

Chapter 29

Second Language Acquisition of Germanic Languages

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29.1 Introduction

The study of second language acquisition focuses on how people acquire and use a second language (L2), and the linguistic and cognitive mechanisms that support these processes (see Gass 2013, Mitchell et al. 2013 for overviews). Key issues include (i) the nature of learners' L2 linguistic representations, (ii) how such representations develop and how they are shaped by the L2 input to which learners are exposed, and (iii) the ways in which features from learners' two languages interact to influence L2 acquisition and use. These issues address larger debates concerning the extent to which L2 learners – and especially adult learners – can acquire nativelike L2 proficiency and whether L1 and L2 acquisition rely on the same underlying mechanisms, or whether fundamentally different mechanisms and strategies are involved, especially among adult L2 learners who already possess a mature first language (L1) linguistic system (e.g., Bley-Vroman 1990, Birdsong 1992, White 2003). There is also growing consensus that L2 learners are “NOT the sum of two complete or incomplete monolinguals” (Grosjean 1989: 3, emphasis in original), leading researchers to focus on the unique characteristics of L2 learners' linguistic systems rather than comparing L2 learners' linguistic systems to some set of monolingual L1 speaker norms (see also Klein and Perdue 1997, Dimroth 2013).

For more than 40 years, Germanic languages, especially German and Dutch, have played a central role in L2 acquisition research. The goal of the present chapter is to review selected findings from this research and discuss how these findings contribute to our understanding of the mechanisms that drive L2 acquisition and use. The scope of this chapter is necessarily limited, focusing primarily on the acquisition and use of L2 morphosyntax among adult L2 learners who begin acquiring their L2 after

puberty (for work on L2 phonological acquisition in Germanic languages, see Bongaerts et al. 2000, Moyer 2004, O'Brien 2004, Gut 2009). The simultaneous and sequential acquisition of a Germanic L2 among children will not be discussed (see Gawlitzek-Maiwald and Tracy 1996, Habertzettl 2005, Müller et al. 2009, Blom 2010, Chilla et al. 2010, Unsworth, 2016, among others). Similarly, only limited reference will be made to research on how different classroom instructional methods support L2 learners' developing linguistic systems (see, e.g., Diehl et al. 2000, Eckerth et al. 2009, Jackson et al. 2018).

29.2 Learner Varieties

Starting in the 1970s, researchers conducted several seminal projects on the acquisition of various European languages by immigrants, including the Heidelberger Projekt Pidgin-Deutsch (Klein and Dittmar 1979), the ZISA cross-sectional and longitudinal studies (Meisel et al. 1981, Clahsen et al. 1983), which focused on the acquisition of German by Italian and Spanish foreign workers, and the ESF project (Klein and Perdue 1992), which involved the cross-linguistic comparison of L2 development among adult immigrants from a variety of L1s (Punjabi, Italian, Turkish, Arabic, Spanish, and Finnish) who were in the process of acquiring English, German, Dutch, French, or Swedish. Central to these studies was the emphasis on investigating L2 learners' linguistic systems as interlanguage systems in their own right, rather than perceiving them as deviant versions of the target language grammar. Participants were primarily untutored L2 learners, whose L2 exposure came from naturalistic input by virtue of living and working in the target language country, thus providing insight into how L2 linguistic systems develop in the absence of formal instruction and – in many cases – on the basis of relatively limited L2 input, as contact with the target language for many participants was confined to everyday interactions in the workplace. The primary goal of these studies was to identify the different developmental stages through which L2 learners progress, what principles guide the internal structure of utterances at any given stage, and the transition from one stage to the next, as well as whether L2 development is influenced by linguistic features from learners' L1. These studies focused on free production data that the L2 learners produced through personal narratives, interviews, and film retellings, in which participants watched part of a silent film and then reconstructed the events in the film for the interviewer.

29.2.1 Word Order in German and Dutch

The general clausal structure is similar in German and Dutch, although differences exist, especially with regard to the robustness of case marking

(see McFadden, Chapter 13). The underlying word order in German and Dutch is SOV. Thus, the finite verb appears clause-finally in embedded clauses, as in (1a) and (1b) (see Haider, Chapter 15; Vikner, Chapter 16). The finite verb raises to verb-second position in main clauses, while verb particles and nonfinite verbs (e.g., infinitive forms and past participles) remain in clause-final position, leading to so-called discontinuous word order or the verbal bracket (*Verbklammer* in German), as in (2a) and (2b). German and Dutch are verb-second languages, meaning that precisely one constituent appears before the finite verb in main clauses, leading to both preverbal and postverbal placement of the subject, as in (3a) and (3b).

- (1) a. Der Vater sagt, dass der Junge am Abend seine Hausaufgabe machen muss.
the father says that the boy in.the evening his homework do must.
- b. De vader zegt, dat de jongen 's avonds zijn huiswerk moet doen.
the father says that the boy in the evening his homework must do.
“The father says that the boy must do his homework in the evening.”
- (2) a. Der Junge muss am Abend seine Hausaufgaben machen.
the boy must in.the evening his homework do.
- b. De jongen moet 's avonds zijn huiswerk doen.
the boy must in the evening his homework do.
“The boy must do his homework in the evening.”
- (3) a. Am Abend muss der Junge seine Hausaufgaben machen.
in.the evening must the boy his homework do.
- b. 'S avonds moet de jongen zijn huiswerk doen.
in the evening must the boy his homework do.
“In the evening the boy must do his homework.”

