DE GRUYTER
MOUTON

Jessica Diebowski

GENDER ACQUISITION IN SPANISH

EFFECTS OF LANGUAGE AND AGE

STUDIES ON LANGUAGE ACQUISITION

Jessica Diebowski

Gender Acquisition in Spanish

Studies on Language Acquisition

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«Mi nono no había dejado otra herencia sino cartas en malicioso, fotos desteñidas [...]. Salvo la moto Indian. Dudé que hubiera sido tan perezoso como para poner un anuncio económico del domino El Mercurio con el popular «Moto vendo». Es decir, el moto – como acotó hasta que dejó de hablar de ella incapaz de entender la lógica del español que permitía que **un sustantivo que terminara en** «**o**» **tuviera artículo femenino** – era parte de una herencia que yo no sólo debía administrar sino también descifrar.»

– Antonio Skármeta (2001: 111): «La chica del trombón»

To my beloved grandfathers and parents who have always believed in me and given so much of themselves.

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Abbreviations

AoA	age of acquisition
ATH	Activation Treshold Hypothesis
CP	Critical Period
FA	full access
FFs	formal features
FI	Full Interpretation
FncFs	Functional Feature
FRH	Feature Reassembly Hypothesis
FTFAH	Full Transfer Full Access Hypothesis
GC	gender congruent
GenP	Gender Phrase
GIC	gender incongruent
HLA	heritage language acquisition
HL	heritage language
iFs	interpretable features
IH	Intrepretability Hypothesis
IL	Interlanguage
MP	Minimalist Program
MSIH	Missing Surface Inflection Hypothesis
MUSH	Missing Underspecification Hypothesis
PIC	Phase-Impenetrability Condition
RD	representational deficit
RDH	Representational Deficit Hypothesis
SDCs	Spanish dominant controls
SLA	second language acquisition
SSH	Shallow Structure Hypothesis
TL	target language
uFs	uninterpretable features
WLiH	Weaker Links Hypothesis
WM	working memory

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1 Introduction

Gender has been regarded as the “most puzzling of the grammatical categories” (Corbett 1991: 1). Unsurprisingly then, it has become a topic of interest and investigation that has yielded a large number of studies on the acquisition of gender in various languages (e.g. French, Italian) and acquisitional contexts, such as early age L1 gender acquisition (e.g. Karmiloff-Smith 1979; Pérez-Pereira 1991 and Müller 1994), L2 gender acquisition (e.g. Finnemann 1992; Hawkins 1998; Fernández-García 1999; Bruhn de Garavito and White 2000; Alarcón 2004 and Montrul 2006a), and 2L1 gender acquisition (e.g. Lipski 1993; Anderson 1999; Montrul 2006a, 2006b; Zaretsky and Bar-Shalom 2008; Eichler, Jansen and Müller 2012; Eichler, Hager and Müller 2012). The focus of these studies has ranged from discussions of specific ultimate attainment accounts such as the Failed Functional Features Hypothesis (Hawkins and Chan 1997); the Interpretability Hypothesis (Hawkins and Hattori 2006;Tsimpli and Mastropavlou 2008); the Missing Surface Inflection Hypothesis (Prévost and White 2000; White et al. 2004) to the role of extralinguistic and linguistic factors, including the influence of the first language (L1) or societally dominant language on the grammars of bilinguals. Although the acquisition of gender has been empirically investigated in many of the aforementioned sources, it was not until the last decades of the 20th century that researchers compared heritage speakers’ knowledge of gender to that of L2 learners (Montrul et al. 2008; Alarcón 2011). Most of these studies have focused on the language pairing English-Spanish in a 2L1 and/or L1–L2 constellation. There are only a few studies that have directed their attention to other language combinations such as German-Italian (e.g. Stöhr et al. 2012) or Dutch-Spanish (e.g. Irizarri van Suchtelen 2016; van Osch et al. 2014). To the best of my knowledge, the direct comparision of the acquisition of gender in Spanish by adult early and late bilinguals with the language combination German-Spanish has not received consideration. The present study attempts to fill this gap by investigating the acquisition of gender in Spanish by early and late bilinguals with the language combinations English-Spanish and German-Spanish. The inclusion of the important group of early and late German-Spanish bilinguals in the present study not only makes a crucial contribution to the ongoing research but also provides a deeper understanding of the role of the language combination in the acquisition of gender. The uninterpretable gender feature is present in German and Spanish (+gen languages), but not in English (-gen language).

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1.1 Theoretical background

The present study, embedded in the field of second language acquisition (SLA) and heritage language acquisition (HLA), adopts a generative framework, namely the Minimalist Program (MP, Chomsky 1995, 1998, 2001 *et sequitur*), which provides insights into the architecture of the faculty of language and the interaction of various components (syntax, on the one hand, and morphology, on the other) causing L2 learners' and heritage speakers' (HSs) difficulties in mapping gender features to appropriate forms.

Minimalists (Chomsky 1995 et seq.) assume that language consists of two components: (1) a computational system (C_{HL}), which is supposed to be invariant across languages, and (2) a lexicon, to which the idiosyncratic differences across languages are ascribed (Putnam and Parafita Couto 2009: 137; Gabriel and Müller 2013[2]: 95). The lexicon provides an optimal coding of such idiosyncrasies which is required by the C_{HL} to derive (compute) well-formed PF and LF representations (Chomsky 1995: 171). In the MP, a lexical entry is a complex bundle of phonological, semantic, and formal features of a lexical item (LI).

With respect to the formal (syntactic) features, these are divided along three lines, among others: intrinsic vs. optional (Chomsky 1995), interpretable vs. uninterpretable (Chomsky 1995), and valued vs. unvalued (Chomsky 2001). Suffice to say, for the present purpose, we do not need to delve into detail (see Chomsky 1995 et seq. for further details). As the focus of this book lies on the acquisition of gender in Spanish, it is assumed in conformity with the MP that gender as other phi-features such as number is a formal feature. Under standard minimalist formalization, the gender feature in N is considered to be an interpretable one, which is relevant at LF for the semantic interpretation of a sentence (Chomsky 1995: 231). By contrast, the gender feature in determiners or adjectives, which agree with the noun, is uninterpretable and only survives to PF (Gabriel and Müller 2013[2]: 96). In addition to the semantically based interpretable/uninterpretable distinction, Chomsky (1995, 2001) establishes a valued vs. unvalued distinction. He advocates the view "[…] that the uninterpretable features, and only these, enter the derivation without values, and are distinguished from interpretable features by virtue of this property. Their values are determined by Agree" (Chomsky 2001: 5).

Within the minimalist framework, the derivation, also dubbed the structure-building computation, includes several operations such as *Select, Merge, Agree, Move,* and *Transfer*, "aiming at determining the least 'costly' derivation in terms of computation" (Al-Horais 2013: 88).

By means of both operations *Merge* and *Move*, the C_{HL} generates sentence structures which at some arbitrary point of the derivation must bifurcate to LF and PF in order to be interpreted for sound and meaning (for details, see Boeckx 2006, Nunes 2004, Hornstein 2001, Hornstein, Nunes and Grohmann 2005). This point of transfer is the so-called *Spell-Out*, at which point the structure-building part of the derivation is completed. It is said that a derivation converges *tout court* (Seuren 2004: 33) “if it converges at both interface levels PF and LF, otherwise it crashes” (Chomsky 1995: 390). In this context, Kennedy (2000: 3) notes: “Ideally, Spell-Out applies freely and without restriction: if it applies at the wrong point or sends the wrong information to one of the interfaces, the derivation crashes. Spell-Out is not a level of representation that the grammar can refer to.”

It is important to note that according to the *Principle of Full Interpretation* (FI; Chomsky 1995 et seq.) “there can be no superfluous symbols in representations” (Chomsky 1995: 27). Or, to put it differently, every element of PF and LF, which is present at the interface levels, has to be interpretable by the interfaces. A syntactic element is PF-interpreted iff it can be read by the phonology whereas it is LF-interpretable iff it can be read by the semantics (Kennedy 2000: 3). Uninterpretable features (uFs) such as the grammatical gender of a noun have to be eliminated from the structure before the LF interface (Chomsky 1986b: 98–99, Bošković 2013: 112–113). This is achieved through feature checking. According to Chomsky’s (1993, 1995: 262ff.) analysis of feature checking, “checking relations are established by either head movement that adjoins a lower head to a higher functional head or XP-movement into the specifier of a functional head” (Fuß 2005: 24). Before we will have a closer look at the concept of feature checking and the operation *Agree* in subsection 1.3, let us briefly look at the DP and its features in particular the gender feature.

1.2 DP and its features

During the 1980s, the idea that determiners occupy the specifier position within the noun phrase (NP) was criticized within the syntactic literature and the Determiner Phrase (DP) Hypothesis developed by Abney (1987) replaced the traditional NP analysis in generative grammar, proposing that the noun phrase is headed by a functional category, identified with the determiner (D) (Abney 1987; Horrocks and Stavrou 1987; Coene and D’Hulst 2003: 2; among others). Under this view, a DP selects an NP as a complement, as illustrated in (Figure 1.1).

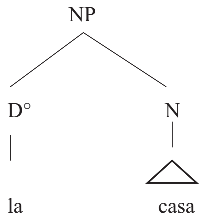

Figure 1.1: Minimalist DP analysis (adopted from Montrul 2004b: 35).

A crucial assumption underlying the DP Hypothesis is, on the one hand, that the DPs are structurally parallel to Complementizer Phrases (CPs) in the verbal domain, i.e. VP (Szabolsci 1983), and, on the other hand, that the determiners as heads of a functional category DP assign reference [± definite] to the complement NP (Montrul 2004b: 35). The formal features such as [± definite] for reference "are checked, valued, or discharged within the DP" (Montrul 2004b: 35). Within the realm of the DP Hypothesis, theorists have suggested a number of other functional categories between DP and NP. In most subsequent analyses by Bernstein (1993, 2008), Ritter (1991) and Valois (1991), it is assumed that DPs contain the functional category Number Phrase (NumP) as shown in (Figure 1.2). The proposal of a NumP has widely gained acceptance within contemporary syntactic frameworks. Note that in some accounts (Ritter 1993; Harris 1996; Gess and Herschensohn 2001), the head Num° of the functional projection NumP entails both number and gender features. I shall follow these accounts in assuming that Num involves number and gender features alike.

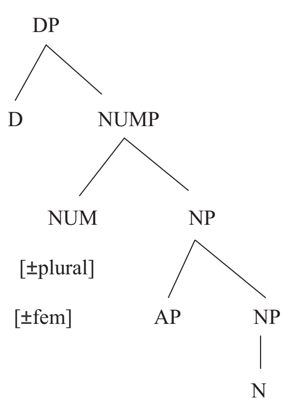

Figure 1.2: Minimalist DP analysis with the functional category NumP (adopted from Montrul 2004b: 35).

Abney (1987), Löbel (1990) and Radford (2004) have made a further proposal of a Quantifier Phrase (QP) that intervenes between DP and NP. According to this proposal, the functional head D° selects a QP as a complement and the functional head Q°, in turn, selects a NP as a complement. Within this proposal, current scholars suggest that "quantifiers should be distinguished from other determiners and head a separate QP above the DP-level, while the lower QP between DP and NP is reserved for existentially quantified determiners" (Kupisch 2006: 79). Other scholars such as Alexiadou, Haegeman and Stravrov (2007) have proposed that a Possesive Phrase (PossP) intervenes between NP and DP. In addition, the existence of a Gender Phrase (GenP) (Picallo 1991) or Wordmarker Phrase (WMP) (Bernstein 1993) still continues to generate debate. In line with current thinking in generative linguistics on this debate (see Di Domenico 1997; De Vincenzi and Di Domenico 1999; Cantone and Müller 2008; Panagiotidis 2002; Alexiadou 2004; Alexiadou et al. 2007, among others), I assume that gender is an abstract lexical feature of nouns and thus reject the view that gender is a functional head in syntax (for further discussion and details see Alexiadou et al. 2007 for Greek, Hebrew, Spanish and Italian; Kramer 2009, 2014, 2015, for Spanish and Amharic, Guijarro-Fuentes et al. 2016 for Spanish).

1.3 Feature interpretability and probe-goal model

The early minimalist assumption that all agreement relations are established under the Spec-head configuration (Chomsky 1995) has been accompanied by discussions on various issues such as the relation between features and feature checking, which led to major developments in recent minimalist theorizing. Contrary to minimalist analyses from the 1990s, the phenomenon agreement has undergone a profound revision in recent minimalist papers by Chomsky (2000 et seq.). This section aims to briefly sketch the theoretical framework adopted in the present book, viz, the probe-goal model of feature-agreement as first set out in Chomsky (2000, 2001a, b) and introduces the relevant terminology (Chomsky 2000, 2001a, b, 2004).

The implementation of the probe–goal model with its underlying syntactic operation *Agree* has clearly replaced earlier versions of feature checking (Biskup 2013: 126; van Gelderen 2016: 3), as agreement preempts movement and enables feature-checking at a distance, rather than in a Spec-Head configuration (Soltan 2006: 255; van Gelderen 2016: 3). Chomsky (2000: 101) conceives the operation *Agree* as a feature-matching relationship between an uninterpretable feature (uF) on an element α and the matching interpretable feature (iF; e.g. φ-feature on functional heads v, T, or C) on another element ß within the domain of α (i.e. c-command domain). The former element is referred to as *probe* whereas the latter, as *goal*. By matching the interpretable features (iFs) on ß (i.e. goal), the matching relationship results in valuing uninterpretable feature (uFS) on an element α (i.e. probe) and thus the goal becomes unavailable for future agreement operations (Al-Balushi 2011: 22; Soltan 2006: 255). This said, the operation *Agree* can be decomposed into at least three sub-operations, namely, (1) *Probing*, (2) *Matching* and (3) *Valuation* (see Pomino 2008: 37ff. for details on the different suboperations of *Agree*). In addition, Kinjo (2015: 203) summarizes Chomsky's (2000, 2001a, b) restriction on the operation *Agree* with the following four conditions (adopted from Kinjo 2015: 203) in (1.1):

(1.1) *Conditions on the operation Agree*
P with *unvalued uninterpretable* features can AGREE with G iff:
a. G is in P's c-command domain (*c-command condition*),
b. There is no intervening element having the matching feature with P between P and G (*intervention condition*),
c. P and G are in the same phase (*phase condition*), and
d. G has an unvalued uninterpretable feature (*activity condition*).

The condition (1.1a) on *Agree* known as *c-command condition* determines the potential search domain of the probe (i.e. down the tree).[1] Thereby, Chomsky (2000) captures a crucial property because it allows the application of *Agree* only to elements in a c-command configuration. The c-command is stated in (1.2) (Müller and Riemer 1998: 74)[2] and schematized in Figure 1.3 (adapted from Pomino 2008: 39).

(1.2) *C-command condition*
A node *A* c-commands another node *B* under the following conditions:
a. *A* does not dominate *B* and vice versa;
b. the first node dominating *A* also dominates *B*

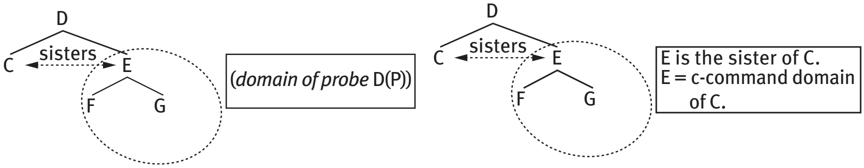

Figure 1.3: Tree diagram of the c-command domain (adapted from Pomino 2008: 39).

1 Until recently, a question that is highly debated in the literature is whether agreement is a case of upward or downward probing. Baker (2008) suggests that "Agree probes both upwards and downwards in Indo-European languages, but only upwards in Bantu languages" (Diercks 2010: 216). For a detailed discussion, see Baker (2008) and Diercks (2010).
2 Adopted from https://www.princeton.edu/~browning/ccommand.html (27.10.2017).

The tree sketched in (Figure 1.3) displays the domain of the probe D(P) assuming that C is the probe and its domain is the sister node E, then E, F and G are possible goals (Pomino 2008: 39). The crucial thing to note about Chomsky's probe-goal system is that the probe C with its uninterpretable features must probe into the *closest c-command domain* to an active head with the matching features i.e. the goal (here: E) (Chomsky 2000: 122; Pomino 2008: 39; Chandra 2011: 11). In this spirit, the *condition closest c-command* subsumed under *Minimal Link Condition* (MLC) (Chomsky 2000: 122) ensures that the "search is minimized on ground of operative efficiency" (Heck and Richards 2010: 9). In other words, the operation *Agree* can only take place between a probe and a potential goal which is closer to the probe than others occurring further down the tree (López 2009: 12). Once the operation *Agree* was successful between the probe C and its goal E, the uninterpretable features on the probe C are valued and deleted. The derivation may further proceed. Apart from these aforementioned key assumptions, it is assumed that the probe-goal system is further restricted by the *Maximize Principle* (Chomsky 2001), which implies that it is sufficient for a goal to agree with just one of the probe's matching features (Heck and Richards 2010: 10; for further discussion and details see Řezáč 2003, 2004 and Béjar and Řezáč 2009). In addition, there is an interesting distinction between defective and non-defective probes. According to Chomsky (2001b: 6), "a non-defective probe is ϕ-complete and a defective probe is not" (for further details see Mensching and Remberger 2006; Pomino 2008; Gallego 2010; for a discussion on goals to be defective see Raposo and Uriagereka 1996; Cardinaletti and Starke 1999; Déchaîne and Wiltschko 2002).

The operation *Agree* under the probe-goal model applies freely and is not constrained by trigger movement. As has been stated earlier, *Agree* is a necessary precondition for the application of the operation *Move* (Bošković 2011). Whether movement operations in a syntactic derivation take place or not depends on the type of uninterpretable features of the probing category. In recent minimalist theory, it is generally assumed that unlike phi-features and structural case, only the EPP features (i.e. Edge feature) induce overt movement because they require checking in a Spec-Head configuration (Gabriel and Müller 2008: 113).[3] The way a probe enters a mutual feature-valuing relation with a goal stems from the given *Principle of Full Interpretation* according to which uninterpretable features must be deleted at the level of LF and feature checking is, therefore, a necessary condition in the course of the derivation (Zeijlstra 2012: 2). Provided that the agree relation

3 The abbreviation EPP refers to what was originally called the Extended Projection Principle and implies the requirement that every clause has a subject (Chomsky 1981). Furthermore, the uninterpretable and selectional EPP feature requires that the Spec-position is occupied (Heinat 2005: 41).

has been successfully established between the probe and the goal, "the uninterpretable features are removed from the narrow syntax 'being handed over to morphology/phonology, the derivation of PF' (Holmberg 2005:7)" (Al-Horais 2013: 93).

As far as this work is concerned with the valuation of gender agreement in the DP, the remainder of this section will illustrate the implementation of the *Agree* operation within the DP against the background of Chomsky's (2000 et seq.) theory of Probe-Goal Agreement. Consider how the Spanish DP *la casa* 'the house' depicted in Figure 1.4 can be accounted for in Chomsky's (2000 et seq.) theory of Probe-Goal Agreement.

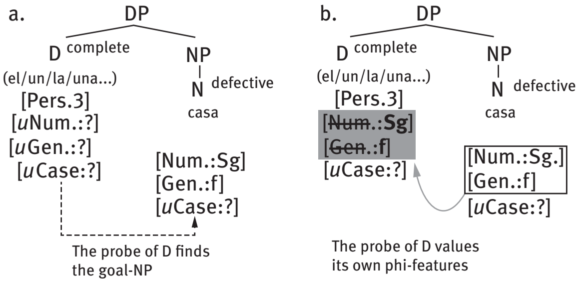

Figure 1.4: Tree diagram feature valuation within the DP adapted from Gabriel and Müller (2013^2: 115).

As broadly acknowledged by many scholars, inter alia, Chomsky (2000), Carstens (2000) and Iverson (2009: 226), I assume further that interpretable phi-features (number, person, gender) are found on the head noun, whereas uninterpretable phi-features are found on determiners and adjectives. The tree diagram in (Figure 1.4a) shows that the φ-features of the noun [$_N$casa] have already been specified in the numeration either as intrinsic features (here: the gender feature [+ feminine] or optional features e.g. number and φ-features on verbs, except for the structural case feature which will be specified after the operation *Merge* between T and DP).[4] Looking at the definite article (D), it is evident that it only carries the intrinsic person features [+ third person] and lacks the relevant gender and number features. The fact that the noun [$_N$casa] and the determiner [$_D$la] are merged to form the DP [$_{DP}$la casa] triggers a probe-goal relation, where the φ-features of the determiner [$_D$la] functions as a probe searching in its *c-command domain* for an

4 As structural case is not a concern in this monograph or relevant for the analysis developed in the chapters to come, this section cannot delve into the specifics and the reader is, therefore, referred to a thorough treatment of this issue in Gabriel and Müller (2013^2: 112ff).

active and closest goal. When the probe with its unvalued features successfully finds the noun [$_N$casa] as a defective goal with its matching φ-features (see Figure 1.4a), the operation *Agree* is induced. Thereby, as can be seen in Figure 1.4b, the probe's unvalued gender and number features get valued by the goal via the sub-operation *Value* and the uninterpretable features (uFs) on D are marked for deletion. The ultimate deletion of the uFs takes place in a "'one fell swoop' operation" (Chomsky 2000: 124) at the point where the derivation reaches Spell-Out, albeit their phonetic reflex remains (Chomsky 2015b: 355), in order to prevent a crash at one of the two interfaces i.e. PF and LF (Fuß 2005: 25).

In addition to the presented implementation of Chomsky's probe-goal model to gender agreement within the DP, it is also important to point out that this theory involves the theory of phases (Chomsky 2000, 2001, 2004) in order to obtain computational efficiency. For Chomsky (2000, 2001b, 2004), phases (i.e. derivational units) can be defined as complete propositions and specify the verb phrase (v*P)[5] and the complementizer phrase (CP) as phases (Chomsky 2000: 106).[6] The reason for considering CP and v*P as phases is that "CP behaves as a complete clausal complex containing essential elements of the clause (e.g., the force markers, topic, focus markers, and so on)" (Al-Horais 2013: 105) and v*P is φ-complete as it represents a full argument structure, including a subject in a specifier position (Kremers 2005: 7; Al-Horais 2013: 105). Under the phase theory, syntactic derivations proceed in phases (Kremers 2003: 10) and when a derivation in a phase has been completed its complement domain is cyclically transferred to the interfaces, semantic component and phonological component, for interpretation in chunks (Chomsky 2000; 2001b). One of the central aspects of Chomsky's (2000: 108) phase theory is that the phase arguments are not able to undergo further syntactic operations since they have to obey the *Phase-Impenetrability Condition* (PIC), stated here in (1.3).

(1.3) *Phase-Impenetrability Condition*
In a phase α with head H, the domain of H [=complement of H] is not accessible to operations outside α [=HP], only H and its edge [=H plus any/all of its specifiers] are accessible to such operations (Chomsky 2000: 108; qtd. in Al-Horais 2013: 106).

5 Following Chomsky (2005, 2007), transitive little *v* is marked with an asterisk (*) in order to distinguish from unaccusative little *v*.

6 More recently, it has been suggested that unaccusative VPs, passive VPs (Svenonius 2004; Hiraiwa 2005; Legate 2003) and DPs (Adger 2001; Kremers 2003; Legate 2003) can be also considered as phases. This assumption is, however, under debate in the literature (for further discussion and details see Chomsky 2005: 9; Al-Horais 2013: 338).

In other words, Chomsky argues that only the head of a phase and its specifiers (i.e. its edges) can undergo "further operations like agreement and movement as the phase heads C and *v contain two types of features: Agree features (Φ-features)" (Al-Horais 2013: 106) and EPP-features, which trigger movement (Chomsky 2000, 2005, 2007).

To summarize, this section has aimed at briefly sketching the theoretical framework adopted in this work, that is, Chomsky's (2000 et seq.) probe-goal model of feature-agreement and introducing the probe-goal terminology. Chomsky has devised a new concept of feature checking and syntactic movement that is not found in its predecessors. Agreement no longer requires a Spec-Head configuration or entails the syntactic operation *Move*.

1.4 The empirical study

Existing research has attested that grammatical gender, as a phenomenon at the lexicon/syntax interface, is susceptible to a remarkable amount of variability in early and late bilinguals (Alarcón 2011; Montrul 2008; Polinsky 2011; Kondo-Brown 2005). These errors do not only hamper communication but also mean that L2 learners and HSs are devalued in their L2/heritage language (HL) competence. The causes of variability in L2 and HL grammars are a matter of great debate. In an attempt to approach the question of why morphological variability in Spanish as an L2 and HL occurs, different accounts have been put forward.

With regard to morphological variability in L2 learners, two main accounts have been proposed: (1) the representational deficit (RD) account and (2) the full access (FA) account. The RD account attributes variability in L2 learners' knowledge of [+ uninterpretable] gender features to maturational constraints (Hawkins and Chan 1997; Tsimpli and Dimitrakopoulou 2007; Tsimpli and Mastropavlou 2008). The hypotheses subsumed under the RD accounts have focused on the acquirability by adult L2 learners of formal features (FFs) that are not part of the grammar of their first language (L1), suggesting that "learners' native language transfer may influence the accessibility of morphosyntactic features in L2" (Romanova 2013: 1). The FA account maintains that adult L2 learners are capable of acquiring native-like gender features irrespective of their interpretability and presence or absence in the L1. Accordingly, morphological variability is not caused by underlying syntactic deficits but rather by a mapping problem between syntax and morphology or a performance problem (Haznedar and Schwartz 1997; Lardiere 1998a, 1998b, 2000; Prévost and White 2000; Schwartz and Sprouse 1996; White et al. 2004). According to the latest generative account, Lardiere's (2007, 2009) Feature Reassembly Hypothesis (FRH), L2 acquisition involves the arduous but not impossible process of re-assembling L1 features in the way they are bundled in the L2. Successful L2 acquisition depends on how effectively L2 learners can reconfigure these features. As in the case of the hypotheses formulated within the FA account, the emergence of variability is argued to be a mapping problem.

In recent decades, researchers have also made several proposals to explain morphological variability in Spanish HSs. Some posit that variability in adult HSs is indicative of incomplete acquisition (Montrul 2008, 2016a) or attrition (Polinsky 2011) due to reduced input as well as reduced language use in the HL during childhood. As a consequence, HSs may never have fully acquired gender patterns in Spanish or may have acquired gender patterns in early childhood but experienced attrition (Potowski 2018). An alternative proposal is Pires and Rothman's (2009) delimited input hypothesis, which attributes variability to differences in the quality of input. The most recent and promising proposal is Putnam and Sánchez' (2013) HL activation account, according to which variability in HSs is triggered by reduced activation of the HL, which ultimately leads to difficulties in accessing functional features (FncFs) in the HL. Each account has to a greater or lesser extent received empirical support from acquisitional studies. Empirical testing of these hypotheses is difficult, as studies differ in their methodologies and tasks, tapping either into metalinguistic or implicit knowledge (e.g. Franceschina 2001; Montrul et al. 2008; Grüter et al. 2012), and have thus yielded conflicting results. In addition, some of these proposals seem to be too "broad-brush" to be able to explain adequately the development and nature of variability in L2 learners and HSs. The debate continues unabated since empirical evidence is inconclusive and leaves room for interpretation regarding the development of gender in L2 learners and HSs. Furthermore, scholars are far from unanimous on the question whether factors such as age of onset (hereafter: AoO) of bilingualism and amount of language use are crucial to the achievement of native-like knowledge (Lardiere 2007, Montrul et al. 2008; Alarcón 2011; Perez Cortes 2016) and whether the source of gender variability is lexical or syntactic (e.g. Carroll 1989; Franceschina 2005; Grüter et al. 2011; Stöhr et al. 2012; Kirova 2016).

The empirical study presented in this book acknowledges the importance of the explanatory factors that have been identified in previous research to impact the knowledge of gender of L2 learners and HSs and takes as a starting point the assumption that there are additional and as yet unexplored factors which may modulate bilinguals' performance in grammatical gender in Spanish (for a similar view see Giancaspro 2017: 6).

The goals of the study are to: (1) contribute to the ongoing debate on whether L2 learners and HSs can achieve native-like attainment in gender assignment and agreement; (2) explore whether there are differences in gender accuracy among early and late bilinguals with the language combination German-Spanish (+gen/+gen language) and English-Spanish (-gen/+gen language); (3) investigate the role of extralinguistic factors (i.e. AoO of bilingualism, proficiency level in the L2/HL, amount of Spanish language activation) on bilinguals' linguistic performance; (4) assess the role of linguistic factors (i.e. agreement domain: gender assignment (D+N) vs. gender agreement (N+Adj), noun gender, noun ending); (5) examine the effect of gender congruency and crosslinguistic influence (CLI) on early and late German-Spanish bilinguals; (6) analyze the extent to which task type and modality (e.g. comprehension or production) affect bilinguals' linguistic performance.

Investigating these potential effects of extralinguistic and linguistic factors as well as their complex interplay in the acquisition of Spanish gender by comparing L2 learners and HSs with different language combinations (German-Spanish and English-Spanish), levels of proficiency (low, intermediate, advanced) and amounts of Spanish language use will provide a more comprehensive understanding of gender knowledge in L2 learners and HSs.

1.5 The broader significance of the study

Recent research on the acquisition of grammatical in gender in Spanish has found that heritage speakers of Spanish and L2 learners of Spanish experienced particular difficulty with agreement morphology. The core of the book is the analysis of bilinguals' accuracy in gender assignment (D+N) and agreement (N+Adj) within the DP.[7] A total of 257 adult participants were included

7 Following previous research by Montrul et al. (2008), Alarcón (2006, 2011), Stöhr et al. (2012), Grüter et al. (2012), Hopp (2012) and Sabourin and Stowe (2008) among others, the present study adopts the distinction between gender assignment and agreement. As Shin (2018: 236) notes "it is helpful to distinguish between gender assignment and gender agreement." From an acquisitional perspective, Montrul (2016a: 211) emphasizes that these two notions are understood as follows: "The command of gender requires assigning or classifying nouns in the lexicon (gender assignment) and computing the rule of agreement in syntax (gender agreement)" (Montrul 2016a: 211). From a formal perspective, a distinction between gender assignment and agreement is not necessary as gender features on nouns come from the lexicon with a specific value, and adjectives and determiners can only receive a value by means of the syntactic operation gender agreement. As this study is embedded in the field of language acquisition, the distinction between gender assignment (lexical) and gender agreement (syntactic) is retained (see also section 2.1).

in the present study: a control group of 16 Spanish dominant controls (SDCs) and four experimental groups of 65 English-Spanish HSs, 60 English-Spanish L2 learners, 56 German-Spanish HSs and 60 German-Spanish L2 learners. The study controlled not only for linguistic variables (agreement domain, noun gender and noun ending, noun congruency, grammaticality) but also for extralinguistic variables (AoO of bilingualism, level of proficiency, language combination and amount of Spanish language activation) and for task type and modality effects, and various comparative analyses were carried out.

To the best of my knowledge, no previous study within SLA or HLA has examined the potential effects of extralinguistic and linguistic factors as well as their complex interplay in the acquisition of Spanish gender by comparing L2 learners and HSs with different language combinations, levels of proficiency and amounts of Spanish language activation. Without doubt, this study is innovative not only in its fine-grained analysis of the effect of each extralinguistic and linguistic factor, but also in its triangulated research approach designed to provide a more comprehensive understanding of gender knowledge in L2 learners and HSs. The present study expands the recent line of research and broadens the understanding of L2 learners' and HSs' knowledge of gender assignment and agreement. The results of the present study will not only inform researchers and language instructors about the potential variables which trigger variability in bilinguals but will also be of benefit for future avenues of research and for teaching Spanish as an L2/Ln and HL.

1.6 Structure of the book

Following this introduction, the contents of the book are organized as follows: Chapter 2 presents key definitions and concepts of grammatical gender. This chapter also briefly describes the gender systems in German, Spanish and English, including the sematic and formal (i.e. phonological and morphological) regularities in these three languages. Chapter 3 considers basic assumptions about bilingualism and ultimate attainment accounts, providing the background for the chapters that follow. Chapter 4 reviews previous studies on the acquisition of gender in Spanish by adult L1, 2L1 and L2 speakers, placing particular emphasis on the languages and language pairs under investigation. As this book examines the effects of extralinguistic and linguistic factors on the acquisition of gender, this chapter also reviews previous research which has addressed these factors and is of relevance for the present study. Chapter 5 introduces the research questions guiding the present study. The remaining sections in this chapter give a description of the data collection method, the participants, the test design, the analysis procedure and the descriptive and inferential statistics of the data. Finally, Chapter 6 summarizes the main findings and focuses on the pedagogical as well as research implications for SLA and HLA, acknowledging the limitations of the present study. The book closes with some concluding remarks.

2 Grammatical gender in Spanish

This chapter gives an introduction to the concept of grammatical gender and its role in the structure of a language. The aim here is twofold: The first is to show and assess the ways in which different scholars have described the representation of gender in sentence structure. The second is to present a comparative and contrastive description of the gender systems in the three languages studied in this book as well as to lay the foundations for the empirical study that will be presented in chapter 5. The chapter is organized as follows: Section 2.1 deals with the definition of the linguistic term ‘gender’, while the section 2.2 addresses the role of gender in the structure of a language. Section 2.3 gives a comprehensive overview of the gender systems in German, Spanish and English. A comparison of these gender systems is provided in section 2.4. Section 2.5 is devoted to assignment systems in which both semantic and formal gender assignment rules are involved. A summary of the chapter is presented in section 2.6.

2.1 Definitions and key concepts

The English word ‘gender’ is a loanword from French *gendre* and originally derives from the Latin *genus*, where it means "‘kind’ or ‘sort’" (Corbett 1991: 1). A widely accepted definition among linguists of the grammatical category gender – also referred to as noun class (Corbett 1994: 1348; Alarcón 2006: 3) – is the following: "Genders are classes of nouns reflected in the behavior of associated words" (Hockett 1958: 231). Hockett’s definition reveals an important distinction between gender assignment and gender agreement. The first part of Hockett’s definition (1958), stating that genders are classes to which nouns are assigned, refers to gender assignment. In this respect, gender is a lexical, inherent and invariable feature of a noun that divides the nouns of a language into distinct classes, for example masculine, feminine or neuter (Schwarze 2008: 19).[8] In other words, as Alarcón (2006: 4) states: "nouns are inherently marked for a specific gender value". There is only a small number of nouns that belong to two gender classes, for instance the Spanish word *el/la representante* ‘the male/female representative’ or *el/la dentista* ‘the male/female dentist’. In these cases, the use of a masculine or feminine determiner is decisive for denoting either a male or a female person (Alarcón 2006: 4). The distinction between grammatical

8 Cf. Kibort, A. and Corbett, G. G. (2008). *Gender: Grammatical Features*. Web. Retrieved from <http://www.grammaticalfeatures.net/features/gender.html> (1.3.2013)

https://doi.org/10.1515/9783110703047-002

gender, on the one hand, and natural gender, on the other, is of special importance. Grammatical gender (e.g. feminine, masculine, neuter) refers to the morphosyntactic category, whereas *natural gender* – also called biological or semantic gender – (i.e. male, female) (Roa Bleck 1993: 43; Kramer 2012: 1[9]) is a distinction that is based on biological sex (Tight 2006: 149; Alarcón 2004: 7). There are only certain cases in which grammatical gender correlates with biological sex. In general, natural gender can be indicated by using two different lexical items, for instance Ger. *Vater – Mutter*; Sp. *padre – madre,* Eng. *father – mother*, by gender-marking inflections such as Sp. *maestro; Ger. Lehrer* (male teacher) versus Sp. *maestra;* Ger. *Lehrerin* (female teacher), or by determiners or adjectives – as mentioned above – that identify the gender of the referent, for example, Ger. *der/die Vorsitzende* (chairman/chairwoman); Sp. *el/la deportista* (sportsman/sportswoman) (Eichler 2011: 139; Alarcón 2006: 8).

The second part of Hockett's definition – suggesting that agreement is a crucial criterion of gender – has met with the general approval of many scholars (Fodor 1959: 2; Ibrahim 1973: 26; Comrie 1999: 457; Corbett 1991: 4; Unterbeck and Rissmann 2000: 585). It means that the gender of a noun is reflected within the agreement targets or associated words (Hockett 1958: 231) such as determiners, pronouns, adjectives and quantifiers that agree with it. These agreement targets as well as the realization of the agreement relationship between the inherently gender marked noun and its targets may differ from language to language.

The gender of a noun is reflected in other syntactically related categories in the context, and gender agreement is a syntactic phenomenon with morphophonological implications for the form of the targets. As a summary of this section, the following definitions are important for the understanding of the linguistic phenomenon investigated in this book. They are partly adapted from Aronoff (1994), Corbett (1991) and Rodina (2007):

(i) **Grammatical gender** is a morphosyntactic phi (ϕ)-feature, which is assigned to a noun in a language based on semantics, morphology, phonology, arbitrary features, or a combination thereof. The term 'gender' is also called noun class to refer to types or subcategories. In this book, the term 'gender' is, however, used to refer to the distinction between masculine, feminine, and neuter nouns.

(ii) **Natural gender** is the classification of nouns in a language as belonging to a specific gender based on the biological sex of the referent.

9 Kramer, R. (2012). Gender in Amharic: A Morphosyntactic Approach to Natural and Grammatical Gender. Manuscript, under review. Retrieved from <http://www9.georgetown.edu/faculty/rtk8/Gender%20in%20Amharic.pdf> (1.3.2013)

(iii) **Gender assignment** is an operation by means of which nouns are associated with a specific gender class based on its inherent features.
(iv) **Gender agreement/concord** is the operation by means of which a gender-carrying lexical item copies its gender feature onto other lexical items e.g. adjectives, relative pronouns.
(v) **Agreement targets** are grammatical categories which agree with the noun, e.g. in gender, number and case.

2.2 What is the purpose of gender?

Some languages do not have grammatical gender while others do. The discussion of grammatical gender in recent scholarly literature has raised an intriguing question about its function in language (Dixon 1986; Greenberg 1978; Corbett 1991; Hickey 2000; Franceschina 2005; Bosworth Andrews 2004; Köpcke and Zubin 2009; among others). In the past few years, numerous claims have been put forward with more or less substantial theoretical and empirical evidence. In view of the complexity of the issue and the scope of this book, this section attempts to provide a brief overview of the main functions of grammatical gender which have found broad consensus among scholars and have been supported by empirical evidence.[10]

(i) Semantic opposition

Grammatical gender has a semantic function in those cases where formal distinctions between lexical items of different meaning is achieved by the determiners they are associated with e.g. Ger. *der Leiter* 'leader' vs. *die Leiter* 'ladder' and Sp. *el frente* 'front' vs. *la frente* 'forehead' (Hickey 2000: 624). Lucy (2000) and Franceschina (2005) consider this function to be more convincing for classifier languages. Franceschina (2005: 79) sees a problem of semantic function for gender languages as they

> [...] generally do not draw on universal semantic notions in establishing gender classes [...]. The grammaticalization of animacy or biological sex distinctions may be candidates for a universal semantic treatment of classification, but gender assignment rules interact with these only in an indirect way.

