage Languages: In the 'Wild' and in the Classroom. *Language and Linguistics Compass*, *1*(5), 368–395. https://doi.org/10.1111/j.1749-818x.2007.00022.x

Polinsky, M., & Scontras, G. (2019). Understanding heritage languages. *Bilingualism: Language and Cognition*, *23*(1), 4–20. https://doi.org/10.1017/S1366728919000245

Polinsky, M., & Scontras, G. (2020). A roadmap for heritage language research. *Bilingualism: Language and Cognition*, *23*(1), 50–55. https://doi.org/10.1017/S1366728919000555

Poole, M. E., & Field, T. W. (1976). A Comparison of Oral and Written Code Elaboration. *Language and Speech*, *19*(4), 305–312. https://doi.org/10.1177/002383097601900401

Purkarthofer, J., & Schroeder, C. (2023). *Sprachen nach Bedarf statt Deutsch nach Vorschrift. Ein Plädoyer für einen pragmatischen Umgang mit Mehrsprachigkeit*. https://wp.me/p8z2pU-1UK

Putnam, M. T., Schwarz, L. S., & Hoffman, A. D. (2021). Morphology of Heritage Languages. In S. Montrul & M. Polinsky (Eds.), *The Cambridge Handbook of Heritage languages and linguistics* (pp. 613–643). Cambridge University Press.

Reis, M. (2013). Weil-V2"-Sätze und (k)ein Ende? Anmerkungen zur Analyse von Antomo & Steinbach (2010). *Zeitschrift Für Sprachwissenschaft*, *32*(2), 221–262. https://doi.org/10.1515/zfs-2013-0008

Rocker, M. (2022). *Variation in finite verb placement in Heritage Iowa Low German: The role of prosodic integration and information structure*. Penn State University.

Roelcke, T. (1997). *Sprachtypologie des Deutschen: historische, regionale und funktionale Variation*. De Gruyter.

Rothman, J. (2007). Heritage speaker competence differences, language change, and input type: Inflected infinitives in Heritage Brazilian Portuguese. *International Journal of Bilingualism*, *11*(4), 359–389. https://doi.org/10.1177/13670069070110040201

Rothman, J. (2009). Understanding the nature and outcomes of early bilingualism: Romance languages as heritage languages. *International Journal of Bilingualism*, *13*(2), 153–163. https://doi.org/10.1177/1367006909339814

Rothman, J., Bayram, F., Deluca, V., Di Pisa, G., Duñabeitia, J. A., Gharibi, K., Hao, J., Kolb, N., Kubota, M., Kupisch, T., Laméris, T., Luque, A., Van Osch, B., Pereira Soares, S. M., Prystauka, Y., Tat, D., Tomić, A., Voits, T., & Wulff, S. (2023). Monolingual comparative normativity in bilingualism research is out of control: Arguments and alternatives. *Applied Psycholinguistics*, *44*(3), 316–329. https://doi.org/10.1017/S0142716422000315

Rothman, J., & Treffers-Daller, J. (2014). A prolegomenon to the construct of the native speaker: Heritage speaker Bilinguals are Natives Too! In *Applied Linguistics* (Vol. 35, Issue 1, pp. 93–98). https://doi.org/10.1093/applin/amt049

Rothweiler, M. (1993). *Der Erwerb von Nebensätzen im Deutschen: eine Pilotstudie*. Max Niemeyer Verlag.

Rothweiler, M. (2006). The acquisition of V2 and subordinate clauses in early successive acquisition of German. In C. Lleó (Ed.), *Interfaces in multilingualism: Acquisition and representation* (pp. 91–113). John Bejamins. https://doi.org/10.1075/hsm.4.05rot

Sánchez Abchi, V., & De Mier, V. (2017). Syntactic complexity in narratives written by Spanish heritage speakers. *Vigo International Journal of Applied Linguistics*, *14*, 125–148.

Schleppegrell, M. J., & Colombi, M. C. (1997). Text Organization by Bilingual Writers. *Written Communication*, *14*(4), 481–503.

Schmid, M. (2011). *Language Attrition*. Cambridge University Press.

Schulz, P., & Tracy, R. (2018). *Revisiting the tolerance of Universal Grammar. In B. Hollebrandse, J. Kim, J., A.T. Pérez-Leroux & P. Schulz (eds.), T.O.M. and Grammar. Thoughts on Mind and Grammar: A Festschrift in honor of Tom Roeper. University of Massa*. *41*, 129–145.