Due to this combination of features and the fact that subject-initial V2 main clauses have SVO surface word order, L2 learners of German and Dutch are faced with inconsistent input with regard to verb placement. Hence, the acquisition of word order requires learning multiple constraints that, from a learner's perspective, often compete with one another.

29.2.2 The Basic Variety

The ESF project consisted of longitudinal data collected from 40 different participants over the course of 30 months (Klein and Perdue 1992). This research culminated in a theoretical framework to account for the initial stages in L2 development, referred to as the Basic Variety. While many ESF respondents eventually progressed beyond the Basic Variety, close to one

third of the participants' language development remained at this level even at the end of the study (Klein and Perdue 1992, Klein and Perdue 1997, Klein and Dimroth 2009). With regard to the lexicon, the Basic Variety consists primarily of nouns and verbs, with a limited set of adverbs and adjectives, a few quantifiers, a single word for negation, a limited set of prepositions, a highly reduced pronominal system, and no complementizers. The Basic Variety contains no inflectional morphology, meaning that all lexical items appear in their bare forms with no markers for tense, aspect, agreement or case.

Here, I will focus on the overall structure of utterances in the Basic Variety (see Dietrich et al. 1995, Becker and Carroll 1997, Dimroth and Starren 2003, Hendricks 2005 for discussion of negation, spatiality, and temporality in the Basic Variety). In the Basic Variety, learners' utterances are organized according to three sets of structural, semantic, and pragmatic constraints. First, phrasal constraints limit utterances to three basic word order patterns: NP₁-V, NP₁-V-(NP₂)-(NP₂), NP₁-Copula-{Adj, NP₂, PP}, and {V, Copula}-NP₂ (Klein and Perdue 1992). Importantly, NP₁ is not necessarily the subject of an utterance nor is NP₂ necessarily the object, as additional semantic and pragmatic constraints are also at play. All of these phrasal patterns can be preceded by an adverbial element or the coordinating conjunction *and* (or *und* or *en*, 'and' in German and Dutch, respectively). In some cases, Turkish learners of German and Dutch – but not Moroccan learners of Dutch or Italian learners of German – also produced a small number of NP-NP-V utterances, providing limited evidence of L1 influence, as Turkish (but not Arabic or Italian) is a verb-final language. However, Klein and Perdue (1997) point out that even Turkish learners progressed to producing NP-V-NP utterances, leading them to conclude that from a longitudinal perspective, L1 influence is more limited at this stage of L2 development.

The second set of constraints in the Basic Variety are semantic constraints. The primary constraint is that the controller of an utterance, specifically which noun exerts control over other arguments in the utterance, should occur first. Thus, agentive referents usually appear in utterance-initial position. When utterances involve three arguments (e.g., actions involving giving something to another person), the controller of the source state outweighs the controller of the target state, leading to utterances like *Charlie give present for young children* (Klein and Perdue 1997: 315).

The third set of constraints consists of pragmatic constraints related to the information status of the elements in an utterance. Learners follow the constraint that the focus expression of an utterance should come last. Consider the Dutch sequence, *De meneer valt van water. Met valt drie* 'That mister fall from water. With fall three' (i.e., Charlie fell into the water. There were three of them who fell; Klein and Perdue 1997: 316). Here, the main referent, *de meneer*, appears in initial position in the first sentence but the main referent of the second utterance, *drie*, appears at the end of

the utterance, because the focus of the second utterance is that an additional three people fell into the water. The second pragmatic constraint is that given information appears before new information. In situations where constraints conflict, for instance when the controller of an utterance is simultaneously the focus of the utterance, learners can choose to prioritize one constraint over the other (e.g., maintain the semantic constraint of controller first, thereby overriding the pragmatic constraint of focus last), or employ an additional device, such as prosody, to mark the in-focus element (Klein and Dimroth 2009).

29.3 The Development of Word Order in L2 German

Around the same time as research on the Basic Variety, a related line of research focused on the development of word order rules among immigrant populations acquiring German. This research also addresses questions regarding developmental stages in L2 acquisition, but with the primary goal of understanding what role, if any, the principles of Universal Grammar and the transfer of L1 linguistic features play in adult L2 acquisition (see Bley-Vroman 1990, Jordens 2001, White 2003). Clahsen and colleagues (Meisel et al. 1981, Clahsen and Muysken 1986, Clahsen 1990), developed a multistage model to explain the developmental sequence of word order among L2 German learners. In stage 1, Clahsen and Muysken (1986) hypothesized that L2 German learners rely on SVO word order, as in (4). In stage 2, L2 learners optionally move adverbs into sentence-initial position, but maintain SV order, as in (5). In stage 3, L2 learners acquire discontinuous word order, correctly placing nonfinite verbs and verb particles in sentence-final position, as in (6). In stage 4, L2 learners acquire inversion and the verb-second rule, placing the subject immediately after the finite verb when an adverbial phrase appears in sentence-initial position, as in (7). In stage 5, L2 learners realize that adverbial phrases can appear between the verb and the object, as in (8). In stage 6, learners correctly place the finite verb in sentence-final position in embedded clauses (all examples from Clahsen 1990, Clahsen and Muysken 1986).