10 For a detailed discussion see Corbett (1991, 2006), Dahl (2000), Wechsler and Zlatic (2003), Barlow and Ferguson (1988), Lehmann (1982), Neidle et al. (2000), among others.

Following Lucy (2000) and Franceschina (2005), it is assumed that the semantic function of gender in Spanish is restricted to animate nouns indicating a sex distinction (e.g. *la*$_{\text{Fem}}$ *chica*$_{\text{Fem}}$ 'the girl' vs. *el*$_{\text{Masc}}$ *chico*$_{\text{Masc}}$ 'the boy'). In the case of inanimate nouns, gender is intrinsic and "pinpoints the class to which the nominal belongs" following Jakubowicz and Roulet (2008: 189) (e.g. [feminine] for *revista* 'magazine' and [masculine] for *libro* 'book').

(ii) Anticipation of content

Given that nouns are distributed across two genders in Spanish and three genders in German, gender-marked forms (articles, adjectives, possessives etc.) help to reduce the number of possible nouns referents for the listener, who can make use of semantic and pragmatic information from the context (Mills 1986b: 36; Köpcke and Zubin 2009: 151).

The German sentence (2.1), taken from Zubin and Köpcke (1983), illustrates the function of anticipation, presenting the context of two friends looking at a landscape whereby one says:

(2.1) *Guck mal. Das*$_{\text{Neut. Sg}}$ *große, im Garten*$_{\text{Masc. Sg.}}$ *stehende Haus*$_{\text{Neut. Sg.}}$
'Look. The large in the garden standing house.'
(Zubin and Köpcke 1983, qtd. in Mills. 1986b: 36)

The mention of the neuter gender article *das*, allows the listener to reduce the number of possible referents. On the basis of linguistic information from the context, the listener can be sure that the referent must be *Haus* 'house' (Mills 1986b: 36). With regard to nominal compounds in German, Mills (1986b) and Köpcke and Zubin (2009) have also pointed out that gender-marked modifiers help the listener to "identify the head noun in the nominal compound where the compound is made up of nouns of different genders, since […] the last noun in a compound determines the whole" (Mills 1986b: 37).

(iii) Reference tracking

In German, Spanish and English, the speaker is able to make unambiguous anaphoric or deictic reference by using gender-marked pronouns. Consider the examples in (2.2) for anaphoric reference and (2.3) for deictic reference in the three languages.

(2.2) a. Maria photographed Tobias in front of the house when s*he/he/it* was ten years old.
b. Maria fotografierte Tobias vor dem Haus, als *sie/er/es* zehn Jahre alt war.
c. Maria fotografió a Tobías frente a la casa, cuando *ella/él/esto* tenía diez años.

(2.3) a. The Smiths were over for dinner last week. He had gone very gray.
b. Die Smiths waren letzte Woche bei uns zum Abendessen. Er sieht schon sehr grau aus.
c. Los Smiths cenaron en nuestra casa la semana pasada. Él tiene canas.
(Mills 1986b: 38–39)

The different gender-marked forms of the third person pronouns allow the listener to identify the appropriate referent from among the potential referents using the linguistic information and context, and this supports the communicative process itself (MacWhinney and Bates 1989: 18–19). However, the possibilities for disambiguation vary among the three languages. As Mills (1986b: 38) points out, the distribution of nouns across two genders in Spanish and three genders in German makes it more likely that the referent can be established in these languages than in English, where non-ambiguous reference to inanimate nouns is not possible, as a comparison of the examples in (2.4) shows.

(2.4) a. The photo is lying on my desk. It (*the photo/desk*) is very old.
b. Das Foto liegt auf meinem Schreibtisch. Er (*der Schreibtisch*) ist sehr alt.
c. La foto está encima de mi escritorio. El es muy viejo.
(Mills 1986: 38–39)

(iv) Ease of lexical access

Many scholars such as Wienold (1967), Zubin and Köpcke (1983) and Köpcke and Zubin (2009) have argued for German that the grammatical gender classification of nouns helps the speaker in lexical access (Mills 1986b: 37).

(v) Indication of the speaker's attitude

As we will see in the section 2.5.1, a speaker may use a particular gender "to mark status, to show respect or a lack of it and to display affection" (Corbett 1991: 322). The gender of the noun may be fixed or changed by the speaker according to his/her attitude (Corbett 1991: 322). In German, for instance, Köpcke and Zubin (1981: 445) report that the neuter gender is often used for female human beings to show a lack of sexual desirability and to show power or even scorn (e.g. *das Gör* ‘girl’; *das Weib* ‘woman’). The feminine gender is used for men who are considered to be unmanly as in *die Memme* ‘coward’. Similarly, in English the use of the neuter with a human referent has a pejorative connotation such as contempt or scorn (for examples in English see Mathiot 1979; for examples in Spanish see Lang 1990: 94).

To conclude, this section has shed light on the function of the feature gender. As we have seen the functions of gender are multiple and vary from general nominal classification to the display of speaker attitude. Some functions only pertain to a certain number of gender systems while others are used even by languages with a more limited gender system, such as English. Clearly, gender is important for the speaker and listener alike because it does not only help to disambiguate sentences but also to optimize lexical processing.

2.3 Grammatical gender systems

The following section gives a descriptive overview of the gender systems of German, Spanish and English. German has a ternary gender system, distinguishing between feminine, masculine and neuter nouns, whereas Spanish has a binary gender system that distinguishes between feminine and masculine nouns (Alarcón 2006: 8; O’Rourke 2008: 40; VanPatten and Jegerski 2010: 114). By contrast, English has a pronominal gender system (Corbett 1991: 5).

2.3.1 The German gender agreement system

The German gender system distinguishes three grammatical gender classes, namely masculine, feminine, and neuter. The distribution of the German noun inventory across the three gender classes is uneven. A corpus analysis of 4164 monomorphemic nouns listed in the CELEX database (Baayen, Piepenbrock, and Gulikers 1995) conducted by Schiller and Caramazza (2003: 171) reveals that the distribution of the German nouns across the three gender classes is as follows: masculine 38.76%, feminine 35.36%, and neuter 25.88%. Given that German has a ternary gender system, the question of the default gender is subject to debate since linguists do not agree on the existence of one or more default genders. Following Steinmetz’s (2003, 2006) gender default hierarchy, i.e.: masculine > feminine > neuter, it is proposed that masculine is the least marked (default) form. As a result, González-Vilbazo (2005) has postulated the formalization of the gender feature in German as [± feminine] and [± masculine] to account for the neuter.

Compared to Spanish and English, German has the most complex gender system because determiners are marked not only for gender (in the singular), but also for the number and case of the co-occurring noun (Kupisch 2006: 58). Articles in German are syncretic and plurifunctional, i.e. one form expresses more than one function. German articles are known as *portmanteau morphemes* because they represent more than one grammatical feature (here: gender, case and number) and cannot be decomposed (Kupisch 2006: 57). Before this chapter presents the various gender paradigms of a noun's co-occurring elements within the DP, this section will focus on the declension of German nouns.

The declension of German nouns

In German, determiners and adjectives show a pattern of forms (declension), whereas nouns tend not to do so. However, there are some instances where the noun encodes case marking in its inflectional ending. German distinguishes two noun declensions: (i) a regular declension and (ii) a weak declension of masculine nouns, most of which denote male beings.

In the regular declension, the ending *-n* or *-en* is generally added to all nouns in the dative plural. If the noun in the plural ends in *-n* or *-s*, the noun does not have any additional suffix. Table 2.1 gives the regular declension pattern.

Table 2.1: Declension of regular nouns (adapted from Durrell 2016: 32).

Case	**Masculine**		**Feminine**		**Neuter**	
	Singular	**Plural**	**Singular**	**Plural**	**Singular**	**Plural**
Nom.	der Vater	die Väter	die Frau	die Frauen	das Kind	die Kinder
Acc.	den Vater	die Väter	die Frau	die Frauen	das Kind	die Kinder
Gen.	des Vater**s**	der Väter	der Frau	der Frauen	des Kind**es**	der Kinder
Dat.	dem Vater	den Väter**n**	der Frau	den Frauen	dem Kind	den Kinder**n**
Nom.	der Park	die Parks	die Hand	die Hände	das Jahr	die Jahre
Acc.	den Park	die Parks	die Hand	die Hände	das Jahr	die Jahre
Gen.	des Park**s**	der Parks	der Hand	der Hände	des Jahr**es**	der Jahre
Dat.	dem Park	den Parks	der Hand	den Hände**n**	dem Jahr	den Jahr**en**

Masculine and neuter nouns have the case-marking suffix *-s* or *-es* in the genitive singular. Nouns in the dative plural have the suffix *-n* if the plural of the noun does not already end in *-n* or *-s*.

In the weak noun declension, masculine nouns take a suffix *-en* or *-n* in the plural and in all cases in the singular except the nominative, as illustrated in Table 2.2.

Table 2.2: The weak declension of masculine nouns (adapted from Durrell 2016: 32).

Case	Singular	Plural	Singular	Plural
Nom.	der Junge	die Junge**n**	der Student	die Student**en**
Acc.	den Junge**n**	die Junge**n**	den Student**en**	die Student**en**
Gen.	des Junge**n**	der Junge**n**	des Student**en**	der Student**en**
Dat.	dem Junge**n**	den Junge**n**	dem Student**en**	den Student**en**

The following subsections present the gender marking on the associated elements co-occurring with a noun within the DP.

Definite and indefinite articles in German

German distinguishes between definite and indefinite articles. Table 2.3 gives the forms of the definite article and the forms of the indefinite article. Gender is only marked in the singular on both the definite and indefinite articles.

Table 2.3: Declension of the definite and indefinite article in German.

Case	Masculine singular		Feminine singular		Neuter singular		Plural
	Definite	**Indefinite**	**Definite**	**Indefinite**	**Definite**	**Indefinite**	**Definite**
Nom.	der	ein	die	eine	das	ein	die
Acc.	den	einen*	die	eine	das	ein	die
Gen.	des	eines	der	einer	des	eines	der
Dat.	dem	einem	der	einer	dem	einem	den

As can be seen, the definite forms do not generally encode gender unambiguously. The form of the indefinite article *einen* is an exception to this general rule and marks masculine gender (see the asterisk in Table 2.3). In this context, Eichler et al. (2012) note that the indefinite article *einen* displays a high degree of homophony to *ein* in spoken German. Thus, where there is homophony, the distinction between nominative and accusative is void for all genders. The absence of a nominative-accusative distinction always holds true for the neuter and feminine paradigms of the definite and indefinite article.

The plural forms of the definite article differ only for case and for all genders are identical with the feminine form of the definite article in the singular. The indefinite article has no plural form for semantic reasons. Positive statements (2.5a), have no article in the plural and forms of ‘kein’ (inflected for case) are used in negative statements and questions (2.5b).[11]

(2.5)	a.	*ein Schuh* ‘a (masc./ nom. /sg.) shoe (masc./ nom. /sg.)’ a shoe	*Ø Schuhe* ‘Ø shoes (nom./pl.)’ shoes
	b.	*kein Schuh* ‘no (masc./ nom. /sg.) shoe (masc./ nom. /sg.)’ no shoe	*keine Schuhe* ‘keine (nom./pl.) shoes (nom./pl.)’ no shoes

Possessives in German

In German, there are two types of possessives: (1) dependent possessive pronouns used as adjectives and (2) independent possessive pronouns used as nouns.[12] They are declined in the singular according to the gender and case of the noun they occur with, as shown in the following declension paradigm (see Table 2.5). Note that the singular third person dependent possessive pronouns in German show agreement with the gender of the possessor. All possessives take the same endings as the indefinite article. Like the definite article, the plural forms of the dependent possessive pronouns are marked for case but not for gender.

Independent possessive pronouns function as nouns since they refer back to a previously-mentioned noun and are thus anaphoric. The following declension paradigm (Table 2.6) shows that the inflections differ only slightly from those in Table 2.5. The masculine nominative singular form has the ending *-er*, whereas the neuter nominative and accusative singular forms end in *-es*.

11 *Kein/e/n* is used here to show the plural because the forms of *ein* have no plural. ‘No shoes’ is possible but not *‘a shoes’.

12 The dependent possessive pronouns (see Table 2.4) are also called possessive adjectives or possessive articles (Eisenberg 2006; Fehringer 2014) since they precede the noun.

Table 2.4: German dependent possessive pronouns.

Number	1st Person	2nd Person	3rd Person		
			Masculine	Feminine	Neuter
Singular	mein	dein	sein	ihr	sein
Plural	unser	euer[13]		Ihr	

Table 2.5: Declension paradigm of German dependent possessive pronouns.

Case	Singular			Plural
	Masculine	Feminine	Neuter	Masculine / Feminine / Neuter
Nom.	- Ø	-e	- Ø	-e
Acc.	-en	-e	- Ø	-e
Gen.	-es	-er	-es	-er
Dat.	-em	-er	-em	-en

Demonstratives in German

As with the indefinite pronouns, there is a distinction between their use as adjectives and as nouns. Demonstrative pronouns (e.g. *dieser/diese/dieses*) are declined in the same way as independent possessive pronouns (see Table 2.6).

Table 2.6: Declension paradigm of German independent possessive pronouns.

Case	Singular			Plural
	Masculine	Feminine	Neuter	Masculine / Feminine / Neuter
Nom.	-er	-e	-es	-e
Acc.	-en	-e	-es	-e
Gen.	-es / -en	-er	-es / -en	-er
Dat.	-em	-er	-em	-en

13 The possesive pronoun *euer* tends to become *eur-* when an ending is added eg. *eure Katze* 'your cat' (Fehringer 2014: 46).

Interrogative and relative pronouns in German

The German interrogative and relative pronoun *welcher* (masculine), *welche* (feminine) and *welches* (neuter) is declined like the possessives and demonstrative pronouns (Table 2.6). However, there is no genitive form of *welcher* as a relative pronoun. The following genitive forms of the relative pronoun *der /die/ das* are used: *dessen* (masculine and neuter) and *deren* (feminine).

Indefinite pronouns in German

German distinguishes between the use of indefinite pronouns as adjectives and their use as nouns. The items include *jeder/jede/jedes, kein/keine/keines,* and *einige/einiges*. They are gender-marked only in the singular and they have the same suffixes as the pronouns presented above (see Table 2.6).

Adjectives and ordinal numbers

In German, we can distinguish four types of adjectives according to the following four functions (see Table 2.7; Duden 1995: 253, 503):

Table 2.7: Overview of types and functions of adjectives in German.

Functions	Examples
(i) Attributive function	das *geheimnisvolle* Haus 'the mysterious house'
(ii) Predicative function	Das Haus ist *geheimnisvoll*. 'The house is mysterious.'
(iii) Noun function (normalization)	das *Geheimnisvolle* 'the mysterious thing'
(iv) Adverbial function	Die Königin kommt jeden Morgen *geheimnisvoll* aus ihrer Kammer. 'Every morning, the queen comes mysteriously out of her chamber.'

As the focus of this book lies in the investigation of gender assignment and agreement, especially between a noun and adjectives within the DP in SLA and HLA of Spanish, the marking of agreement on adjectives and ordinal numbers in German will be presented next. Attributive adjectives always precede the noun. They agree in gender, case and number with the noun. Depending on whether these attributive adjectives are accompanied by or occur without a determiner and the kind of determiner, there are three sets of adjectival endings in German, conventionally called strong, weak and mixed declensions (Table 2.8).

Table 2.8: Strong, mixed and weak declension of German adjectives (adapted from Mills 1986b: 15).

		Case			
		Nom.	**Acc.**	**Gen.**	**Dat.**
Masculine singular	**strong**	-er	-en	-es	-en
	mixed	-er	-en	-en	-en
	weak	-e	-en	-en	-en
Feminine singular	**strong**	-e	-e	-er	-er
	mixed	-e	-e	-en	-en
	weak	-e	-e	-en	-en
Neuter singular	**strong**	-es	-es	-es	-em
	mixed	-es	-es	-en	-en
	weak	-e	-e	-en	-en
Plural	**strong**	-e	-e	-er	-en
	mixed	-en	-en	-en	-en
	weak	-en	-en	-en	-en

The underlying principle governing the use of the strong declension is that the more clearly distinguished strong ending is used if the adjective is not accompanied by a determiner in the noun phrase (e.g. frisch**e** Milch 'fresh milk', gut**es** Brot 'good bread', gut**er** Wein 'good wine') or if the determiner has no inflectional ending which clearly marks the gender, number and case of the noun (e.g. kein schön**er** Tag 'not a nice day', mein neu**es** Kleid 'my new dress'; Durrell 2016: 132). The strong declension follows the declension paradigm of the demonstrative pronoun (see Table 2.6) except that the genitive singular masculine and neuter forms end in *-en* (e.g. die Perfektion rein**en** Klanges 'the perfection of pure sound'; Durell 2016: 131).

The weak declension is used when the adjective is preceded by a definite determiner showing the gender, number and case of the noun. As can be seen in Table 2.8, the weak declension has only two endings *-e* and *-en*. The ending *-e* occurs in the nominative singular of all genders (der gut**e** Wein 'the good wine', das gut**e** Brot 'the good bread', die gut**e** Suppe 'the good soup') and the accusative singular of the feminine and neuter gender (das gut**e** Brot 'the good bread', die gut**e** Suppe 'the good soup'; Durell 2016: 131). The ending *-en* is used in all other combinations of gender, number and case. The mixed declension is used when an indefinite determiner or quantifier precedes an adjective (ein gut**er** Wein 'a good wine', ein gut**es** Brot 'a good bread', eine gut**e** Suppe 'a good soup'). The endings of the mixed declension overlap with the strong declension. The only exceptions are the dative singular in all genders and the feminine genitive singular, all of which end in *-en* (e.g. einem gut**en** Brot 'a good bread', einem gut**en** Wein 'a good wine', einer gut**en** Suppe 'a good soup'; Durell 2016: 132). Ordinal numbers follow the same declension paradigm as adjectives (*der zweite Pfirsich* – 'the second peach' versus *der schöne Pfirsich* – 'the fine peach').

2.3.2 The Spanish gender agreement system

Similar to other Romance languages like Italian and French, Spanish has two grammatical gender classes, namely masculine and feminine. Based on Bulls' findings (1965), the distribution of the two gender values is almost equally represented in Spanish, as 52% of the nouns in his corpus are masculine and 45% feminine. The discrepancy of 3% stems from epicene nouns, which can have both masculine and feminine semantic gender (Clegg 2010: 6). Many scholars, including Prado (1982), Roca (1989), González-Vilbazo (2005) consider masculine as the unmarked or default gender of Spanish and hence the gender feature is often formalized as [± feminine]. Elements such as determiners, demonstratives, possessives, interrogatives, indefinites, relatives, numerals and adjectives are marked for gender in Spanish, as shown below.

Definite and indefinite articles in Spanish

In Spanish, gender is marked in the singular and plural form of both the definite and indefinite articles. The singular forms of the definite article are *la* (feminine), *el* (masculine) and *lo* (so-called neuter), whereas the plural forms are *las* and *los*. A highly contentious issue among grammarians and linguists alike is whether the form *lo* should be considered a neuter definite article used to nominalize adjectives (*lo bueno* 'the good thing'), adverbs (*lo mejor* 'the best'), participles (*lo escrito* 'the written word'), possessives (*lo mío* 'mine') and ordinals (*lo primero* 'the first') (Eichler 2011: 152). Scholars such as Stockwell et al. (1965), Roa Bleck (1993) and Haase (2000) hold a traditional view of Spanish grammar and posit a neuter grammatical gender in Spanish (Alarcón 2006: 8). In their view, the neuter form can be understood as an "overt remnant in Spanish of the Latin neuter gender" (Bergen 1978: 871). However, Bergen (1978) and Roca (1989) disagree, since assigning a third gender form neuter contradicts the “binary categorization of nouns” (Alarcón 2006: 8). Their argument is substantiated by the fact that the ending *-o* in *lo* or *esto* is a “marker of masculine gender forms and their modifiers showing the same formal agreement as do the modifiers of other masculine gender forms (compare *El perro es pequeño* ‘The dog is small’ to *Esto es pequeño* ‘This one is small’)” (Bergen 1978: 872). Bergen (1978: 872) goes one step further, pointing out the following:

> gender-variable adjectives agree in gender with the noun or pronoun that they modify, [thus] the recognition of neuter gender pronouns would erroneously imply that adjectives also have a separate inflected form for the neuter gender, a form which in all cases would be homophonous with the masculine singular form of the adjective.

If we accept Bergen’s argument, it is evident that there cannot be a grammatical gender neuter in Spanish.

The indefinite article in Spanish has the two forms (*un/una*) in the singular and two (*unos/unas*) in the plural. Table 2.9 gives a brief overview of the Spanish indefinite and definite article forms.

Table 2.9: Spanish definite and indefinite articles (Eichler et al. 2012: 5).

Singular				**Plural**			
Masculine		**Feminine**		**Masculine**		**Feminine**	
Definite	**Indefinite**	**Definite**	**Indefinite**	**Definite**	**Indefinite**	**Definite**	**Indefinite**
el/ lo	un	la	una	los	unos	las	unas

Possessives in Spanish

Spanish makes a distinction between possessive adjectives and possessive pronouns. Table 2.10 shows the Spanish possessive adjectives, in both the singular and plural forms depending on the noun that follows.

Taking a closer look at Table 2.10, it becomes apparent that the forms for the third person singular and plural (*sus*) are identical. Furthermore, there is a striking difference between the first- and second-person plural forms and the other forms, i.e. only the first and the second person plural forms are marked for gender while the other forms display an inflection for number only (Eichler 2012: 153). Unlike the possessive adjectives in Spanish, all the forms of the possessive pronouns are gender-marked, as can be inferred from the following Table 2.11.

Table 2.10: Spanish possessive adjectives (Bosque 2007).

Person	Singular		Plural	
	Masculine	**Feminine**	**Masculine**	**Feminine**
1st Person Singular	mi		mis	
2nd Person Singular	tu		tus	
3rd Person Singular	su		sus	
1st Person Plural	nuestro	nuestra	nuestros	nuestras
2nd Person Plural	vuestro	vuestra	vuestros	vuestras
3rd Person Plural	su		sus	

Table 2.11: Possessive pronouns in Spanish (Bosque 2007).

Person	Singular		Plural	
	Masculine	**Feminine**	**Masculine**	**Feminine**
1st Person Singular	mío	mía	míos	mías
2nd Person Singular	tuyo	tuya	tuyos	tuyas
3rd Person Singular	suyo	suya	suyos	suyas
1st Person Plural	nuestro	nuestra	nuestros	nuestras
2nd Person Plural	vuestro	vuestra	vuestros	vuestras
3rd Person Plural	suyo	suya	suyos	suyas

Demonstratives in Spanish

As is the case with the possessives, Spanish distinguishes between the nominal and the adjectival use of demonstratives. In contrast to English, which has two demonstrative forms *this/that* in the singular and *these/those* in the plural, Spanish has three demonstrative forms, namely *este/éste, ese/ése, aquel/aquél* in singular and *estos/éstos, esos/ésos, aquellos/aquéllos*[14] in the plural (Eichler 2011: 154). The choice in context depends on spatial as well as temporal proximity or distance from an object, the speaker and the addressee (Nuessel 2006: 84). The Spanish demonstrative *este* refers to an item that is close to the speaker, but

14 It is important to point out that the accent marks on the demonstrative pronouns have become obsolete (c.f. Ortografía de la Lengua Española, RAE, 2010).

far away from the addressee. By contrast, the demonstrative *ese* indicates distance from the speaker and proximity to the addressee. *Aquel,* on the other hand, refers to an item that is remote from both the speaker and the addressee (Eichler 2011: 154; Harris 1991: 73f.). The system of Spanish demonstratives is shown in Table 2.12. Note that the demonstratives in Spanish agree in gender (*masculine, feminine, neuter*) and number (*singular/plural*) with the noun that is modified or replaced.

Table 2.12: Demonstratives in Spanish (Bosque 2007).

Degree of Proximity and Distance	Singular			Plural		
	Masculine	Feminine	Neuter	Masculine	Feminine	Neuter
Proximity to the speaker	éste/ este	ésta/ esta	esto	éstos/ estos	éstas/ estas	éso
Proximity to the hearer	ése/ ese	ésa/ esa	éso	ésos/ esos	ésas/ esas	ésto
Distance	aquél/ aquel	aquélla/ aquella	aquello	aquéllos/ aquellos	aquéllas/ aquellas	aquello

Interrogative and relative pronouns in Spanish

Like demonstrative pronouns, relative pronouns in Spanish are gender-marked. Table 2.13 gives an overview of the different forms of relative pronouns. Note that the neuter forms *lo que* and *lo cual* occur only in the singular.

Table 2.13: Relative pronouns in Spanish (Bosque 2007).

Singular			Plural	
Masculine	Feminine	Neuter	Masculine	Feminine
el que	la que	lo que	los que	las que
el cual	la cual	lo cual	los cuales	las cuales
cuyo	cuya	–	cuyos	cuyas

Unlike the relative pronouns, interrogative pronouns in Spanish show no gender variation with the exception of the interrogative pronoun *cuánto*, – *cuánta* (fem. sg.), *cuánto* (masc. sg.), *cuántos* (masc. pl.) and *cuántas* (fem. pl.) (Eichler 2011: 154).

Indefinite pronouns in Spanish

In Spanish, indefinite pronouns can either function as indefinite nouns or as indefinite adjectives and are gender-marked in both singular and plural. Table 2.14 illustrates the forms with *alguno* (masc. sg.) and *ninguno* (masc. sg.) as examples.

Table 2.14: Indefinite pronouns in Spanish (Bosque 2007).

Singular		**Plural**	
Masculine	**Feminine**	**Masculine**	**Feminine**
alguno/ algún	alguna	algunos	algunas
ninguno/ ningún	ninguna	ningunos	ningunas

A close look at the indefinite pronouns above reveals that the forms *alguno* and *ninguno* become *algún* and *ningún* when they precede a masculine singular noun (Batchelor and San José 2010: 38; Eichler 2011: 154; Stein 2011: 198). As well as *alguno* and *ninguno* presented in Table 2.14, the following indefinite pronouns in Spanish also agree with the noun in gender: *mucho, poco, tanto, demasiado, otro* and *mismo*. The indefinite pronoun *todo* used as a noun does not indicate gender, and only when functioning as an indefinite adjective does *todo* agree with the noun.

Adjectives and ordinal numbers

For Spanish, it can be said that predicative and attributive adjectives agree in gender with the noun that they modify. In general, the gender-inflected endings of adjectives correspond to the endings on the nouns (Andrews Bosworth 2004: 25). Thus, adjectives ending in -*o* are masculine and those ending in -*a*, feminine, as shown in Table 2.15.

Table 2.15: Adjectives in Spanish (Stein 2011: 219).

Singular		**Plural**	
Masculine	**Feminine**	**Masculine**	**Feminine**
alto	alta	altos	altas
blanco	blanca	blancos	blancas

However, there are some adjectives such as *interesante, impaciente* or *fuerte* – ending in the vowel *-e* – that are invariant adjectives with respect to gender marking.[15] In other words, these adjectives do not have a gender-inflected morpheme. On the other hand, ordinal numbers in Spanish – for instance *el primero* (masc. sg.) and *la primera* (fem. sg.) –, agree in gender and number with the noun that follows.

2.3.3 The English pronominal gender system

The gender system of English is significantly different from that of German and Spanish since English lost grammatical gender in its transition from Old to Middle English. During the period of Old English (450–1100 or 1150), English was like other Indo-European languages (e.g. Modern German) in terms of having a ternary gender system (masculine, feminine and neuter). Inflectional morphology or suffixes, constituted an essential criterion for categorizing a noun as belonging to a particular gender. It was not until the language shift in the 14th century (Hellinger 1990: 64) that morphology in English underwent considerable changes, resulting not only in the demise of the inflection system but also in the loss of the gender system (Corbett 1991: 101). As a result of this development, the Modern English gender system is a "'pronominal gender system', [meaning that] gender is marked solely on personal pronouns" (Corbett 1991: 12). Furthermore, this development affected gender concord between the noun and its accompanying elements such as articles, adjectives, possessives and numerals, which is no longer found in Modern English (Schwarze 2008: 177; Cruzan 2003: 13 f.). As Schwarze (2008: 177) and Cruzan (2003: 14) note, gender is only marked externally by means of pronouns, and gender marking is primarily based on semantic and not on grammatical criteria. The earlier distinction of three gender classes and cases has only been retained in the 3rd person singular pronouns in the nominative (*he/she/it*), accusative (*him/her/it*), genitive (*his/hers/its*) and reflexive forms (*himself/herself/itself*) (see Table 2.16 and Andrews Bosworth 2004: 28).

15 At this point it is important to stress that in Spanish "not all adjectives show gender agreement depending on their morphophonological form" (Montrul and Potowski 2007: 305). As indicated earlier, adjectives ending in –*e* are not inflected for gender and thus remain invariant. The same is true for adjectives ending in a consonant, for instance, *azul* ('blue') (Montrul and Potowski 2007: 305).

Table 2.16: The gender-marked pronoun system in English (Mills 1986b: 13).

Gender-marked forms	Masculine	Feminine	Neuter
Subject	he	she	it
Object	him	her	it
Possessive pronoun	his	hers	its[16]
Possessive adjective	his	her	its

Kádár (2007: 296) goes even further, stressing that the personal pronouns clearly follow semantic gender agreement and English can thus be considered a semantic gender system. He bases his argument on the fact that: "male humans are masculine (*he*), female humans are feminine (*she*) and anything else is neuter (*it*)" (Corbett 1991: 12). Bloomfield states:

> The English definite or third-person pronouns [...] differ [...] in the singular form for personal and non-personal antecedents: personal *he, she*, versus non-personal *it*. [...] The distinction, then, between the pronoun-forms *he* and *she*, creates a classification of our personal nouns into *male* (defined as those for which the definite substitute is *he*) and *female* (similarly defined by the use of the substitute *she*). Semantically, this classification agrees fairly well with the zoological division into sexes. (Bloomfield 1994: 253)

In this context, Schwarze raises an objection to Corbett's and Bloomberg's semantic criteria (*female* vs. *male* and *human* vs. *non-human*), which are used for the classification of the personal pronouns, pointing out that "die meisten Personenbezeichungen des Englischen [sind] hinsichtlich des Geschlechts überhaupt nicht spezifiert" [most English nouns denoting human beings are not specified for gender at all, author's translation] (Schwarze 2008: 174).[17] She supports her claim by adding that there is only a limited number of cases in which the choice of a pronoun can be based on the semantic features of a preceding noun and thus it is only for these that a classification according to the criterion (*male* vs. *female*) is reasonable (Schwarze 2008: 174).[18]

16 Mills (1986b: 13) points out that "there is no evidence of the use of this form".
17 In English, nouns that are not specified for gender are called common gender noun. Nouns such as *teacher*, *lawyer*, *student* etc. are examples. For a detailed overview see Schwarze (2008: 174f.).
18 Schwarze gives examples in which the natural gender is lexically inherent (*mother* vs. *father*) or occurs via derivation (*actor* vs. *actress*) (Schwarze 2008: 174f.). However, Hellinger (1990: 72) points out that nouns that are marked by gender-specific morphemes such as *-ess* are very rare in English and most of them refer to females.

The increasing flexibility and fluctuation in the Modern English gender assignment – affecting the use of pronouns due to the speaker's attitudes and emotions –, gave rise to a very heated discussion about the presence of a gender system among scholars such as Erades (1956), Kaneikiyo (1965), Strang (1970), Vachek (1976) Markus (1988), Greenbaum (1996).[19] From the point of view of critical scholarship, it may be justifiable to claim that the presence of pronouns is not a sufficient criterion to consider Modern English as a gendered language with a gender system since in the agreement hierarchy, pronouns, and specifically personal pronouns, are the least important of all targets.[20] However, Corbett (1991: 169f.) objects to this claim, arguing that English has a gender system and that its pronouns are agreement targets. He stresses that

> [i]n languages like French it is natural to treat gender of pronouns together with that of other targets. Consequently, it would be strange to treat pronouns differently (as not defining genders), simply because in a given language they were the sole indicators. (Corbett 1991: 169)

Nevertheless, some scholars, including Hall (1951), Fodor (1959) and Hellinger (1990, 2001), strictly reject the idea of classifying English as a gendered language. Terms such as 'pronominal gender system', 'natural system' or even 'semantic system' are used to describe the Modern English gender system. Schwarze (2008) comments:

> Auf diese Art und Weise wird hervorgehoben, dass sich das Englische sowohl im Hinblick auf die Klassifikation als auch in puncto Kongruenz von (proto-) typischen Genussprachen unterscheidet: Die Bezeichnung 'natural gender system' unterstreicht, dass die Sexusunterscheidung (wie auch die Unterscheidung belebt vs. unbelebt) im Englischen eine ungleich größere Rolle spielt, als dies normalerweise der Fall ist; die Rede vom ‚pronominal gender' macht explizit, dass lediglich eine pronominale (externe) Markierung erfolgt, während Artikel, Adjektive, bestimmte Verbformen etc. – wiederum anders als in den meisten Genussprachen – genusinvariabel sind. (Schwarze 2008: 177)

> [In this way it is highlighted that English differs from prototypical gender languages in regard to the classification as well as in terms of agreement. The term natural gender system emphasizes that in English the distinction based on sex (as well as the distinction animate vs. inanimate) plays a more important role than it is usually the case; and 'pronominal gender' makes explicit that only pronominal (external) marking takes place, while articles, adjectives, certain verbs etc. – in contrast to most gender languages – are of invariable gender.] [author's translation]

19 For a detailed overview of the different viewpoints and claims regarding the existence of an English gender system, see Cruzan (2003: 21–26).

20 For a closer look on the concept of the *agreement hierarchy* see Corbett (1991: 226f.)

In conclusion, all these terms highlight the special feature of the English gender system, which marks only gender on singular third person pronouns and, thus, is at odds with the German gender system (see section 2.3.1) and the Spanish system (see section 2.3.2). The next subsection gives a comparison of the German, Spanish and English gender systems.

2.4 Comparison of the gender systems

The previous subsections have presented a descriptive overview of the gender systems in Spanish, the target language of all the speakers analyzed in this book, and in German and English as the majority language of HSs and L1s of L2 learners. Without doubt, the German, Spanish and English gender systems differ from each other in fundamental ways, and therefore this section will summarize the major differences in the grammatical gender systems of these languages. Firstly, Modern English has a limited gender system, with gender marked only by means of pronouns, whereas Spanish has a binary gender system (feminine/masculine) and German a ternary gender system (feminine/masculine/neuter) that assigns a specific gender to nouns.

Secondly, English shows no gender concord between the noun and its accompanying elements such as determiners, adjectives, possessives etc. within the DP. In Spanish and German, by contrast, there is gender agreement between nouns and their accompanying elements in the DP. However, gender marking on these elements is a language-specific phenomenon and thus varies in these two languages.

With respect to the determiner agreement systems, German and Spanish nouns, unlike English nouns, assign gender to determiners and agree with them. Taking the definite and indefinite articles as an illustrative example, it is striking that German has plurifunctional determiners marked for number, case, and gender only in the singular, whereas Spanish determiners are marked only for number and gender in both the singular and plural (see Stockwell et al. 1965: 66). Plurifunction in German requires speakers and learners to "have knowledge of cases and number in order to establish gender paradigms" (Mills 1986b: 14). English has only "a distinction for number, and a variation in form [regarding the indefinite article] determined by whether a consonant or vowel follows" (Stockwell et al. 1965: 67). Table 2.17 gives a summary of these differences.

Table 2.17: Differences between the definite and indefinite determiner agreement systems in German, Spanish and English.

Language / Gender(s)	Singular		Plural	
	Definite	**Indefinite**	**Definite**	**Indefinite**
German				
Masculine	der	ein	die	–
Feminine	die	eine	die	–
Neuter	das	ein	die	–
Spanish				
Masculine	el/lo	un	los	unos
Feminine	la	una	las	unas
English				
	the	a / an[21]	the	–

Spanish, German and English also differ in terms of their possessive pronouns. In Spanish and German, the possessive pronouns agree in number and gender with the antecedent i.e. possessum (e.g. *mein Buch*/*meine Bücher* 'my book/my books'). But in the third person singular, German possessive pronouns agree in gender with the possessor (e.g. *das Buch der Frau* 'the book of the woman' – *ihr Buch* 'her book' vs. *das Buch des Mannes* 'the book of the man'- *sein Buch* 'his book'). This special feature of possessive pronouns in the third person singular is also found in English, which has no agreement between the possessive pronouns and the antecedent. As far as personal pronouns are concerned, Andrews Bosworth (2004: 29) observes that:

> Spanish pronouns are similar to English. The nominative pronouns *él* and *ella* correspond to 'he' and 'she', respectively, and the accusative *lo* and *la* to 'him' and 'her'. However, where English uses gender-neutral 'they' in the plural, Spanish also distinguishes between a group of females *ellas*, and a group of male *ellos*.

Andrews Bosworth's observation also applies to German pronouns, which are similar to English as they use gender-neutral forms such as *sie* in the plural. As far as

21 The indefinite article *an* precedes a noun beginning with a vowel, whereas the indefinite article *a* precedes a noun beginning with a consonant.

the agreement systems of adjectives are concerned, the three languages again show cross-linguistic differences. Attributive adjectives can occur prenominally or postnominally within the NP in Spanish, whereas in German and English there are no postposed adjectives, as exemplified in Table 2.18. By contrast, predicative adjectives occur outside the NP of the noun they modify (e.g. *The car is red.*).

Table 2.18: Differences between the adjectival agreement systems within the DP in German, Spanish and English.

Pre-posed adjectives		
Language /Gender(s)	**Singular**	**Plural**
German		
Masculine	der kleine Stuhl	die kleinen Stühle
Feminine	die kleine Blume	die kleinen Blumen
Neuter	das kleine Buch	die kleinen Bücher
Spanish		
Masculine	el pequeño libro	los pequeños libros
Feminine	la pequeña silla	las pequeñas sillas
English	the small chair the small flower the small book	the small chairs the small flowers the small books
Post-posed adjectives		
	Singular	**Plural**
German	–	–
Spanish		
Masculine	el libro pequeño	los libros pequeños
Feminine	la silla pequeña	las sillas pequeñas
English	–	–

Spanish has agreement between the adjective and the noun regardless of its position inside or outside the NP (i.e. attributive vs. predicative adjectives). German only has agreement between a prenominal adjective and the noun, and thus agreement depends on word order (Foucart 2008: 27). English has prenominal adjectives, and they do not agree with the noun in gender.