Scontras, G., Polinsky, M., Tsai, C.-Y. E., & Mai, K. (2017). Cross-linguistic scope ambiguity: When two systems meet. *Glossa: A Journal of General Linguistics*, *2(1)*(36), 1–28. https://doi.org/10.5334/gjgl.198

Shadrova, A., Linscheid, P., Lukassek, J., Lüdeling, A., & Schneider, S. (2021). A Challenge for Contrastive L1/L2 Corpus Studies: Large Inter- and Intra-Individual Variation Across Morphological, but Not Global Syntactic Categories in Task-Based Corpus Data of a Homogeneous L1 German Group. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.716485

Shin, S. J. (2002). Birth Order and the Language Experience of Bilingual Children. *TESOL Quarterly*, *36*(1), 103–113. https://about.jstor.org/terms

Sorace, A. (2011). Pinning down the concept of "interface" in bilingualism. *Linguistic Approaches to Bilingualism*, *1*(1), 1–33. https://doi.org/10.1075/lab.1.1.01sor

Stolberg, D. (2015a). *Changes Between the Lines. Diachronic Contact Phenomena in Written Pennsylvania German* (Berlin).

Stolberg, D. (2015b). German in the Pacific: Language policy and language planning. In D. Schmidt-Brücken, S. Schuster, Th. Stolz, I. H. Warnke, & M. Wienberg (Eds.), *Koloniallinguistik. Sprache in kolonialen Kontexten* (pp. 317–362). De Gruyter.

Stolberg, D. (2019). Canadian heritage German across three generations: A diary-based study of language shift in action. *Journal of Historical Sociolinguistics*, *5*(2). https://doi.org/10.1515/jhsl-2019-0005

Stolberg, D., & Münch, A. (2010). Die Muttersprache vergisst man nicht - or do you? A case study in L1 attrition and its (partial) reversal. *Bilingualism*, *13*(1), 19–31. https://doi.org/10.1017/S1366728909990332

Tausch, J., & Tsehaye, W. (2023). Mehrsprachigkeit als Ressource. Ein Einblick in mehrsprachiges Sprachverhalten im Alltag. In J. Purkarthofer (Ed.), *Schulheft Sprach-verhandeln* (3/23, Vol. 191, pp. 109–122). Studienverlag.

Tracy, R. (1984). Fallstudien: Überlegungen zum Erwerb von Kasuskategorie und Kasusmarkierung. In H. Czepluch & H. Janßen (Eds.), *Syntaktische Struktur und Kasusrelation* (pp. 271–313). Gunter Narr Verlag.

Tracy, R. (1991). *Sprachliche Strukturenentwicklung: Linguistische und kognitionspsychologische Aspekte einer Theorie des Erstspracherwerbs*. Gunter Narr Verlag Tübingen.

Tracy, R. (2011). Konstruktion, Dekonstruktion und Rekonstruktion: Minimalistische und (trotzdem) konstruktivistische Überlegungen zum Spracherwerb. In S. Engelberg, A. Holler, & K. Proost (Eds.), *Sprachliches Wissen zwischen Lexikon und Grammatik* (pp. 397–428). De Gruyter. https://doi.org/10.1515/9783110262339.397

Tracy, R. (2015). Bilingual Education: International Perspectives. In *International Encyclopedia of the Social & Behavioral Sciences: Second Edition* (pp. 580–586). Elsevier Inc. https://doi.org/10.1016/B978-0-08-097086-8.92044-0

Tracy, R. (2022). Gemischtsprachiges Sprechen: Formen, Funktionen, Dynamik. In *Handbuch Mehrsprachigkeit* (pp. 399–428). De Gruyter. https://doi.org/10.1515/9783110623444-018

Tracy, R. (2023). Erwerb sprachlicher Kompetenzen im Lebensverlauf. In M. Becker-Mrotzek, I. Gogolin, H.-J. Roth, & P. Stanat (Eds.), *Grundlagen der sprachlichen Bildung* (pp. 57–81). Waxmann.

Tracy, R., & Gawlitzek, I. (2023). *Mehrsprachigkeit und Spracherwerb: Vol. LinguS 10* (S. Döring & P. Gallmann, Eds.). Narr Francke Attempto.

Tracy, R., & Lattey, E. (2010). "It wasn't easy but irgendwie äh da hat sich's rentiert, net?": a linguistic profile. *Dimensions of Second Language Research*.

Tracy, R., & Lemke, V. (2011). Young L2 and L1 Learners: More Alike than Different. In *Comparative Perspectives on Language Acquisition* (pp. 303–323).

Tracy, R., & Stolberg, D. (2008). *Nachbarn auf engstem Raum - Koexistenz, Konkurrenz und Kooperation im mehrsprachigen Kopf*. 83–108.