- (4) ich studieren in Porto (Stage 1: SVO)
I study._{INF} in Porto
- (5) vielleicht andere kollege sagen (Stage 2: ADV-PREP)
perhaps other colleague say._{INF}
- (6) ich muss jetzt putzen (Stage 3: Particle)
I must._{SG} now clean._{INF}
- (7) und dann arbeiten die zwei in zuhause (Stage 4: INV)
and then work._{INF/PL} the two in at home
- (8) ich soll aus Italien eine apparat bringen (Stage 5: ADV-VP)
I should._{SG} from Italy a machine bring._{INF}

As with the Basic Variety, not all L2 learners progress to stage 6. For some learners, language development stabilizes at an earlier phase.

Clahsen and Muysken (1986) argue that all L2 learners progress through these phases, including the initial SVO stage, even when their L1 is verb-final, thus positing no significant role for L1 transfer in the early stages of adult L2 acquisition. They claim that any early utterances containing a verb in final position are best interpreted as containing some sort of preposed element, as in *meine bruder er helfen* 'my brother [is who] he helps' (Clahsen and Muysken 1986: 108), rather than as verb-final per se. Clahsen and Muysken also contrast these developmental stages of word order acquisition among adult L2 learners to the developmental stages in child L1 acquisition of German. Specifically, L1 German speaking children acquire verb-final word order early on. Further, in child L1 acquisition there is a tight coupling between the acquisition of subject-verb agreement and the placement of finite verbs in verb-second position, whereas these two linguistic features are acquired separately among adult L2 learners (but see Parodi 2000 for counterevidence). Based on the lack of significant L1 transfer and these differences between child L1 and adult L2 acquisition, Clahsen and colleagues conclude that adult L2 acquisition relies on fundamentally different cognitive processes from child L1 acquisition, with adult L2 acquisition relying on domain-general cognitive processes and child L1 acquisition driven by the principles of Universal Grammar (see also Clahsen 1990, but see Meisel 1997 for the possibility that adult L2 acquisition can involve both domain-general and UG-constrained processes).

Building on this research, Pienemann (1998) developed Processability Theory to explain the sequence of these developmental stages in L2 German in terms of processing constraints. Pienemann bases Processability Theory on psycholinguistic models of L1 production (Kempen and Hoenkamp 1987, Levelt 1989), framed within Lexical-Functional Grammar (Kaplan and Bresnan 1982). Such models emphasize the incremental nature of language processing and that the processing procedures involved in L1 production first require the activation of individual words, followed by lexical procedures, then phrasal procedures, then sentence-level procedures (i.e., word order rules), and finally subordinate clause procedures (if needed). Applied to L2 acquisition, L2 learners must successfully acquire the L2-specific processing routines necessary to process L2 input at any given level before they can proceed to the next level. For example, L2 learners must be able to successfully produce utterances containing fronted adverbial phrases in the absence of inversion (i.e., XSVX word order), a phrasal-level procedure, before acquiring inversion, a sentence-level procedure. Such implicational sequences are identical for all L2 learners, regardless of the L1. L1 transfer occurs only when the L2-specific processing routines that are necessary for processing such grammatical features are already in place, at which point L1 transfer may facilitate accurate production of target L2 features within a given

developmental stage (see Håkasson et al. 2002, Bohnacker 2006, Pienemann and Håkasson 2007 for further discussion). Although developed to explain the acquisition of word order in L2 German (see also Jansen 2008), Processability Theory has since been applied to the acquisition of case marking among Dutch L2 learners of German (Baten 2011), word order sequences in L2 Swedish (Glahn et al. 2001, Håkasson and Norrby 2010), and additional linguistic phenomena in non-Germanic languages (see Pienemann 2005 for review).

Contra Clahsen and Muysken (1986) and Pienemann (1998), Schwartz and Sprouse (1994, 1996) proposed the Full Transfer / Full Access hypothesis, arguing that the starting point of adult L2 acquisition is the end state of L1 acquisition and that adult L2 learners have full access to the principles and parameters of Universal Grammar throughout all stages of L2 acquisition. Their hypothesis rests largely on a reanalysis of data from a Turkish L2 learner of German from the ESF project (Klein and Perdue 1992). Schwartz and Sprouse (1994) characterize this learner as going through three developmental stages which are all UG-compatible in that they are instantiated in other natural languages, even if they are not instantiated in German. Stage 1 contains both SV and SOV word order, with verb particles and nonfinite verbs appearing in verb-final position, as in (9), while finite verbs occur earlier in the sentence, as in (10). At this stage there are no instances of a nonfinite verb preceding an object NP, leading Schwartz and Sprouse to conclude that this learner's underlying word order is SOV, which he has transferred from his L1 Turkish. The high proportion of SV utterances, even at this early stage, reflects the frequency and saliency of this word order for main clauses in German. Stage 2 is characterized by a high proportion of inversion and verb-second word order with pronominal subjects, as in (11), but not nonpronominal subjects, as in (12). The learner also exhibits verb-final word order in embedded clauses, as in (13). To explain the divergence in inversion with pronominal versus nonpronominal subjects, Schwartz and Sprouse appeal to generative accounts of subject-verb inversion in French, as French similarly allows inversion with pronominal but not nonpronominal subjects (Rizzi and Roberts 1989). In stage 3, this learner now produces sentences containing inversion with nonpronominal subjects, as in (14), although some instances of ungrammatical XSV utterances with nonpronominal subjects remain, leading Schwartz and Sprouse to conclude that he has still not fully acquired the verb-second constraint in German (all examples from Schwartz and Sprouse 1994).