The number of gender values and gender-marked elements comprising articles, demonstratives, (possessive) pronouns, adjectives etc. is language-specific and its transparency varies. Gender marking in English plays almost no role, given the language's loss of grammatical gender in Middle English. The situation is different in Spanish, which is rich in gender-marked inflection, and grammatical gender can be clearly inferred from the forms. In German, gender marking is less transparent than in Spanish, especially in the forms of the determiners. Table 2.19 summarizes the most important characteristics of the gender features in the three languages involved in the present study.

Table 2.19: Summary of characteristics of the gender features in German, Spanish and English (adapted from Klassen 2016: 35).

Language	Gender values	Formalization	Default value	Elements agreeing with the noun in gender	Relationship between inflection and gender value
German	masculine feminine neuter	[± feminine] [± masculine]	masculine	determiners pronouns adjectives	complex relationship between inflection and gender value
Spanish	masculine feminine	[± feminine]	masculine	determiners pronouns adjectives	often clear relationship between inflection and gender value
English	masculine feminine neuter (only restricted to pronouns)	–	–	pronouns	limited relationship between inflection and gender value

2.5 Gender assignment systems

One intriguing question, which has been highly debated within linguistics (Corbett 1991) and psycholinguistics (Van Berkum 1996; Schriefers and Jeschniak 1999), is the mechanism by which nouns are assigned to different genders. Native speakers know the gender of each noun, but acquiring this knowledge proves difficult for foreign learners (Corbett 1991: 7). But how does a native speaker know the appropriate gender for each noun in his/her language? Here, there are two schools of thought based on claims about whether gender assignment is arbitrary or to some extent rule-governed. Proponents of the

Arbitrariness Hypothesis on gender assignments to nouns, including Brugmann (1889), Bloomfield (1973/1994), Fodor (1959) and Maratos (1979), assume that gender seems to be an arbitrary feature of nouns and that speakers simply have to memorize the gender of each noun in the course of language acquisition. Maratos (1979: 232) succinctly sums up:

> The classification is arbitrary. No underlying rationale can be guessed at. The presence of such systems in a human cognitive system constitutes by itself excellent testimony to the occasional nonsensibleness of the species. Not only was this system devised by humans but generation after generation of children peaceably relearns it.

Opponents of the Arbitrariness Hypothesis, also known as analogists, include Zubin and Köpcke (1984a, b), Köpcke and Zubin (1986), MacWhinney (1978) and Corbett (1991) who question the view that gender assignment is a completely arbitrary classification. In their view, there is a system of rules and regularities to which speakers have access. This system, also referred to as a gender assignment system, helps speakers to select the gender of nouns. Empirical evidence from language acquisition research confirms the assumption of an existing gender assignment system and thus argues against the lexicalization of gender. Native speakers produce almost no errors in the gender assignment of nouns. If they really have to memorize the gender of each noun, a much higher error rate is likely to occur due to memory failure (Corbett 1991: 70–104). Furthermore, they are able to assign a particular gender to novel words, loan words and even invented words in a way that is not random (see Ervin 1962 for Italian; Köpcke and Zubin 1984, 1996 for German; Karmiloff-Smith 1979 for French; Pérez-Pereira 1991 for Spanish).[22] These convincing accounts refute the Arbitrariness Hypothesis, and scholars generally regard gender assignment systems to be fundamentally systematic in all languages (Corbett 1991: 1350). According to Corbett (1991: 7f.), assignment is based on two types of information about the noun: the meaning (semantics) and the form. The latter includes the level of derivational and inflectional morphology (*word structure)* as well as the level of phonology (*sound structure)*. Consequently, languages are divided into two types of assignment systems: (1) semantic gender assignment system (here referred to as semantic gender) or (2) formal gender assignment system (here referred to as grammatical gender). Corbett (1991: 8) postulates a semantic core as a universal property of all gender assignment systems.

22 According to studies on gender assignment regularities in languages with grammatical gender, the gender of at least 85% of nouns is moderately predictable by morphological or phonological gender regularities, which are stored in the lexicon (Corbett 1991: 68).

This section focuses on the gender assignment systems in the three languages involved in this study (English, German and Spanish). Section 2.5.1 and 2.5.2 will consider the semantic and formal criteria that can account for noun gender in these languages. The gender regularities, however, are probabilistic in nature and differ greatly between the languages, as will be shown. Taking into consideration that the Modern English gender system is – in contrast to Spanish and German – solely based on semantic criteria and not dependent on formal criteria, gender assignment in English can only take place within the scope of semantic assignment rules (Cruzan 2003: 17ff.).

2.5.1 Semantic gender regularities

In general, semantic gender regularities can be understood in terms of assigning a specific gender to a noun based on its meaning or aspects of its meaning (Köpcke and Zubin 1984; Cantone 1999; Cruzan 2003; Eichler 2011). These aspects of meaning can involve "male/female, human/non-human and animate/inanimate dichotomies, or combinations of them" (Alarcón 2006: 6). The clearest semantic basis in gender assignment is, however, the ''natural gender (or perceived sex) principle''[23] (Schwichtenberg and Schiller 2004: 328). In those cases, the grammatical gender assigned to the nouns coincides with the biological sex of the referent. Consequently, male human beings are denoted as masculine (Eng. *the man*; Span. *el hombre*; Ger. *der Mann*) and female human beings as feminine (Eng. *the woman*; Span. *la mujer*; Ger. *die Frau*; Köpcke and Zubin 1996). Apart from the principle of natural gender, a set of further semantic gender regularities exist in German, Spanish and English which will be illustrated in the following subsections.

2.5.1.1 German

The natural gender principle (biological sex) applicable solely to animates is one of the most straightforward semantic regularities in gender distribution, as in the examples *die Frau* 'the woman' and *der Mann* 'the man' (Mills 1986b: 23ff.), which are feminine and masculine respectively. There are only a few exceptions to this rule, such as *das Mädchen* 'the girl', which is neuter although referring to a feminine entity.

23 The principle of perceived sex was originally formulated by Köpcke and Zubin (1996). According to this principle, it is assumed that nouns denoting perceived animate entities as male or female are associated with the gender of their biological sex (Köpcke and Zubin 1996: 481).

In spite of the natural gender principle, Köpcke (1982: 71ff.) and Köpcke and Zubin (1996) stressed in their work that 15 other semantic regularities operate in German (see also Köpcke and Zubin 1983, 1984). According to them, there are cases where the natural sex distinction is overridden by the semantic concept of devaluation or immaturity. Thus, feminine gender can be assigned to a male referent in order to put an emphasis on the referent's lack of masculinity, as in *die Tunte* 'effeminate homosexual' or *die Memme* 'coward' (Mills 1986b: 16). Similarly, neuter gender can be assigned to females. In this context, Zubin and Köpcke (1981: 445) give the following rule: "Nouns canonically referring to women are feminine or neuter, depending on lexical content for sexual status, kinship status, and derogation." The use of the neuter gender with females such as *das Gör* 'girl', *das Kind* 'child' is associated with the age before recognized sexual status and with immaturity, or with a lack of sexual desirability and a lack of power (e.g. *das Weib* 'woman'), carrying a pejorative connotation (Zubin and Köpcke 1981: 445; Mills 1986b: 16f.). These mismatches between natural and grammatical gender account for only a few instances. As Wegener (1995b) points out, the high validity of the natural gender principle (86.1%) for the designation of animates applies to 5.9% of the nouns in the German core vocabulary.

With regard to the category of animals, Köpcke and Zubin (1984) argue that the principle of natural gender is applicable to nouns denoting domestic and wild animals (e.g. *der Bulle* 'bull'- *die Kuh* 'cow'; *der Hirsch* 'deer'- *die Rehkuh* 'doe'). This correspondence is referred to as the principle of egocentricity and relatedness to culture (Köpcke and Zubin 1984: 33). Classification based on natural gender applies more to domestic animals than to wild animals as they are of economic importance. Here, gender assignment is subject to a distinction between father, mother, and young animal (e.g. *der Eber* 'boar'- *die Sau* 'sow'- *das Ferkel* 'piglet'; *der Hahn* 'cock', *die Henne* 'hen', *das Küken* 'chick'; *der Hengst* 'stallion', *die Stute* 'mare', *das Fohlen* 'foal'). Based on these examples, the following pattern of gender assignment occurs: Masculine and feminine gender is assigned according to the biological sex of the father/mother animal, and neuter gender is assigned to baby animals (Zubin and Köpcke 1986: 156).

Building on the assumptions of Rosch and colleagues that there is a close correlation between gender assignment and the taxonomic ranking of nouns, Rosch et al. (1977), Köpcke (1982) and Zubin and Köpcke (1986) developed further the folk taxonomy of German nouns according to gender distinctions and postulated semantic principles underlying gender assignment in German. According to Zubin and Köpcke's (1983, 1984a), semantic gender rules consisting of superordinate terms (hyperonyms) such as *das Besteck* 'cutlery', *das Obst* 'fruits', *das Kraftfahrzeug* 'motor vehicle' are primarily neuter in gender regardless of the feature [± animacy] (see Köpcke and Zubin 1984, 1996; Zubin and

Köpcke 1986). By contrast, basic level and subordinate terms occur with all three genders (masculine/feminine/neuter). Subordinate terms receive their gender from the dominating basic level term. For instance, wine subtypes or hyponyms (*der Rosé, der Merlot, der Chardonnay*) inherit masculine gender from the basic level term *der Wein* 'the wine', whereas non-alcoholic sparkling drinks such as *die Cola* or *die Fanta* inherit feminine gender from the basic level term *die Limonade* 'the lemonade' (Köpcke and Zubin 1984, 1996; Zubin and Köpcke 1986).[24] Köpcke and Zubin (1984, 2009) refer to this underlying pattern of semantic motivation for gender assignment as the principle of subcategorization, whereas others, including Wegener (1995b: 72) and Heringer (1995) use the term *Last Member Principle*.

In a further study, Zubin and Köpcke (1984) identified another type of semantic gender regularity, what they called 'classification along a semantic continuum', implying two poles of a semantic continuum with different genders in German. A commonly cited example is the affect continuum: nouns associated with introverted affect (e.g. *die Scham* 'the shame') have feminine gender, whereas nouns associated with extroverted affect (e.g. *der Zorn* 'the anger') have masculine gender.

As well as these semantic rules and principles, scholars such as Köpcke (1982), Köpcke and Zubin (1983, 1984a, b, 1996) and Zubin and Köpcke (1984) have demonstrated that there is a large number of additional semantic categories (e.g. rocks / stones, beverages, minerals, spices, fabrics) correlating with a particular gender. All of these semantic gender assignment regularities account only for small semantically related groups of nouns with a considerable number of exceptions. For instance, fruits are generally associated with feminine gender. The nouns *der Apfel* 'the apple' and *der Pfirsich* 'the peach' are an exception to the rule because they are masculine (Köpcke and Zubin 1984: 37f.; for further examples and details see Köpcke 1982; Köpcke and Zubin 1983, 1984, 1996; Zubin and Köpcke 1984).[25]

2.5.1.2 Spanish

Like English and German, Spanish assigns gender to humans based on the semantic *principle of natural gender*. In the case of nouns denoting animals, the

24 Note that the non-alcoholic drink *die/das Sprite* has varying feminine and neuter gender (Schwichtenberg et al. 2004: 328). However, the use of the feminine gender is generally preferred in oral and written speech.

25 Based on the narrow semantic scope of the semantic gender regularities and the numerous exceptions to these rules, Eisenberg (1994: 174) questions the validity of these semantic assignment rules: "Über die Systematik des Zusammenhangs von Genus und Bedeutung läßt sich in solchen Aufzählungen wenig entnehmen." [Such enumerations give little evidence of a systematic relationship between gender and meaning] [author's translation].

correlation between biological sex and grammatical gender (e.g. *gato* ‘tomcat’ vs. *gata* ‘cat’) tends to be the exception rather than the rule. Spanish has two different names for the male and the female of a species only for a small group of nouns, typically pets or farm animals (Morales 2008: 9f.), as shown in (2.6):

(2.6)	a. el caballo	‘stallion’	la yegua	‘mare’
	b. el carnero	‘ram’	la oveja	‘sheep’
	c. el toro	‘bull’	la vaca	‘cow’

In most cases, nouns referring to animals have invariable gender applied to either sex (William et al. 2010: 19).[26] Such nouns are referred to in grammatical desriptions as *epicene* or *common nouns* (William et al. 2010: 19). The following are examples:

(2.7)	a. el castor	‘the beaver’
	b. el puma	‘the puma’
	c. la rana	‘the frog’
	d. la nutria	‘the otter’

The sex of these animals can only be indicated by using the word *macho* ‘male’ or *hembra* ‘female’ with a noun of this kind with the corresponding definite article as in (2.8):[27]

(2.8)	a. la jirafa hembra	‘the female giraffe’
	b. la jirafa macho	‘the male giraffe’
	c. el dinosaurio macho	‘the male dinosaur’
	d. el dinosaurio hembra	‘the female dinosaur’

Another semantic criterion of gender assignment is the concept of gender opposition, which applies to animate beings and objects. A masculine / feminine noun alternation marks a difference of dimension (Lang 2013: 188). A gender opposition is used to differentiate between (2.9) the agent of an action (masculine) and the machine or tool used for the action (feminine), (2.10) the expert / connoisseur of a discipline and the discipline itself or the designation of a tree

26 Generally, masculine gender functions as the default gender for the species.

27 Note that the words *macho* and *hembra* are traditionally considered to be either nouns or invariable adjectives. They are invariant forms in terms of gender or number: *las jirafas hembra* ‘the female giraffes’ vs. *las jirafas macho* ‘the male giraffes’. Some speakers in Latin America sometimes use the words *macho* and *hembra* in the plural.

and its fruits (2.11).[28] Sometimes gender opposition can be just the opposite, as shown in (2.9d) for example, where feminine gender is assigned to the agent of the action and masculine gender to the machine or tool used for the action (Schwarze 2008: 63ff.).

(2.9)	a.	el trompeta 'the trumpeter'	vs.	la trompeta 'the trumpet'
	b.	el espada'the matador'	vs.	la espada 'the sword'
	c.	el segador 'the mower'	vs.	la segadora 'the mowing machine'
	d.	la costurera 'the sewer'	vs.	el costurero 'the sewing machine

(2.10)	a.	el músico 'the musician'	vs.	la música 'the music'
	b.	el farmacéutico 'the pharmacist'	vs.	la farmacéutica 'the pharmacology'
	c.	el ético 'the ethicist'	vs.	la ética 'the ethics'
	d.	el mecánico 'the mechanic'	vs.	la mecánica 'the mechanics'

(2.11)	a.	el castaño 'the chestnut tree'	vs.	la castaña 'the chestnut'
	b.	el manzano 'the apple tree'	vs.	la manzana 'the apple'
	c.	el almendro 'the almond tree'	vs.	la almendra 'the almond'
	d.	el cerezo 'the cherry tree'	vs.	la cereza 'the cherry'

Gender distinction (masculine / feminine) occasionally correlates with the size of the referent in Spanish and hence indicates a difference.[29] In general, the masculine gender designates small entities or entities of standard size, whereas feminine gender applies to large entities, representing the generalized sense of the referent. Some examples are given in (2.12) below (Schwarze 2008: 63ff; Pountain 2016: 102):

(2.12)	a.	el charco 'the puddle'	vs.	la charca 'the pond'
	b.	el cubo 'the bucket'	vs.	la cuba 'the barrel'
	c.	el huerto 'the garden'	vs.	la huerta 'the market garden area'
	d.	el bolso 'the purse'	vs.	la bolsa 'the bag'

28 This semantics-related gender distinction has even been exploited in Spanish with borrowings such as *el naranjo* 'the orange tree' vs. *la naranja* 'the orange' from Persian (cf. Pountain 2016: 102f.) For more examples see Pountain (2016). However, there are some exceptions to gender distinctions for the designation of a tree (masculine) vs. its fruit (feminine), for example, *la higuera* 'the fig tree' vs. *el figo* 'the fig' or *el peral* 'the pear tree' vs. *la pera* 'the pear'.
29 As Lang (2013: 188f.) notes, this is "another type of gender derivation where inflectional and derivational features intermingle [...] morphology is used to mark a difference in size."

However, there are several semantically-related cases in which this gender distinction is reversed, as in (2.13).

(2.13)	a.	el barco 'the boat (in general)'	vs.	la barca 'the boat (typically a fishing or rowing boat)'
	b.	el barreno 'the large/big drill'	vs.	la barrena 'the drill'
	c.	el cesto 'the large basket'	vs.	la cesta 'the basket'
	d.	el manto 'the cloak'	vs.	la manta 'the large blanket /shawl'

Although such examples of masculine / feminine alternations have been highly productive in forming gender pairs in the development of Spanish (Pountain 2016: 102), there are several other semantic principles which are important for marking nouns as either masculine or feminine in gender (for an overview of direct gender associations in Spanish within a certain semantic category see Ambadiang 1999: 4851f.; De Bruyne 2002: 66f.; Morales 2008: 22; Schwarze 2008: 145).

2.5.1.3 English

Only a few gender assignment systems of the world's languages operate exclusively on the principle of natural gender. Languages such as Tamil, in the Dravidian language family, and also a number of other North-East Caucasian languages are considered to assign gender based on strict semantic systems. Similar gender systems can be found in some other language families, for instance in the Germanic language English.[30] Although English may differ from these languages in that it only marks gender on personal (*he/she/it*), reflexive (*himself/herself*) and possessive (*his/her*) pronouns for animates (see section 2.3.3), it is classified as a language with a strict semantic system (Corbett 1991: 180–184).[31] Like other strict semantic systems, English divides nouns into groups based on semantic criteria. First, nouns denoting female humans are feminine. Second, nouns denoting male humans are masculine. Third, inanimate nouns are neuter. The fact that the pronominal system in English corresponds to

30 Ibrahim (1973: 84–86) and Cruzan (2003: 19f.) note that English has a special role among the Indo-European languages due to the shift from a grammatical to a natural gender system.
31 Corbett (1991: 9) regards strict semantic gender systems as synonymous with natural gender systems: "A system where given the meaning of a noun, its gender can be predicted without reference to its form". However, most scholars, especially those focusing on the English gender system, tend to define natural gender systems as a subset of strict semantic ones because the relevant features for predicting gender can be much more numerous than just the biological sex of the referent (Cruzan 2003: 17).

the distinctions of biological sex and animacy for most of the nouns leads many scholars to view the English gender assignment system as simple, and it is presented as simple in traditional schoolbooks. However, as Erades (1956: 2) points out: "[T]he gender of English nouns, far from being simple and clear, is complicated and obscure, and the principles underlying it are baffling and elusive, no less, and perhaps even more so, than in other languages."

For the group of nouns denoting domestic animals, Quirk et al. (1985: 317) stated that: "male/female gender distinctions in animal nouns [especially if they are named] are maintained by people with a special concern (for example pets)." In general, no gender distinction is made and the masculine gender functions as a default form when referring to animals in spoken language (Curme 1962: 211; Wagner 2005: 234). Only in written or professional language is gender distinction encoded either in different lexical items (*hen/cock*) by means of suppletion, or in forms such as *tiger/tigress* by means of derivation (Haegeman and Guerón 1994; Alexiandou et al. 2007: 244). In this context, Corbett (1991: 12) points out the fact that in most children's stories, animals have a particular gender by convention.

An array of inanimate nouns that can take the gendered pronouns *he* or *she* and animate nouns that can take the pronoun *it* demonstrates that the semantic gender regularities have exceptions (Erades 1956: 9). As Cruzan (2003: 20) notices, these "exceptions to the system as traditionally defined form patterns that need to be addressed in any formulation of the system, because English speakers are consistently inconsistent in their choice of gendered pronouns according to strict natural gender rules."

Understanding these exceptional nouns that do not follow the biological sex correlation is crucial for the formulation of statements on referential gender. In this context, the literature distinguishes between two types: (1) conventional references and (2) emotive/affective references. The former refers to certain inanimate nouns, also known as hybrid nouns. The anaphoric personal pronouns (*she* and *it*) are possible with such nouns, whereas the use of the relative pronoun is restricted to *which* or *that*. English 'boat nouns' are a prime example. The use of *she* for a word such as 'ship' seems to be conventional within English speech communities and applies when the inanimate referent is referred to by its name, as illustrated in (2.14) (Whorf 1956: 90 f.; Cooper 1983: 175 ff.; Corbett 1991: 180–181; 236–238).[32]

32 For further discussion see Malone (1985) and for data see Marcoux (1973: 102f.). For a list of exceptions see Whorf (1956: 90).

(2.14) a. The QEII is a beautiful ship.
b. The QEII, on *whom I sailed recently, is a beautiful ship.
c. The QEII, on which I sailed recently, is a beautiful ship.
d. I sailed on the QEII recently; she/it is beautiful.

(Wagner 2005: 223)

The nouns that can be emotive/affective refer to a number of inanimate referents and occur in ordinary language with no conscious personification (Cruzan 2003: 21). However, the semantic assignment rules can be deliberately overridden on the basis of emotive or affective factors, even if it may seem absurd to talk about such sexless objects in a gendered way (Vachek 1976; Corbett 1991; Cruzan 2003).

2.5.2 Formal gender regularities

This section deals with the formal gender regularities, which are further divided into morphological and phonological assignment rules. The morphological rules are based on the fact that a certain gender is assigned based on morphology, for example, derivational suffixes, whereas phonological rules are based on phonology, taking into account the phonological representations of words (Corbett 1991: 32ff.).

English almost exclusively assigns gender based on the semantic criterion of natural gender (biological sex) and is thus considered to be a strict semantic system. Languages like German exploit a complex interplay of semantic, morphological and phonological information to assign gender (Corbett 1991: 49), whereas Spanish makes use of the morphophonology of the noun (Foucart 2008: 32). This section, thus, presents only the morphological and phonological assignment rules for German and Spanish.

2.5.2.1 Phonological gender regularities in German

As presented in section 2.5.1, Köpcke and Zubin's semantic gender assignment rules are limited in scope to the specific domain of application and have numerous exceptions. In this respect, Köpcke and Zubin (1984: 29f.) note that "monosyllabic nouns have traditionally been cited as the locus of completely arbitrary gender assignment". This observation led Köpcke (1982) to conduct an analysis of 1466 monosyllabic nouns that appeared in the Duden spelling dictionary and identified 24 phonological gender regularities (see also Köpcke and Zubin 1984). He differentiates between three types: (1) structural rules, (2) main rules and (3) stand-by rules. Structural rules consider only the general syllable structure of a noun. A well-known example of a structural rule is the consonant cluster principle, stating that "the more consonants occur in the onset and coda of a monosyllabic noun, the more likely the word is to have masculine gender" (Schwichtenberg et al. 2004: 328). Main rules involve phonetic aspects of syllable structure. Köpcke (1982: 107) further distinguishes between three subtypes of such rules: (1) word-initial rules (monosyllabic words only), (2) word-medial rules (monosyllabic words only) and (3) word-final rules. For instance, German nouns beginning with /kn/as in *Knopf* (button) or *Knall* (bang) assign masculine gender, while nouns ending in /ft/ or /çt/ assign feminine gender.[33]

Stand-by rules take into account the relationship between two different parts of a syllable, e.g. nouns with a long high vowel and a final /r/ have feminine gender. Looking at the phonological gender regularities proposed by Köpcke (1982) more closely, it becomes evident that these regularities are probabilistic rather than deterministic in nature and apply to only a very small number of nouns.[34] Approximately half of the phonological gender regularities identified by Köpcke (1982) assign either masculine or neuter gender to a noun and thus exclude feminine gender. As Belout and Belke (2017: 4) conclude: "Not assigning the feminine gender to a monosyllabic word is the default anyway, as most of the monosyllabic nouns Köpcke analyzed were either masculine (940 words) or neuter (321 words), exceeding the number of feminine words (205 words) by 4.6 and 1.6 respectively (see Köpcke 1982)". Wegener (1995) shares this view and proposes a reduction in the number of Köpcke's phonological gender assignment rules to one principle, the so-called *monosyllable principle*. According to this principle, monosyllabic nouns have masculine gender by default, and this applies to two-thirds of the nouns Köpcke had analyzed (Bebout and Belke 2017: 4). Wegener (1995) and others have put forward a smaller set of gender assignment rules that also apply to *bi*- and multisyllabic words. These rules assume that there is a relationship between the nouns with the pseudo-suffixes (*-e /ə/, – el /əl/, -en /ən/, -er*

33 Note that the phonological gender regularity rule according to which nouns beginning with /kn/ have masculine gender only applies to 15 out of 1466 monosyllabic words. The limited scope of validity is most noticeable in the case of nouns ending in /ft/ or /çt/ with feminine gender as this phonological gender regularity applies to only 35 out of 1466 monosyllabic words (cf. Köpcke 1982; Bebout and Belke 2017: 4). Exceptions are *der Stift* 'the pen' or *der Knecht* 'the servant'. The same holds true for the rule that nouns consisting of the syllable structure long high vowel and final /r/ have feminine gender, since this pattern is fond in only 25 out of 1466 monosyllabic words. However, only 16 of these nouns are assigned feminine gender.

34 Given the difficulties in establishing valid gender assignment rules for monosyllabic words, scholars argue that monosyllabic words are largely arbitrarily assigned to gender subclasses.

/ər/,) and the gender that is assigned. Nouns ending in *-e* /ə/ (schwa) are assigned feminine gender, as in *Schule* 'school'. Exceptions are *das*$_{\text{Neut.}}$ *Auge* 'eye' and *der*$_{\text{Masc.}}$ *Hase* 'rabbit'. Nouns ending in *-er* /ər/ as in *der Winter* 'winter' or *der Taucher* 'diver' are masculine. There are also exceptions to this rule, such as in *das*$_{\text{Neut.}}$ *Fieber* 'fever' or *die*$_{\text{Fem.}}$ *Mauer* 'wall'. Nouns with other pseudo-suffixes have similar exceptions.[35] Table 2.20 gives an overview of the phonological gender assignment rules and their reliability rate, which ranges from 60% to 97%, an example of this rule as well as a counterexample (based on Köpcke 1982: 45ff.; Köpcke and Zubin 1983: 478; Mills 1986b; Müller 1990; Eichler 2011: 173; Hager 2014: 78–79). The phonological gender assignment rules are divided into four types: structural rules, word rules, word-medial rules, and word-initial rules. Both the word-medial and the word-initial rules apply only to monosyllabic nouns. In these rules, *X* represents any word-initial phoneme and *Y* any word-final phoneme. *V* is any vowel and *C* any consonant, which is obligatory unless it appears in brackets, when it is optional (C). The curly brackets represent alternative phonemes, and stop means one of the sounds [k], [p] and [t].

Table 2.20: Phonological gender assignment rules in German (based on Köpcke 1982; Köpcke and Zubin 1983: 478; Mills 1986b; Müller 1990; Eichler 2011: 173; Hager 2014: 78–79).

Phonological Rule	Gender	Reliability	Example	Exceptions
structural rules				
X diphthong C	masculine/ neuter	92%	Bein 'leg'	Zeit (fem.) 'time'
word-final rules				
X/ʃ/	masculine	80%	Tisch 'table'	Couch (fem.) 'couch'
XX nasal (C)(C)	masculine	75%	Fund 'trove/finding'	Hand (fem.) 'hand'
X C /s/	masculine	75%	Kranz 'wreath'	Salz (neut.) 'salt'
X /l/	masculine/ neuter	94%	Ball 'ball' Seil 'robe'	Zahl (fem.) 'number'
X /l/ C	masculine	68%	Pilz 'mushroom'	Milch (fem.) 'milk'
X /r/ stop (C)	masculine	66%	Herd 'stove'	Herz (neut.) 'heart'

35 For a detailed overview see Wegener (1995a: 73ff).

Table 2.20 (continued)

Phonological Rule	Gender	Reliability	Example	Exceptions
$\left\{\begin{array}{c}[\text{u:}]\\ [\text{y:}]\end{array}\right\}$ – /r/	feminine	93%	Kur 'cure'	Schwur (masc.) 'oath'
/ə/	feminine	90%	Tanne 'fir'	Hase (masc.) 'rabbit'
X$\left\{\begin{array}{c}/\text{s}/\\ /\text{ʃ}/\end{array}\right\}$ – /t/	masculine/ feminine	94%	Pest 'plague'	Nest (neut.) 'nest'
X$\left\{\begin{array}{c}/\text{f}/\\ /\text{ç}/\\ /\text{X}/\end{array}\right\}$ – /t/	feminine	66%	Macht 'power'	Saft (masc.) 'juice'
/i:r/	neuter	60%	Tier 'animal'	Gier (fem.) 'greed'
[ɛt]	neuter	95%	Fett 'fat'	–
word-medial rules (monosyllabic words only)				
X V (+long) Y	masculine/ neuter	86%	Flur 'hall'/los 'lottery ticket'	Uhr (fem.) 'watch/ clock'
word-initial rules (monosyllabic words only)				
/kn/	masculine	93%	Knopf 'button'	Knie (neut.) 'knee'
$\left\{\begin{array}{c}/\text{tr}/\\ /\text{dr}/\end{array}\right\}$Y	masculine	89%	Druck 'pressure'	Drei (frem.) 'three'
/ʃ/ C Y	masculine	86%	Stuhl 'chair'	Stirn (fem.) 'forehead'
/d/ Y	masculine	97%	Dunst 'vapor'	Dult (fem.) 'fair'
/r/ Y	masculine	94%	Rost 'rust'	Rast (fem.) 'rest'
$\left\{\begin{array}{c}/\text{gr}/\\ /\text{kr}/\end{array}\right\}$Y	masculine/ neuter	93%	Greis 'old man'	Kraft (fem.) 'power'
/t/ Y	masculine/ neuter	92%	Tor 'gate'	Tür (fem.) 'door'

2.5.2.2 Morphological gender regularities in German

As well as the phonological gender regularities, there are also morphological rules that apply in German. Many scholars, including Köpcke and Zubin (1983), Bittner (2000) and Enger (2004), have argued that there is a correlation between gender and declension markers, namely plural and case markers. For the plural formation of monosyllabic nouns, Köpcke and Zubin (1983) put forward a number of morphological rules.[36] For example, all nouns with the plural marker *-er*, *-s* or *-e* without an umlaut are assigned to masculine or neuter gender. Nouns with the plural marker *-e* and an umlaut have masculine or feminine gender.[37] Nouns with an umlaut plural and zero ending have masculine gender, while nouns with a plural marker *-(e)n*, as in *Lampe-n* 'lamps' have feminine gender (for an overview see Mugdan 1977: 177ff.; Wurzel 1984; Köpcke 1987: 25ff.). Note that the plural noun inflections can be considered as an indicator of gender rather than providing a precise and reliable gender-assigning rule.

By contrast, the correlation between gender and case markers seems to be more predictable. As Köpcke and Zubin (2009) point out, nouns of the weak declension class with the case marker *-n* such as *den Falken* 'falcon' have masculine gender almost without exception. Nouns with a zero affix in the genitive case have feminine gender (e.g. *der Mutter* 'mother') while nouns with the suffix *-s* in the genitive case do not usually have feminine gender, e.g. *des Kuchens* 'cake' (Wegener 1995: 80). In addition, for complex nouns or so-called compounds,[38] Köpcke and Zubin (1983: 9; 1984: 24) identify the *Last Member Principle*, stating that the final segment (i.e. the lexical head in German) determines the gender of the noun. Hence, the compound *Dampfschiff* 'steamship', consisting of *Dampf*$_{\text{Masc}}$ 'steam' + *Schiff*$_{\text{Neut.}}$ 'ship', has neuter gender because the final segment *Schiff*$_{\text{Neut.}}$ 'ship' assigns neuter gender to the whole compound. Mills (1986b: 31) points out that Köpcke and Zubin fail to define the term "last segment" precisely in their proposed rule. Mills (1986b: 31) stresses that "it is not clear what kind of morphological analysis is being referred to." She cites the German compound *Muttergestein* 'parent rock' as an example,

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36 Rettig (1972), Augst (1975, 1979) and Mugdan (1977) and more recently Fakhry (2005) have undertaken research on German plural morphology and the assignment of gender.

37 The correlation of the feminine gender and plural marker *–e* without an umlaut can only be found in derived nouns, ending with in *–nis* or *–sal* (Zubin and Köpcke 1984). The plural marker *–e* without an umlaut can also occur with infrequent nouns such as *die Mühsal*$_{\text{Sg}}$ – *die Mühsale*$_{\text{Pl}}$ (Duden http://www.duden.de/rechtschreibung/Muehsal, 18.03.2017).

38 As the American author, Mark Twain (1880) in his essay *The Awful German Language* noted, noun compounds in German are highly productive: "[I]t is built mainly of compound words constructed by the writer on the spot, and not to be found in any dictionary – six or seven words compacted into one, without joint or seam [...]." (retrieved from: https://www.cs.utah.edu/~gback/awfgrmlg.html) As a result, more than 68% of complex nouns are stored in the lexicon (Köpcke and Zubin 1984: 29ff.).

consisting of the noun *Mutter*$_{\text{Fem.}}$ 'mother', the collective prefix *ge-* and the noun *Stein*$_{\text{Masc.}}$ 'stone'.[39] The compound *Muttergestein* 'parent rock' receives neuter gender, although the two nouns *Mutter* 'mother' and *Stein* 'stone' do not have neuter gender. Due to the German prefix *ge-* the noun *Stein*$_{\text{Masc.}}$ 'stone' is converted to the neuter collective noun *Gestein*$_{\text{Neut.}}$ 'rock', which, as the last complex noun, determines the gender of the compound (Corbett 1991: 50). The German prefixes *be-* and *ver-* assign masculine gender to the noun as in *Bereich* 'area' or *Verband* 'bandage', although the nouns *Reich*$_{\text{Neut.}}$ and *Band*$_{\text{Neut.}}$ do not have masculine gender (Eichler 2011: 169; Hager 2014: 75). These examples illustrate that the *Last Member Principle* interacts and competes with other gender assignment regularities (here: derivation). In German, derivational suffixes are an extremely reliable and valid predictor of gender (Eisenberg 2006).[40] Thus, they are summarized in almost every German grammar book: the derivational suffixes *-er, -ant, -ist, -ismus, -ler, -lich, -ling, -ig, -ich, -rich, -or* are characteristic of masculine gender, and the derivational suffixes *-in, -ei, -heit, -keit, -schaft, -ung, -ness, -ess(e), -ion* are associated with feminine gender. Nouns ending in *-ing, -ment, -nis, -um, -tum*,[41] including the diminutives *-chen, -lein, -le* are typically neuter (Hoeppner 1980: 120ff; Duden 1995: 205ff.; Götze and Hess-Lüttich 1999; Hoberg and Hoberg 2009; Eisenberg 2013). With respect to *zero derivation*, also known as *conversion,* further rules for gender assignment have been proposed. For example, nominalized verbs receive neuter gender as in *das Malen* 'painting', whereas verb-to-noun conversions are typically masculine gender (e.g. *springen* 'to jump' – *der Sprung* 'jump'; Spitz 1965: 38). For an overview of the affixes in German that are associated exclusively with a particular gender, the interested reader should consult Ivanova (1973), Hoeppner (1980), Heidolph et al. (1981), Wegener (1995a; 1995b), Köpcke and Zubin (1984), Swick (2012), Baumgartner (2013) and Durrell et. al (2015).

2.5.2.3 Phonological gender regularities in Spanish

As in the case of German, gender assignment in Spanish follows phonological rules. Although the relationship between grammatical gender and phonological

39 In Rettig's (1987: 38) view, the claim that the prefix *ge-* describes collective nouns is vacuous owning to the many exceptions of this rule.

40 According to Eisenberg, derivational suffixes function as heads because they determine the grammatical features such as word class and gender of the noun. Consequently, derivational suffixes are inherently specified for gender features and play a decisive role in gender assignment. For more information about this assumption, please refer to Leiss (2005), Weber (2001) and Pfau (2009).

41 The masculine noun *der Reichtum* 'wealth' ending in *-tum* is an exception to the rule.

word shape has been investigated by many scholars, including Harris (1985, 1991), Bergen (1978), Smead (2000), Klein (1983, 1989), the study conducted by Teschner and Russell (1984) is especially worth mentioning as it provides evidence that gender assignment is not arbitrary in Spanish and that a noun's phonology gives a cue to its gender. In their study, Teschner and Russell looked in depth at the findings of Bull (1965) and the refinements of Bergen (1978) and reported that there were some inaccuracies (Clegg 2010: 6). They analyzed 41.882 gender-invariable nouns in Spanish taken from the *Diccionario de la Lengua Española de la Real Academia Española* (1976) and then formulated gender regularities based on phonology. Table 2.21 gives the phonological gender regularities in Spanish (Teschner and Russell 1984). Looking at the distribution of these rules, a clear preference for masculine gender is visible, as only two out of the twelve word-final sounds assign feminine gender.

Table 2.21: Spanish phonological gender regularities (based on Teschner and Russell 1984).

Word ending	Gender	Reliability	Example	Exception
-a	feminine	96.30%	casa 'house'	mapa 'map'
-d	feminine	97.57%	pared 'wall'	césped 'grass'
-e	masculine	89.35%	garaje 'garage'	costumbre 'habit'
-i	masculine	93.13%	taxi 'taxi'	metrópoli 'metropolis'
-l	masculine	97.85%	sol 'sun'	sal 'salt'
-m	masculine	100%	ítem 'item'	–
-o	masculine	99.87%	genio 'genius'	mano 'hand'
-r	masculine	98.55%	dolor 'pain'	flor 'flower'
-t	masculine	93.86%	déficit 'defecit'	–
-u	masculine	95.10%	tabú 'taboo'	tribu 'tribe'
-x	masculine	90.91%	clímax 'climax'	–
-y	masculine	93.68%	jersey 'jersey'	ley 'law'

Even though nouns in Spanish can have different word endings but the same gender (cf. Alarcón 2006: 9), it is a rule of thumb – presented as one of the first rules in Spanish textbook grammars – that the majority of nouns ending in *-o* or *-a* are assigned to a specific gender i.e. masculine and feminine respectively (see Böhringer 2000: 5; Moriena and Genschow 2010: 63). 99.87% of the nouns ending in *-o* are masculine and 96.30% of the nouns ending in *-a* are feminine (Teschner and Russell 1984). These results imply that the phonemic criteria are reliable for determining a noun's gender. A study conducted by Echaide (1969) gives further evidence for this assumption. In his analysis of 2172 nouns taken from the *Frequency Dictionary of Spanish Words*, he found almost identical percentages: 99.9% of the nouns ending in *-o* were masculine and 97.1% ending in *-a* were feminine. Although these findings indicate that the endings *-o* and *-a* cover a large part of the noun lexicon in Spanish (Eichler 2011: 175), it is important to point out that some nouns ending in *-n, -s,* and *-z* slightly favor one gender over the other and therefore these final sounds or letters cannot be regarded as reliable predictors of gender assignment (Teschner and Russell 1984: 118ff.). Only a slight majority of *-n* nouns are feminine in gender (51.61%), whereas the remaining *-n* nouns are masculine (48.39%). In contrast, *-s* nouns show a slight preference for masculine (57.32%) over feminine gender (42.68%). A large (though not overwhelming) majority of *-z* nouns are feminine (61.63%) with a minority being masculine (38.37%). Alarcón (2006) and Schwarze (2008) observe some exceptions to these phonological gender assignment rules. According to them, some nouns ending in *-o, -a -l, -r,* and *-e* can be either masculine or feminine (gender-ambivalent),[42] for instance, in *el/la testigo* (the witness), *el/la modista* (the modernist), *el/la criminal* (the criminal), *el/la bachiller* (the high school graduate) and *el/la amante* (the lover) (Alarcón 2006: 10; Schwarze 2008: 126).[43]

2.5.2.4 Morphological gender regularities in Spanish

Apart from the phonological gender regularities presented in section 2.5.2.3, gender can also be assigned and predicted by morphological rules in Spanish.[44] Many scholars argue that there is a correlation between the noun ending and its gender (for an overview of the Spanish morphological gender assignment rules see

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42 Note that gender-ambivalent nouns are not synonymous with gender-ambiguous nouns, which allow either gender without a change in meaning. For a more detailed discussion and examples, see Teschner and Russell (1984: 116f.)