Tracy, R., & Thoma, D. (2009). Convergence on finite V2 clauses in L1, bilingual L1 and early L2 acquisition. In P. Jordens & Dimroth C. (Eds.), *Functional Categories in Learner Language* (pp. 1–44). Mouton de Gruyter. https://doi.org/10.1515/9783110216172.1

Tracy, R. & Tsehaye, W. (2023). *Options and opportunities: What heritage speakers tell us about choice*. [Invited speakers]. Workshop: Optionality and Variation in Multilingual Syntax II, Wuppertal, Germany. https://www.anglistik.uni-wuppertal.de/de/aktuelles/ansicht/workshop-optionality-and-variation-in-multilingual-syntax-opvams-ii/

Tsehaye, W., Tracy, R. (2022, October 20-21). *Complexity deconstructed: Syntactic complexity and task complexification*. [Talk]. Heritage Language Syntax 3, Paris, France. https://drive.google.com/file/d/173iAJtd2kR-iw1o5ya76PfXV_LaTC8VS/view

Tsehaye, W., Tracy, R., & Tausch, J. (to appear). Inter- and intra-individual variation: how it materializes in Heritage German and why it matters. In S. E. M. Allen, M. Keller, A. Alexiadou, & H. Wiese (Eds.), *Linguistic dynamics in heritage speakers*. Language Science Press.

Tsimpli, I. M. (2014). Early, late or very late? *Linguistic Approaches to Bilingualism*, *4*(3), 283–313. https://doi.org/10.1075/lab.4.3.01tsi

Vasilyeva, M., Waterfall, H., & Huttenlocher, J. (2008). Emergence of syntax: Commonalities and differences across children. *Developmental Science*, *11*(1), 84–97. https://doi.org/10.1111/j.1467-7687.2007.00656.x

Vinckel-Roisin, H. (2012). Das Nachfeld im Deutschen: Rechte Satzperipherie und Diskurstopik. *Studia Linguistica*, *XXXI*, 143–163.

Vinckel-Roisin, H. (2015). *Das Nachfeld im Deutschen: Theorie und Empirie* (H. Vinckel-Roisin, Ed.). De Gruyter. https://doi.org/https://doi.org/10.1515/9783110419948

Vogel, D., Şimşek, Y., Huxel, K., Putjata, G., Buchholtz, G., Stock, E., Schroeder, C., Küppers, A., & Woerfel, T. (2021). *RfM-Debatte 2020: "Drei Sprachen sind genug fürs Abitur!“ - Ein Reformvorschlag für den Abbau der Diskriminierung von mehrsprachig Aufgewachsenen bei Schulabschlüssen*. https://doi.org/10.26092/elib/455

Weerman, F. (1989). *The V-2 conspiracy – a synchronic and diachronic analysis of verbal positions in Germanic languages.* Foris Publications.

Westergaard, M., & Kupisch, T. (2020). STABLE AND VULNERABLE DOMAINS IN GERMANIC HERITAGE LANGUAGES. *Oslo Studies in Language*, *11*(2), 503–526. http://www.journals.uio.no/osla

Westphal Fitch, G. (2011). Changes in frequency as a measure of language change. In M. T. Putnam (Ed.), *Studies on German-Language Islands* (pp. 371–384). John Benjamins Publishing Company. https://doi.org/10.1075/slcs.123.14wes

Wiese, H. (2020). Language Situations: A method for capturing variation within speakers' repertoires. In Y. Asahi (Ed.), *Methods in Dialectology XVI* (pp. 105–117). Peter Lang.

Wiese, H., Alexiadou, A., Allen, S., Bunk, O., Gagarina, N., Iefremenko, K., Martynova, M., Pashkova, T., Rizou, V., Schroeder, C., Shadrova, A., Szucsich, L., Tracy, R., Tsehaye, W., Zerbian, S., & Zuban, Y. (2022). Heritage Speakers as Part of the Native Language Continuum. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.717973

Wiese, H., & Müller, H. G. (2018). The hidden life of V3: An overlooked word order variant on verb-second. In M. Antomo & S. Müller (Eds.), *Non-canonical verb positioning in main clauses* (pp. 201–224). Buske Verlag.

Wiese, H., Rosemarie, T., & Sennema, A. (2020). *Deutschpflicht im Schulhof? Warum wir Mehrsprachigkeit brauchen*. Duden.

Wöllstein, A. (2014). *Topologisches Satzmodell*. Winter.

Yager, L., Hellmold, N., Joo, H. A., Putnam, M. T., Rossi, E., Stafford, C., & Salmons, J. (2015). New structural patterns in moribund grammar: Case marking in heritage German. *Frontiers in Psychology*, *6*(NOV), 1–9. https://doi.org/10.3389/fpsyg.2015.01716

Zifonun, G. (2015). Der rechte Rand in der IDS-Grammatik: Evidenzen und Probleme. In H. Vinckel-Roisin (Ed.), *Das Nachfeld im Deutschen: Theorie und Empirie* (pp. 25–52). De Gruyter. https://doi.org/10.1515/9783110419948-003

Zifonun, G., Hoffmann, L., & Strecker, B. (1997). *Grammatik der deutschen Sprache*. De Gruyter.