- (9) der Mann seine Frau geküsst (Stage 1: SOV)
 the man his wife kissed._{PST}
 "The man kissed his wife."
- (10) jetzt er hat Gesicht [das ist falsches Wagen] (Stage 1: SV)
 now he has._{SG} face that is false wagon
 "Now he makes a face that [that] is the wrong car."

- (11) dann trinken wir bis neun Uhr (Stage 2: XPronV)
then drink._{PL/INF} we until nine o'clock
“Then we will drink until nine o'clock.”
- (12) in der Türkei der Lehrer kann der Schüler schlagen (Stage 2: XSV)
In the Turkey the teacher can._{SG} the pupil beat._{INF}
“In Turkey the teacher can beat the student.”
- (13) dass ich mit Brot war (Stage 2: SOV, embedded)
that I with bread was._{SG}
“That I had some bread.”
- (14) draußen hatte die Polizei eine Wagen brauchen sollten (Stage 3)
outside had._{SG} the police a wagon bring._{INF} should._{PL/INF}
“Outside the police should have used a vehicle.”

Schwartz and Sprouse (1994) emphasize that the critical test for whether adult L2 acquisition is supported by Universal Grammar is not whether key developmental stages in adult L2 acquisition directly map onto developmental stages in child L1 acquisition (cf. Clahsen and Muysken 1986), or whether L2 learners' linguistic systems perfectly match the target language grammar, as constructed by mature native speakers of that language. Rather, the crucial test is whether the language produced by an L2 learner at any given developmental stage can be adequately explained by Universal Grammar, exemplified here by their analysis of inversion with pronominal versus nonpronominal subjects in stage 2. Schwartz and Sprouse highlight that adult L2 learners – similar to child L1 speakers – must construct and continually update their linguistic systems to account for the dominant patterns they encounter in the L2 input, and that the mechanisms by which they do so are constrained by the principles of Universal Grammar. In essence, even if the initial and end states of child L1 and adult L2 acquisition differ, the cognitive and linguistic processes that drive acquisition are fundamentally similar. Each stage in adult L2 development represents how L2 learners construct a grammar based on the interaction of UG-based principles, the architecture of the L1 grammar, the L2 input to which they are exposed, and general constraints in language learning procedures.

Based on data from Turkish, Korean, Italian, and Spanish L2 learners of German, Vainikka and Young-Scholten (1996a, 1996b, 2011) proposed the Minimal Trees Hypothesis, or more recently, Organic Grammar, as yet another model to explain adult L2 acquisition within a generative framework. In contrast to the Full Transfer / Full Access Hypothesis (Schwartz and Sprouse 1994, 1996), Vainikka and Young-Scholten propose that the full array of functional projections (i.e., CP, AgrP, TP/FP) are not available in the initial stages of adult L2 acquisition, but rather such projections, and their corresponding syntactic structures, develop incrementally over time. As outlined in Vainikka and Young-Scholten (1996b), a central argument in this model is that the initial state of L1 acquisition consists of only a bare

verb phrase (VP), which is either head-initial or head-final based on the parameter settings from a learner's L1, leading to different word order preferences in L2 German (i.e., SVX versus SXV) based on the L1 grammar, as in (15) and (16). The absence of modal and auxiliary verbs, as well as tense and agreement features, indicates that at this initial state, L2 learners lack any functional projections beyond the VP. In stage 2, the acquisition of modal verbs serves to trigger the development of a single functional projection above the VP, leading to verb raising and discontinuous word order, as in (17). Based on the preponderance of SVX input in German main clauses, this functional projection (FP; finite phrase) is head-initial, regardless of learners' L1. Importantly, learners still raise nonfinite forms, as in (18), meaning they have yet to acquire subject-verb agreement, suggesting that the acquisition of bound morphemes does not serve as a trigger for syntactic development in adult L2 acquisition in the same way that it does in child L1 acquisition (Clahsen and Muysken 1986, see also Vainikka and Young-Scholten, 2011). In stage 3, L2 learners begin to consistently produce correct agreement and verb raising becomes obligatory, leading to the projection of an agreement phrase (AgrP). Importantly, this AgrP differs from the AgrP in German, as it is head-initial instead of head-final. Agreement features are also acquired similarly regardless of a learner's L1 grammar, providing further evidence against a strong role for L1 transfer at this stage (Vainikka and Young-Scholten 2011). In a final stage, L2 learners acquire a complementizer phrase (CP). However, as long as they continue to classify the AgrP as head-initial, learners continue to place the finite verb in second position in embedded clauses (all examples from Vainikka and Young-Scholten 1996b).

- (15) Oya Zigarette trinken (Stage 1: Turkish L2 learner)
 Oya cigarette drink._{INF}
 "Oya smokes cigarettes."
- (16) ich sprechen in meine Firma (Stage 1: Italian L2 learner)
 I speak._{INF} in my firm
 "I speak in/at my firm."
- (17) jetzt brau Wohnungsamt fragen (Stage 2)
 now need._{0/1SG} housing authority ask._{INF}
 "Now [I] need to ask [the] housing authority"
- (18) ich sehen Schleier (Stage 2)
 I see._{INF} veil
 "I see the veil."