43 It should be noted that there is only a small number of gender-ambivalent nouns in Spanish. Bergen (1978) identified 1165 out of 38233 (3%) nouns in Spanish as gender-ambivalent. This list of 1165 gender-ambivalent nouns contains, on the one hand, animate nouns that vary in gender according to the biological sex of the referent (*el/la amante* 'male/female lover') and, on the other hand, nouns that have a meaning with a different gender – also known as homophonous pairs – as in *el/la frente* 'front /forehead' (Bergen 1978; Teschner and Russell 1984: 116).

44 As compounding in Spanish is not nearly as productive as it is in German and not relevant for the present study, the interested reader should consult for more information on compounding in Spanish Buenafuentes de la Mata (2014: 5), Schpak-Dolt (1999: 128ff.) and Contreras (1985).

Bergen 1978; Morales, 2008; Rainer 1993; Teschner and Russell 1984). The probability that a noun has this specific gender is at least 75% (Bergen 1978; Teschner and Russell 1984; Schwichtenberg and Schiller 2004: 327). Table 2.22 provides an overview of some gender assignment rules based on morphological information.

Table 2.22: Spanish morphological gender regularities (based on Bergen 1978; Morales 2008; Rainer 1993 and Teschner and Russel 1984).

Classification	Suffix	Gender	Example
-n nouns	{c/g/n/s/t/x}ión	feminine	nación 'nation' legión 'legend' opinión 'opinion' discusión 'discussion' cuestión 'question' conexión 'connection'
	-an -en -in -un	masculine	pan 'bread' examen 'exam' jardín 'garden' atún 'tuna'
-z nouns	-ez	feminine	timidez 'shyness'
	-az -oz	masculine	disfraz 'costume' arroz 'rice'
-s nouns	-sis	feminine	crisis 'crisis'
	-s	masculine	bus 'bus'
-e nouns	-cie -stole -strofe	feminine	especie 'specie' sístole 'systole' catástrofe 'catastrophe'
	-aje	masculine	viaje 'journey'

According to these morphological gender assignment rules, *-n* nouns of feminine gender end in one of the following six ways: *-ción, -gión, -nión, -sión -tión* and *-xión,* whereas nouns ending in *-an, -en, -in,* and *-un* are masculine. The *-z* nouns ending in *-ez* are feminine, and the nouns ending *-az,- oz, -uz* are predominately masculine. For *-s* nouns the morphological rules indicate that a handful of nouns ending *-sis* and *-tis* have feminine gender, although the majority of *-s* nouns are masculine. Morphological gender assignment rules can also account for exceptions to phonological gender assignment rules. For instance, *-e* nouns are considered to be masculine, but those ending in *-cie, -stole, -strofe* and *-umbre* are feminine. The *-a* nouns of Greek origin constitute another exception to the phonological gender assignment rule that nouns ending in *-a* are feminine. Teschner and Russell (1984: 118) identified 30.33% (3 out of 10) of *-ma* nouns as masculine and not feminine. Nouns ending in *-drama, -grama* and *-orama* are, like nouns of Greek origin, feminine and thus also exceptions to the phonological gender assignment rules. Apart from these exceptions, nouns ending in *-ima*, *-uma, -lma,* and *-rma* predominantly have feminine gender and hence follow the phonological gender assignment rule. The authors also show that the endings *-ista, -ita, -ata* and *-ota* are not reliable gender indicators because they can denote not only a non-human referent with a specific gender but also a human referent (they are also known as *gender-ambivalent nouns)* with either gender, depending on the sex of the referent: *el/la modista* 'male/female dressmaker', *el/la menonita* 'male/female retailer', *el/la burócrata* 'male/female bureaucrat', *el/la idiota* 'male/female idiot' (Teschner and Russell 1984: 120f.; Teschner 1983: 186).

2.6 Summary of the gender regularities in English, German and Spanish

The preceding sections have presented the gender regularities in the languages investigated, namely English, German and Spanish. It has shown that in English only semantic rules and gender regularities apply. Hence, English can be considered a simple gender system because the entire system consists of simply formulated rules which mainly rely on the distinctions sex and animacy (Audring 2014: 11). Unlike English, German and Spanish make use of semantic and formal principles when assigning gender to a noun. As far as the dimension of complexity of the gender systems is concerned, the three languages differ in many respects. Figure 2.1 presents two dimensions of complexity: (1) the complexity of gender values and (2) the complexity of gender assignment rules. The three languages under consideration are highlighted in bold.

I. Complexity of gender values

English **Spanish** **German** Nigerian Fula

⟷

II. Complexity of rules

Kolami **English** **Spanish** French **German**

⟷

simple complex

Figure 2.1: Complexity continuum of the gender systems in English, German and Spanish (adapted from Audring 2014).

In comparison to English and Spanish, German has a much more complex gender system with its three gender values and the fact that gender is fused with case marking. Languages such as English with three different pronominal gender values or Spanish with two gender values are assumed to be simpler than German with its three genders, or, for example, Nigerian Fula with around 20 genders (see Audring 2014 and Figure 2.1). The high degree of complexity of the German gender assignment system was revealed by Köpcke's analysis (1982). He proposed a large set of semantic, morphological and phonological rules by means of which gender can be deduced from form, but these rules are small in scope, exception-ridden and thus inconclusive and probabilistic in nature. As Audring (2014: 11) points out: "A language that employs small rules in order to organize its gender system needs a large number of them in order to account for each and every noun. Therefore, languages [such as German] with this type of assignment rules are considered complex" (see Figure 2.1). As shown in sections 2.3.2 and 2.3.3, English and Spanish can be considered to have a simple gender system because the entire system is accounted for by means of simply formulated rules, which mainly rely in the former case on distinctions based on sex or animacy and in the latter case on phonological information (Bergen 1978: 898; Audring 2014: 11 and see Figure 2.1). Although the Spanish gender system is considered to be simple, for any L2 learner with an ungendered language (e.g. English), acquiring gender seems to be more challenging than for learners with a gendered language (see chapters 4 and 5). Spanish clearly has two default suffixes, viz, *-o* for masculine and *-a* for feminine nouns. In the case of these endings in Spanish, gender is – as Teschner and Russell's study reveals – 98% predicable. With regard to the phonological gender regularities, it is striking that the final sounds *-o* and *-a* clearly correlate with either masculine or feminine gender. Given the high formal transparency of gender marking in Spanish, its system differs clearly from gender marking in German. According to Corbett, Spanish as a language "in which the gender of a noun is evident from its form [...] [is] described as having 'overt gender'" (Corbett 1991: 62).

Corbett distinguishes between an overt and a covert system and assumes that the classification is not a rigid one, since "[t]here are many possibilities between the poles of absolutely overt and absolutely covert" (Corbett 1991: 62). Taking this into consideration, English as a language which assigns gender based on semantics and almost lacking any formal clues – except the fact that "nouns ending in *woman* are feminine" (Corbett 1991: 63, emphasis added) – has a covert system. Figure 2.2 illustrates the degree of gender transparency along the continuum between overt and covert gender systems. The three languages under scrutiny are highlighted in bold.

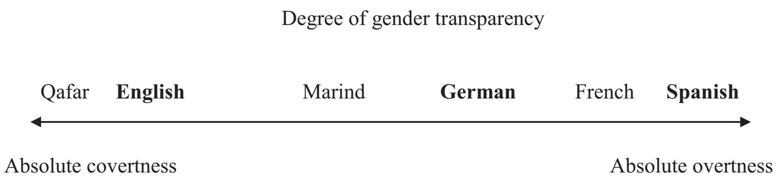

Figure 2.2: Continuum of overt and covert gender systems (based on Corbett 1991: 62 ff.).

3 Competing theories on the sources of variability in HLA and SLA

The present chapter provides the theoretical framework related to bilingual language acquisition covering theoretical assumptions and approaches on HLA and SLA. The primary aim of this chapter is to outline the most theoretically relevant accounts on HLA and SLA by taking into account the assumptions about the accessasibilty to UG, the role of the CP and L1.

3.1 Theoretical assumptions about HLA

The issue of ultimate (native-like) attainment in HLA and the question of why and where divergence and variability in the linguistic outcomes of HSs occur across many domains and societal contexts has fueled a contentious debate among linguists (see e.g. Austin et al. 2015). In an attempt to explain why certain patterns of attainment in HSs often deviate from several control groups such as monolinguals, parental generation and dominant-speakers of the HL (Benmamoun, Montrul and Polinsky 2013: 27), researchers have proposed a range of different accounts, for instance, incomplete acquisition also referred to as divergent attainment (e.g. Montrul 2008, 2016a), missing-input competence divergence (e.g. Pires and Rothman 2009; Rothman 2007), reduced usage and activation of the HL (Putnam and Sánchez 2013), cross-linguistic transfer (e.g. Cuza and Frank 2011) or mental representation deficits (e.g. Montrul 2002, 2008).

The large number of proposals to account for the HSs' differential language use and knowledge observed so far relate to the divergent results concerning HSs' ultimate attainment in the USA and Canada, on the one hand, and Europe, on the other hand. In the US and Canada, most studies report a high degree of variability in the linguistic competence of HSs, whereas in Europe several studies find high levels of linguistic competence (Kupisch et al. 2013; Kupisch et al. 2014; Irizarri van Suchtelen 2014; Flores 2015). Nevertheless, variability in the observed HSs' competence is not exclusively restricted to the US and Canada or to the respective HL under investigation, as studies by Dogruoz and Backus (2007), Treffers-Daller et al. (2015) and van Osch and Sleeman (2016) reveal. It appears to be the case that HSs in the US and Canada show more heterogeneity compared to those in Europe. A reason might lie in the possibility that in the US and Canada HSs receive less support for the maintenance of their HL from language education and language policies at a national level than in Europe which ultimately might yield "different types of heritage speakers, namely (fully) proficient

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HL1 [home/heritage language] speakers and functional HL1 speakers/HL1 overhearers" (Guijarro-Fuentes and Schmitz 2015: 240). The identified differences between heritage grammars and target grammars clearly present a challenge for linguistic theory but the exploration of the factors which cause patterns of HSs' divergence and variability compared to other types of language acquirers (e.g. monolinguals, HL dominant speakers, L2 learners, etc.) will provide answers to questions related to "the very nature of mental constitution of language and cognition" and "how and why languages change through space and time and the role 'nurture' has beyond 'nature' in the process of language acquisition and maintenance" (Rothman 2009: 159).

The next sections will shed light on four specific proposals that may account for HSs' divergence and variability. These accounts are neither said to be 'correct' or 'incorrect', nor mutually exclusive (Giancaspro 2017: 28). It might be the case that one needs to consider all accounts together to a certain extent in order to fully understand and explain the linguistic outcomes of HSs.

3.1.1 Language attrition and incomplete acquisition

Studies documenting divergence in HSs' attainment from the monolingual norm have given rise to various theoretical approaches that attempt to account for this observation. In this section, the accounts of incomplete acquisition and attrition both accounting for "language loss across generations" (Montrul 2008: 21) will be reviewed and critically assessed. The incomplete acquisition account, also dubbed the Incomplete Acquisition Hypothesis (in the sense of Montrul 2004a, b, 2010a, b, 2008, 2016; Polinsky 2006), refers to the outcome of heritage competence mostly found at the mature linguistic state of adult HSs. Incomplete acquisition takes place in childhood where some specific properties of the L1 (HL) are not present in the L1 system as compared to typically developing monolingual L1 systems mostly due to insufficient input and use (Montrul 2008; O'Grady et al. 2011; Polinsky 2006). In other words, it is assumed that HSs do not completely acquire their HL during childhood because they switch to the dominant language when they enter school which leads to a decline in input in the HL (Polinsky and Kagan 2007: 369 et seq.). From an acquisition perspective, incomplete acquisition of the HL (L1) implies an incidence of interrupted L1 acquisition in which the HS has access to UG and acquires some grammatical aspects of the language, while in other grammatical aspects of the language he/she does not reach age-appropriate levels that require input quality, exposure and usage during the process of acquiring the HL (Montrul 2012: 7; Guijarro Fuentes and Schmitz 2015: 241). By contrast, language attrition or language loss describes a process of erosion of grammatical properties of the L1 after they have been previously acquired with native-like accuracy and were stable for a while before a speaker loses or fails to make full use of the given grammatical structure that would be consistent with monolinguals of the same age and stage of language development (Selinger 1996: 616; Montrul 2008: 56; Pires and Rothman 2009: 213). Attrition typically occurs in the first generation of immigration (de Bot 1991) and “affects structural aspects of the L1 as a result of language shift, or a change in the relative use of the L1 and the L2” (Montrul 2008: 64). Such a language shift can be related to evolving communicative needs of HSs and CLI (e.g. Silva-Corvalán 1994; Paradis and Genesee 1996) which “may surface in the form of the reanalysis of some linguistic properties (i.e. L1 properties that may become more similar to the structures represented in the L2)” (Pascual y Cabo 2013: 37). Recent research devoted to language acquisition in children has revealed that the phenomenon of first language attrition also occurs in young children, dramatically affecting the integrity of the grammar (Montrul 2008; Schmid 2011). For Benmamoun, Montrul and Polinsky (2013: 57), prepubescent children are more prone to language attrition than those after puberty. Polinsky (2006) and Montrul (2008), among others, use the macro-label incomplete acquisition to refer to the incidence of language attrition within childhood.

Under the macro-label incomplete acquisition, the two processes of incomplete acquisition and language attrition conflate and become difficult to tease apart in later childhood. For methodological reasons, Pires and Rothman (2009: 213) argue that these terms need to be formally distinguished from one another with exactitude, as in the case of attrition adult bilinguals completely acquire the target grammar as children. Furthermore, incomplete acquisition and attrition have their own independent role in the development of HS grammars (e.g. Pascual y Cabo and Rothman 2012; Polinsky 2011). To distinguish the term incomplete acquisition from individual language loss or attrition in the best way, Montrul (2008) suggests carrying out longitudinal case studies of children (e.g. see Anderson 1999 on nominal and verbal inflection in Spanish and Silva-Corvalán 2003 on verbal inflection in Spanish in simultaneous and sequential bilinguals) and longitudinal studies of child and adult HSs (see Polinsky 2011 on the comprehension of relative clauses in Russian adult and child HSs). In line with this reasoning, Pascual y Cabo and Rothman (2012: 4) also highlight the importance of access to longitudinal data to distinguish between the two processes more tangibly:

> it is virtually impossible to determine *a posteriori*, and recall that HSs are tested in a mature state of knowledge as adults, the course of development. That is, there is no way to know for sure working backwards if something did not develop or if it was acquired and then eroded, the former being actual incomplete acquisition and the latter being attrition.

Within HLA research, there has been a vivid debate on the use of the term 'incomplete acquisition' to refer to any deviation of heritage grammars from the monoglot standard (Silverstein 1996). Thereby, the concept of incomplete acquisition disregards input as a crucial component in the acquisition process. In contrast to monolinguals, HSs are exposed to input "that has inevitably been affected to some degree by previous cross-generational attrition and/or other language contact consequences" (Pascual y Cabo and Rothman 2012: 451).

The term appears to be politically and theoretically problematic and is strongly criticized in terms of descriptive and theoretical imprecision. Recently, Montrul (2016a: 125) herself has admitted the problematic nature of the term incomplete acquisition understood as describing a result rather than a process and thus ultimately leading to the characterization of heritage grammars as incomplete grammars:

> In previous work (Montrul 2008), I have also referred to heritage language grammars as 'incomplete grammars', the result of incomplete acquisition, but I now realize that referring to a grammar as incomplete can be theoretically problematic if one considers that languages are always changing in some way.

The notion of incomplete acquisition entails the dichotomy of complete vs. incomplete which "does not seem to do justice in terms of accurately reflecting a process in which a language has been naturally acquired in the exact same way that monolinguals do" (Pascual y Cabo 2013: 41).

Thus, many scholars, inter alia Rothman, (2007), Pires and Rothman (2009), Pascual y Cabo and Rothman (2012), Otheguy (2013, 2016) and Kupisch and Rothman (2016), argue that the inaccurate term 'incomplete acquisition' should be avoided and replaced "with more accurate and less potentially evaluative labels that capture not only the description of differences, but inch us towards explanatory adequacy of how and why these differences obtain as has been attempted in recent years (e.g. Pires and Rothman 2009; Pascual y Cabo and Rothman 2012; Putnam and Sánchez 2013; Kupisch 2013; Scontras, Fuchs and Polinsky 2015)" (Kupisch and Rothman 2016: 6). Just recently, researchers such as Scontras, Fuchs and Polinsky (2015) have used the term 'divergent attainment', while Kupisch and Rothman (2016) prefer the term 'differential acquisition' to refer to the phenomenon of variable competence outcomes in adult HSs in hopes that this term is more consensual. Although Montrul (2008, 2016a) maintains that her intention is not to foster a deficit view of bilingualism and the term 'incomplete acquisition' should be understood "as a descriptive term, not as a value judgment" (Montrul 2008: 7), the term 'incomplete acquisition' inevitably carries a negative connotation that is associated with the language development of HSs (Pascual y Cabo and Rothman 2012; Kupisch and Rothman 2016, among others). When problematizing the term ‘incomplete acquisition’, Pascual y Cabo and Rothman (2012: 452) firmly state:

> The term incomplete is not only imprecise, it is misleading. Since incompleteness is often interpreted as a deficiency, the term is not appropriate when comparative differences can be traced back to contact-induced changes in first generation immigrant input providers to subsequent generations of (heritage speakers).

In accordance with Pascual y Cabo and Rothman (2012), Otheguy (2013) cautions researchers in the application of the unifying label incomplete acquisition to cases which display divergences of HS grammars in comparison to adult monolingual norms. In this vein, researchers fail to see that what they have called incomplete acquisition is the outcome of “normal intergenerational language change accelerated by conditions of language contact” (Otheguy 2013: 1). Without doubt, the label incomplete acquisition socially devalues “some dialects of a given language as compared to others, whereby ‘complete’ dialects (or, more precisely, native adult dialects) would be only those that have property ‘y’ while dialects, even monolingual ones under this logic, [...] are somehow incomplete” (Pires and Rothman 2009: 214).

Given this state of affairs, Pires and Rothman (2009) maintain that Montrul’s notion of incomplete acquisition does not acknowledge sufficiently the role of the input HSs receive. They put forward a more fine-grained distinction of the term incomplete acquisition to account for the sources of competence divergence in HSs. In light of the particular characteristics of HLA in terms of the quantity and quality of input, Pires and Rothman (2009) and Pires (2011) assume for HSs the possibility of complete acquisition of a contact variety, which is not incomplete but rather different from a monolingual variety due to language change. Further criticism concerns the comparison of multilingual speakers, herein HSs, with monolinguals, as many previous studies have done. Pascual y Cabo and Rothman (2012: 452) emphasize that this comparison between HSs and monolinguals as the benchmark for linguistic competence is not inherently justifiable and disregards the point that they are simply different.

Rothman and Treffers-Daller (2014) also critique the comparison of HSs to a monolingual baseline group consisting of fully competent monolingual speakers who are often highly educated and use the full variety in professional and/ or academic settings (see also Fairclough and Beaudrie 2016 on this issue). These authors draw attention to the underlying equation of native competence with monolingual competence and concede that the construct of a native speaker and its descriptive label ‘native’ “can and should apply to states of linguistic knowledge that can be described as varying, even significantly, from monolingual baselines” (Rothman and Treffers-Daller 2014: 97). Accepting that

HSs are native speakers presupposes that research needs to overcome the ideological construct of the notion of 'native speaker' which often is used interchangeably with the term 'monolingual speaker' and idealized by linguists as being exclusively the true native (Rothman and Treffers-Daller 2014: 93).

3.1.2 Dominant language transfer

A very prominent question in SLA concerns the extent to which the L1 grammar plays a role in shaping the developing L2 grammar (Scontras et al. 2015). This question that has come up to understand the source of non-native attainment of L2 learners could also have been posed in other language contact situations, where phenomena like lexical borrowing so-called areal features are visible consequences of language contact (Scontras et al. 2015). Research on HLA assumes that the direction can be reverse: the majority language (i.e. early L2) may affect the HL (i.e. L1) (Seliger 1996; Pavlenko and Jarvis 2002; Cook 2003). As a result, changes can surface as differences in, for instance, lexical choice or morphosyntax. These contact-induced changes clearly deviate from the standard of monolingual usage and may be unstable and ephemeral and might be categorized as production errors (Gogolin, Siemund, Schulz and Davydova 2013: 6). Over time, these contact-induced changes, which appear in the form of simplifications and overgeneralizations of complex patterns, may become a robust part of the HL and develop into accepted linguistic practice owing to increase in use.

The question whether these observed simplifications could be exacerbated by language transfer from the dominant language (mostly English) remains open (Montrul 2011: 171). Regardless of whether HSs exhibit divergent linguistic behavior due to incomplete acquisition, attrition, or differences in the input, dominant language transfer may not be off the table as a possible factor contributing to variable competence outcomes in adult HSs. Evidence supporting the argument comes from several studies (e.g. Lynch 2008, Montrul, et al. 2008 on gender marking in HL Spanish; Montrul 2010b on the omission of DOM in HL Spanish; Montrul and Ionin 2010 on the reanalysis of definite articles in HL Spanish; Polinsky 2009 on the preference of SVO over topicalization in the HL Russian; Cuza and Frank 2011 on double-que in HL Spanish, among others). In light of this evidence, Benmamoun, Montrul and Polinsky (2013: 59) point out:

> One can easily entertain the possibility that nominal and verbal inflection morphology in Spanish and Russian heritage speakers is eroded because the contact language in most of the heritage speakers tested today is English, a language which does not mark gender in

nouns or have rich tense/aspect and mood morphology. The same explanation goes for the overuse of overt subjects and the loss of semantically based case in Spanish and Russian, as well as for the preference for SVO over topicalization.

The authors emphasize that, in order to resolve the question of whether simplification in heritage grammars follows from language contact with English, it is necessary to test another group of HSs whose majority language is typologically close to their HL and both share the phenomenon under investigation. Another possibility would be to compare the effects of different dominant languages on the same HL, as the comparison with a native speaker baseline does not provide evidence for transfer effects.

3.1.3 HL activation

In the previous sections, we discussed several possible causal factors that contribute to variable competence outcomes in adult HSs. Another factor that is likely to influence outcomes in adult HSs is the frequency of activating the HL. Putnam and Sánchez' (2013: 483) HL activation approach attempts to reconsider a spectrum of possibilities of HSs and explains how HS variability and divergence emerge by taking into account the levels of activation of and access to formal features (FFs) in the HL lexicon. Putnam and Sánchez' model relies on a widely-held key distinction between input and intake in SLA (Faerch and Kasper 1980; Krashen 1982; Sharwood Smith 1986; Sun 2008; Swain 1985; VanPatten 1996). The authors separate input as fundamental, raw linguistic material upon which grammars are built from intake, defined as "the operation the mind/brain participates in interpreting, extracting and storing these features, which serve as the fundamental building blocks of grammar" (Putnam and Sánchez 2013: 479). By doing so, their model is able to account for the variability and optionality observed in HL data regardless of HSs' exposure to the quantitative and/or qualitative input.

Previous accounts in which insufficient input has been claimed to be the main factor for variable competence outcomes or the notion of incomplete acquisition in adult HSs have not been tenable, as it is difficult to determine how input would guarantee complete acquisition (for a similar view see Westergaard 2008; Nazzi et al. 2011 from the perspective of monolingual L1 acquisition and Putnam and Sánchez 2013; Giancaspro 2017 from the perspective of HL acquisition, among others).

According to Putnam and Sánchez (2013: 500), the "key factor leading to changes and ultimate decay of an L1 heritage grammar is the degree of activating and processing of their L1 throughout the course of a heritage speaker's lifetime". In this way, Putnam and Sánchez incorporate previous proposals such as the Activation Treshold Hypothesis (henceforth ATH, Paradis 1993, 2004, 2007) and the Feature Reassembly Hypothesis for L2 acquisition (henceforth FRH, Lardiere 1998a, b, 2005, 2008) into their model. They argue that HS divergence and variability arise as a consequence of reassembly of L1 FFs by L2 FFs triggered by decreased activation of certain feature values in the HL (Putnam and Sánchez 2013: 488).

The ATH assumes that for the activation of a targeted lexical item or formal feature, "its competitors are simultaneously inhibited, i.e., their activation threshold is raised and consequently more impulses are required to activate them" (Paradis 1996: 138). Thus, the more frequently a lexical item or formal feature is activated, the lower the activation threshold is and the easier it is to retrieve the targeted trace. Applying this view to HSs, this proposal assumes that a HS who exhibits decreased usage and activation of certain morphosyntactic forms for production may experience "a decline in the availability of FF's" (Putnam and Sánchez 2013: 482), which ultimately could bring about a feature reassembly.

As pointed out by Schmid and Köpke (2017: 23), "[l]ess salient or less frequent elements of the heritage language, as well as 'fringe' elements whose change has little impact on other areas of grammar, can become recessive and eventually be dissociated and reassigned to L2 features due to the continued activation of the L2". By implication, continuous and increased usage of the socially dominant majority language over the L1/HL may affect, on the one hand, the parsing strategies and, on the other hand, the composition of lexical items and configuration of FFs in the heritage grammar at the competence level (Putnam and Sánchez 2013: 487). While the authors do not deny the possible recovery of HS grammars during the bilingual's lifetime, they do stress the fact that it becomes more difficult (at least in cases of permanent deactivation of the HL) as HL grammars are more prone to a process of feature reassembly and/or CLI from the dominant societal language (see Montrul and Ionin 2010; Cuza and Frank 2011; Santos and Flores 2016 for an extensive discussion of this point in the acquisition of morphosyntactic properties in HLA). Dekydtspotter and Renaud's (2014) results have shown that highly proficient L2 learners appear to be able to recover from long inhibition periods better than low proficiency L2 learners, resulting in the successful processing and reconfiguration of different morphosyntactic features. This result strengthens previous study findings that have suggested a correlation between increased activation of the L1/HL and a high level of language proficiency (De Houwer 2007; Grey et al. 2015; Perez Cortes 2016). Along this line of thinking, Putnam and Sánchez (2013) suggest four possible stages of activation and their impact on shaping the heritage grammars, as illustrated in Figure 3.1.

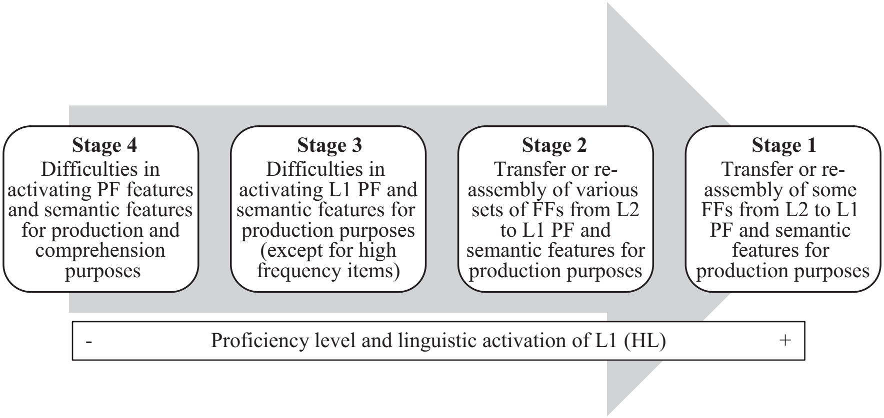

Figure 3.1: A bilingual grammar at various stages of activation (adapted from Putnam and Sánchez 2013: 487–488).

These proposed four stages – where at stage 1 advanced HSs' production exhibits instances of language transfer from the dominant societal language or feature reassembly of some FFs due to high language co-activation levels, while at stage 4 low proficiency HSs exhibit difficulties activating L1 features of all types in both production and comprehension – provide an explanation for the different HS outcomes in comprehension and production and moves away from purporting insufficient input to be the primary reason heritage grammars generate structures distinguishable from monolinguals.

Recent psycholinguistic studies by Gollan et al. (2008, 2011) examined the bilingual lexicon in comparison to a monolingual one. The findings revealed that bilinguals lag behind monolinguals in some production tasks, specifically picture naming tasks. Gollan et al. (2008) proposed an indirect effect of bilingualism on lexical retrieval in so far as bilinguals have a "weaker link" between lexical items and their semantic as well as phonological features. Accordingly, slower lexical retrieval is the result of lower frequency of accessing lexical items in each language because bilinguals speak and understand each of their languages relatively less often than monolinguals (Segalowitz and Segalowitz 1993; Gollan et al. 2008; Hopp 2017). They refer to this assumption as the Weaker Links Hypothesis (WLiH).

Gollan et al. (2008: 788) link the factors language usage, bilingualism and frequency effects to one another "whereby increased use leads to improved lexical accessibility." According to Gollan et al.'s (2011) findings, the activation of lexical items for production and comprehension differs from each other. They argue that comprehension is triggered by decreased use of lower frequency words and, thus, lead to larger frequency effects. By contrast, production is triggered by semantic constraints. Due to dominance effects and more frequency-sensitive stages involved in production, bilinguals are more likely to display susceptibility to changes, which may surface in production.

Although Gollan et al.'s (2011) findings exclusively focus on lexical items, Putnam and Sánchez (2013: 484–485) explicitly expect bilinguals to display also differences between comprehension and production in terms of the activation of FFs of lexical items such as inflectional morphology (see also Liceras, Spradlin and Fernández Fuertes 2005 on the activation of FFs in early bilinguals). With regard to the finding of bilinguals' difficulty in naming pictures in the experiment reported by Gollan et al. (2011), Giancaspro (2017: 43) considers the lower activation of entire lexical items rather than the corresponding FFs to be the reason for why bilinguals are disadvantaged as compared to monolinguals in speech production. Another proposal might be that lexical knowledge has an impact on the observed differences in comprehension and production. Giancaspro (2017: 44) follows Jiang's (2000) approach of lexical representation and development in L2 acquisition to argue that HSs, similar to L2 learners, undergo different stages of lexical knowledge in which they display differential knowledge of the lexical item's morphological, syntactic and semantic information. This assumption is particularly important in the context of HLA because it accounts for any temporary difficulties in accessing as well as retrieving FFs and grammatical information of lexical items in production even if a speaker is at a certain stage of lexical development "when the semantic, syntactic and morphological specifications of an L2 word are extracted from exposure and use and integrated into the lexical entry" (Jiang 2000: 53). It may be that L2 learners and HSs, who experience a temporary difficulty in accessing functional features such as gender associated with lexical items in production, draw on the masculine form as the default or even overuse that form (McCarthy 2008, 2012). Montrul et al. (2014) extend Gollan et al.'s (2008) WLiH to the specific case of gender processing and production in HSs to explain why they display a higher variability with non-canonical ending nouns than canonical ending nouns in the two Picture-Naming Tasks and the Elicited Production Task. As a possible explanation for these findings, Montrul et al. (2014: 111) state:

> [W]e can assume that gender–noun links may have been stronger in their childhood, but they may have also progressively weakened as their first language became the secondary language. Weaker links due to reduced frequency of exposure and use lead to slower retrieval of nouns in the lexicon and gender assignment errors like the ones we have observed.

Although HSs made systematic gender errors of the same quantity as L2 learners in these studies, it is important to note that their performance was always above chance, suggesting that they have underlying knowledge of gender and the observed gender assignment errors are due to decreased frequency of exposure and noun access in the lexicon.[45] Several studies – inter alia Kirova (2016) on gender assignment and agreement in adult Russian-speaking L2 learners of Spanish, Kupisch et al. (2013) on assignment and agreement in adult German-speaking bilingual and L2 speakers of French, and Lohndal and Westergaard (2016) on assignment and agreement in adult American-Norwegian bilingual speakers – focusing on different language combinations within SLA and HLA made similar observations and attribute the variability with grammatical features to a certain extent to the speakers' lexicon.

Crucially, the view that HSs' variability may result from feature reconfiguration or feature value shifts triggered by the level of language activation for comprehension and production offers a promising and alternative approach to incomplete acquisition and another perspective on the acquisition and maintenance of the HL (Cuza and Pérez-Tattam 2015: 2; Putnam and Sánchez 2013: 488; Unworth 2013). In view of the interplay between proficiency, age of onset (AoO) of bilingualism and frequency of language activation, Perez Cortes (2016) has recently incorporated the variable AoO of bilingualism into Putnam and Sánchez' (2013) activation model. Based on the observation that intermediate sequential HSs were more accurate than their simultaneous counterparts with obligatory and variable mood selection in Spanish, Perez Cortes (2016: 256) argues that AoO effects are likely "to emerge at intermediate stage of development (Stages 2 and 3), modulating feature reassembly/rebundling and CLI from the dominant language."

More recently, Sánchez (2017: 4) acknowledged AoO effects to be part of the model, but at the same time pointed out that "it is difficult to isolate their impact given the substantial evidence of feature reassembly among early bilinguals who are heritage speakers and of attrition among late bilinguals" (for details see Schmid and Köpke 2017). Despite the important insights Putnam and Sánchez' (2013) activation model brings to the fore, one question of how frequently or in what contexts adult HSs need to activate and process their HL for maintenance and grammatical stability remains unanswered. Sewell (2015: 229) remarks that "most studies that suggest characteristics of HSs are related to a shift in using the socially-dominant language do not distinguish between speakers who still use the HL to different degrees as adults."

45 Some studies, inter alia Montrul et al. (2008), Martínez-Gibson (2011) and Alarcón (2011), differ in the amount and systematicity of the observed gender errors.

Studies analyzing the relationship among the frequency of activation of the HL, the amount of exposure to the HL and the observed effects of variability and divergence in the HL have reported mixed results (see Köpke and Schmid 2004 for a discussion on the conflicting findings). Some studies, inter alia Köpke (1999), Opitz (2013) and Bergmann et al. (2016), have found a correlation between frequency of activation of the HL, amount of exposure to the HL and attrition in the HL. Decreased HL use and exposure appear to be a predictor for losing low frequency items more rapidly than high frequency ones, whereas increased HL use and exposure results in more native-like outcomes. Other studies found no or only a weak relationship between HSs' differing degrees of HL activation and exposure and variability in their linguistic outcome (Schmid and Duesseldorp 2010; Sewell 2015). These results, which are hardly compelling evidence, led de Leeuw et al. (2010) and Schmid and Dusseldorp (2010) to examine whether the amount of usage in different settings such as at work, with friends and family, with monolinguals, etc. has an impact on bilingual development. The findings revealed that bilinguals who use their HL at work exhibited a lower error rate in free speech and on other tasks (e.g. Verbal Fluency Task) than those using the HL mainly with friends and family.

Findings such as these contribute to our understanding of HSs' language development and the factors that may exert an influence on their grammars. These factors, however, are complex and a fine-grained analysis is needed to provide a clearer picture (Schmid and Köpke 2017).

3.1.4 Summary of HLA accounts explaining native and non-native variability

In this section, four accounts have been presented to account for divergence and variability in adult HSs: (1) language attrition and incomplete acquisition, (2) incipient changes in the input, (3) dominant language transfer and (4) HL activation. In Table 3.1, all proposals are summarized in terms of what they claim about the triggers of optionality and variability in HSs' linguistic systems.

Although all accounts are distinct in the ways they provide a rationale for the divergent and variable linguistic outcomes that characterize HSs, they are not mutually exclusive and can even interact with each other.

Proponents of the first account have related language attrition and incomplete acquisition to the age of onset of bilingualism, input quality, exposure to and usage of the HL (Polinsky 2006; Montrul 2008, 2012, 2016a). Proponents of the second account assume, beyond input as the strongest predictive factor for non-native abilities of HSs, the role of possible other factors such as HL activation, dominant language transfer and underlying representational differences

(Rothman and Pires 2009; Pascual y Cabo and Rothman 2012). Advocates of the third account attribute HSs' variability to CLI from the dominant language. Typological differences or similarities between the HL and the socially dominant language appear to play an important role with regard to whether the socially dominant language weakens the HL. Advocates of the last account not only attribute HSs' variability and divergence to HL activation and usage, but also bear in mind a number of other possible factors such frequency of exposure, input, age, affective factors, CLI and representational differences influencing the grammar of HSs (Putnam and Sánchez 2013).

Table 3.1: Overview of HLA proposals.

	HL acquisition			
Theoretical accounts	*Incomplete acquisition* (Montrul 2008, 2016a) Gender is acquired incompletely by these HSs.	*Attrition* (Polinsky 2006) Gender is completely acquired but subsequently lost due to language contact.	*Delimited input hypothesis* (Pires & Rothman 2009) Gender is not acquired by HSs because it is not in the input or the contact-related variability emerging in the 1st generation. It leads to modifications in the input HSs (i.e. 2nd generation) receive.	*HL activation* (Putnam & Sánchez 2013) Reduced activation of the HL leads to difficulties in accessing FFs in the HL and increases the likelihood of feature reassembly and transfer from the dominant language.
Reason for variability	Insufficient input	Language contact	Differences in the quantity and quality of input	Reduced activation of HL

The key factors that have been proposed for shaping heritage grammars and ultimately causing divergence and variability are illustrated in Figure 3.2. In view of these factors the question that arises is: Is there a factor which outweighs others; and if so, which one? This question is at the heart of the debate about HLA. Up to now, there has been no clear-cut answer and, therefore, as Benmamoun, Montrul and Polinsky (2013: 61) point out "[i]solating each factor is crucial for a better understanding of language loss and change, and it may be achieved by expanding the empirical grounding of heritage studies". It is beyond the scope of this book to examine all of the possible factors that have been empirically established as variables affecting the language development of heritage speakers (see Gharibi 2016 for a detailed discussion and the references therein). To contribute to the discussion and enhance our understanding of HLA, the present work will examine the potentially predictive roles of age, HL proficiency and use related to grammatical gender in Spanish which links morphosyntax and the lexicon (see chapter 5).