Vainikka and Young-Scholten (2011) reported that English-speaking high school students exhibit a similar pattern of development over the course of an exchange year in Germany, although they pass through the FP-stage (stage 2) more quickly than the immigrant populations investigated in earlier research, perhaps due to increased L2 input as a result of

living with German host families and attending German-speaking high schools. From this, they conclude that these developmental stages may not be limited to immigrant populations with less education and less overall L2 exposure – a critical step in evaluating the extent to which the extensive research on learner varieties extends to adult L2 acquisition more generally.

29.4 The Acquisition of Finiteness

The L2 acquisition of finiteness (i.e., subject-verb agreement) is often investigated in tandem with the acquisition of word order in Germanic languages, because the acquisition of morphological finiteness marking (i.e., the production of bound morphemes to mark subject-verb agreement on thematic verbs) and syntactic finiteness (i.e., verb raising), are hypothesized to be linked in child L1 acquisition (Clahsen and Muysken 1986, Clahsen and Penke 1992). There is evidence from adult L2 Dutch and adult L2 German acquisition that auxiliary verbs play a critical role in the acquisition of subject-verb agreement and verb movement among untutored L2 learners, like the participants in the earlier ESF project (Klein and Perdue 1992, Parodi 2000, Vainikka and Young-Scholten 2011), and in more recent data from tutored learners, i.e., L2 learners who complete formal L2 language courses after emigrating to The Netherlands or Germany (van de Craats 2009, van de Craats and van Hoet 2010, Schimke 2011, Verhagen 2011). The precise acquisitional trajectory is influenced by L1 features, including the choice of auxiliary verb (e.g., *is* 'is' versus *ga(at)* 'go(es)' for Turkish versus Moroccan L2 Dutch learners), the preferred location of accompanying thematic verbs (i.e., sentence-final position versus earlier in the sentence), and the preferred forms for these thematic forms (i.e., finite versus nonfinite forms) (van de Craats 2009, van de Craats and van Hoet 2010, Schimke 2011, Verhagen 2011). However, commonalities across studies and different L1-L2 pairings in the general developmental pattern are very pronounced. L2 learners produce finite forms for modal, auxiliary and copula verbs prior to producing thematic verbs that are marked for number and person. L2 learners are more likely to place these inflected auxiliary verbs earlier in the sentence, prior to negators and other constituents, compared to nonfinite thematic verbs (but see Vainikka and Young-Scholten 2011). Further, L2 learners exhibit sensitivity to these distributional differences in elicited imitation and sentence matching tasks before they produce such patterns in their own productions (Schimke 2011, Verhagen 2011), although even here performance – especially when imitating correct verb placement with finite versus nonfinite thematic verbs – is linked to L2 learners' ability to produce auxiliary verbs

during free production (Verhagen 2011) and the correct marking of third person singular agreement on thematic verbs (Schimke 2011). Such findings have led researchers to conclude that L2 learners use the production and placement of finite auxiliary verbs as an intermediate step in acquiring verb raising and subject-verb agreement. This research highlights that verb placement is not random even at earlier stages of acquisition and that L2 functional categories may be built incrementally over the course of L2 acquisition (Vainikka and Young-Scholten 1996a, 1996b, 2011, see also Schimke 2011).

29.5 L2 Psycholinguistic Research

L2 researchers also increasingly use psycholinguistic methods to investigate how L2 learners build the grammatical structure and meaning of an utterance during L2 comprehension and production (see Morgan-Short 2014, Juffs and Rodriguez 2015, for review). Here, research focuses less on the final outcome of such processes (e.g., whether an L2 learner comprehends an utterance), and more on how lexical items and grammatical structures are activated and retrieved, and how the structure and meaning of a sentence is built up incrementally, as one comprehends or produces an utterance. This research seeks to understand the underlying cognitive mechanisms that support the processing of L2 input and the production of L2 utterances, and the extent to which these mechanisms are similar to the mechanisms used by native speakers. When differences between L1 and L2 processing emerge, the question arises whether such differences reflect qualitative differences in how grammatical information is stored, retrieved, and used by L2 learners versus native speakers (Ullman 2005, Clahsen and Felser 2006), or whether such differences reflect quantitative differences between L2 speakers and native speakers in overall processing capacity and lexical retrieval speed, combined with potential interference from the co-activation of L1 structures, rather than fundamental differences in L2 versus native processing mechanisms per se (Dekydtspotter et al. 2006, Hopp 2010, Cunnings 2017).

As with research on learner varieties, studies involving L2 learners of German and Dutch have played a central role in advancing our understanding of real-time L2 processing. Here I will focus on research on the processing of case marking in L2 German and of grammatical gender in L2 German and L2 Dutch, to showcase how research in German and Dutch has addressed key issues in L2 psycholinguistic research more generally. Readers are directed to Schimke and Hopp (2018), and the chapters therein, for a broader overview of L2 psycholinguistic research, and L2 psycholinguistic research on Germanic languages in particular.

29.5.1 L2 Processing of Case Marking and Grammatical Role Assignment

As outlined in Section 29.2.1, beyond strict V2-SOV rules for verb placement in German and Dutch, the ordering of constituents in a sentence is fairly flexible. In German, case marking on determiners in noun phrases (NPs) are thus the most reliable cue to assign grammatical roles (e.g., subject, object, indirect object). For instance, the subject and object in sentences (19) and (20) are identical even though the word order differs.

- (19) Der Mann sieht den Bruder.
 the._{NOM} man sees the._{ACC} brother
- (20) Den Bruder sieht der Mann.
 the._{ACC} brother sees the._{NOM} man
 “The man sees the brother.”

This reliance on case marking differs from other languages, like English, where word order is the most reliable cue to identify grammatical roles. According to the Competition Model (MacWhinney 2008), such cross-linguistic differences in cue strength and reliability can lead to difficulties during L2 acquisition, as learners often rely on the strongest cues from their L1 to assign agent/patient roles when comprehending the L2 input (McDonald 1987, Kempe and MacWhinney 1998, Jackson 2007, Henry et al. 2009).

Although case marking is the most reliable cue to identify the subject and object of a German sentence, even German native speakers exhibit a subject-first bias during real-time sentence processing. In the absence of unambiguous case marking, German native speakers interpret the first NP in a sentence as the subject, and exhibit longer reading times and associated processing difficulties upon encountering disambiguating morphosyntactic information (e.g., case marking on the second NP or number marking on the finite verb) that requires speakers to reanalyze this initial interpretation towards a less-preferred object-first structure (Bader and Meng 1999, Schlesewsky et al. 2000). L2 learners of German exhibit similar processing difficulties when reading sentences that disambiguate to a less-preferred object-first structure (Hopp 2006, Jackson 2008). However, Hopp (2006) and Jackson (2008) found that only highly-proficient L2 learners and/or learners with an analogous case-marking system in the L1 (e.g., Russian) exhibited processing difficulties immediately upon encountering disambiguating case-marking information. Less-proficient L2 learners' processing difficulties emerged only at the end of the sentence. This suggests that only highly proficient L2 learners exhibit nativelike processing routines that include incremental reanalysis. In contrast, less proficient L2 learners use case-marking information to assign grammatical roles, but they may have difficulty doing so immediately upon encountering such information.

Additional research finds that reanalyzing an initial subject-first interpretation may be more difficult for L2 learners than “native speakers” (Gerth

et al. 2017). The strength and immediacy of such reanalysis is also influenced by task-based factors, including the extent to which accompanying comprehension or grammaticality judgment tasks draw explicit attention to case-marking information (Jackson and Bobb 2009, Jackson and Dussias 2009), and whether target sentences are presented in isolation or as part of a larger discourse context that supports the information structural constraints modulating the use of object-first structures in German discourse (Hopp 2009). In an eye-tracking study, Jackson et al. (2012) also found that intermediate-level English L2 learners of German spent longer processing accusative-marked than nominative-marked determiners, even when they appeared in a subject-first sentence (e.g., *Welche Ingenieurin traf den Chemiker gestern Nachmittag im Café?* ‘Which_{NOM} engineer met the_{ACC} chemist yesterday afternoon at the café?’). This points towards an intermediate stage in L2 acquisition where learners have identified the importance of case marking cues for determining grammatical roles, even if they do not yet exhibit clear signs of incremental structure building during real-time language comprehension (see also Henry 2015).

Research with German L2 learners of Dutch reveals similar difficulties with the incremental reanalysis of subject-object ambiguities, even among L2 learners whose L1 and L2 are maximally similar. Havik et al. (2009) found no reading time differences at the disambiguating number-marked verb for subject- versus object-relative clauses, like (21), among advanced German L2 learners of Dutch, even though both German and Dutch require verb-final word order with relative clauses. This contrasts with Dutch native speakers’ performance in the same experiment and previous research investigating the online processing of similar object- and subject-relative clauses among German native speakers (Schriefers et al. 1995).

(21) Daar is de machinist die de conducteurs heeft/hebben bevrijd uit het brandende treinstel.

There is the train-driver_{SG} who the conductors_{PL} has_{SG}/have_{PL} freed from the burning train-carriage.

‘There is the train driver who has freed the conductors/who the conductors have freed from the burning train carriage.’

Havik et al. concluded that L2 learners may not incrementally assign grammatical roles and commit to a particular analysis during L2 processing, especially in the absence of disambiguating case-marking information prior to the thematic verb, regardless of cross-language syntactic similarity. However, in a follow-up study, Jackson and Roberts (2010) found that manipulating the animacy of the critical NPs led similarly proficient German L2 learners of Dutch to incrementally assign grammatical roles, resulting in reading time patterns at the disambiguating region that paralleled those of Dutch native speakers. Comparing their results to

Havik et al., Jackson and Roberts concluded that, in the presence of sufficient lexical-semantic information, L2 learners can build argument structure in real time, even without the aid of disambiguating case-marking information and number marking on the thematic verb – further highlighting that at least under certain circumstances, L2 learners can apply processing routines that do not differ from those used by native speakers.