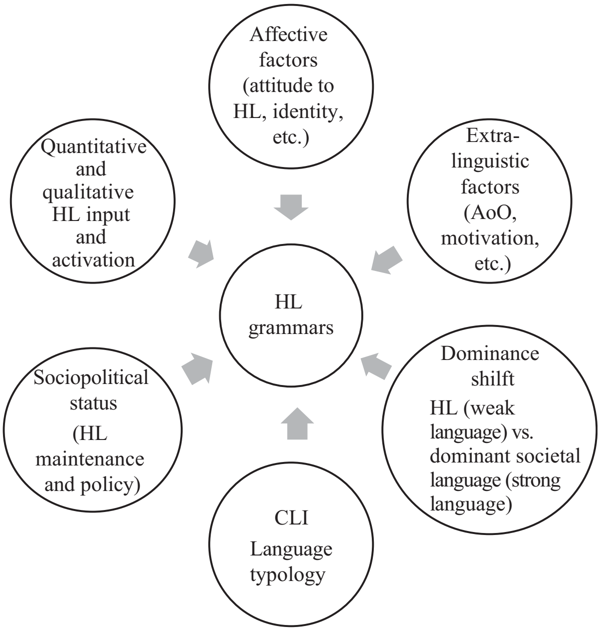

Figure 3.2: Overview of possible factors shaping HS grammar.

3.2 Theoretical assumptions about SLA

Since the early 1980s, one of the most contentious questions in SLA has revolved around the actual role of UG in the nature of L2 grammars and the limits of ultimate attainment in the L2 (Montrul et al. 2008: 504). From a theoretical perspective, early research on UG in SLA concentrated largely on the question of whether or not L2 learners have access to UG (see White 2003 for an overview and discussion).

In the literature, a wide array of hypotheses has been put forward to address the question regarding L2 learners' access to universal principles and parameter resetting as well as to what extent the L1 affects the initial state and even ultimate attainment in IL grammars. The hypotheses about the starting point of non-native grammatical knowledge have been crucial "for figuring out the structure of subsequent stages and [...] for finding explanations for development" (Schwartz 1999: 226) and varied with respect to whether L2 learners have no access, partial access or full access to UG. It has, furthermore, become obvious over the past decade that the no access account advocated by Clahsen and Muysken (1986) and Meisel (1991)[46] appears to be one of the least plausible assumptions. The no access account will not be further elaborated in this section (see White 2003 for a discussion of this issue). The partial and full access accounts fare much better than the no access account "in view of the many obvious and observable differences between first and [child and adult] second language acquisition" (Meisel 2000: 130; see also Meisel 2009 on child L2 acquisition). The following subsections focusing mainly on the partial and full access accounts will present different hypotheses in greater detail to provide a deeper understanding of the implications and consequences of these accounts.

3.2.1 Partial access to UG

Proponents of the partial access to UG position hold the view that L1 and L2 acquisition are fundamentally different (Alarcón 2011: 333). Thereby, they suggest implicitly that UG is accessible to L1 acquirers and hence only they can fully acquire the grammatical structures and features (Alarcón 2011: 333). Past a critical period, adult L2 learners no longer have access to UG. In other words, the basic assumption of these theoretical proposals is that UG constrains the development of IL grammars. Thus, L2 learners are unable to acquire the grammatical representations in the L2 which are absent or not instantiated in the L1. Any target-like representations in the IL are considered to result from L2 learners' metalinguistic skills to emulate knowledge of a given linguistic structure which is not part of the L1 (Montrul 2004: 22). In the following subsections, different proposals put forward within this theoretical position will be reviewed despite the fact that empirical evidence has recently challenged the position of partial access to UG.

Among those L2 researchers who adopt a partial-acess view to UG, various hypotheses have been put forward to explain that the use of optional forms by L2 learners is a manifestation of a representational deficit, namely: (i) Failed Functional Features Hypothesis (FFFH) by Hawkins and Chan (1997) and

46 Note that Meisel (1991 et seq.) has changed his opinion and argues against the no access account now, referring to this account as an 'implausible scenario' (Meisel 2011: 93).

(ii) the Interpretability Hypothesis (IH) proposed by Tsimpli & Dimitrakopoulou (2007). In this section, I will briefly sketch these hypotheses with respect to their predictions on the L2 acquisition of gender.

The Failed Functional Features Hypothesis (FFFH) posits that SLA is guided by partial access to UG. More precisely, Hawkins and Chan (1997) argue that the universal features are acquirable by all adult L2 learners, while parameterized features (e.g. gender agreement) can only be activated if they are present in the learner's L1 functional feature inventory (Snape et al. 2009: 64). This claim "rejects the possibility of UG restructuring in L2 development" (Leung 2003: 199) and implies that the acquired structures in the L1 determine the development of the L2 acquisition process.

Based on the FFFH, we should expect German L2 learners of Spanish to successfully acquire grammatical gender in Spanish because German involves interpretable and uninterpretable features. For English L2 learners of Spanish, the prediction of the FFFH is that gender agreement in Spanish is not acquirable and, thus, they would have major difficulties with resetting certain functional features from the L1 to fit the L2. Consequently, these gender features will exist as failed functional features that deviate from those of Spanish native speakers.

This expectation, however, is not met as a study on the categories tense and gender by Leung (2003) disproved the claim that the aforementioned formal categories are no longer acquirable for adult L2 learners or even in the initial state of third language (L3) acquisition (Leung 2003: 205). In opposition to the prediction of the FFFH, Leung found that none of the features appear to have "failed," neither in the L2 nor the L3 steady state (Leung 2003: 204).

In light of the critique, Hawkins and Chan's (1997) hypothesis received, Tsimpli and Dimitrakopoulou (2007) put forward a modified version of the FFFH. This is the Interpretability Hypothesis (IH, see Tsimpli and Dimitrakopoulou 2007; Tsimpli and Mastropavlou 2008). The IH is based on the distinction between interpretable features "used in syntactic computation by the semantic component in determining the meaning of the syntactic expression" (Yuan 2009: 81) and uninterpretable features which are not usable by the semantic component. A concrete example of this distinction is the feature gender [±fem], which is interpretable in nouns and uninterpretable in adjectives agreeing with the noun in this feature. Agreement is considered as a syntactic process which does not have an effect on meaning. Under the IH, it is proposed that only uninterpretable syntactic features that have not been selected from the UG inventory during L1 acquisition within the critical period (CP), will be inaccessible in L2 acquisition and cause non-native representations in the L2 target-grammar (Hawkins and Hattori 2006). The IH is also referred to as the Representational Deficit Hypothesis (RDH, see Hawkins 2003).

All UG components such as the UG principles, the syntactic and semantic computational devices, the interpretable syntactic features and even the uninterpretable feature – provided that it has been selected during L1 acquisition – remain accessible for the L2 learner. In other words, different parametric values in the L1 and L2 associated with uninterpretable features are not resettable, and are "difficult to identify and analyze in the L2 input due to persistent, maturationally-based, L1 effects on adult L2 grammars" (Tsimpli and Dimitrakopoulou 2007: 217), whereas interpretable features are always accessible, even if they are not instantiated in the L1 (Valenzuela 2005: 60).

With respect to the acquisition of gender, we should expect German and English L2 learners of Spanish to exhibit different accuracy rates for the purportedly unacquirable gender features in the L2 Spanish. Since German has grammatical gender and English lacks it, the predictions of the IH would be that German L2 learners of Spanish have access to the interpretable and uninterpretable gender features as they are in present in the L1, whereas English L2 learners of Spanish can only access the interpretable gender features due to the lack of uninterpretable ones in the L1. Thus, German L2 learners would not be expected to have problems with either interpretable or uninterpretable gender. By contrast, the IH would predict English L2 learners of Spanish to have major difficulties with uninterpretable gender.

3.2.2 Full access to UG

In contrast to the partial access position, advocates of the full access to UG position assume similarities between L1 and L2 acquisition despite some differences between the languages (Alarcón 2011: 333). In other words, it is assumed that L2 learners not only have complete access to UG, including all universal principles and parameter settings as well as functional categories and feature values for the L1 grammar, but also throughout the entire acquisition process. Even past a CP, L2 learners have full access to features of UG that are not instantiated in the L1: "L2 learners acquire complex and subtle properties of language that could not have been induced from the L2 input" (White 2003: 22). Although the theoretical proposals supporting the full access position vary in terms of the conceptualization of the L2 initial state, the role of L1 and access to UG from the beginning or later on, the basic assumption of this position is that full access and ultimate attainment in the L2 is in principle possible, but not guaranteed due to grammatical and extra-grammatical factors (Montrul 2004: 23). In this section I will review the following proposals within this broad theoretical position: (i) Full Transfer/Access Hypothesis (FTFAH; Schwartz and

Sprouse 1994, 1996), (ii) Missing Surface Inflection Hypothesis (MSIH; Prévost and White 2000), (iii) the Morphological Underspecification Hypothesis (MUSH; McCarthy 2007) and (iv) the Feature Reassembly Hypothesis (FRH; Lardiere 2009), which has recently also been extended to HLA.

The Full Transfer/Access Hypothesis (FTFAH) by Schwartz and Sprouse (1994, 1996) argues that two processes, to wit, full transfer and full access, are simultaneously involved in L2 acquisition. The term 'full transfer' refers to the fact that the L1 grammar, including its abstract properties, functional properties and parameter-setting is adopted and used by the L2 learner for L2 acquisition. The learner's L1 grammar thereby constitutes the initial state of L2 acquisition "including all abstract properties but excluding all specific lexical items" (White 2003: 61). In the course of language development, the initial grammar can be changed, provided that "the L1 grammar is unable to accommodate the properties of the L2 input" (White 2003: 61). In this case, the L2 learner resorts to the complete UG and sets the new parameters, functional categories and feature values specifically for the UG-constrained interlanguage grammar (White 2003: 61). The unlimited access to UG is considered as full access. Based on the FTFAH, ultimate convergence of the L2 grammar (i.e. Spanish) with the native grammar is predicted to be possible for German and English L2 learners of Spanish, irrespective of their L1 and age of acquisition.

Following the full access account, Prévost and White's Missing Surface Inflection Hypothesis (2000, henceforth MSIH) argues that L2 learners are able to reach native-like knowledge just like monolinguals and are not constrained by maturational factors. In view of the variable use of inflection in adult L2 learners, the MSIH claims that "L2 learners have unconscious knowledge of the functional projections and features underlying tense and agreement" (Prévost and White 2000: 103). According to Prévost and White, learners occasionally have problems with the realization of correct surface morphology rather than an impairment in the associated syntactic representations.[47] As Prévost and White (2000: 203) point out, the "feature specification in interlanguage syntax, even if target-like, does not necessarily get morphologically spelled out in the same way the syntax of the target language does, due to performance problems." According to the MSIH, we expect German and English L2 learners of Spanish to have the mental representation of the interpretable and uninterpretable gender features. However, German and English L2 learners of Spanish may face difficulties in accessing that grammatical representation in an oral production task

47 For detailed results from studies on grammatical features such as tense, please see Haznedar and Schwartz (1997) and Prévost and White (1999).

due to a production or a processing problem. When problems retrieving the specified forms arise, German and English L2 learners of Spanish may rely on less-specified or default forms.

In regard to the L2 learners' performance in the different tasks of the present study, both groups of Spanish L2 learners are expected to perform more accurately on the untimed Forced-Choice Selection Task (FCST) and Grammaticality Judgement Task (GJT) than in the spontaneous Oral Elicitation Picture Task (OEPT).

Bruhn de Garavito and White (2002) lent support to the MSIH by comparing their results from the acquisition of gender in Spanish by French-speaking learners with those of Hawkins's (2001) English-speaking learners of L2 French. The fact that both L2 groups, irrespective of the absence or presence of gender in their L1, exhibited virtually the same gender error rates (30%) in oral production, contradicts the predictions of both the FFFH and the IH.

Assuming the framework of Distributed Morphology (DM), McCarthy (2007, 2008) proposed the Morphological Underspecification Hypothesis (MUSH), according to which erroneous morphological forms encountered in L2 grammars are not simple performance errors, but rather stem from instances of underspecification (McCarthy 2007: 62). To put it differently, the MUSH claims that a representation deficit in morphology rather than in syntax (contra the FFFH) drives morphological variation (McCarthy 2007: 52–53). Accordingly, L2 learners produce erroneous morphological forms which "involve the systematic substitution of underspecified, representationally-simpler forms across comprehension and production" (Slabakova 2009: 58). In this view, it is possible that underspecified, or so-called default forms associated with underspecified features, are inserted rather than fully specified forms (evoking a feature match or even mismatch) in order to mitigate the cost of feature calculations (Renaud 2010: 136).

According to the MUSH, we expect German and English L2 learners of Spanish – even at high levels of L2 proficiency – to show variability in both production and comprehension. L2 learners are expected to exhibit two types of errors (i.e. underspecification and feature clash) which may occur in the competition of lexical insertion. Consider the following examples in (3.1a) taken from McCarthy (2007: 55).

(3.1) a. **el*$_{\text{Masc}}$ *noche*$_{\text{Fem}}$
the night

b. **la*$_{\text{Fem}}$ *libro*$_{\text{Masc}}$
the book

Example (3.1a) represents an error of underspecification. The syntactic representation *noche* requires the feminine determiner *la* associated with specified gender feature. However, in the competition of vocabulary insertion the underspecified form *el*$_{\text{Masc}}$ is inserted into the feminine context (i.e. *noche*$_{\text{Fem}}$), not resulting in a feature clash "as the elsewhere morpheme represents the absence of gender" (McCarthy 2007: 55). In contrast, (3.1b) illustrates an error of feature clash between the syntax, which supplies [masculine] and the Vocabulary Item, which is associated with the feminine form *la* (McCarthy 2007: 55).

In light of these two types of errors, the prediction of the MUSH (McCarthy 2007: 59) is that "no variability occurs in the least marked syntactic context [masculine and singular]" and "learners will not produce errors that result in feature clash, but that errors of underspecification may occur". According to this line of reasoning, German and English L2 learners of Spanish might use the masculine gender as a default form in L2 acquisition because it has a simple morphological representation as compared to the feminine.

McCarthy (2007) offers empirical support for her hypothesis. In her study on the acquisition of number and gender agreement in L2 Spanish clitics and adjectives by intermediate and advanced English-speaking learners of Spanish, an Elicited Production Task and a Picture Selection Task were carried out. McCarthy found that number agreement as opposed to gender agreement appeared to be less susceptible for variability. As far as gender agreement was concerned, the intermediate learners exhibited higher morphological variability than the advanced learners in both comprehension and production. In addition, she found that the masculine clitics surface as defaults across production and comprehension tasks irrespective of the proficiency level.

The most recurrent account is Lardiere's (1998a, b, 2005, 2008, 2009) Feature Reassembly Hypothesis (henceforth FRH), which assumes that morphological variability in adult L2 acquisition is not a feature availability problem (i.e. the presence or absence of certain types of features in the L1), but rather a complex process of the reconfiguration or reassembly of morphological feature bundles of L1 lexical items from the way they are realized (or not) in the L1 into new or different configurations in the L2. In this vein, Shimanskaya (2015: 23) notes: "The lack of native-like L2 acquisition changes from being a maturational problem, to a problem of distinguishing and recombining individual features from L1 bundles into new L2 combinations". Adopting Schwartz and Sprouse's (1994, 1996) Full Access Full Transfer (FAFT) model, Lardiere (2007) assumes that L2 learners bring formal features which are already assembled and contained in the lexical items of the native language to the acquisition task (Shimanskaya 2015: 20). According to the FRH, the task of the L2 learner does not, therefore, lie in (re)setting existing parameters to their target-like L2 value, but rather requires the L2 learner to either select new features for the L2 or reconfigure the assembly of features first transferred from the way they are represented in the L1 (Lardiere 2008: 106–107).

The FRH predicts that German and English L2 learners of Spanish can ultimately reach native competence. For gender, the task for English learners of Spanish is to recognize that grammatical gender exists in the target language before starting with the assembling process. By contrast, L1 German learners, whose own system provides them with grammatical gender, have to reassemble the [+LF, +interpretable] gender feature encoded by L1 items onto Spanish L2 lexical items. L1 German learners with may encounter cases where the direct mapping of morphosyntactic features succeeds (e.g. *die*$_{\text{Fem}}$ *Blume*$_{\text{Fem}}$ – *la*$_{\text{Fem}}$ *flor*$_{\text{Fem}}$ 'the flower') or fails (e.g. *der*$_{\text{Masc}}$ *Korb*$_{\text{Masc}}$ – *la*$_{\text{Fem}}$ *cesta*$_{\text{Fem}}$ 'the basket'). When faced with distinct features and values between the L1 and L2, these learners have to disassemble the morphological expressions from the way they are employed in the L1 and reconfigure them appropriately. According to Lardiere (2009), the more feature reconfiguration is necessary, the harder the acquisition process will be. If the process of feature reconfiguration fails, target-deviant or fossilized morphological forms are to be expected. To put it differently, erroneous morphological forms do not stem from a problem of feature selection, but rather from "the appropriate morphological spell-out of the features of L2 lexical entries and the knowledge of the correct contexts for their insertion" (Lardiere 2008: 116). In this regard, German learners of Spanish might face difficulties in the reassembly process but also show an advantage compared to English learners, as their L1 lacks grammatical gender entirely. The feature (re)assembly task of grammatical gender for L1 English and L1 German learners is schematized in Figure 3.3.

In view of the complex process of feature reassembly, Lardiere (2009: 175) mentions three further challenges that L2 learners may experience (adopted from Shimanskaya 2015: 22):

i. whether a particular feature is associated with the same functional category;
ii. how features are combined into lexical items;
iii. optional/obligatory realization of a morphological marker.

The FRH is, at the same time, similar to and different from other aforementioned proposals such as the MUSH or IH in accounting for morphological variability. Similar to the MUSH, the FRH considers morphological errors to be a problem of morphological competence, rather than performance issues such as working memory lapses, automaticity or processing difficulties, whose impact on the L2 acquisition of morphological features is not as decisive as "the knowledge of which forms go with which features" (Lardiere 2005: 179). In contrast to

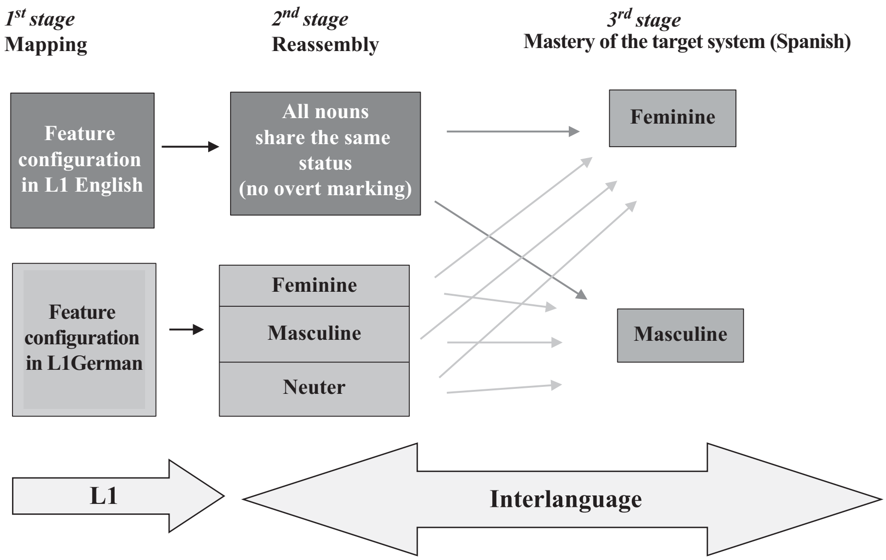

Figure 3.3: Feature reassembly task of grammatical gender in L1 German and English.

the IH's claim that uninterpretable features not present in the L1 become unavailable for L2 acquisition, and only interpretable feature are accessible to the learners (Tsimpli and Dimitrakopoulou 2007), the FRH (Lardiere 2005, 2008, 2009; Choi and Lardiere 2006a, 2006b) argues that all features, irrespective of their presence and absence in the L1 and status of LF-interpretability [± interpretable], should in principle be acquirable as they are reflections of "fundamental cognitive categories" (Harley and Ritter 2002: 482).

Over the last years, the FRH has been studied in various domains of adult L2 acquisition, inter alia, L2 acquisition of grammatical gender and number in Swahili (Spinner 2013) and Spanish (Guijarro-Fuentes 2014a, b), and even more recently in child and adult HLA (see Perez Cortes 2016 for indicative/subjunctive mood alternations; Cuza and Pérez-Tattam 2015 for grammatical gender selection and phrasal word order; Pomino, Schmitz and Neuburger 2018 for DOM, among others). As the present study is concerned with the acquisition of gender in Spanish, the studies by Spinner (2013) and Guijarro-Fuentes (2014a, b) will be briefly reviewed in view of evidence for the FRH.

Spinner (2013) conducted a study on the acquisition of gender and number by 38 English-speaking L2 learners of Swahili. In Swahili, grammatical gender and number marking are expressed on noun prefixes, whereas in English only number is present and expressed on the noun suffix. The results of an Elicited

Production and a Written Gender Assignment Task showed that the L2 learners failed to mark number in the target language (henceforth TL) feature despite its presence in their L1. Crucially, they displayed no errors in marking gender in the TL, though it is not present in their native language. Spinner describes the L2 learners' difficulty "to segment the Swahili noun prefixes into separate morphemes that indicate number and gender" (Spinner 2013: 476) as a detection problem.

In Spinner's opinion, this detection problem can be best understood under the feature reassembly approach. She provides two possible explanations. The first touches on the location of the number marker in the L1 and the TL. It might be the case that "that English speakers are 'looking for' number marking as a suffix" (Spinner 2013: 471) as it appears in their L1. If they cannot detect an overt number marker, English learners of Swahili might analyze it as a null form. The second explanation considers the conflation of the number and gender feature in Swahili as well as the absent gender feature in English to be the problem for English learners of L2 Swahili (Spinner 2013: 462).[48]

Guijarro-Fuentes (2014a, b) also examined the acquisition of gender and number in adjective placement by French and Chinese learners of L2 Spanish at intermediate and advanced proficiency levels. French and Spanish are typologically similar in the way they share certain DP features, whereas Chinese and Spanish differ and do not share any DP features. What is more, Chinese does not allow post-nominal adjectives and lacks nominal agreement (Guijarro-Fuentes 2014b; Guijarro-Fuentes, Parafita Couto, Pérez-Tatam and Wildeboer 2016). The results of the Grammatical Judgement and Semantic Context-Based Collocation Tasks showed that "both French and Chinese learners of Spanish were unable to (re)select the proper uninterpretable and interpretable features, notwithstanding the resemblance between French and Spanish" (Guijarro-Fuentes, Parafita Couto, Pérez-Tatam and Wildeboer 2016: 202). Guijarro-Fuentes (2014b) concludes that both L2 groups do not have full access to uninterpretable and interpretable features irrespective of their presence in the L1. In this vein, the FRH thus seems to be more suited to describe these data in terms of a gradual process of feature reconfiguration than the IH does.

48 See also Spinner and Juffs (2008) for a similar explanation on Italian-speaking L2 learners of German who are unable to mark gender on German determiners because German gender is conflated with case marking.

The empirical studies adopting a feature reassembly approach provide a framework from which to discuss and understand why morphological variability emerges. As noted by Lardiere (2005: 190) herself, the FRH is not yet fully developed enough to offer specific predictions about acquisition of particular features. Further research is needed to arrive at a more articulated account even in the domain of language processing. As pointed out by Shimanskaya (2015: 32), future research needs to address the following questions:

> What remains to be seen is whether L2 processing routines are automatically adjusted to process lexical items available in L2 once the corresponding feature bundles have been established in the grammar. In other words, if and when featural representations are reassembled into new L2 bundles, does successful completion of this reassembly process automatically alter L1 processing routines? Or does the required change in how meaning is computed on-line in L2 represent an additional step towards target-like L2 use?

3.3 Summary of L2 accounts explaining non-native variability

In this section, we have considered several hypotheses that focus on the nature and the role of UG within SLA as well as the possibility of (non)-native attainment in the TL. It is important to note that not all hypotheses are mutually exclusive especially within the two broad theoretical positions, namely partial access to UG, one the one hand, and full access to UG, on the other.

The hypotheses proposed within the partial access to UG position are deficit accounts arguing that L1 and L2 acquisition radically differ from one another. After the CP, L2 learners no longer have access to UG and parameter resetting is impossible. L2 learners can only acquire those features in the syntactic representation that are present and instantiated in their L1. According to a specific claim of the IH, L2 learners cannot acquire uninterpretable features regardless of their presence and instantiation in the L1. Apparent native-like performance in the L2 is largely ascribed to L2 learner's usage of domain-general-problem-solving cognitive abilities (Montrul et al. 2008: 504) and there are no task differences predicted because the underlying deficit in the IL grammar is claimed to affect the L2 performance.

In contrast, the hypotheses within the full access to UG position start from the assumption that the whole inventory of UG is available to the L2 learners and parameter resetting is possible. Proponents of this position agree that no maturational constraints on the L2 exist and thus, according to all hypotheses except for the FTFAH, ultimate attainment in the L2 should be, in principle, possible. Under the FTFAH ultimate attainment in the L2 is considered to be possible but not guaranteed as "L1 representation appears to be a major determinant of the final outcome of L2 acquisition" (White 2003: 284). In spite of the considerable overlap between the various hypotheses within this position, they disagree in their explanations for divergent outcomes in adult L2 learners. In the FTFAH (Schwartz and Sprouse 1996), problems are due to L1 interference and task effects are not expected.

The MSIH (Prévost and White 2000) and MUSH (McCarthy 2007) attribute difficulties to a mapping problem between syntax and morphology rather than deficits in syntactic representations. The MUSH goes a step further in its formulation by arguing that errors are due to underspecification rather than a feature clash. Both proposals, the MSIH and MUSH, agree on the assumption that variability is more likely to occur in L2 production than comprehension. In the FRH, a non-target-like L2 outcome results from the failure to (re)assemble formal and semantic bundles in the L2 lexicon as well as to figure out the specific conditions under which their properties may or may not be morphophonologically expressed (Lardiere 2008, 2009). Under the FRH, variability in production and comprehension might occur randomly. Yet another proposal formulated within the context of L2 acquisition is the IFH. Unlike the previous proposals, the IFH predicts that core syntactic features or/and external interfaces pose severe problems for L2 learners. Under the IFH, task differences are not assumed.

In Table 3.2, all proposals are summarized in terms of what they claim about potential L1 effects, the CP, task differences and ultimate attainment in the TL.

Table 3.2: Overview of proposals on L2 ultimate attainment.

Proposals	Claim	L1 effects	CP	Task differences	Ultimate attainment in L2
FFFH	L1 determines convergence / representational impairment	No	Yes	No	No
IH		No	Yes	No	No
FTFA	L1 interference	Yes	No	No	Possible
MSIH	computational limitations in lexical access	Yes	No	Possible (only in production)	Possible
MUSH	morphological underspecification	Yes	No	Possible	Possible
FRH	feature reassembly	Yes	No	Possible	Possible

As we have seen from the review of empirical studies testing these hypotheses, some data supported them, whereas others, in fact, refuted them or need to be further elaborated. We will consider these hypotheses and their predictions in more detail in chapter 6, when discussing and explaining the L2 data.

4 The acquisition of gender by L1, 2L1 and L2 speakers

There seems to be no consensus in research on the successful acquisition of gender by Spanish L2 learners and even Spanish HSs. The majority of studies suggests that both Spanish L2 learners and Spanish HSs struggle to acquire a native-like command of grammatical gender (Sabourin 2003; Sabourin and Stowe 2008; Montrul et al. 2008), although from a generative perspective all speakers are assumed to “have access to the basic syntactic operations (Move, Merge, Agree)” (Perez Cortes 2016: 50; see also section 1.3). Schmid et al. (2015: 5) note that “there is to date little evidence of grammatical systems being adversely affected by attrition in late bilinguals”. Nevertheless, the recurrent claim of research (e.g. Montrul 2002; Montrul et al. 2008) on the inability of L2 learners to achieve monolingual gender behavior has been linked to maturation constraints supporting the claim for a CP or the inaccessability of uFFs not instantiated in the L2 learner’s L1 (e.g. Hawkins and Franceschina 2004). In the case of HSs, non-target-like realizations of gender assignment and agreement are attributed to CLI (Lipski 1993; Montrul 2002; Polinsky 2007; Silva-Corvalán 2003), language attrition or incomplete acquisition caused by input insufficient to maintain or develop the full system of the HL (Montrul et al. 2008; see also chapter 3 for further details). As was pointed out in chapter 3, language acquisition is dynamic and complex. Apart from the variable age of acquisition (AoA), numerous other external variables (i.e. language proficiency levels, language input, activation, etc.) as well as internal factors (noun gender, noun morphology, etc.) may have an impact on the language development of bilinguals and ultimately the speaker’s competence in the HL/TL.

In this chapter, the review of studies – embedded in the generative framework and sometimes even outside of any linguistic theory at all – focuses on findings related to the aforementioned extralinguistic variables as well as to four linguistic variables, namely: (1) noun class, (2) noun morphology, (3) noun gender and (4) lexical gender (i.e. gender assignment) versus syntactic gender (i.e. gender agreement).

4.1 Evidence from monolingual adults

Adult L1 research on the use of gender cues for ascribing a noun’s inherent gender is scarce. To the best of my knowledge, there is no study which has investigated the correct use of gender-marked pronouns or gender-marked forms with

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semantic gender nouns by adult L1 English speakers. For German, there are a few studies by Köpcke and Zubin (1983), Wegener (1995) and Mills (1986b), all aiming at validating the hypothesis that phonological cues are the determinant factor in gender assignment and even part of the speaker's linguistic competence (Varlokosta 2011: 323). The studies by Antón-Méndez (1999) and Antón-Méndez, Nicol and Garrett (2002) concentrated mainly on the accuracy of gender agreement in adult Spanish-speaking monolinguals. The more recent study by Anderson and Lockwitz (2009) constitutes an exception as it explored Spanish gender assignment with a focus on the relevance of noun internal or external cues. The following subsections will give an overview of the findings in all the aforementioned studies.

4.1.1 Evidence from monolingual German-speaking adults

In their study, Köpcke and Zubin (1983) examined the relevance of phonological cues for identifying the noun gender in 10 monolingual German-speaking adults. The researchers auditorily presented 44 monosyllabic nonce nouns with two different determiners from which the more appropriate determiner had to be selected. German native speakers reached accuracy scores of over 64% in seven out of eight phonological gender assignment rules. In five phonological gender assignment rules the accuracy scores reached over 73%. Moreover, the results showed that the participants obtain high accuracy scores especially when more than one phonological assignment regularity applies. These results were corroborated by the findings of Wegener's study (1995). In her study, Wegener modified the task to allow for the selection of all three genders and reported similar accuracy scores for decisions on the gender for a nonce word.

Mills (1986b) replicated Köpcke and Zubin's study with 30 German-speaking adults aged 20 to 25 years to determine the relevance of phonological cues in identifying the gender for a nonce word. Mills (1986b: 47) administered a further task to her subjects and "they were asked to note if they had related the nonsense word to any existing word when marking the gender assignment." This task was included to examine whether the subjects assign gender by analogy with a particular lexical item rather than by phonological gender assignment rules, as Clyne (1969: 224) has contended. The results revealed "considerable conformity between the results of Köpcke and Zubin and those of this experiment" (Mills 1986b: 47). Subjects obtained high accuracy scores of gender assignment according to seven of eight phonological rules. According to Mills (1986b: 49), erroneous gender assignments are due to individual real word associations which are exceptions to the phonological rules (as in *Schlaß* vs. *Schloß*$_{\text{Neut}}$ 'castle'). In most cases, these word associations also reflect the rule.

4.1.2 Evidence from monolingual Spanish-speaking adults

Igoa et al. (1999) analyzed gender stranding errors in a Language Production Task by 10 Spanish-speaking monolinguals, and found that they produced more gender stranding errors with semantic than non-semantic nouns. Igoa et al. (1999) also analyzed the effect of morphology on overt and non-overt semantic nouns in a word-exchange experiment. Given that, in the case of non-overt semantic nouns, no gender is reflected through its morphological ending, gender stranding errors become apparent in the gender of the determiner, not the gender of the noun, as in *el/la estudiante* 'the male/female student' (Alarcón 2006: 25, emphasis added). Contrary to the prediction that overt semantic nouns would show more stranding errors than non-overt semantic nouns, the researchers found the opposite.

Antón-Méndez (1999) explored the processing of gender and number agreement by using three different experiments. In investigating whether there are any differences in the error agreement rates between semantic and non-semantic nouns, she followed the methodology used in an experiment on subject-verb agreement by Bock and Cutting (1992) and Bock (1995). In one of the three tasks, Antón-Méndez administered a list consisting of 48 experimental nouns (all singular and overtly marked for gender) and 88 distractors to 56 adult Spanish-speaking monolinguals (age range 18–56). The participants were asked to establish gender congruency between the adjective, which had been given in its feminine and masculine marked form, and the sentence with the pattern subject noun (head) + prepositional modifier + second noun (attractor), as in *El enfermo en la cama* by completing the sentence with a verb and the appropriate form of the adjective. The results revealed that the participants made only 3% of gender agreement errors. Most gender agreement errors occurred when the head noun was non-semantic rather than semantic. This is consistent with previous findings on the acquisition of gender in Italian and French as L1 by Vigliocco and Franck (1999).

Antón-Méndez (1999) addressed the question whether there is a possible effect of morphology on gender assignment errors in her second task by studying 40 Spanish speakers consisting of monolinguals and bilinguals (age range 18–46). This task was similar to the first one, except for the fact that this time the adjective stem was displayed without the last vowel, which indicates the gender (4.1).

(4.1) El reloj de la plaza es antigu_.
El reloj de la plaza es antiguo.
'The$_{\text{Masc.Sg.}}$ clock$_{\text{Masc.Sg.}}$ in the$_{\text{Fem.Sg.}}$ square $_{\text{Fem.Sg.}}$ is old$_{\text{Masc.Sg}}$.'

An effect of the morphology on gender agreement errors could only be found between semantic nouns and non-overt head nouns, particularly in preambles containing feminine head nouns (see also Alarcón 2006: 25).

Antón-Méndez, Nicol and Garrett (2002) examined the relationship between gender and number in subject-predicate agreement processing by thirty-two native Spanish speakers (most of them monolinguals from Mexico and some bilinguals from Arizona) aged 18–42. With the aim of testing the effect of gender on agreement errors, the authors made use of a previous test design by Antón-Méndez (1999), as exemplified in (4.2).

(4.2) La prima del pastelero está aburrid_.
La prima del pastelero está aburrida.
'The$_{\text{Fem.Sg.}}$ cousin$_{\text{Fem.Sg.}}$ of the$_{\text{Masc.Sg.}}$ pastry chef$_{\text{Masc.Sg.}}$ is$_{\text{Sg.}}$ bored$_{\text{Fem.Sg}}$.'

Their results show a higher percentage rate of correct responses with masculine head nouns, while similar studies conducted by Igoa et al. (1999) and Antón-Méndez (1999) did not find an effect for gender. Antón-Méndez et al. (2002) observed an effect of gender congruency because most errors were made in mismatched conditions between head and attractor nouns.

Apart from these studies, there is one recent offline study by Anderson and Lockwitz (2009), which focuses on the use of gender assignment rules by 11 L1 Spanish-speaking adults.[49] Regarding the use of determiner and adjective cues provided for ascribing gender to the invented nouns, the Spanish-speaking adults achieved mean scores of nearly 100%. They showed a significantly high proportion of correct gender assignment based on the determiner cues (93%) and adjective cues (87%), whereas they achieved a mean score of 73% on the semantic transparency cue sub-test. Anderson and Lockwitz (2009) assume that syntactic agreement cues account to a great extent for ascribing gender in adult native Spanish speakers, whereas natural gender did not appear to be a main strategy on which they rely. However, further studies are needed to confirm this suggestion.

49 It is noteworthy to mention that the data from these native adult Spanish speakers were only gathered to gain the expected response patterns for comparison with those obtained from the TLL and SLI child groups.

4.2 Evidence from early and late bilingual adults

In the last decades, there has been growing interest in the language abilities of adult 2L1 bilinguals, also referred to as HSs. A substantial body of HL studies on various linguistic domains and modules of grammar have been conducted to explore the “developmental stages and outcome of learning a heritage language from childhood and into adulthood, as well as the wax and wane of the heritage language in response to input factors” (Montrul 2016a: 2). Most of the existing studies have directly compared adult HSs and adult L2 speakers against a native benchmark to illustrate similarities and differences between these groups. Previous research has documented that the linguistic outcome of HSs depends on numerous factors such as the intake and activation of the HL or the modality of acquisition (i.e. written and spoken; see section 3.2.3 and 3.3 for an overview of the factors shaping HSs grammars). This section reviews empirical studies investigating early bilingual adults’ (i.e. HSs) and late bilingual adults’ (L2 learners) knowledge of grammatical gender in Spanish.

4.2.1 Evidence from early Spanish-English bilingual adults (HSs)

Montrul, Foote and Perpiñán’s (2008) study was the first to explore the acquisition of gender in Spanish by adult English-Spanish bilinguals. They examined the role of AoO of bilingualism in the acquisition of gender among 69 adult Spanish HSs, 72 English speaking L2 learners of Spanish and 22 Spanish monolinguals. The test battery comprised three experiments: a Written Picture Identification Task, a Written Gender Recognition Task and an Oral Picture Description Task.

According to Montrul et al. (2008), the findings of the three experiments revealed non-native mastery of gender in Spanish for both bilingual groups. A crucial difference between HSs and L2 learners concerns the task modality (i.e. written vs. oral). HSs were more accurate on gender agreement in the oral task than in the written task, while for the L2 learners, the opposite pattern holds true. This rebuts previous findings by White et al. (2004), whose L2 learners performed equally well in both online comprehension and production tasks. Montrul et al. (2008) attribute White et al.’s (2004) findings to the fact that the Oral Production Task was easier compared to the Comprehension Task as only high frequency nouns with overt gender endings were included. Montrul et al.’s (2008) error analysis showed that both groups produced more gender agreement errors than gender assignment errors. When considering the data in more detail, the authors observed a higher error rate with non-canonical nouns and a preference for the masculine form.

Alarcón (2011: 333) contests whether Montrul et al.'s (2008) results are indicative of incompleteness of gender acquisition in adult HSs and L2 learners because they compared lower-proficiency HSs exposed to English before age five with the L2 learners of various proficiency levels. In Alarcón's (2011: 333) words:

> This leaves open the question whether heritage speakers and L2 learners at a higher proficiency level would also display incomplete acquisition of gender, and if so, whether they would display similar patterns of errors. More important, if advanced proficiency heritage speakers, who were exposed to English after age 5, display completely native-like gender behavior both in comprehension and production, while advanced L2 learners do not, one could argue that maturational constraints play a role in the underlying representation of gender.