29.5.2 Grammatical Gender in L2 German and L2 Dutch

In both German and Dutch, NPs are marked for grammatical gender. In German, all nouns are classified as either masculine, feminine, or neuter, whereas in Dutch, nouns are classified as common or neuter. These lexical categories have consequences for morphosyntactic agreement, as other words in a sentence, like determiners and adjectives, must be marked based on the gender classification of the noun they modify (see also Kürschner, Chapter 12). Gender assignment in both languages is largely arbitrary, and the morphophonological cues to gender assignment that exist are probabilistic in nature (Köpcke and Zubin 1984). Dominant L1 psycholinguistic models (Levelt et al. 1999) propose that gender information is stored at the lemma level, with each noun entry connected to an abstract gender node for that particular gender (i.e., masculine, feminine, or neuter in German; common or neuter in Dutch). When a noun's lemma is activated during production or comprehension, its corresponding grammatical information stored at the lemma level – here, grammatical gender – is also activated, to then be used when producing or comprehending agreement features associated with that particular gender. Thus, the acquisition of L2 grammatical gender involves acquiring both lexical and syntactic knowledge, as learners must learn (i) the correct gender for each individual noun and (ii) which constituents in a sentence are marked for gender agreement, and what the corresponding morphological markers are for each gender category. Grammatical gender is notoriously difficult for L2 learners to master, with even highly proficient L2 learners exhibiting residual variability in both gender assignment and agreement (see Bordag and Pechmann 2018, Hopp 2018 for review).

Paralleling child L1 acquisition (Szagun et al. 2007), English L2 learners of German are sensitive to morphophonological cues to gender assignment in German, with greater gender assignment accuracy and faster determiner+noun naming times for nouns containing a frequent and reliable cue to gender assignment (e.g., 90 percent of German words that end in *-e* are feminine, Wegener 2000), and lower accuracy and longer naming times for nouns with atypical gender assignment (e.g., *das Auge* 'the_{NEUT} eye_{NEUT}'; whereby *-e* is usually associated with feminine, not neuter, nouns) (Bordag et al. 2006, Bobb et al. 2015). For L2 learners whose L1 also contains grammatical gender, accuracy and naming times are faster

for nouns that are assigned the same gender in both languages (e.g., *Teller* and *talír* ‘plate’ are masculine in both German and Czech) than nouns with conflicting gender assignment (e.g., *Haus* ‘house’ is neuter in German but *dům* ‘house’ is masculine in Czech), suggesting that gender nodes are shared across languages and both languages are co-activated during language production (Bordag and Pechmann 2007, Salamoura and Williams 2007, Klassen 2016, Fowler 2017, but see Lemhöfer et al. 2008 for an alternative explanation).

Sabourin et al. (2006) further showed that the extent to which L2 learners exhibit nativelike accuracy in gender agreement depends on the degree of cross-linguistic similarity between an L2 learner’s two languages. In a grammaticality judgment task involving nouns and their corresponding gender-marked relative pronoun, German L2 learners of Dutch outperformed Romance L2 learners of Dutch (Spanish, French, and Italian L1), although their performance was still below that of Dutch native speakers. The German and Romance learners, in turn, outperformed English L2 learners of Dutch. Sabourin et al. concluded that the English learners exhibited the lowest accuracy because they did not possess grammatical gender in their L1. Romance learners were more accurate because Romance languages contain the abstract feature of grammatical gender, even if the system – in terms of the grammatical gender assigned to individual nouns and how gender agreement is realized – exhibits little overlap with Dutch. Sabourin et al. argued that the German learners exhibited the highest accuracy because grammatical gender in German and Dutch largely overlap, both in terms of gender assignment and how gender agreement is marked (see also Sabourin et al. 2008, Meulman et al. 2014, 2015, and Hopp and Lemmerth 2016, for related findings using eye-tracking or event-related potentials).

Using event-related potentials (ERPs), Lemhöfer et al. (2014) reported that – in contrast to other studies claiming persistent difficulty in the real-time processing of L2 grammatical gender violations (Meulman et al. 2014, 2015) – even intermediate German L2 learners of Dutch can exhibit native-like neurophysiological responses to grammatical gender violations in L2 Dutch (e.g., *Het volk verlangt naar *de einde van de dictatuur* ‘The people longed for the_{.COM} end_{.NEUT} of the dictatorship’). However, such effects emerged only once responses were coded according to participants’ “subjective” gender assignment (i.e., which gender they assigned to the target Dutch nouns in an offline gender naming questionnaire), rather than the “objective” gender assignment for each target noun (i.e., the gender assigned to each noun according to Dutch native speakers). Together, these studies underscore how L2 learners struggle to acquire the lexical and syntactic knowledge necessary for producing and comprehending L2 grammatical gender. However, research involving learners whose L1 also possesses grammatical gender reveals that learners’ persistent difficulties with this grammatical feature lie not just with acquiring a novel L2 feature, but also

stem from cross-language interaction and competing L1 information during real-time language processing.

29.5.3 Predictive Processing in L2 Learners

Researchers have also begun to investigate predictive processes during real-time language comprehension, specifically the processes whereby native speakers and L2 learners use linguistic cues to anticipate upcoming words and morphosyntactic structures. Prediction facilitates language comprehension and aids communication in dialogue (see Huettig 2015 for review), and may even play a role in L1 and L2 acquisition (Dell and Chang 2014, Phillips and Ehrenhofer 2015, Hopp 2016). However, L2 learners often have difficulty using predictive cues in the L2. In light of research showing that even native speakers may not always predict upcoming input during real-time language processing, the central goal of this research is to identify the factors that modulate L2 prediction (see Kaan 2014 for review).

Scherag et al. (2004) found that German native speakers and English L2 learners of German used semantic information on adjectives to facilitate recognition of a subsequent noun, in that participants were quicker to decide that the word *Gesicht* ‘face._{NEUT}’ was a real German word when preceded by the word *faltiges* ‘wrinkled’, than when the word *faltiges* preceded a semantically unrelated word, like *Gerücht* ‘rumor’. However, only German native speakers similarly used gender marking on the preceding adjective to facilitate subsequent word recognition (e.g., *faltiges* ‘wrinkled._{NEUT}’ facilitated recognition of *Gesicht* ‘face._{NEUT}’ more than *Haut* ‘skin._{FEM}’).

Hopp (2013) reported that overall gender assignment accuracy was a critical factor in whether highly proficient English L2 learners of German used gender to predict upcoming words in an experiment using the visual world paradigm. In such experiments, participants’ eye movements toward different images are tracked while they listen to a target sentence. In Hopp’s study, participants heard sentences like *Wo ist die gelbe Karte?* ‘Where is the._{FEM} yellow._{FEM} card._{FEM}?’. For half of the trials, three of the four target images contained yellow nouns with the same grammatical gender (e.g., a card, *Karte._{FEM}*, a cup, *Tasse._{FEM}*, a flower, *Blume._{FEM}*) but for half of the trials, the three yellow target images bore different gender (e.g., a card, *Karte._{FEM}*, a dress, *Kleid._{NEUT}*, and a button, *Knopf._{MASC}*). If participants use grammatical gender to predict upcoming nouns, they should look more quickly towards the target noun (i.e., the card) on the trials in which competitor nouns bear different gender than the trials in which target and competitor nouns all bear the same gender. Indeed, German native speakers used gender to predict upcoming target nouns. However, only those L2 learners with near perfect gender assignment accuracy, as measured by their accuracy in naming the target nouns and their gender

prior to the onset of each trial, used gender information predictively. In a follow-up study, Hopp (2016) showed that after training L2 learners on grammatical gender assignment, those L2 learners who exhibited high gender recall accuracy on a production task after the training unit then used gender predictively on the visual world paradigm post test. These studies underscore that having grammatical gender in the L1 is not a necessary prerequisite for using this grammatical feature during real-time L2 comprehension, although gender assignment accuracy can influence the strength of such predictive processes.

Turning to case marking, Hopp (2015) found that English L2 learners of German did not use case marking on the first noun in unambiguous OVS and SVO sentences, like (22) and (23), to predict whether the second noun would be a logical agent or patient of the utterance.

- (22) Der Hase frisst gleich die Blume. (SVO)
 the._{NOM} rabbit eats soon the._{ACC} flower
 “The rabbit soon eats the flower.”
- (23) Den Hasen frisst gleich der Fuchs. (OVS)
 The._{ACC} rabbit eats soon the._{NOM} fox
 “The fox soon eats the rabbit.”

L2 learners, regardless of proficiency, exhibited a subject-first preference, looking towards the picture of a flower independent of whether the first NP (i.e., *Hase* ‘rabbit’) had been introduced as a nominative-marked subject or an accusative-marked object. Hopp concluded that while the L2 learners used lexical-semantic information on the verb to anticipate upcoming input – they heard the noun rabbit and the verb eat, and then looked towards the likely patient of that action – they did not use case marking, assuming instead that the rabbit was always the subject of the utterance.

This begs the question of whether L2 learners always use lexical-semantic information predictively, or whether even the use of lexical-semantic cues may vary according to how such information is instantiated in the L1. Van Bergen and Flecken (2017) used the visual world paradigm to measure whether Dutch native speakers and German, French, and English L2 learners of Dutch used Dutch placement verbs *zetten* ‘set’ and *leggen* ‘lay’ to anticipate the placement of objects on the computer screen, as *zetten* is used to describe the placement of objects on their natural base (e.g., a bottle standing up) whereas *leggen* is used to describe the placement of objects in a position other than on their natural base (e.g., a bottle lying down). Similar to Dutch native speakers, German L2 learners of Dutch used the placement information encoded by verb choice to quickly look towards the target object (e.g., a bottle standing up after hearing the verb *zetten*), which van Bergen and Flecken attribute to the fact that German similarly encodes placement information via the choice between *stellen* ‘set’ and *legen* ‘lay’. Equally proficient English and French L2 learners of Dutch did not exhibit significant predictive

eye movements, presumably because they lack this distinction in their L2 (i.e., a single verb, like *put*, encodes both placement events). This work on L2 predictive processing highlights the difficulties L2 learners have in using linguistic cues to anticipate upcoming input, including the accuracy and stability of lexical and syntactic representations (Hopp 2013) and competing information from the L1 (Hopp and Lemmerth 2016, van Bergen and Flecken 2017). At the same time, some of the same issues that hinder predictive processing in L2 learners also modulate predictive processing among native speakers (see Kaan 2014).

29.6 Conclusion

As demonstrated by the review of L2 research presented here, we have made much progress over the last 40 years in understanding the linguistic and cognitive mechanisms that support L2 acquisition, and research involving the L2 acquisition of German and Dutch has been critical to the success of this endeavor. However, many debates remain unresolved and many questions remain unanswered, especially regarding the interaction between the development of L2 linguistic representations and the real-time processing of L2 input, and particularly how different instructional methods, as well as age of acquisition, may modulate such interactions. Especially with the recent influx of migrants to Germany and The Netherlands, many projects are underway to investigate precisely these questions. Thus, without a doubt, research on the L2 acquisition of Germanic languages will continue to make significant contributions to the field of L2 acquisition into the future.

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