To address these issues, Alarcón (2011) replicated Montrul et al.'s (2008) study with 18 English-Spanish HSs exclusively exposed to Spanish until age five, 18 English-speaking L2 learners of Spanish and 17 native Spanish speakers as a baseline. According to a grammar proficiency test, all participants were at an advanced proficiency level.

Similar to Montrul et al.'s (2008) results, Alarcón found both Spanish HSs and Spanish L2 learners had a higher error rate with non-canonical nouns and overextended default masculine forms to feminine nouns. Furthermore, the HSs clearly outperformed the L2 learners in the Oral Production Task. Alarcón (2011) attributes the errors in oral production displayed by the L2 learners to difficulties in the surface manifestations of the abstract features of gender (i.e. the mapping problem). In contrast to Montrul et al. (2008), Alarcón observed no differences in the gender accuracy rates between HSs and L2 learners in the Written Gender Recognition Task. As far as the gender errors in the two tasks are concerned, both HSs and L2 learners produced more errors in the domain of gender assignment (lexical gender) than in the domain of agreement (syntactic gender), and this is as previously reported by Montrul et al. (2008). Alarcón (2011) concludes that both groups have an underlying knowledge of Spanish gender as shown by their high accuracy rates.

Martínez-Gibson (2011) conducted a comparative study on gender agreement errors in the spoken Spanish of 16 first-generation HSs (HSG1), 14 second-generation HSs (HSG2) and 14 English-speaking Spanish L2 learners. Martínez-Gibson (2011: 186–189) finds minimal percentage differences in the gender assignment error rate and gender agreement error rate within the groups. There is, however, a difference in the number of gender assignment and agreement errors between the three groups of Spanish speakers. Most errors were produced by the L2 learners (i.e 75.25% assignment errors and 76.25% agreement errors). The HSG2 group shows a considerably lower error rate (16.75% assignment errors and 15.25% agreement errors), followed by the HSG1 group with the lowest error rate (7.5% assignment errors and 8.5% agreement errors). As far as the errors are concerned, Martínez-Gibson (2011) reports that one of the most consistent errors was the overextension of the masculine modifier with a feminine noun, while the three groups also showed some instances of errors with a feminine modifier and masculine noun.[50] The latter was mainly found with words of Greek origin, such as **la*$_{\text{Fem}}$ *mapa*$_{\text{Masc}}$ 'the map' (HSG1) and **la*$_{\text{Fem}}$ *día*$_{\text{Masc}}$ 'the day' (L2 learners). Martínez-Gibson (2011: 188) argues that "these are exceptions to the more basic grammar rule, this gender error may have been the result of applying the general rule or the incomplete acquisition of learning the exceptions".

Diebowski (2013, 2014) revisited the comprehension and written production of grammatical gender in 24 advanced proficiency English-Spanish HSs, 25 intermediate and advanced proficiency English-speaking L2 learners of Spanish, using a very similar procedure. In accordance with Montrul et al. (2008) and Alarcón (2011), she found all groups had higher accuracy with canonical noun endings than with non-canonical endings or exceptional nouns as well as the overextension of the masculine form. The error analysis revealed that advanced L2 learners and HSs showed more gender assignment errors than agreement errors. However, the opposite was found in intermediate L2 learners. According to Diebowski (2013), intermediate L2 learners have difficulty with gender agreement because they have not yet fully internalized gender as part of their implicit knowledge in their interlanguage grammar (Ellis 2005). Both L2 groups fail to see the restriction of the gender assignment rules in Spanish with regard to deceptive nouns or exceptions, and thus make overgeneralization errors. By contrast, HSs do not tend to overuse the general gender assignment rule but instead make errors with words whose first syllable begins with a stressed *-a* and are accompanied with the masculine indefinite article in the singular form despite their feminine gender, as in (4.3) (Diebowski 2013: 92).

(4.3) *Siempre tengo clases en <u>una</u>$_{\text{FemSg}}$ aula$_{\text{FemSg}}$ sucia$_{\text{FemSg}}$.
Siempre tengo clases en <u>un</u>$_{\text{MascSg}}$ aula$_{\text{FemSg}}$ sucia$_{\text{FemSg}}$.
'I always have class in a dirty auditorium.'
(Examples from Diebowski 2013: 120, author's underlying)

The author questions whether the HSs made these errors due to incomplete acquisition, as previously claimed by Martínez-Gibson (2011), and argues that the HSs are aware of the noun's feminine gender but fail to see the phonological

50 For similar findings see for example Andersen 1984 and Boyd 1975.

restriction (i.e. feminine words whose first syllable begins with a stressed *–a* are accompanied by the masculine article in the singular). Diebowski (2013) explains the errors found in the study by the fact that the nouns are not frequently used and are words which are generally restricted to discourse specific conversations, as exemplified in (4.4).

(4.4) *Aunque Fernando me mienta, él tiene una$_{\mathrm{FemSg}}$ alma$_{\mathrm{FemSg}}$ buena$_{\mathrm{FemSg}}$.
Aunque Fernando me mienta, él tiene un$_{\mathrm{MascSg}}$ alma$_{\mathrm{FemSg}}$ buena$_{\mathrm{FemSg}}$.
'Although Fernando lies to me, he has a good soul.'
(Examples from Diebowski 2013: 121, author's underlying)

Valenzuela, Faure, Ramírez-Trujillo, Barski, Pangtay and Diez (2012) examined the acquisition of gender in code-mixed DPs and copula constructions by 20 adult English-Spanish HSs and 32 L1 Spanish monolinguals, who were post-childhood L2 English learners. Valenzuela et al. (2012) administered a Sentence Selection Task (SST) consisting of dialogues between two bilingual speakers that included either a code-switched DP or an agreement copula sentence. Each participant was asked to read the dialogue and choose the statement that sounded most natural, as exemplified in Table 4.1.

Table 4.1: Examples from the Sentence Selection Task (Valenzuela et al. 2012: 488).

Code-switched DP (Assignment)	Copula constructions (Agreement)
Juan: I had lots of fun anoche, pues, I ran into Sergio. Elisa: Seriously? Dónde lo viste? a. En la party b. En el party	Elisa: Ayer fue el cumpleaños de Fernando. Juan: Really? And how was the party? a. Fue fantastica b. Fue fantastico

The results from the HSs revealed two tendencies. First, the HSs, unlike the L1 Spanish monolingual group, were more accurate with feminine tokens in the code-switched copula constructions than in DP conditions. The authors assume that this difference between the groups stems from processing assignment and agreement differently rather than from different underlying representations or a problem with the gender feature itself (Valenzuela et al. 2012: 491–492). Second, HSs resorted more to the default masculine determiner with nouns whose Spanish equivalents were feminine than the L1 Spanish monolingual group. Valenzuela et al. (2012: 491) argue that the HS grammars differ from the grammar of monolinguals with regard to some of the aspects of grammatical gender (Montrul 2008;

Rothman 2009). They rule out age as a variable affecting HSs' knowledge of gender as the HSs were exposed to Spanish from birth and instead assume that the amount of exposure and/or dominance of the community language (i.e. English) plays a role in the bilingual acquisition of gender.

More recently, Montrul, de la Fuente, Davidson and Foote's (2014) study investigated whether the role of linguistic experience (i.e. the timing, type, modality, frequency and amount of exposure to relevant input and use of the language) may affect the mastery of gender marking in Spanish by 29 intermediate to advanced proficiency Spanish HSs (exposed to English before age 5) and 37 advanced proficiency English-speaking Spanish L2 learners, with 24 native Spanish speakers as a baseline. Evidence from experimental data using two Picture-Naming Tasks and an Elicited Production Task revealed that the HSs were more accurate than the L2 learners with grammatical gender in general and especially with nouns that have a non-canonical ending. It is interesting to note that 65% of the HSs performed at the level of the Spanish monolinguals, which reveals a full command of grammatical gender, whereas no L2 learner demonstrated the same performance. Montrul et al. (2014) relate the asymmetries in performance between HSs and L2 learners to early language experience (i.e. the HSs were exposed to Spanish from birth, whereas the L2 learners from the age of 11) and the different kind of input received. Most of the HSs (65%) show more native-like patterns in implicit tasks such as aural comprehension and appear to have an advantage over the L2 learners, who perform better in metalinguistic awareness tasks. For the remaining HSs (35%), Montrul et al. (2014: 112) conclude that "reduced input and use of the minority language throughout the school-age period may have led to reduced frequency of use of nouns and their associated genders as they grew older". Extending Gollan et al.'s (2008) WLiH to the specific case of gender processing and production in HSs, Montrul et al. (2014: 112) suggest that "gender-noun links may have been stronger in their childhood, but they may also have progressively weakened as their first language became the secondary language." Support for this claim comes from their 19 HSs who did not exhibit any gender errors and "had a mean naming latency in the Spanish Picture-Naming Task of 1,030 ms, whereas the 10 heritage speakers who made gender errors had a mean naming latency of 1,262 ms – a 232 ms difference– suggesting that their lexical retrieval is actually slower" (Montrul et al. 2014: 112).

A recent study by Diebowski (2020), who investigated whether the amount of exposure to the target language (i.e. Spanish) affects gender accuracy in adult English-speaking L2 learners of Spanish and simultaneous Spanish HSs, all residing in New York State, does not support the explanation given by Montrul et al. (2014). Based on the data from the Grammaticality Judgment

Task (GJT) and Oral Production Task (OPT), Diebowski (2020) observes successful mastery of gender assignment and agreement both in the L2 and HS groups. For the group of HSs, she could not find a significant correlation between the frequency of HL use and gender accuracy, but there was a significant correlation for the group of L2 learners. Diebowski (2020) draws the conclusion that grammatical gender does not appear to be vulnerable with regard to language attrition within the group of HSs under investigation. Nevertheless, she concedes: "[...] we must keep in mind that all heritage speakers involved in this study attended classes in Spanish, which might also be a relevant factor for the high gender accuracy rates. This does not preclude the possibility that an effect of the amount of language exposure may be found [...]" (Diebowski 2020).

4.2.2 Evidence from late English-Spanish bilingual adults (L2 learners)

Existing research on the L2 acquisition of Spanish grammatical gender by adults is plentiful and quite complex as it covers a range of different language combinations, theoretical frameworks as well as offline and online research methods (Jaensch 2012: 170). Numerous past studies have focused either on traditional error analysis (e.g. Finnemann 1992; Fernández-García 1999; Schlig 2003), clues and strategies to identify the gender of a noun (Cain et al. 1987) or have explored the question whether uninterpretable syntactic features not instantiated in the L1 are available to L2 learners or whether they are subject to the CP.

Unlike the large number of error analysis studies, Cain et al. (1987) looked at how adult learners of L2 Spanish handled conflicting gender clues. He tested 20 English-speaking university learners of L2 Spanish (5 each in the first year, second year, third or fourth year, and graduate students), using an Oral Production Task with 45 nonce words and colorful drawings of animate and inanimate referents. The aim was to elicit gender marked determiners and adjectives. The researcher reported that the adult learners showed more attention to semantics than syntactic and morphophonological cues when assigning gender. These findings are in accordance with later studies on the strategies used by English speakers acquiring gender in L2 Spanish, which will be discussed in what follows.

Finnemann (1992) examined gender agreement within the NP by three English speaking first-year college Spanish L2 students over a period of six months. During the nine semi-guided interview sessions, students were asked to establish gender agreement in the NP with overt and non-overt noun morphology as well as with animate and inanimate nouns. He found that his adult learners produced higher accuracy rates with nouns that have overt gender markings than those that are not overtly marked. Concerning the noun-class effect, the findings revealed higher rates of gender agreement with nouns having human referents than with nouns having non-human referents. Moreover, the subjects used the masculine as a default form in cases of non-overt or ambiguous human references such as *amigo* 'friend'. Finnemann (1992: 134) argues that "the individual's propensity to use the 'marked' form may be a revealing feature of the learner's basic cognitive strategy". He differentiates between two learner types: (i) meaning-oriented learners, who use the unmarked forms, and (ii) form-oriented learners, who produce marked forms (Finnemann 1992: 133–134).

In a similar study, Fernández-García (1999) also investigated gender agreement within the NP and the effects of gender cues, noun class and the gender of the noun, among other variables. Analyzing the data from one-hour tape-recorded interviews with seven third-year English speaking learners of L2 Spanish, the results corroborate those of Finnemann (1992). L2 learners of Spanish achieved higher accuracy rates with nouns that have overt gender markings than those that are not overtly marked. Interestingly, participants in the study tend to change the non-overt noun ending into an overt ending, for instance in **la clarineta* vs. *el clarinet* 'the clarinet'. All the subjects except one performed better on gender agreement with nouns that have natural rather than purely grammatical gender, suggesting that "the gender of the referent may play a role in gender agreement in adult second language acquisition" (Fernández-García 1999: 13). Moreover, the results display higher gender agreement accuracy rates with determiners than adjectives, and this corroborates findings by other studies, including Finnemann (1992) and Montrul et al. (2008). Fernández-García attributes the high number of errors in the noun-adjective domain to the fact that L2 learners acquire noun-adjective agreement later than determiner-noun agreement. The results also provide evidence for a gender effect. The L2 learners were more accurate in masculine than feminine contexts. Fernández-García (1999) also explored the use of a default form with various modifiers. She found that the participants overused the masculine form, especially in the domain of indefinite article-noun and adjective-noun agreement. Her findings are consistent with Finnemann's results, which also document that there is notable variation among the participants' use of a default. In fact, it seems that the L2 learner's use of a default form depends on the type of modifier.

Schlig (2003) analyzed gender agreement errors in written portfolio productions of 61 advanced English L2 learners of Spanish who were either enrolled in an advanced grammar or an advanced composition course. The portfolio consisted of compositions, translations, essays and reading assignments. Schlig's (2003: 316) results revealed that over 38% of all errors were gender assignment or gender agreement errors. More gender agreement errors involved non-overt nouns (81%) than overt nouns (66%), which patterns with previous studies (Finnemann 1992; Fernández-García 1999; Franceschina 2001). In addition, the L2 learners in Schlig's study tend to modify the ending of non-overt nouns and thus produce overt gender nouns such as **las mujeras* instead of *las mujeres* 'women'or **el vido* instead of *la vida* 'life' (Schlig 2003: 316). This finding is in accord with the results of Fernández-García's (1999) study. Strong evidence for the effect of noun gender and masculine as default is found in Schlig's data. The L2 learners were more inaccurate with feminine than masculine nouns as they overgeneralized the masculine modifier forms with feminine nouns, as in **un buen cosa* 'a good thing'; **la semana pasado* 'last week'; **una película cómico* 'a funny movie'. This is also consistent with previous empirical findings by Bruhn de Garavito and White (2002), whose study on gender assignment and agreement in Spanish DPs revealed that the French-speaking L2 learners of Spanish tend to use a masculine default form of articles and adjectives with feminine nouns. With respect to the gender assignment and agreement errors, Schlig (2003) reported that 81% of these errors occurred with nouns ending in *-e* or consonants such as *-dad* (which are often taught to be feminine) as in **universidad público* 'public university'. She does not find any "significant difference in the number of errors between the two courses; students who received explicit grammar instruction did not perform any better than students in the conversation class" (Schlig 2003: 316).

Alarcón (2004) studied 69 L1 English speaking university students who were learning Spanish as an L2 in their first through fourth semester. The task consisted of a grammar test to examine gender assignment and agreement. Her results support previous findings in terms of higher accuracy rates with overt nouns than with non-overt nouns. She attributes this result to the fact that the gender of overt nouns is acquired before the gender of non-overt nouns. The results further indicate that all the subjects give more weight to semantic cues than morphophonological and syntactic cues as they assigned grammatical gender more correctly to animate nouns than to inanimate nouns.

In a follow-up study, Alarcón (2006) studied 139 English speakers at three different proficiency levels in order to examine whether proficiency level affects the knowledge of gender. She tested gender assignment and agreement in a written grammar test. The results indicated that proficiency level has a significant effect on gender accuracy, advanced learners achieving a high degree of accuracy of gender agreement, while learners at lower proficiency levels are more inaccurate. Subsequent studies by Judy, Guijarro-Fuentes and Rothman (2008) on English-speaking L2 learners of Spanish also observed the influence of the proficiency level on the acquisition of gender agreement.

Studies focusing on the effect of grammatical (i.e. gender matching) versus ungrammatical (i.e. gender mismatching) contexts are rare, and Alarcón (2006) is one of the few researchers who has investigated this variable. She argues that learners perform better in gender matching than in mismatching contexts (Alarcón 2006: 81). Although her results reveal that the 48 English-speaking L2 Spanish learners and native Spanish speakers display more accuracy in gender accord than discord contexts, there is not enough evidence to support her claim. More studies on this variable are needed in order to provide convincing evidence.

Franceschina (2003, 2005) looked at Spanish gender acquisition by 15 English-speaking learners of Spanish (age 21–62). From the numerous written and oral tasks employed in this study, the Cloze Test, and the Novel Word Task modeled on Pérez-Pereira's study (1991), are of interest because they examined the strategies the subjects used in assigning gender to a noun. In the Cloze Test, the subjects had to select the correct noun from 12 animate and inanimate one on the basis of gender agreement with the other elements in the sentence. Franceschina found errors mainly in items with clue conflicts. Subjects were less accurate in conflicting conditions of the type phonology vs. syntax/natural gender than of the type phonology vs. syntax only. Franceschina (2005: 162) interprets the results, stating that "the semantic clues did not only fail to facilitate accuracy but they actually make it more difficult." The results from the Novel Word Task indicated that syntactic and phonological cues had a strong effect on gender assignment. In conditions with conflicting cues, however, participants paid more attention to syntactic cues than either phonological or semantic cues. This is in accordance with previous findings on L1 gender acquisition indicating a slight developmental trend, with older children relying more on syntactic than on phonological cues (Karmiloff-Smith 1979; Pérez-Pereira 1991). In addition, Franceschina found a clear difference in the way subjects relied on masculine and feminine cues, particularly when syntactic clues are involved. Subjects favored feminine clues more strongly than masculine ones. Franceschina (2005: 182) interprets these results as an indication that "a different underlying mechanism of gender assignment and/or agreement marking is in place in the -gen L1 speakers' grammars".

In another study, McCowen and Alvord (2006) investigated gender assignment and agreement with human referents by 17 adult English-speaking L2 learners of Spanish between the ages of 18 and 22 at a beginning level of proficiency. In order to validate whether the type of task affects the L2 learners' command of gender, as attested by previous SLA research (see Lafford and Salaberry 2003, among others), the authors used the following four tasks: (1) an oral interview, (2) a narration of a video clip, (3) a Text Reconstruction Task and (4) a Written Translation Task. The results showed that the L2 learners' performance on the different tasks employed in the study varies.

The English-speaking L2 learners were somewhat more accurate with masculine nouns (87%) than with feminine nouns (73%) across tasks, with the exception of performance in the Text Reconstruction Task, in which the L2 learners performed much better with feminine than masculine nouns. In the data, a great deal of individual variation can be observed. In general, the L2 learners overgeneralized both the masculine and feminine form, though the overuse of the former was more frequent. McCowen and Alvord (2006: 167) argue that "this may indicate a general confusion about gender that is not always solved by overgeneralizing the unmarked form". Interestingly, only the correlation between the number of feminine tokens in the interview task and the percentage correct was statistically significant, suggesting a connection between an increase in the number of feminine tokens being produced and their accuracy (McCowen and Alvord 2006: 166–167).

4.3 Evidence from psycholinguistic studies

A number of studies have focused on the acquisition of gender by using primarily standard behavioural methods (White et al. 2004; Montrul et al. 2008; Alarcón 2006, 2011, among others). The increasing sophistication of experimental study designs in the 21st century has given rise to (psycho-)linguistic studies that examined the acquisition of gender and its computation by crossing production/comprehension and offline/online tasks (Antón 2011). Behavioral studies make use of reaction times (RTs) and various online paradigms (including eye-tracking), while neurolinguistic studies include methods such as event-related potentials (ERPs).

To date, Grüter, Lew-Williams and Fernald's study (2012) on the acquisition of gender by highly proficient English speaking L2 learners of Spanish is one of the few innovative studies framed in the feature availability accounts that employs both production/comprehension and online/offline tasks. Grüter, et al. (2012: 191) address the question of whether persistent difficulties with grammatical gender are due to a production-specific performance problem or a retrieval problem of gender information in real-time language use. They used three different experiments targeting grammatical gender: (1) an offline Sentence-Picture Matching Task, (2) an Elicited Production Task and (3) an online processing using an eye-tracking paradigm. All three experiments were carried out with 19 adult native English-speaking L2 learners of Spanish at advanced proficiency level and 19 monolingual Spanish speakers. The results of the study revealed ceiling performance in offline comprehension for both English-speaking L2 learners of Spanish and monolingual Spanish speakers, thus confirming the results of previous acquisition studies by White et al. (2004) and Montrul et al. (2008). However, the performance of the L2 learners and monolinguals differed in the Elicited Production

Task. The L2 learners exhibited more gender errors than the monolinguals. The gender errors produced by the L2 learners were mainly gender assignment rather than gender agreement errors, suggesting the source of the problem to be lexical, rather than syntactic. The results of the eye-tracking task did not show any difference in the online processing of gender-marking on determiners between the two groups. This is consistent with the prediction by the MSIH (see section 3.2.2). Within-group comparisons, however, revealed a weaker use of gender cues by L2 learners in online processing for familiar noun conditions than by Spanish monolinguals. According to Grüter et al. (2012: 210–211), these fundamental differences between L1 and L2 speakers using gender-marking on the determiner as a predictive cue could be attributed "to differences in the strength of associations between nouns and what can be instantiated as gender nodes in L1 vs. L2 lexicons, differences that [...] may be the result of fundamental differences between how infants and adults approach the task of word learning." Furthermore, the authors conclude that L2 learners' difficulties in production tasks do not arise from the nature of the task itself but rather from the time constraints/pressure often found in online and production tasks. This may ultimately cause problems for the L2 learners to retrieve the correct gender.

Leaving aside the influence of task types and demands, numerous other online studies on the acquisition of grammatical gender have found a correspondence between the gender behavior and processing of L2 learners and intra- and extralinguistic variables such as the distance between agreement source and target, animacy, working memory, language proficiency, L1 influence/transfer and L2 characteristics. Despite the vast number of studies focusing on specific factors, it appears to be difficult to disentangle the factors which can play a role in L2 processing, as some of them may interact (Renner 2014: 32). Some of these online studies will now be reviewed in order to gain a better understanding of the source of differences between L1 and L2 gender acquisition as well as processing (see for example Renner 2014; Klassen 2016 and references therein for a full review of online studies on late L2 gender processing).

Keating (2009) conducted an eye-tracking study on agreement violations of Spanish adjectives in three syntactic domains: (1) the DP, (2) the VP and (3) a subordinate clause. The participants were adult English-speaking L2 Spanish learners at beginner, intermediate and advanced proficiency levels was well as Spanish monolinguals. The results revealed that L1 English advanced learners of L2 Spanish, like Spanish monolinguals, were sensitive to gender violations on adjectives within the DP. Beginner and intermediate L2 learners, however, did not show any sensitivity to agreement violations within the DP. In view of this proficiency effect, Keating (2009: 521) argues against the strong version of the FFFH (see section 3.2.1 and Franceschina 2005, among others) and maintains that gender agreement is acquirable by late L2 learners as demonstrated by the advanced L2 learners of Spanish. Though the beginner and intermediate L2 learners do not seem to have yet acquired gender agreement, they do so later, as reported for most adult L2 learners in the literature (for example White et al. 2004). Regarding the distance effect, L2 learners overall fail to show native-like sensitivity to gender errors on adjectives located outside the DP, suggesting that "the distance that separates nouns and adjectives affects the detection of gender anomalies in the second language" (Keating 2009: 508). These findings are in line with previous work by Myles (1995) and recent work by Foucart and Frenck-Mestre (2012), who also address the question whether the syntactic distance between elements affects agreement processing in L2 French. They found a correlation between low proficiency levels, gender errors and structural distance. In other words, the lower the proficiency level is, the higher is the insensitivity to gender violations with increasing structural distance between agreement source and target. Following Clahsen and Felser's (2006) Shallow Structure Hypothesis (SSH), Keating (2009: 527) attributes the nonnative sensitivity to gender agreement violations outside the DP to a deficit in processing "where deficit means that L2 learners may not have the processing resources necessary to hold information about gender in working memory while processing material that intervenes between nouns and adjectives".

In spite of these studies showing an effect of syntactic distance and proficiency, there are, nonetheless, a few studies such as those of Bartning (2000) and Dewaele and Véronique (2001), which found no significant difficulties for adult French L2 learners given increasing structural distance between the noun and attributive adjectives in ante- and postposition or predicative adjectives. Note, though, that these studies analyzed oral production data and did not entail any manipulation of agreement distance (Renner 2014: 34). These results should thus be considered with caution as most L2 learners do not use structures they are not sure of in production in order to avoid errors (Hubert 2011; Renner 2014).

Some of these studies as well as more recent ones considered the question of whether CLI (i.e. the presence or absence of grammatical gender in the L1) or cross-linguistic similarity in terms of gender congruency effects between L1 and L2 influences L2 gender acquisition and processing ability. The possible influence of the L1 as another factor has gradually received more attention in studies on L2 gender acquisition and has given rise to a substantial body of SLA literature examining different language pairs and using a variety of methodologies. Since it is of interest for the present work, the remainder of this section will give a review of some of the studies showing that CLI and cross-linguistic similarity vs. dissimilarity also play an important role in L2 gender acquisition and processing.

Sagarra and Herschensohn (2010, 2011, 2013) investigated whether beginner and intermediate English-speaking L2 learners of Spanish, whose L1 lacks gender but not number agreement, can show native-like sensitivity to gender and number agreement violations. They used an offline Grammaticality Judgment Task (GJT) and an online self-paced Moving Window Test (MWT) with comprehension questions. The results showed that intermediate L2 learners, but not beginners, display qualitatively similar reactions to monolinguals in terms of gender and number (mis-)matches in the online task (Sagarra and Herschensohn 2013: 607). Beginners, however, showed only sensitivity to gender and number violations in the GJT. This led Sagarra and Herschensohn (2013: 618) to argue that "they had declarative knowledge of gender agreement, but the Moving Window Test confirmed that they did not have procedural knowledge about gender agreement – meaning they had not really acquired gender agreement – (see Paradis 2009; Morgan-Short and Ullman 2011 for more information on declarative and procedural knowledge)". Sagarra and Herschensohn's findings indicate a proficiency effect which is in line with other studies (Keating 2009). Concerning noun animacy, Sargarra and Herschensohn found intermediate L2 learners to be like monolinguals, i.e. more accurate and faster with inanimate than animate nouns, while no animacy effects could be found in the beginners. In this vein, the data fail to provide evidence for a facilitating effect of L1 English interpretable gender on animates. This finding rebuts previous L1 child and L2 behavioral and psycholinguistic studies (e.g. see López-Ornat 1994 for L1 and Alárcon 2009 for L2 acquisition) that report a facilitative effect of animate nouns on accuracy and processing rates (Geeslin 2013: chapter 12.4.1). Sagarra and Herschensohn also found that for English-speaking L2 learners of Spanish gender disagreement seems to be cognitively more demanding and thus more difficult to process than number disagreement, a feature present in English (corroborating other studies: Franceschina 2001; White et al. 2004, among others). In view of the data, Sagarra and Herschensohn (2013: 618) concluded that "[...] language experience affects the computation of concord/discord in Spanish L2 adjectives, and might potentially affect the representation: early stages of L2A may be limited to transfer of L1 features and are clearly not sensitive to L2 grammatical concord, whereas sensitivity to grammatical features seems to develop over time."

ERP studies by Tokowicz and MacWhinney (2005), Gillon Dowens, Vergara, Barber and Carreiras (2010) and Bond et al. (2011) offered a neurolinguistic perspective on the sensitivity to gender and number violations by L1 English speakers of L2 Spanish at different proficiency levels. The results of these studies indicate that even beginners display native-like sensitivity to determiner-noun agreement violations. They exhibited a P600 in their online performance, whereas the performance was at chance for this type of violation in the Grammaticality Judgment Task (GJT). Interestingly, the data of Tokowicz and MacWhinney (2005) also revealed differences in morphosyntactic processing compared to monolinguals in constructions with violations (i.e. determiner-number agreement violations) which are formed differently in the L1 and the L2 rather than for constructions which are formed similarly. Tokowicz and MacWhinney (2005: 3) conclude that "learners are able to implicitly process some aspects of L2 syntax even in early stages of learning, but that this knowledge depends on the similarity between L1 and L2." According to the authors, the data can best be accounted for by an analysis based on the Competition Model (MacWhinney and Bates 1989), which states that learners will be implicitly more sensitive to violations of constructions that are unique to their L1 and those which are different between the L1 and L2. Furthermore, the study by Foote (2011), investigating the sensitivity to agreement violations in early and late English-Spanish bilinguals (i.e. heritage speakers and L2 learners) using a Moving Window Task found no significant differences in the working memory (hereafter, WM) scores and reading times between the two groups. Regardless of the age of acquisition and the absence of grammatical gender in the L1, late bilinguals, like early bilinguals, showed sensitivity to violations in constructions with noun-adjective agreement discord. These results are in line with White et al. (2004) and Sagarra and Herschensohn (2008), but they contradict findings by Franceschina (2001, 2005), Sabourin (2003) and Sabourin et al. (2006), who attribute difficulties with gender agreement to the absence of grammatical gender in the L1. Foote (2011) suggests that one possible reason for the disparity in the results of these studies lies in the fact that the late bilinguals in her study may differ from those in other studies, as almost all her late bilinguals were very advanced Spanish teachers. She also reports distance effects for both groups and raises doubts about Keating's explanation (2009) that the distance effects exclusively present in late bilinguals may be due to WM limitations.

Of particular interest for the present work is the study by Renner (2014), who examined L1 transfer effects and the effects of gender congruency in L2 Spanish and L2 German grammatical gender processing. The participants were late L1 Spanish-L2 German and L1 German-L2 Spanish bilinguals at different L2 proficiency levels who were compared to monolinguals (the control group). Data were gathered from a behavioral and an ERP experiment in which different syntactic structures with varying agreement distance were used. For the offline Gender Assignment Task, transfer effects were found only for L1 Spanish-L2 German learners and there were none for L1 German-L2 Spanish learners. Renner (2014: 190) attributes the lack of transfer effects in the latter group to the transparency of the Spanish gender system as opposed to the opacity of the German gender system (see section 2.3.1). The higher gender agreement errors and longer reaction times (RTs) in the online tasks (i.e. the Picture Naming Task, PNT and the Lexical Decision Task, LDT) in the L1 Spanish-L2 German learners provided additional support that they had greater problems retrieving the correct definite article in the target language than the L1 German-L2 Spanish learners. As well as these findings, a clear effect of proficiency on gender transfer in the offline task was found in the groups of low-proficiency learners, who displayed more errors than the groups of high-proficiency learners. The results from the online tasks also suggest that proficiency seems to play a more significant role in the low-proficiency groups than the high-proficiency groups. Furthermore, no effect of cognate status was found in the various groups. Further research, however, is needed to validate and generalize these findings across different language combinations and features.

4.4 Summary

This chapter has presented previous studies on the acquisition of gender assignment and agreement by L1, 2L1 and L2 adults. The studies of the languages under investigation (i.e. English, German and Spanish) have been outlined and important gaps in the literature have been revealed. Little research has been undertaken longitudinally, particularly on early and late bilinguals or even the language combination German-Spanish. In addition, the results from the studies discussed in this chapter are sometimes inconclusive or even contradictory when assessing the variable(s) which affect the acquisition of gender. Despite these differences in the results obtained, some common findings can be summarized. Research investigating adult L1 gender systems is scarce and scattered. The findings for the L1 adult studies are widely disparate, inconclusive and sometimes even contradictory when assessing the effect of gender and noun class on agreement with nouns. Antón-Méndez (1999) reports participants to be sensitive to noun class as they produce more errors when the head noun is non-semantic, whereas Igoa et al. (1999) find the opposite in their analysis of gender stranding errors. More consistent results are found regarding the effect of morphology. The results obtained provide evidence that a noun's inflectional morpheme gives a significant clue for gender assignment and agreement (Antón-Méndez 1999; Igoa et al. 1999; Anderson and Lockwitz 2009). Antón-Méndez (1999), Antón-Méndez et al. (2002) as well as Igoa (1999) indicated that native Spanish speakers make more congruency errors with nouns that lack overt gender marking. Antón-Méndez (1999) and Antón-Méndez et al. (2002)

also observed a clear congruency effect for both semantic and non-semantic nouns. Adult Spanish native speakers displayed more agreement errors when the head and attractor nouns had a different gender (Alarcón 2006: 24).

The vast majority of studies on the acquisition of gender assignment and agreement in adult 2L1 systems (i.e. HL systems) have been conducted comparing HSs and L2 learners residing in the United States, where English is the dominant language. The studies available reported mixed results regarding the variables which influence the mastery of gender and even whether or not gender is mastered successfully. Since no consensus has been reached so far with respect to the discussion, in particular, of whether HSs have 'complete' or 'incomplete' knowledge of gender in Spanish, an intriguing finding across most studies conducted in the USA concerns the task modality. Both Montrul et al. (2008) and Alarcón (2011) found advantages for HSs in oral tasks and for L2 learners in written tasks. Furthermore, studies have documented that when HSs do make errors, they are consistent (Martínez-Gibson 2011). In this vein, the errors mostly occur with feminine, inanimate and non-canonical rather than animate nouns (e.g. van Osch et al. 2014; Irizarri van Suchtelen 2016). In these cases, HSs overgeneralize the masculine form to feminine nouns. In particular, low proficiency HSs have been found to display more gender errors than high proficiency HSs. Contrary to these findings, the data from Spanish heritage speech communities, particularly in Europe, differ from data for the USA. Irizarri van Suchtelen (2016: 198) could not find evidence for a morphology effect in the adult Dutch-Spanish HSs. Parafita Couto et al. (2015) also could not find an overextension of the masculine as a default form by adult Basque-Spanish HSs. These differences in the results suggest that the properties of the languages in contact as well as other interacting variables may play a role. Further studies, therefore, are needed to better understand how and why potential divergence occurs in the grammars of Spanish HSs across geographic regions.

Similar to the existing research on the HLA of gender, the literature on adult L2 acquisition involves mainly the language pair English-Spanish, with a limited number of empirical studies focusing on German-Spanish. Based on the L2 studies reviewed, persistent difficulties with gender agreement are found in adult L2 learners, regardless of whether the gender features in the L2 are instantiated in the L1 or not. Contrary to Hawkins and Chan's (1997) FFFH mentioned in section 3.7.2, the results give conclusive evidence to support the FAFTH, according to which "elements of Universal Grammar not selected by the learners' native language remain accessible after a critical period" (Montrul 2004: 84). Results from adults acquiring gender in L2 Spanish reveal some similarities between the L1 and L2 development of gender. For instance, as in L1 development, determiner-noun agreement is more accurate and mastered before noun-adjective agreement

(Franceschina 2005: 114). In addition, L2 learners seem to show a clear default gender use, although it is not necessarily "the same for each speaker within the same language" (Foucart 2008: 34). Nevertheless, most studies reported that there was a greater tendency toward the use of the masculine rather than feminine form (Cain et al. 1987; Finnemann 1992; Fernández-García 1999; White et al. 2003; Bruhn de Garavito and White 2002; Schlig 2003, and others). Only studies focusing on gender agreement in adult L2 learners have found strong evidence for effects of noun morphology and distance (Finnemann 1992; Fernández-García 1999; Bartning 2000; Schlig 2003; Keating 2009; Renner 2014, and others). Put differently, adult L2 learners were more accurate with canonical nouns than non-canonical nouns and with a shorter distance between nouns and modifiers. Despite the similarities between L1 and L2 development and across child and adult L2 learners, this review has observed some differences between L2 children and adults. One of the most striking differences concerns the error rates of L2 children and adults. A factor that has been identified as quite important for the mastery of gender is proficiency (Keating 2009; Sagarra and Herschensohn 2011; Foucart and Frenck-Mestre 2011; Renner 2014, and others). Almost all studies indicate that low proficiency L2 learners of Spanish are less accurate than high-proficiency learners.

Another factor which has received a lot of attention in L2 research is the effect of the L1 on the acquisition of gender in the L2. Some studies, including White et al. (2001), Sabourin (2001), Franceschina (2005) and Renner (2014), observed that the presence or absence of grammatical gender in the L1 and similarities between the L1 and L2 in terms of transparency, complexity and symmetry of the gender systems play a role in the acquisition of gender and may trigger transfer. For example, Franceschina (2005) found that L2 learners with a [+gen] language, unlike those with a [-gen] language, were indistinguishable from native speakers in their performance on L2 grammatical gender. Another interesting finding was made by Renner (2014). Her study shows that the transfer of features which are not instantiated in the L1 is possible. Furthermore, she found that the transparency of the L2 gender system and language proficiency mediate gender transfer. Based on the data available, (Renner 2014: 192) reports that "no transfer occurred for L2 Spanish with a transparent system but transfer occurred in L2 Spanish with an intransparent system […]".

There is a need for more studies focusing on the circumstances under which L1 gender transfer occurs in Spanish SLA in order to understand which factors affect L2 attainment.

To conclude this section, Table 4.2 gives a synthesis of the relevant findings on adult L1, 2L1 and L2 studies in terms of the intra- and extralinguistic variables which have been found to play a role in the acquisition of gender in Spanish.

Table 4.2: Summary of findings according to the group of speakers and the intra- and extralinguistic variables (adapted from Alarcón 2006: 35 and Irizarri van Suchtelen 2016: 149).

	Effect in adult L1 Spanish	Effect in adult 2L1 Spanish (HSs)	Effect in adult L2 Spanish
Noun gender	Inconclusive	Masculine > Feminine	Masculine > Feminine
Animacy / noun class	Animate > Inanimate	Animate > Inanimate	Animate > Inanimate
Morphology	Effect only for animate nouns	Overt > Non-overt	Overt > Non-overt
Target Type	Attributive > Predicative	Attributive > Predicative Determiner > Adjective	Determiner > Adjective
Distance	Short > Long	Short > Long	Short > Long
Task modality	–	Yes: Advantage in oral tasks	Yes: Advantage in written tasks
Proficiency	–	High > Low-proficient	High > Low-proficient
CLI /L1 influence	–	Yes*	Yes*

*Depends on the language combination.

5 The empirical study

This chapter describes an experimental study that investigates the knowledge of gender assignment and agreement in L2 learners and HSs of Spanish with different language combinations. The purpose of the study is to examine and compare the overall competence in gender between L2 learners and HSs (2L1 acquirers) as well as the extra- and intralinguistic factors which condition such knowledge. Bearing in mind that a specific task design and its implementation "over another to examine a linguistic phenomenon may have the effect of generating between and within-group differences" (Perez Cortes 2016: 87), the present study employs a multi-task design. This methodological approach enables the researcher to both identify possible differences in the participants' knowledge of gender among the tasks and to determine whether extra- and intralinguistic variables affect the participants' linguistic performance. The next section will set out the research questions and hypotheses of the study. Following this, the participants, research design, methodology and tasks will be outlined. Finally, the results of the study will be presented.

5.1 Research questions and hypotheses

The phenomenon of grammatical gender in Spanish has sparked growing interest among researchers. In light of the studies reviewed thus far, it should, however, be pointed out that until now no empirical research on Spanish grammatical gender in German-Spanish speakers has been done examining both adult L2 learners and HSs. Research to date has predominantly examined the language pairing English-Spanish either in an L1–L2, L1–2L1 or L2 and 2L1 constellation. Furthermore, most studies have been conducted by using a limited range of experimental techniques and modalities. In an attempt to expand on the SLA and HLA research discussed in chapter 4 and to fill the gaps in the literature, the present study investigates adult English-Spanish and German-Spanish L2 learners and HSs in terms of grammatical gender in Spanish. Based on the theoretical assumptions (see in particular chapter 3) and findings coming from previous studies (see chapter 4), four main research questions were raised and guided this study.

The research questions touched on various factors which might have an effect on L2 learners' and HSs' linguistic performance on gender. As mentioned in the predictions, it was important to keep in mind that in many cases various factors may interact.

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The first research question to be addressed in the present study was the following:

RQ1a: Can adult L2 learners and HSs exhibit full mastery of grammatical gender in Spanish?

RQ1b: Are there differences between [+gen] L1 (German) and [-gen] L1 (English) speakers of L2 Spanish, on the one hand, and between HSs with [-gen/+gen] L1s (English-Spanish) and [+gen/+gen] L1s (German-Spanish), on the other hand, in the way they master grammatical gender?

The bulk of studies on the acquisition of grammatical gender have shown that both adult L2 learners and HSs have considerable difficulty in mastering gender (Finnemann 1992; Fernández-Garcia 1999; Franceschina 2001, 2005; Montrul et al. 2008; Davidson et al. 2011; Martínez-Gibson 2011; Montrul et al. 2014; Montrul 2016b, among others). They deviate from the target and, thus, some researchers hold the view that native-like attainment or maintenance of gender often seems to be challenging even up to advanced levels of proficiency (Franceschina 2005; Montrul et al. 2008) and high levels of exposure to the target language (Germany and Salazar 1998; Hawkins and Franceschina 2004; Franceschina 2005; McCarthy 2007). As far as post-puberty L2 learners are concerned, it is still debated whether L2 learners whose L1 lacks grammatical gender (e.g. English) are able to acquire this feature to the level of native-like attainment in their L2 Spanish.

Following the full access view, it was hypothesized that the L2 learners of this study take the repertoire of categories and features available in their L1 as a starting point and that all features are acquirable in the L2 regardless of whether they are present in the L1 (e.g. German) or not (e.g. English). German-speaking L2 learners of Spanish will be able to reassemble the gender features in accordance with their configuration in the L2. Nevertheless, for this group of L2 learners one can expect problems with those gender features that are assembled in a different way in the L2 from that of the L1 (for more details see RQ#4).

With regard to HSs, previous studies have documented morphological variability and divergence from the target in terms of gender. These findings led some researchers to suggest that these differential outcomes are the result of attrition, incomplete acquisition or input delimitations (see 3.1.1). As HSs form a very heterogenous group (Montrul 2016a), it may be that some of them fail to develop full linguistic ability in the HL. A number of factors, inter alia, input and use of the HL, age of exposure to the majority language, linguistic identity, and prestige of the HL, strongly affect HSs' knowledge. In this study, it was hypothesized that HSs are able to develop full linguistic ability in their HL but their grammars are influenced by various factors and the sociolinguistic embedding of the HL.

The second research question tackled precisely this issue in more detail, being dedicated to possible effects of extralinguistic factors on the speakers' linguistic performance:

> RQ2: To what extent do extralinguistic factors such as age of onset of bilingualism, level of proficiency in the weaker language/L2 and frequency of Spanish language use modulate bilinguals' knowledge of gender assignment and agreement?

A series of previous studies on SLA and HLA have examined the effect of age of onset of bilingualism (AoO), the effect of language proficiency and even more recently the effect of amount of language use and exposure. Of all these extralinguistic factors, the age factor has been the most controversial and debated in the literature on language acquisition. From this debate two main views concerning the effects of AoO have evolved, both suggesting that any non-target-like performance and, in particular, morphological variability in L2 learners stems from computational problems (see chapter 3 and 4 for a discussion). As far as gender is concerned, adult L2 learners may face problems in the syntactic mapping of gender morphology or accessing grammatical representations, especially in oral production (Prévost and White 2000; see also section 3.2.2). In their view, L2 learners generally have access to UG and are able to reach ultimate attainment in the L2 irrespective of the AoO. In the case of HSs, who are often early bilinguals acquiring the HL from birth through their caregivers, evidence is mixed regarding whether AoO is a critical factor which differentiates adult L2 learners from HSs (Montrul et al. 2014: 90). Some researchers, consider HSs to have an advantage over adult L2 learners as they have been exposed to the HL at an "age of optimal language learning potential" (Montrul et al 2014: 90), while others have argued that the early exposure to the minority and majority languages leads to "less productive and receptive sensitivity to properties of the HL than sequential HSs, who began learning English [and German] at school age" (Giancaspro 2017: 101). Following Putnam and Sánchez (2013) and Perez Cortes (2016), among others, it was hypothesized that the acquisition of the HL or L2 from an early age cannot guarantee the target-like realization of gender. As presented in section 3.4, a number of critical factors such as sociopolitical and affective issues, fluctuation in input, as well as the amount of language exposure and activation interact and determine whether early bilinguals have an advantage over proficiency-matched L2 learners.

Regarding the effect of language proficiency, previous studies, inter alia, White et al. (2004), Camacho et al. (2007), Alarcón (2006, 2011) Sagarra and Herschensohn (2011), Grüter et al. (2012) and Diebowski (2014), have found significant differences between L2 learners and HSs at different proficiency levels in terms of their gender accuracy and suggest that highly proficient L2 learners and

HSs can more likely attain native-like performance on gender marking. The present study was designed to also address this issue, investigating whether there is a correlation between language proficiency and gender accuracy. The motivation lay in the fact that there are inconsistencies in the evaluation of proficiency in past studies. Some have employed standardized tests as an objective measure of proficiency while others relied on self-report measures (De Diego Balaguer et al. 2005; Austin, Blume and Sánchez 2015). It was hypothesized that the level of proficiency attained in Spanish will significantly correlate with the gender accuracy in the way that as proficiency increases, gender accuracy increases, and as proficiency decreases, gender accuracy also decreases. In other words, it was expected that advanced L2 and HSs outperform intermediate and low-proficient L2 learners and HSs.

As mentioned in section 3.1.3, Putnam and Sánchez (2013) consider the amount of language use and exposure to be a critical factor in the maintenance of morphosyntactic properties. According to their model, they propose that "the degree of language use/activation affects bilinguals' availability and productivity of FFs for the generation of morphosyntactic structures (as well as) the gradual replacement of the FFs attributed to the L1 by those found in the L2" (Putnam and Sánchez 2013: 483). The literature so far has provided mixed results. Cuza and Pérez-Tattam (2015) failed to find strong correlations between bilingual children's performance on gender in Spanish and the amount of language activation. By contrast, Perez Cortes (2016) found a correlation between the usage and exposure to the weaker language/L2 and participants' performance on verbal mood selection. As studies on the correlation of amount of language use/activation and linguistic performance are scarce, this study expanded on this issue and expected to find variation in the comprehension and production of HSs and L2 learners who have activated their minority language/L2 to varying degrees. Adopting the hypothesis put forward by Perez Cortes (2016: 95), it was hypothesized that "the higher the activation of the weaker language/L2 for comprehension and production purposes, the less likely is it for the system to exhibit attrition/optionality".

Turning from extralinguistic factors to linguistic factors, the third research question was as follows:

> RQ3: To what extent do linguistic factors such as agreement domain (gender assignment vs. gender agreement), noun gender, noun ending (morphology) and noun gender congruency affect the participants' accuracy?

Morphological variability occurring in L2 learners and HSs may be due to either extralinguistic (see RQ#2) or linguistic factors; or it may arise from an interplay of these factors. Studies that have analyzed whether the agreement domain has a significant effect on the adult L2 learners and HSs' performance on gender have found that both groups of speakers differ in the number of errors made with gender assignment (at the lexical level) and gender agreement (at the syntactic level). Most studies found that L2 learners and HSs perform significantly less accurately on gender agreement than gender assignment (Finnemann 1992; Fernández-García 1999; Bruhn de Garavito and White 2002; Alarcón 2006; Sabourin et al. 2006 and others). Based on these findings, researchers suggest that L2 learners and HSs pass through the same developmental stages as monolinguals. Furthermore, they attribute L2 learners' difficulties with gender agreement to differences in the input or/and gender processing, mostly occurring in oral production tasks (Prévost and White 2000). Other studies, inter alia, Grüter et al. (2012) and Stöhr et al. (2012), report that gender assignment is the source of difficulty rather than gender agreement. These researchers explain that difficulties with lexical gender can come from processing constraints (e.g. working memory, lexical retrieval), task constraints or real-time constraints, among others. A possible explanation for the mixed results with regard to the more difficult agreement domain might stem from the fact that some of the existing studies do not distinguish between gender assignment (at the lexical level) and gender agreement (at the syntactic level). This distinction, however, seems to be important in order to identify whether the agreement domain affects the linguistic performance of L2 learners and HSs. This study takes into account the distinction between gender assignment (lexical knowledge) and gender agreement (syntactic knowledge) across different bilingual groups, expecting L2 learners' and HSs' accuracy on gender assignment to be significantly higher than on gender agreement.

Concerning the possible effect of the noun gender on the speakers' performance, most of the research on SLA and HLA has reported feminine forms to be particularly challenging and thus the level of gender accuracy tends to be lower than with masculine forms. Adult L2 learners and HSs seem to resort to the less specified form, that is, the masculine, for a number of reasons. A limited number of scholars such as Andersen (1984) and Gathercole (1989), among others, take the view that the use of the masculine form demonstrates that L2 learners do not pay attention to morphological accuracy at all levels of proficiency. White et al. (2004) and McCarthy (2007), however, assume that early and late bilinguals operate with the default form when they face a problem with producing gender marked forms. In the case of adult L2 learners, the use of the default form in oral production "reflects a mapping problem, a performance issue, rather than a problem in the underlying representation of the speaker's grammar" (Alarcón 2011: 345). With an increase in proficiency the overgeneralization of the masculine form should decrease (see Franceschina 2001; Bruhn de Garavito and White 2002; Schlig 2003;

White et al. 2004; McCarthy 2007). Based on these findings, L2 learners and HSs were hypothesized to be significantly more accurate with the masculine than the feminine form. It is expected that the masculine default will be used as a linguistic strategy to cope with a variety of performance factors such as processing and communication pressure (Alarcón 2011: 345). Furthermore, it was argued that the effect of gender is also conditioned by extralinguistic factors (language proficiency, amount of exposure and language use) as well as linguistic factors such as the noun morphology and noun gender congruency (the latter discussed in what follows).

The bulk of studies reviewed in chapter 4 have found ample evidence of a significant effect of noun ending on the marking of gender. Findings for L2 learners and HSs reveal native-like performance on gender marking with regular and transparent patterns of noun endings (i.e. canonical endings, *-o* and *-a*), whereas irregular and non-transparent patterns of noun endings (i.e. non-canonical endings such as *-e* and exceptional word markers such as *-o* or *-a*) are problematic and susceptible to a high level of inaccuracy (White et al. 2001; Alarcón 2006, 2011; Valenzuela et al. 2009; Montrul et al. 2008; Davidson et al. 2011; Montrul et al. 2014). In view of these results, it was hypothesized that adult L2 learners and HSs are more likely to exhibit higher accuracy rates with canonical nouns than non-canonical or exceptional ending nouns.

Studies examining whether there are differences in the level of accuracy between German-Spanish gender congruent nouns (e.g. *die*$_{\text{Fem}}$ *Tür*$_{\text{Fem}}$ – *la*$_{\text{Fem}}$ *puerta*$_{\text{Fem}}$ 'the door') and German-Spanish gender incongruent nouns (e.g. *das*$_{\text{Neut}}$ *Haus*$_{\text{Neut}}$ – *la*$_{\text{Fem}}$ *casa*$_{\text{Fem}}$ 'the house') are scarce and scattered. Renner (2014) observed an effect of gender congruency in that German-speaking L2 learners of Spanish were more accurate when the syntactic gender specification of the noun is the same, rather than different in the L1 and the L2. As German and Spanish exhibit a certain degree of overlap and the grammatical phenomenon in question involves the interfaces between morpho-syntax and lexicon, it is assumed that the likelihood of CLI increases and may cause target-deviant gender markings (see Müller and Hulk 2001; Hulk and Müller 2000; Sorace 2005, 2011). In the context of the present study, when German and Spanish nouns do not match in their gender specifications, it was hypothesized that negative transfer will be more likely to occur. The L1 gender specification of nouns (here: German) may mislead German-Spanish bilinguals in the process of restructuring and assembling gender values which do not match the target feature configurations. As a result, German-Spanish bilinguals will adhere to the gender values of their L1, resulting in negative transfer when the L1 and L2 nouns are gender incongruent but positive transfer when the nouns are congruent.

The fourth and final research question was the following:

RQ4: To what extent do task types and modality (comprehension/production vs. oral/written) influence the performance of the participants?

An emerging body of research on grammatical gender in SLA and HLA has explored the effects of task types and modalities on the performance of L2 learners and HSs across different levels of language proficiency (McCowen and Alvord 2006; Franceschina 2005; Montrul et al. 2008; Montrul et al. 2011; Alarcón 2011; Grüter et al. 2012; Perez Cortes 2016). Most studies have documented a significant effect of different task types and modalities on the linguistic performance of L2 learners and HSs alike. L2 learners appear to be more accurate in gender marking when written production and metalinguistic tasks are used, rather than oral production tasks. In contrast, HSs are more accurate in oral production than written production and metalinguistic tasks, even if they involve an aural component.

Researchers have explained task type and modality effects in terms of the role of language experience (Montrul et al. 2014). L2 learners are taught and instructed in the L2 in a classroom setting where the focus is often on written production and metalinguistic tasks rather than oral production. It was, thus, hypothesized that L2 learners are more accurate in their gender realizations in written and metalinguistic tasks than tasks eliciting spontaneous oral production. For the HSs, the language experience is the opposite. As they are exposed to naturalistic input since birth through aural input and interactions with caregivers rather than form-focused instruction, it is expected that HSs will be more accurate in oral tasks than written or metalinguistic ones. For clarity and ease of use, Table 5.1 provides an overview of the research questions and predictions made in the current study.

Table 5.1: Summary of the research questions and corresponding predictions.

	Research questions	Predictions
1a	Can adult L2 learners and HSs exhibit full mastery of grammatical gender in Spanish?	Full mastery of grammatical gender is possible for adult L2 Spanish speakers and Spanish HSs but will be affected by proficiency, amount of language exposure and usage.

Table 5.1 (continued)

	Research questions	Predictions
1b	Are there differences between [+gen] L1 (German) and [-gen] L1 (English) speakers of L2 Spanish, on the one hand, and between HSs with [-gen/+gen] L1s (English-Spanish) and [+gen/+gen] L1s (German-Spanish), on the other hand, in the way they master grammatical gender?	There will be significant differences between L1 [+gen] and L1 [-gen] speakers and between HSs with [-gen/+gen] L1s (English-Spanish) and [+gen/+gen] L1s (German-Spanish) in the way they master grammatical gender. L1 speakers of one or two gendered language(s) will be significantly more accurate than those whose L1 lacks gender.
2	To what extent do extralinguistic factors such as age of onset of bilingualism, level of proficiency in the weaker language/L2 and frequency of Spanish language use modulate bilinguals' knowledge of gender assignment and agreement?	There is no correlation between speakers' AoO of bilingualism and their gender accuracy. There is a correlation between language proficiency and gender accuracy. Gender accuracy increases with increased language proficiency. There is also a correlation between the amount of exposure and language use and the speakers' gender accuracy. As amount of exposure and language use increases, so does gender accuracy.
3	To what extent do linguistic factors such as agreement domain (gender assignment vs. gender agreement), noun gender, noun ending (morphology) and noun gender congruency affect the participants' accuracy?	There are significant effects on participants' gender accuracy for all of the linguistic factors. L2 learners of Spanish and Spanish HSs will be more accurate on: – gender assignment than gender agreement. – masculine than feminine forms. – nouns with canonical endings than non-canonical and exceptional endings. – nouns that are gender congruent in the L1 and L2 than nouns in which the gender is incongruent in the L1 and L2.
4	To what extent do task types and modality (comprehension/production vs. oral/written) influence the performance of the participants?	There is a correlation between participants' gender accuracy and the types of task and their modality. L2 learners of Spanish will be more accurate on written production and comprehension tasks than oral production tasks, whereas the reverse applies to Spanish HSs.

5.2 Participants

During 2016 and 2017, participant recruitment was done in various sites in New Jersey, USA and North Rhine Westphalia, Germany.[51] Two hundred and fifty-seven individuals were tested, all participated voluntarily in the study and received extra credit or monetary compensation.

The participants were divided into the following four experimental groups according to their language combination. The first group consisted of 60 English-speaking L2 learners of Spanish (15 males and 45 females; mean age: 23.2, *SD* = 2.4) living in the US. The second group of participants were 65 English-Spanish bilinguals (i.e. HSs; 7 males and 58 females; mean age: 24.6, *SD* = 3.2) also residing in the US. The third group consisted of 60 German-speaking L2 learners of Spanish (16 males and 44 females; mean age: 30.9, *SD* = 10) living in Germany. Participants in the fourth group were 56 German-Spanish HSs (22 males and 34 females, mean age: 31.6, *SD* = 10.3) residing in Germany. In addition to these experimental groups, the present study included a control group consisting of 16 Spanish-dominant controls (hereafter SDCs; 7 males and 9 females; mean age: 32.0, *SD* = 6.2).

Table 5.2 summarizes the distribution of participants per type of speaker and country.

Table 5.2: Distribution of participants in this study.

Groups	Sex		Age		
	Male	Female	*M*	*SD*	Range
English-Spanish L2 learners (*N* = 60)	15	45	23.2	2.4	21–27
English-Spanish HSs (*N* = 65)	7	58	24.6	3.2	21–35
German-Spanish L2 learners (*N* = 60)	16	44	30.8	10	23–62
German-Spanish HSs (*N* = 56)	22	34	31.6	10.3	16–65
SDCs (*N* = 16)	7	9	32	6.2	21–47
Total (*N* = 257)	67	190	28	8	16–65

51 Participants from the US were recruited from Camden, New Brunswick and Newark. Participants from Germany were recruited from Aachen, Bochum, Bonn, Cologne, Düsseldorf, Remscheid, Solingen and Wuppertal.

A Picture-Word Matching Task (PWMT) was used to screen participants for inclusion in the study. Participants indicated which written noun from the list corresponded to each picture. The task took five minutes to complete, and the maximum score was 18. As all participants scored 90% or higher, they met the *a priori* criterion for inclusion (80%). The subsequent section will provide a detailed description of each group on the basis of the sociolinguistic language background questionnaire and language proficiency test.

5.2.1 Extralinguistic information about the participants

As the participants came from a wide range of cultural and linguistic backgrounds, a comprehensive sociolinguistic language background questionnaire (SLBQ) was administered in order to obtain measures of extralinguistic variables. The SLBQ was derived from Perez Cortes' (2016) study and developed on the basis of Marian et al.'s (2007) Language Experience and Proficiency Questionnaire (LEAP-Q), Blume et al.'s (2010) Adult Multilingual Questionnaire (AMQ) and Unsworth's (2012) Utrecht Bilingual Language Exposure Calculator (UBiLEC). The SLBQ collected personal information such as age, sex, places and length of residence and linguistic history data such as the L1(s), knowledge of foreign languages, AoO of bilingualism, visits to Spanish speaking countries and their duration, educational background of Spanish, linguistic preference and estimated frequency of language use in different contexts and self-ratings of their Spanish proficiency. In the interest of space, this section will provide an overview of the most relevant extralinguistic data gathered from the participants.

English-Spanish heritage speakers

The English-Spanish HSs ($N = 65$) were a group of 35 English-Spanish simultaneous bilinguals (AoO: birth-3 years old; mean age: 9 months, $SD = 1.3$) and 30 sequential English-Spanish HSs (AoO: after 3 years old; mean age: 8;3, $SD = 3$). At the time of testing, all English-Spanish HSs were undergraduate or graduate students at a large research university in New Jersey. They were either born in the USA ($N = 44$) or in a Spanish-speaking country ($N = 21$) and had emigrated to the US in early childhood (mean age: 6;7, $SD = 3.6$) and are still considered as bilinguals/heritage speakers (see Valdés 2001 for a discussion on that matter). According to the results of the sociolinguistic background questionnaire, 33% of the English-Spanish HSs reported that their parents were from Peru, 24% from Ecuador, 19% from the Dominican Republic and 10% from Columbia.

The remaining 5% had parents from Argentina, El Salvador or Mexico. All English-Spanish HSs had been exposed to different Spanish-speaking varieties and were schooled in the US.[52] Out of the 65 English-Spanish HSs, 13 (20%) had not received any schooling in Spanish (i.e. were educated exclusively in English). The remaining 52 (80%) English-Spanish HSs were formally educated in Spanish (but were not specifically enrolled in Spanish HL classes), mostly during high school or/and college/university. Only 14% of the English-Spanish HSs ($N = 8$) began receiving formal instruction in Spanish during primary education. In 26% of the cases (14 out of 52), English-Spanish HSs took part in Spanish classes during high school, while 58% (30 out of 52) were enrolled in Spanish courses at college/university.

When asked about which culture they felt they belonged to, 43 out of 65 (66%) English-Spanish HSs considered themselves to have Hispanic cultures, whereas 22 out of 65 (34%) felt they to belonged to both Hispanic and American cultures. As far as visits to Spanish-speaking countries are concerned, only 38 out of the 65 HSs reported to have visited a Spanish-speaking country (mean length of the stay in months: 11.2, $SD = 2.8$). To assess the participants' preference of language and frequency of use, they were asked to indicate their language choice together with a percentage of use with different interlocutors (e.g. parents, siblings, etc.) and in various contexts and activities such work, school, shopping etc. Table 5.3 summarizes the patterns of language use for both Spanish and English. Note that each column represents the average percentage of language use out of the maximum value (100%) and, therefore, the sum of the average values for English and Spanish language use in each context will not amount to 100%.

As can be seen, the majority of English-Spanish HSs reported favoring and using predominately English (84%) over Spanish (30%). Not surprisingly, most of them used only English in contexts such as work (97%), school (95%), shopping (98%) or activities such as reading (94%). The highest amount of Spanish use occured when interacting with their parents (77%), while only 31% Spanish use was reported when interacting with siblings (31%). This was closely followed by watching TV in Spanish (29%). The high amount of English use was also reflected when being asked in which language they feel most comfortable. Only 32% (21 out of 65) felt more comfortable in Spanish than English. By contrast 68% (44 out of 65) responded that they felt equally comfortable with both languages.

52 This is very common in regions in the US with a high percentage of Hispanic groups.

Table 5.3: Estimated frequency of Spanish and English language use by English-Spanish HSs ($N = 65$).

Context	Language use	
	Only Spanish	**Only English**
Parents	77%	42%
Siblings	31%	82%
Partner	19%	77%
Work	20%	97%
School	22%	95%
Reading	22%	94%
Watching TV	29%	88%
Shopping	19%	98%
Mean	30%	84%

English-speaking L2 learners of Spanish

The English-speaking L2 learners of Spanish were all born and raised in the US. They attended Spanish undergraduate or graduate classes at a university in New Jersey and reported English as their L1. Unlike the English-Spanish HSs, all English speaking L2 learners of Spanish had received formal education in Spanish. More than half of the English-Spanish L2 learners (58%) reported to have received instruction in Spanish during elementary school and 28% reported to have received instruction in Spanish during middle school. Only 3% of the English-Spanish L2 learners ($N = 2$) began receiving formal instruction in Spanish during high school and 10% during college/university education.

Regarding travel experiences in Spanish-speaking countries, only 8% (5 out of 60) of the L2 learners had been abroad (mean length of the stay in months: 0.55; $SD = 2.1$). In terms of language preference and frequency of use, the learners reported only a small amount of Spanish language use (6%). As expected, they used predominately the majority language English (97%) in their daily lives. The highest amount of Spanish language use occured when watching TV (12%), followed by interactions at school (10%) and during reading activities (8%). Table 5.4 depicts the amount of language use of both Spanish and English by the English-speaking L2 learners of Spanish.

Table 5.4: Estimated frequency of Spanish and English language use by English-Spanish L2 learners ($N = 60$).

Context	**Language use**	
	Only Spanish	**Only English**
Parents	2%	97%
Siblings	2%	97%
Partner	7%	97%
Work	7%	97%
School	10%	93%
Reading	8%	97%
Watching TV	12%	100%
Shopping	3%	98%
Mean	6%	97%

German-Spanish heritage speakers

The 56 German-Spanish HSs participating in this study were mostly students at a German university in North-Rhine-Westphalia. The group consisted of 39 simultaneous German-Spanish bilinguals (AoO: birth-3 years old; mean age: 0.078; $SD = 0.5$) and 17 sequential bilinguals (AoO: after 3 years old, mean age: 12.5; $SD = 3.3$). Fifty-two percent of them were born in Germany, while 48% were born in a Spanish-speaking country and emigrated to Germany in early childhood (mean age: 4; $SD = 6.1$). For the majority of German-Spanish HSs, their parents were from Peru (33%), Ecuador (24%) or the Dominican Republic (19%). Ten percent reported that their parents were from Columbia and the remaining 5% had parents from either Argentina, El Salvador or Mexico. All German-Spanish HSs were exposed to different Spanish-speaking varieties and schooled in the Germany. In 42 out of 56 cases (75%), the HSs reported to have been instructed formally in Spanish HL classes – so-called *Muttersprachlicher Ergänzungsunterricht* – since elementary school.[53] The remaining 14 German-Spanish HSs (8%) reported not to have received any instruction in Spanish. As for travel experiences in Spanish-speaking countries, 88% ($N = 49$) of the

53 For more information see https://www.schulministerium.nrw.de/docs/Schulsystem/Unterricht/Lernbereiche-und-Faecher/Herkunftssprachlicher-Unterricht/index.html (accessed 20.08.2018).

HSs had travelled to a Spanish-speaking country (mean length of the stay in months: 5.28; *SD* = 3.5).

When asked to which culture they feel belonging to, 20 out of 56 (36%) considered themselves to have Hispanic cultures, whereas in 36 of 56 cases (64%) they felt to belong to both the Hispanic and German cultures. These responses differed strikingly from those of the English-Spanish HSs. The information regarding participants' language preference and frequency of use is given in Table 5.5.

Table 5.5: Estimated frequency of Spanish and German language use by German-Spanish HSs (*N* = 56).

Context	**Language use**	
	Only Spanish	**Only German**
Parents	73%	46%
Siblings	59%	55%
Partner	52%	70%
Work	32%	88%
School	36%	88%
Reading	46%	79%
Watching TV	50%	71%
Shopping	30%	79%
Mean	47%	72%

As can be seen in Table 5.5, German-Spanish HSs exhibited a considerably higher mean Spanish language use (47%) compared to the English-Spanish HSs (30%). The majority of them used Spanish exclusively to communicate with their parents (73%), siblings (59%), partner (52%) and when watching TV (50%). While interacting with their siblings, German-Spanish HSs used the minority language (59%) and majority language (55%) almost equally. Though the German-Spanish HSs differed from the English-Spanish HSs in some regards, they did pattern with them in the more frequent overall use of the majority language (72%) than the minority language (47%). A high amount of German language usage was notable especially in contexts such as work and school (88% in both instances) and activities such as reading and watching TV (79% and 71% respectively). Regarding the language in which they feel most comfortable, the vast majority (66%) reported being more comfortable in Spanish than German. Only a third of the German-Spanish HSs (34%) responded that they feel equally comfortable with both languages.

German-speaking L2 learners of Spanish

At the time of data collection, all German-speaking L2 learners of Spanish were either enrolled in Spanish undergraduate/graduate courses at a German university or a Spanish language course at the adult education center, the so-called Volkshochschule (VHS) in North-Rhine-Westphalia. They were all born in Germany and raised as German monolinguals, implying that they spoke exclusively German at home. All of them received formal instruction in Spanish, generally during high school or university/college education. None of the L2 learners were instructed in the L2 during elementary school. More than half of them (55%), however, reported to have received instruction in Spanish during university education and 45% reported to have received instruction in Spanish during high school.

It is worth noting that all German-speaking L2 learners of Spanish knew English because it is an obligatory foreign language taught in all German schools from elementary to high school. As a consequence, it was impossible to find L1-German speakers learning Spanish as a second language prior to English (see also Montrul and Gürel 2015: 291 for a similar view for L1 Turkish-L2 Spanish learners). For the present study, it is assumed that English as a second language will not affect the acquisition of gender in Spanish as a L3 rather than L2 given that English does not have grammatical gender.

As far as the travel experiences in Spanish-speaking countries were concerned, 31 (52%) of the German-speaking learners reported having been abroad (mean length of the stay in months: 4; $SD = 4.8$), while 29 (48%) had no travel abroad experience. The SLBQ also elicited information on the speakers' language preference and amount of language use, the results of which are summarized in Table 5.6.

All German-speaking L2 learners of Spanish reported to use the majority language in all contexts more frequently than the L2 (93% and 15%, respectively). As expected, the majority language was the dominant language and present in their daily lives. Regarding the amount of Spanish language use, there were important differences across the various contexts: from 27% in reading to 25% in watching TV and interaction at school, respectively (see Table 5.6).

Table 5.6: Estimated frequency of Spanish and German language use by German-Spanish L2 learners ($N = 60$).

Context	Language use	
	Only Spanish	**Only German**
Parents	8%	95%
Siblings	5%	95%
Partner	12%	93%
Work	8%	96%
School	25%	88%
Reading	27%	90%
Watching TV	25%	87%
Shopping	7%	100%
Mean	15%	93%

Spanish-dominant controls

Following previous research (e.g. Pascual y Cabo and Rothman 2012; Hopp and Schmid 2013; Schmid and Hopp 2014 and Perez Cortes 2016), two types of SDCs consisting of recent SDCs (recent arrivals) in the US and Germany as well as long-term SDCs (i.e. first-generation immigrants from a Spanish-speaking country in the US and Germany, also known as long-term residents) formed the comparison or baseline group. The motivation for not using a monolingual baseline was twofold. First, as pointed out by many scholars, inter alia, Rothman (2009), Pascual y Cabo and Rothman (2012) and Perez Cortes (2016), the use of predominantly monolingual controls who were educated in the target language as a point of comparison for HSs having little formal education in the HL has led many other researchers to incorrectly argue in favor of incomplete acquisition. Second, from the acquisitional point of view, the comparison between HSs and monolinguals is untenable insofar as it fails to capture the nature of the HSs' grammatical system that develops under reduced input conditions and involves additional factors (e.g. language prestige, settlement arrangement, amount and domain of language use, schooling and literacy) that play a role in the output of HL (Aalberse and Muysken 2013).

In terms of the present study, it is assumed that the language competence of early immigrants resembles that of Spanish monolinguals (Perez Cortes 2016: 101), whereas effects of language attrition might be visible in the group of long-term immigrants due to the increased dominance of the majority language and lessened exposure to the HL Spanish (Seliger 1991, 1996; Montrul 2008; Schmid 2011, Flores 2014). In order to be able to make comparisons between the different Spanish varieties and to balance potential dialectal differences, the groups of early and late SDCs each comprised of eight speakers total: four from Latin/South America and four from Spain. As a result, 31% of the controls emigrated from Columbia ($N = 5$) and Spain ($N = 5$), 13% emigrated from Mexico ($N = 2$) and Ecuador ($N = 2$), and 6% were from Argentina ($N = 1$) and Peru ($N = 1$). Table 5.7 presents a summary of the controls' language preferences and frequency of use for both Spanish and the respective majority language.

Table 5.7: Estimated frequency of Spanish and English/German language use by controls ($N = 16$).

Context	**Language use**	
	Only Spanish	**Only English/German**
Parents	88%	19%
Siblings	69%	25%
Partner	50%	63%
Work	50%	75%
School	63%	56%
Reading	81%	38%
Watching TV	44%	56%
Shopping	63%	44%
Mean	64%	47%

It is not surprising that Spanish was used more often by the SDCs than the respective majority language (64% versus 47%, respectively). The SDCs predominately used Spanish when interacting with their parents (88%), siblings (69%) or reading (63%). They also reported the highest English/German usage in the following contexts: work (75%), interacting with their partner (63%), school and watching TV (both 56%). It should be noted that the patterns of language use differed slightly between the early and long-term immigrants. As expected, early immigrants appeared to favor and more frequently use Spanish across all contexts compared with long-term immigrants due to increased exposure to the majority language over the time (Schmid 2011). As discussed by Putnam and

Sánchez (2013, see also the references therein), language exposure and use were crucial factors because they can affect linguistic proficiency in the HL.

5.2.2 Intralinguistic information about the participants: Measuring language proficiency

Just as speakers differ in age, gender, place of residence, language exposure and amount of language use, so also do they differ in their levels of proficiency in Spanish. As research does not agree on a single proficiency measure (see Lynch 2012), the study has implemented two assessment tools to measure participants' level of proficiency: (1) a standardized Spanish proficiency test and (2) self-reported proficiency assessment.

The standardized Spanish proficiency test is a version of the *Diploma de Español como Lengua Extranjera* (DELE) consisting of a cloze test and a multiple-choice Reading Comprehension Task. The cloze test contained 20 blanks and the Reading Comprehension Task comprised 36 multiple choice items, yielding a maximum score of 56 points. The present study adopted the proficiency cut-off scores which have been set in many previous studies: low = 0–36; intermediate = 37–44 and advanced = 45–56 points.[54]

Regarding the DELE-based proficiency test, Pascual y Cabo (2013: 91) pointed out that "using such formal tasks may not be the best option to test linguistic proficiency, especially considering that HSs have primarily been exposed to an informal variety of Spanish (and have low -if any- literacy skills in the language)".[55] Previous studies within the generative paradigm, inter alia, Montrul et al. (2008) and Alarcón (2011), among others, have proven that the DELE-based proficiency test is a valid tool to measure language proficiency for L2 learners and HSs alike. For the purpose of comparing L2 learners with proficiency-matched HSs, the DELE-based proficiency test has been administered to all participants (an overview of the individual scores obtained in all speakers is provided in Appendices 2–6).

The scores obtained in the DELE-based proficiency test resulted in the following division of the experimental groups: among the English-Spanish L2 learners, 32% were classified as advanced ($N = 19$; mean score: 45.7; $SD = 0.73$), 33% as intermediate ($N = 20$; mean score: 33.4; $SD = 1.2$) and 35% as low proficiency ($N = 21$; mean score: 20.9; $SD = 3.4$). As far as English-Spanish HSs are concerned,

54 These proficiency cut-off scores were used by Pascual y Cabo (2013) and Perez Cortes (2016).
55 Although the DELE-based proficiency test has its fair share of criticism (Carreira and Potowski 2011), it is still important to make use of at least one common assessment tool when it comes to comparing HL and L2 learners' language proficiency (see Montrul et al. 2008; Montrul 2016a, b).

32% were advanced (*N* = 21; mean score: 47.9; *SD* = 2.5), 40% were intermediate (*N* = 26; mean score: 40.8; *SD* = 2.9) and 28% were low proficiency (*N* = 18; mean score: 29.6; *SD* = 3.5).

In the case of German-Spanish L2 learners, 35% of them had an advanced level of proficiency (*N* = 21; mean score: 48.6; *SD* = 2.7), 33% an intermediate level (*N* = 20; mean score: 38.1; *SD* = 2.5) and 19% a low level of proficiency (*N* = 32; mean score: 25.1; *SD* = 4.3). As for the German-Spanish HSs, 36% of them were advanced (*N* = 20; mean score: 52; *SD* = 3.8), 36% were intermediate (*N* = 20; mean score: 40.4; *SD* = 2.5) and 29% were low proficiency (*N* = 16; mean score: 27.6; *SD* = 3.5). All SDCs (*N* = 16; mean score: 51.5; *SD* = 4.2) – recent arrivals (*N* = 8; mean score: 54.8; *SD* = 1.0) as well as long-term residents (*N* = 8; mean score: 47.9; *SD* = 3.2) – scored within the upper range of advanced proficiency.[56]

Turning from the DELE-based proficiency scores to the proficiency self-ratings, Table 5.8 summarizes the mean self-reported scores for comprehension and production skills in Spanish and either English or German across all groups (see Appendices 2–6 for further details on the self-reported scores).

As can be observed from Table 5.8, all groups, except for the advanced German-Spanish HSs (*M* = 96% for Spanish vs. *M* = 81% for German), gave themselves higher scores for production and comprehension in the majority language (i.e. English or German) than in the minority language/L2 (i.e. Spanish). Being aware that self-ratings were highly subjective and might not be the best assessment tool for language dominance (Lim et al. 2008; for a full discussion on language dominance see Silva-Corvalán and Treffers-Daller 2016), the self-rated proficiency scores appeared to indicate that for the majority of participants either English or German is the dominant language. All groups also reported a higher degree of Spanish proficiency for comprehension than production skills. Note how the self-ratings align with the division of the groups according to the DELE scores. Participants with a higher degree of proficiency reported a higher perceived proficiency in Spanish than those participants at a lower proficiency level. Another notable difference is that German-Spanish L2 learners and HSs, with the exception of the low-proficiency German-Spanish L2 learners, rated themselves higher in Spanish than the English-Spanish L2 learners and HSs.

56 DELE scores differed significantly for the different participant groups, Welch's F (12,91.56) = 248.68, $p < .001$.

Table 5.8: Summary of self-reported scores according to skill type and modality across groups.

	Group	*N*	Spanish			English or German*		
			Production	Comprehension	*M*	Production	Comprehension	*M*
US	Adv. L2ers	19	67%	73%	70%	99%	99%	99%
	Interm. L2ers	20	59%	66%	63%	99%	99%	99%
	Low L2ers	21	49%	57%	53%	99%	99%	99%
	Adv. HSs	21	82%	86%	84%	98%	95%	97%
	Interm. HSs	26	67%	76%	72%	98%	98%	98%
	Low HSs	18	57%	67%	62%	99%	99%	99%
Germany	Adv. L2ers	21	69%	75%	72%	97%	98%	99%
	Interm. L2ers	20	62%	69%	66%	98%	99%	99%
	Low L2ers	19	41%	46%	44%	98%	99%	99%
	Adv. HSs	20	95%	97%	96%	79%	87%	81%
	Interm. HSs	20	86%	89%	88%	95%	98%	97%
	Low HSs	16	73%	82%	78%	94%	97%	96%

*based on the speaker’s language combination.

5.3 The data

5.3.1 Research design and item construction

This study made use of a mixed method design to address the research questions (section 5.1), including both qualitative and quantitative methods as well as written and oral tasks. The experimental items consisted of inanimate nouns as well as determiners and predicative adjectives marked for gender. All items were singular to avoid effects of number mismatch. Experimental items were divided into conditions for gender assignment and gender agreement. Within each condition for syntactic and lexical gender congruency, items were further classified in terms of grammatical agreement and agreement violations. Experimental nouns were also controlled for gender (masculine vs. feminine), noun ending (*-o*, *-a*, *-e*) and noun gender compatibility (also known as noun gender congruency). The noun gender compatibility was either gender congruent or gender incongruent. The gender congruent conditions refer to those cases in which the grammatical gender of a noun is the same in German and Spanish (e.g. el_{MascSg} $suelo_{\mathrm{MascSg}}$ – der_{MascSg} $Fußboden_{\mathrm{MascSg}}$ 'the floor'). By contrast, gender incongruent conditions are those in which the grammatical gender of a noun differs in German and Spanish (e.g. el_{MascSg} $choche_{\mathrm{MascSg}}$ – das_{NeutSg} $Auto_{\mathrm{NeutSg}}$ 'the car'). In view of the noun gender compatibility conditions, there were 9 experimental nouns for the gender congruent conditions in each domain (gender assignment vs. gender agreement) and 9 nouns for the gender incongruent conditions, respectively. Due to the number of nouns and other conditions, an even distribution of gender congruent and incongruent items regarding their noun endings in Spanish could not be achieved.

To enhance the reliability and validity of the research design, the experimental nouns ($N = 18$) were selected according to token frequency and L2 learners and HSs' expected knowledge at all proficiency levels (a complete list of the experimental nouns can be found in Appendix 1). Davies' (2006) *Frequency Dictionary of Spanish* was used as a reference since it contains a list of the 5000 most frequently used words in Spanish based on the actual frequency of words in a large 20-million-word corpus of many different types of Spanish texts (e.g. fiction, non-fiction, and actual conversations). The experimental nouns used in this study were controlled for number of letters and syllables as well as frequency. The frequency was measured on the basis of the range, frequency, and the weights for different registers (for more details see Davies 2006: 7). Table 5.9 provides information on the characteristics of the experimental nouns.

An ANOVA was carried out on the nouns in terms of the variables summarized in Table 5.9. The results of the ANOVA reveal that there were no significant differences between the nouns in terms of number of letters [F (5, 4) = .77, *p* = . 56], number of syllables [F (2, 2) = 18.14, *p* = .56] or frequency ranks [F (2, 16) = 1.620, *p* = .56].

Table 5.9: Characteristics of experimental items.

	M	*SD*	Range
Frequency Rank	1713	1236.2	150–3776
Number of letters	6	1.6	4–9
Number of syllables	2	0.6	2–4

To assess the quality of the experimental materials, tasks and their implementation, the researcher conducted a pilot prior to the present study. All tasks were successfully piloted with three adult English-speaking L2 learners of Spanish (1 female and 2 male) and two German-speaking L2 learners of Spanish (2 female) as well as three English-Spanish HSs (2 female and 1 male) and two German-Spanish HSs (1 male and 1 female). All pilot participants completed the tasks without difficulties, and the results showed differences among the groups both with respect to the language pairings (i.e. English-Spanish vs. German-Spanish) and in terms of type of speaker (i.e. L2 learner or HSs). Before turning to the experimental tasks used in the present study, the following sections will outline the general procedure and data analysis.

5.3.2 General procedure

All participants were tested individually in a quiet room together with the researcher. Before the experimental tasks were administered, the participants filled out the sociolinguistic background questionnaire and the DELE-based proficiency test. The actual test battery consisted of three experimental tasks: (1) a written Forced-Choice Selection Task (FCST), (2) a written Grammaticality Judgement Task (GJT) and (3) an Oral Elicitatation Picture Task (OEPT). For the FCST and GJT, the order of tasks was counterbalanced across all experimental groups such that half of the participants completed the FCST first and then the GJT, while the other half was assigned the GJT first followed by the FCST. A Picture-Word Matching Task (PWMT) was administered immediately after the completion of the experimental tasks. The completion of all tasks was untimed. The motivation for examining the participants’ performance under untimed testing conditions lay in the fact that previous research (Montrul, et al. 2008; Sabourin 2003; Sagarra and Herschensohn 2011) found that L2 learners show better performance in self-paced rather than timed tasks. In the FCST, GJT and OEPT, all experimental items were randomized. The entire test session took approximately 60 minutes.

5.4 Forced-Choice Selection Task (FCST)

The written Forced-Choice Selection Task (FCST) was modeled after the written Recognition Task used in Montrul et al. (2008), Alarcón (2011) and Grüter et al. (2012), originally designed by White et al. (2004). The main reason for using a written FCST over other written formats such as fill in the gap is the effectiveness of the task because it controlled and restricted the options available to the participant. The written FCST in the present study was designed to investigate early and late bilinguals' basic knowledge of gender assignment and agreement in Spanish, their ability to make use of overt Spanish noun morphology, and potential effects of Spanish noun gender on performance.

5.4.1 Experimental design

The FCST consisted of a total of 72 Spanish items divided evenly across three blocks. Of the 72 items, half of them were experimental ($N = 36$) and the other half were fillers ($N = 36$). The experimental items were further divided as follows: 18 items focused on gender marking on the determiner (gender assignment), and the other 18 items tested gender marking on the adjective (gender agreement). The 36 fillers used to mask the purpose of the task consisted of 12 items pertaining to the correct use of *ser* vs. *estar* ('to be'), imperfect vs. preterit and subject-verb agreement. With regard to the N+Adj agreement items, the present study only incorporated attributive adjectives ending in *-o* or *-a*, which were overtly marked for gender (see section 2.4).[57] All target NPs occurred either after the gap (when the determiner form was to be selected) or before the gap (in the case of adjective selection). To examine the effect of the gender value of the noun, half of the experimental items were masculine and half were feminine. To assess the

57 By incorporating only attributive adjectives (i.e. adjectives within the DP), the task follows the methodological design by Alarcón (2011) and differs from that of Montrul et al. (2008), who included both predicative and attributive adjectives. As Montrul et al. (2008) do not distinguish between the two types of adjectives in their analysis, it may have an impact on their results (see Alarcón 2011: 337 for a similar opinion).

effect of noun morphology, within each gender three nouns had canonical endings (i.e. -*o* and -*a*) and three had either non-canonical endings (-*e*) or an exceptional noun ending (-*o* and -*a*).

To examine potential effects of CLI in the German-Spanish bilinguals, the 18 items in each domain (gender assignment and agreement) were evenly divided between the gender congruency conditions. Half of the target nouns were gender-congruent (i.e. nouns have the same gender in German and Spanish) and half were gender-incongruent (i.e. nouns do not have the same gender in German and Spanish).[58]

Among the gender congruent items 5 were feminine and 4 were masculine. The gender incongruent items consisted of 4 feminine and 5 masculine items in Spanish. As far as the gender values of the incongruent nouns in German were concerned, they were distributed as follows: 5 had neuter gender, 3 feminine gender and 1 masculine gender. Table 5.10 exemplifies the items of the gender congruent (GC) condition and gender incongruent (GIC) condition.

Table 5.10: Overview of items in gender incongruent and congruent conditions.

Condition	**Spanish Target noun**	**German equivalent noun**	**German gender**	**Spanish Gender**	**Type of (in)congruency**	
					German	**Spanish**
Gender congruent	sombrero	Hut 'hat'	masc	masc	masc →	masc
	guitarra	Guitarre 'guitar'	fem	fem	fem →	fem
Gender incongruent	llave	Schlüssel 'key'	masc	fem	masc fem neut	masc fem
	chocolate	Schokolade 'choclate'	fem	masc		
	libro	Buch 'book'	neut	masc	masc fem neut	masc fem
	casa	Haus 'house'	neut	fem		

58 For more information on the selection of target nouns and the noun gender congruency condition, see section 5.3.1 and Appendix 1.

All test items were randomized according to the constraint that items from the same morphological ending, gender, congruency, or agreement condition could not occur consecutively.[59]

The task was administered to the participants as an untimed, written pen and paper task. Though participants followed their own pace when completing the task, they were directed to answer as quickly as they can and not go back to provided responses. Prior to the beginning of the task, written instructions in both Spanish and the majority language (English or German) were provided. Participants were requested to read the sentences carefully and to select which of the two possible gender forms (i.e. masculine or feminine) of the determiner or adjective is appropriate for each NP. Examples (5.1)–(5.2) show some of the items used in the task, with the correct answers indicated in bold.

(5.1) Me voy a poner _______ camisa que me regalaste. A. el B. **la**
I will put on _______shirt$_{\text{FemSg}}$ you gave me. A. the$_{\text{MascSg}}$ B. **the$_{\text{FemSg}}$**
'I will put on the shirt you gave me.'

(5.2) En verano leí el libro ______de J.K. Rowling.
In the summer I read the$_{\text{MascSg}}$ book$_{\text{MascSg}}$ ______ by J.K. Rowling.
A. **new$_{\text{MascSg}}$** B. new$_{\text{FemSg}}$
A. **nuevo** B. nueva
'In the summer I read the new book by J.K. Rowling.'

Each response obtained from the FCST that was grammatically correct received one point and grammatically incorrect responses a score of zero. The task took 20–30 minutes.

5.4.2 Results of extralinguistic factors

As a preliminary analysis of the data, the participants' performance on the experimental task was examined through a multivariate analysis of variance (MANOVA) with the overall accuracy rate as the dependent variable and three independent variables, i.e. AoO of bilingualism (HSs, L2 learners), language combination (English-Spanish, German-Spanish) and proficiency level (low, intermediate, advanced) as fixed factors. The results of the MANOVA revealed a significant effect

59 See also Klassen (2016: 95) for a similar procedure.

of AoO of bilingualism [F (2, 242) = 51.64, $p < .001$, Wilk's $\Lambda = .70$, *partial* $\eta^2 = .30$], language combination [F (2, 242) = 10.25, $p < .001$, Wilk's $\Lambda = .92$, *partial* $\eta^2 = .08$] and proficiency level [F (4, 486) = 17.81, $p < .001$, Wilk's $\Lambda = .76$, *partial* $\eta^2 = .13$]. These main effects indicated that HSs were significantly more accurate than L2 learners, German-Spanish speakers performed significantly better than English-Spanish ones, and high proficiency groups outperformed low proficiency ones. The MANOVA comparisons also showed interactions between language combination × AoO of bilingualism [F (2, 242) = 4.38, $p = .013$, Wilk's $\Lambda = .97$, *partial* $\eta^2 = .04$] and between language combination × proficiency level [F (4, 484) = 2.385, p = .050, Wilk's $\Lambda = .96$, *partial* $\eta^2 = .02$]. In the following sections, I will present the data and effects of the extralinguistic factors in more detail.

5.4.2.1 Effects of AoO and language combination

The results of the MANOVA showed that there was a significant interaction between language combination and AoO. In order to examine whether HSs and L2 learners with different L1s can exhibit native-like mastery of grammatical gender in Spanish (RQ#1), it was necessary to initially explore the data from each group according to the type of speaker and language combination. Table 5.11 presents the mean overall accuracy rates across the different participant groups and language combinations.

Table 5.11: Mean overall accuracy by language combination and AoO of bilingualism.

Groups	*N*	Overall accuracy	
		M	*SD*
English-Spanish HSs	65	94.3%	6.5
English-Spanish L2 learners	60	85.2%	8.8
German-Spanish HSs	56	97.9%	3.2
German-Spanish L2 learners	60	92.3%	7.9
Control group	16	99.3%	1.2

As shown in Table 5.11, the control group ($M = 99.3\%$, $SD = 1.2$) and the German-Spanish HSs ($M = 97.9\%$, $SD = 3.2$) exhibited very similar accuracy rates. This was followed by the accuracy rate of English-Spanish HSs ($M = 94.3\%$, $SD = 6.5$), which was extremely close to that of the German-Spanish L2 learners ($M = 92.3\%$, $SD = 7.9$). The less accurate English-Spanish L2 learners ($M = 85.2\%$, $SD = 8.8$)

differed from the other groups in their accuracy rates. The significant effect of the interaction AoO × language combination was further explored with Games-Howell post-hoc tests since the homogeneity of variance assumption was not met (Levene's $p < .001$). The post-hoc tests reveal that there is a significant difference [F (4,118.72) = 48.02, $p < .001$] between the following groups: English-Spanish L2 learners were significantly less accurate than all other groups, German-Spanish L2 learners and HSs were significantly more accurate than English-Spanish L2 learners and HSs. These results indicate that the language combination German-Spanish led to better gender accuracy rates on the FCST than the language combination English-Spanish.

5.4.2.2 Effects of language proficiency and language combination

The MANOVA showed a significant effect of proficiency level on accuracy in the different participant groups. We now turn to the question what exactly does this interaction mean in the data (RQ#2). This section will start with the results regarding proficiency effects first by language combinations (i.e. English-Spanish and German-Spanish groups), then by AoO of bilingualism within language combinations (i.e. English-Spanish HSs vs. L2 learners and German-Spanish HSs vs. L2 learners), and finally by AoO of bilingualism across language combinations (i.e. English-Spanish vs. German-Spanish HSs and English-Spanish vs. German-Spanish L2 learners).[60]

English-Spanish groups

Table 5.12 shows the mean accuracy rates and standard deviations for the English-Spanish HSs, L2 learners and control group across the three proficiency levels: low, intermediate and advanced.

The overall accuracy rates across all proficiency levels–except for the low-proficiency English-Spanish L2 learners (M = 79.8%, SD = 7.8)–were quite high, ranging from 86.3% to 99%. With respect to the English-Spanish HSs, while the advanced HSs (M = 99%, SD = 1.6) had the same accuracy rate to the control group (M = 99.3%, SD = 1.2), accuracy in the other groups decreased as proficiency decreases.

60 Note that the following means presented for and one-way ANOVAs run on the interaction AoO of bilingualism × language combination × proficiency does not come out as significant in the omnibus analysis. In the cases were presenting means broken down by more than just the significant effects is deemed relevant to thoroughly adress the RQs, the reader should know that non-significant effects are considered to be trends.

The accuracy rates also varied across proficiency levels within the English-Spanish L2 groups. Advanced L2 learners exhibited the highest accuracy rate (*M* = 90.1%, *SD* = 1.2), followed by the intermediate learners (*M* = 86.3%, *SD* = 9.1), and finally the low proficiency learners (*M* = 79.8%, *SD* = 7.8). The accuracy rates across the English-Spanish L2 learners at all proficiency levels deviated from that of the control group.

Table 5.12: Mean accuracy by English-Spanish group and proficiency level.

Groups		*N*	Overall accuracy	
			M	*SD*
English-Spanish HSs	Low	18	88.7%	7
	Intermediate	26	94.3%	5.5
	Advanced	21	99%	1.6
English-Spanish L2 learners	Low	21	79.8%	7.8
	Intermediate	20	86.3%	9.1
	Advanced	19	90.1%	6
Control group		16	99.3%	1

A series of one-way ANOVAs with Games Howell Post-hoc tests were carried out on the accuracy rates of all groups to determine whether the preliminary observations as described above were statistically significant. Results indicated that all English-Spanish L2 groups differed significantly from the control group in their overall accuracy rates [F (3, 33.64) = 63.82, $p < .001$]. There were no statistical differences between the intermediate and advanced English-Spanish L2 learners in their accuracy rates although low-proficiency English L2 learners of Spanish exhibited a less accurate performance than the intermediate English-Spanish L2 group. When the English-Spanish HS groups were compared to the control group, the advanced English-Spanish HS group did not differ significantly from the controls, but the intermediate and low proficiency groups differed significantly both from each other and from the advanced and control groups [F (3, 39.84) = 18.75, $p < .001$].

German-Spanish groups

Table 5.13 summarizes the mean accuracy rates of the German-Spanish HSs and L2 learners across the different proficiency levels.

Table 5.13: Mean accuracy by German-Spanish group and proficiency level.

Groups		*N*	Overall	
			M	*SD*
German-Spanish HSs	Low	16	95.5%	3.2
	Intermediate	20	99%	2.1
	Advanced	20	99%	3.2
German-Spanish L2 learners	Low	19	89%	11.2
	Intermediate	20	91.9%	5.2
	Advanced	21	95.5%	4.9
Control group		16	99.3%	1.2

The overall accuracy rates for all groups–except for the low-proficient German-Spanish L2 learners ($M = 89\%$, $SD = 11.2$)–were quite high, ranging from 89.3% to 99%. The results for the German-Spanish HSs showed that both intermediate ($M = 99.1\%$, $SD = 5.2$) and advanced HSs ($M = 95.5\%$, $SD = 4.9$) displayed a similar gender accuracy rate as controls ($M = 99.3\%$, $SD = 1.2$). In contrast, the German-Spanish L2 learners did not pattern with the controls and accuracy rates decreased with proficiency. A one-way ANOVA showed that the mean accuracy rates on gender differed significantly between the German-Spanish L2 learner groups and control group [$F\ (3, 34.50) = 19.38$, $p < .001$]. Given the minimal variations in performance, no statistically significant differences between low and intermediate German-Spanish L2 groups were found.

Results from a one-way ANOVA showed that there were statistically significant differences between the German-Spanish HS groups and the control group [$F\ (3, 35.60) = 6.42$, $p < .001$]. In particular, only the low-proficient German-Spanish HS group did not score within the same range as the other German-Spanish HS groups and control group.

English-Spanish: L2 learners vs. HSs

Both the English-Spanish L2 learners and English-Spanish HSs displayed high mean accuracy rates overall. There were, however, differences between and within and between the two groups. The English-Spanish HSs were more accurate than the proficiency-matched English-Spanish L2 learners, suggesting that HSs have an advantage with gender over late L2 learners. The advanced English-

Spanish HSs patterned with the controls (99%), whereas proficiency-matched L2 learners showed an accuracy rate of 90.1%. Likewise, the intermediate and low-proficiency HSs (94.3% and 88.7%, respectively) outperformed intermediate and low-proficiency L2 learners (86.3% and 79.8%, respectively).

A series of independent pair-wise t-tests were conducted to compare the overall gender accuracy for early and late proficiency-matched bilinguals. Results showed significant differences between the advanced L2 learners and the advanced HSs [t (20.36) = 6.40, $p < .001$], the intermediate L2 learners and the intermediate HSs [t (44) = 3.74, $p < .01$], and the low-proficiency L2 learners to the low-proficiency HSs [t (37) = 3.76, $p < .01$].

German-Spanish: L2 learners vs. HSs

Similar to the English-Spanish L2 learners and English-Spanish HSs, while all German-Spanish groups displayed high accuracy rates overall, there were some differences within and between the groups. In general, the German-Spanish HSs showed higher levels of accuracy than the German-Spanish L2 speakers. Looking at the results more closely, both advanced and intermediate HSs patterned with the controls (99%), whereas the proficiency-matched L2 learners showed a slightly lower accuracy rate ($M_{advanced\ L2ers}$ = 95.5% and $M_{intermediate\ L2ers}$ = 91.9%). The low-proficiency HSs also outperformed the low-proficiency L2 learners (95.5% and 89%, respectively).

Several independent t-tests for paired samples were applied to statistically compare these groups. All descriptive trends were confirmed to be significant, namely, the advanced HSs outperformed the advanced L2 learners [t (34.66) = 2.69, $p < .05$], intermediate HSs performed better than intermediate L2 learners [t (25.07) = 5.57, $p < .001$], and low-proficiency HSs outperformed low-proficiency L2 learners [t (21.37) = 2.39, $p < .05$].

L2 learners: English-Spanish vs. German-Spanish

An overview of the overall accuracy rates for both the English-Spanish and German-Spanish L2 learners by level of proficiency is illustrated in Figure 5.1.

As the results in Figure 5.1 demonstrate, in general, German-Spanish L2 learners seem to be more accurate at producing correct gender realizations than English-Spanish L2 learners, with the most pronounced differences in accuracy rates surfacing at the lowest level of proficiency. To ensure that the German-Spanish and English-Spanish L2 groups differed significantly in their performance, independent samples t-tests were run for the L2 groups at each proficiency level. The descriptive trends were confirmed to be significant: the advanced German-Spanish L2 learners performed better than the advanced English-Spanish L2 learners [t (38) = 3.18, $p < .01$], the intermediate German-Spanish L2 learners performed better than the intermediate English-Spanish L2 learners [t (30.1) = 2.43, $p < .05$], and the low-proficiency German-Spanish L2 learners outperformed the low-proficiency English-Spanish L2 learners [t (38) = 3.05, $p < .01$]. These findings point to the fact that L2 learners of Spanish whose L1 has also instantiated gender outperform learners whose L1 lacks gender.

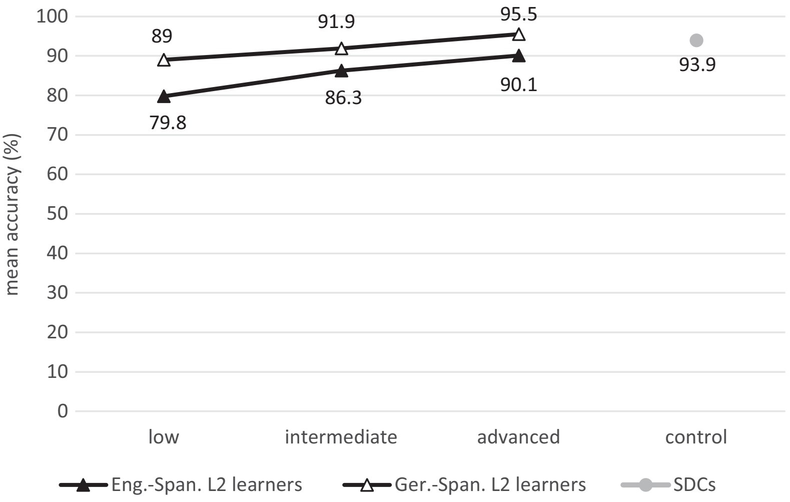

Figure 5.1: Comparison of mean L2 learner accuracy rates by language combination and proficiency level.

HSs: English-Spanish vs. German-Spanish

As shown in Figure 5.2, the gender accuracy rates across the two groups of HSs were largely high, except for the low-proficiency English-Spanish HSs.

The English-Spanish and German-Spanish HSs' accuracy rates converged at the advanced level of proficiency and they patterned with the controls. Differences among the HS groups became evident with decreasing proficiency, as the German-Spanish HSs outperformed the English-Spanish HSs at intermediate and low proficiency levels.

The results from the t-tests yielded no statistically significant differences in the mean accuracy rates between the English-Spanish and German-Spanish HSs at the advanced proficiency level [t (39) = −.24, $p = .813$], whereas the comparisons between both HS groups were statistically significant at intermediate [t (33.82) = 1.17, $p < .001$], and low [t (24.41) = 3.70, $p < .01$] levels of proficiency.

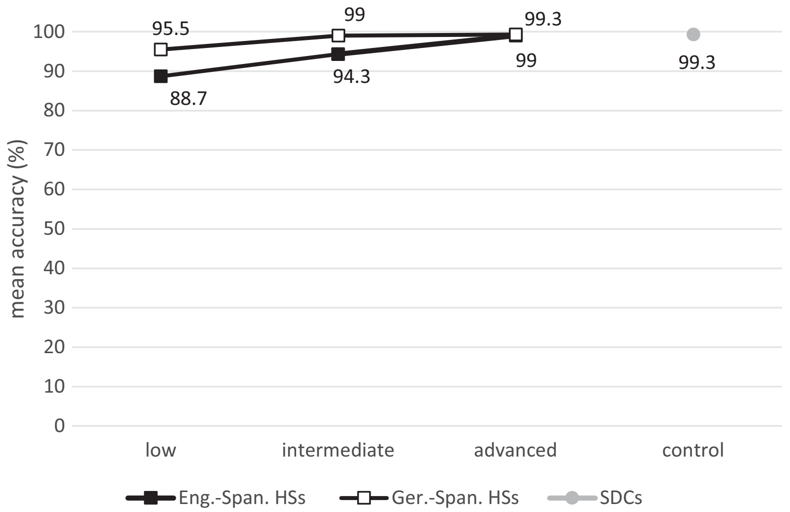

Figure 5.2: Comparison of mean HS accuracy rates by language combination and proficiency level.

5.4.2.3 Effect of the amount of language use

In order to investigate whether the frequency of using Spanish affects participants' overall gender accuracy, a series of Pearson's correlations were carried out for each speaker group at the respective proficiency level.[61] For the majority of participant groups there was no significant relationship between the amount of Spanish usage and the gender accuracy rates obtained in the FCST. Only for the advanced German-Spanish HSs ($r = .903$, $p < .001$) and low-proficiency English-Spanish HSs ($r = .505$, $p < .05$) did their amount of Spanish usage significantly correlate with their accuracy rates. These results indicate that increased Spanish usage leads to neither higher nor lower accuracy in all groups except for the advanced and low-proficiency German-Spanish HSs, who are more accurate at increased levels of Spanish usage. Detailed results of the bivariate correlations appear in Table 5.14.

61 As the value of the effect size of Pearson's r correlation varies between −1 to +1, I will follow using the commonly cited benches for the effect size criteria for Pearson correlation coefficients, which are as follows: the effect size is low if the value of *r* varies around 0.1, medium if *r* varies around 0.3, and large if *r* varies more than 0.5 (Cohen 1988, 1992; Field 2016).

Table 5.14: FCST: Effect of the amount of language use.

Groups			*N*	Pearson's r
English-Spanish	L2 learners	Low	21	.390
		Intermediate	20	.139
		Advanced	19	.304
	HSs	Low	18	.505*
		Intermediate	26	.280
		Advanced	21	.390
German-Spanish	L2 learners	Low	19	.219
		Intermediate	20	.217
		Advanced	21	−.039
	HSs	Low	16	.283
		Intermediate	20	.297
		Advanced	20	.903***

$^*p < .05$, $^{**}p < .01$, $^{***}p < .001$.

5.4.3 Results of linguistic factors

The previous section has examined the data in terms of potential effects of extralinguistic factors. In this section, we will now focus on the possible effects of the linguistic factors such as agreement domain, noun gender and noun ending on participants' performance. To this end, participants' mean accuracy rates were submitted to a repeated-measures analysis of variance (ANOVA) with the within-subjects factors of agreement domain (assignment, agreement), noun ending (canonical, non-canonical, exceptional), and noun gender (masculine, feminine) as well as the between-subjects factor of group (13 levels, representing all groups in the study).[62] The analysis revealed significant main effects of agreement domain [F (1, 243) = 182.90, $p < .001$, *partial* $\eta^2 = .43$], and

62 This way of running statistical tests was chosen in order to compare the current results with previous ones. Note that whether a result is statistically significant or not often depends on the statistical tests which a researcher runs. The factor group with 13 levels might not come out as significant given the amount of data. Alternative statistical tests might provide statistical significance of the factor.

noun ending [F (2, 486) = 15.75, $p < .001$, *partial* $\eta^2 = .06$], though no effect of noun gender [F (1, 243) = .102, $p = .75$]. There were also significant interactions between factors agreement domain × noun ending [F (1.83, 444.40) = 54.34, $p < .001$, *partial* $\eta^2 = .18$], agreement domain × gender [F (1, 243) = 36.03, $p < .001$, *partial* $\eta^2 = .13$], noun ending × gender [F (2, 483.72) = 74.75, $p < .001$, *partial* $\eta^2 = .24$] and agreement domain × noun ending × gender [F (1.87, 454.16) = 40.30, $p < .001$, *partial* $\eta^2 = .14$]. In the remainder of this section, the data and the effects for each experimental group will be explored in more detail.

English-Spanish experimental groups

English-Spanish L2 learners

Detailed descriptive data, including mean accuracy rates by agreement domain, noun ending and gender value, are included in Appendix 7.1. In general, the English-Spanish L2 learners across all proficiency levels were more accurate on gender agreement ($M_{low} = 91.3\%$, $SD = 8.4$; $M_{intermediate} = 94.7\%$, $SD = 8.9$; $M_{advanced} = 96.5\%$, $SD = 5$) than gender assignment ($M_{low} = 68.3\%$, $SD = 10.6$; $M_{intermediate} = 77.8\%$, $SD = 11.8$; $M_{advanced} = 83.6\%$, $SD = 10.1$). Figure 5.3 depicts these results. A paired-samples t-test was conducted to compare assignment and agreement conditions. There was a significant difference in the scores for the low-proficiency English-Spanish L2 learners [t (20) = –9.70, $p < .001$], intermediate English-Spanish

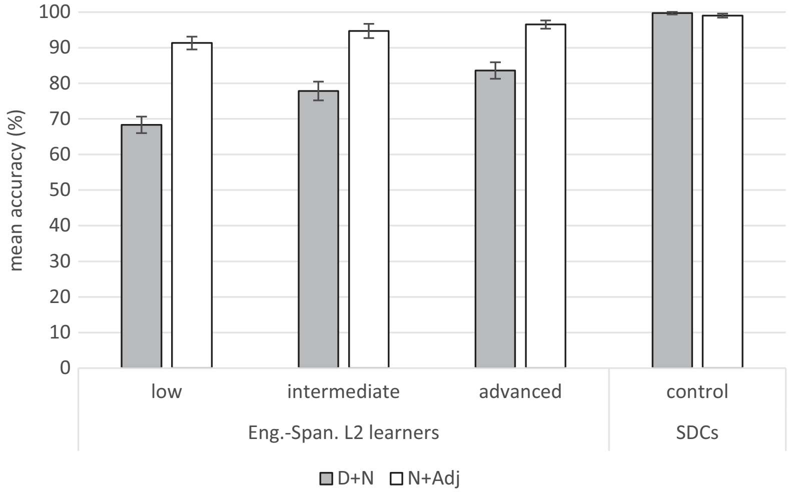

Figure 5.3: Eng.-Span. L2 learners' mean accuracy and standard error by agreement domain and proficiency level.

L2 learners [t (19) = –7.38, $p < .001$] and advanced English-Spanish L2 learners [t (18) = –5.35, $p < .001$]. These results suggest that these L2 learners perform more accurately on agreement than assignment.

Figure 5.4 shows the mean accuracy for the English-Spanish L2 learners according to the noun gender and ending. English-Spanish L2 learners were overall most accurate with canonical ending nouns (masculine nouns ending in *-o* and feminine nouns ending in *-a*), followed by non-canonical ones (nouns ending in *-e*), and finally the exceptions (feminine nouns ending in *-o* and masculine nouns ending in *-a*).[63] Whether the non-canonical nouns were feminine or masculine did not seem to have an effect on accuracy rates.

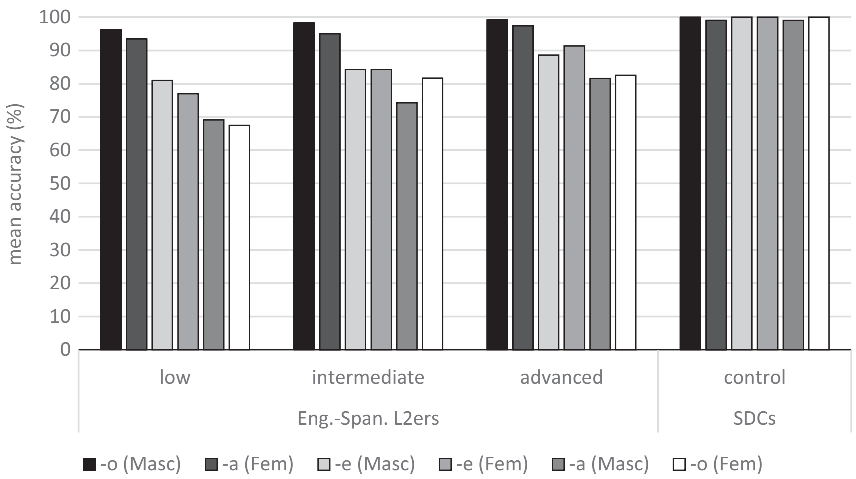

Figure 5.4: Eng.-Span. L2 learners' mean accuracy by noun gender and ending across proficiency levels.

English-Spanish HSs

The descriptive data for the English-Spanish HS groups appear in Appendix 7.2. As illustrated in Figure 5.5, the mean accuracy rates between the two agreement domains were similar across the English-Spanish HSs at the intermediate ($M_{D+N} = 93.4\%$, $SD = 6.5$; $M_{N+Adj} = 95.3\%$, $SD = 7.7$) and advanced proficiency levels ($M_{D+N} = 99\%$, $SD = 2.24$; $M_{N+Adj} = 99.2\%$, $SD = 2$), while the low-proficiency HSs were clearly more accurate on gender agreement ($M = 95.7\%$, $SD = 6.8$) than assignment ($M = 81.8\%$, $SD = 12.1$). A paired-samples t-test was conducted to

63 Note that the first two bars of the graph are canonical, the next two are non-canonical, and the final two are exceptional noun endings.

compare assignment and agreement conditions. There was a significant difference in the scores for the low-proficiency English-Spanish HS group [t (17) = −4.32, $p < .001$]. There was no significant difference found between assignment and agreement for the intermediate [t (25) = −1.09, $p > .05$] and advanced English-Spanish HS group [t (20) = −.44, $p > .05$]. These results suggest that low-proficiency English-Spanish HS group perform more accurately on agreement than assignment and those differences between the two conditions disappear with increasing proficiency.

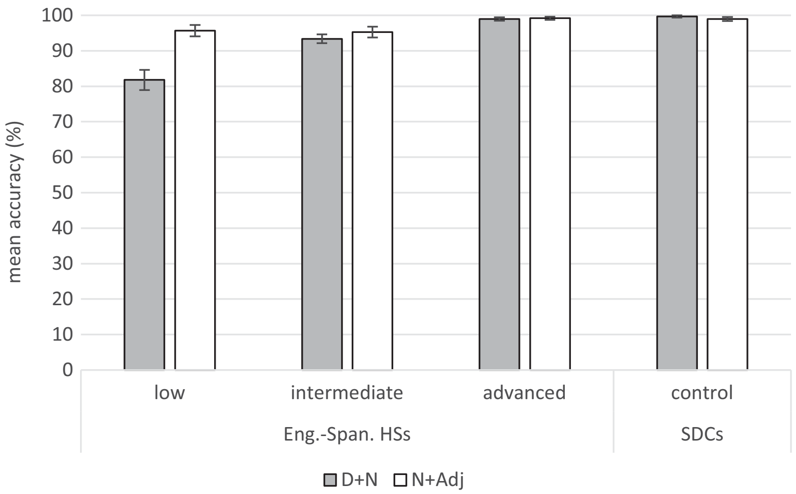

Figure 5.5: Eng.-Span. HSs' mean accuracy and standard error by agreement domain and proficiency level.

The aforementioned observations also hold true for the distribution of accuracy rates in terms of the noun gender and ending (see Figure 5.6). The intermediate and advanced English-Spanish HSs produced comparable accuracy rates with all ending types and both genders. As expected, the advanced HSs performed slightly better than their intermediate counterparts. Low-proficiency HSs, by contrast, appear to have lower mean accuracy rates with masculine nouns ending in *-a* ($M = 66.7\%$, $SD = 25.6$) and nouns ending in *-e* irrespective of their gender ($M_{masc\ nouns} = 86.1\%$, $SD = 17.39$; $M_{fem\ nouns} = 81.5\%$, $SD = 16.1$).

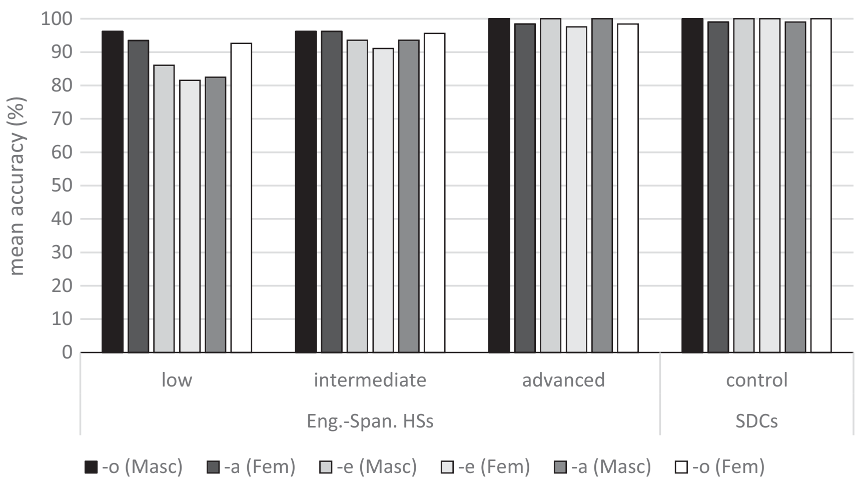

Figure 5.6: Eng.-Span. HSs' mean accuracy by noun gender and ending across proficiency level.

German-Spanish experimental groups

German-Spanish L2 learners

Appendix 7.3 includes the means and standard deviations for the German-Spanish L2 group at each proficiency level. Looking at the mean accuracy rates by agreement domain illustrated in Figure 5.7, it becomes apparent that the German-Spanish L2 learners across all proficiency levels are more accurate on gender agreement (M_{low} = 95.3%, SD = 11.5; $M_{intermediate}$ = 96.7%, SD = 6.6; $M_{advanced}$ = 97.6%, SD = 3.8) than gender assignment (M_{low} = 82.7%, SD = 16.2; $M_{intermediate}$ = 87.2%, SD = 7.2; $M_{advanced}$ = 93.4%, SD = 9.06). A series of paired sample t-tests comparing the scores between the assignment and agreement condition showed that low-proficiency [t (18) = –3.29, $p < .01$] and intermediate German-Spanish L2 learners [t (19) = –4.59, $p < .001$] achieved statistically differet scores across both agreement domains. This seems to suggest that assignment appears to be more error-prone than agreement. The differences in the two conditions, however, were not statistically significant for the advanced German-Spanish L2 learners [t (20) = –1.96, $p > .05$].

When examining the effect of noun gender and ending on the German-Spanish L2 learners' gender accuracy rates, the results showed that their gender accuracy rates were prone to a high level of inaccuracies with masculine nouns ending in *-a* as well as masculine and feminine nouns ending in *-e*. Interestingly, while there were no differences in the accuracy rates between feminine and masculine nouns ending in *-e* for low-proficiency L2 learners, the intermediate and

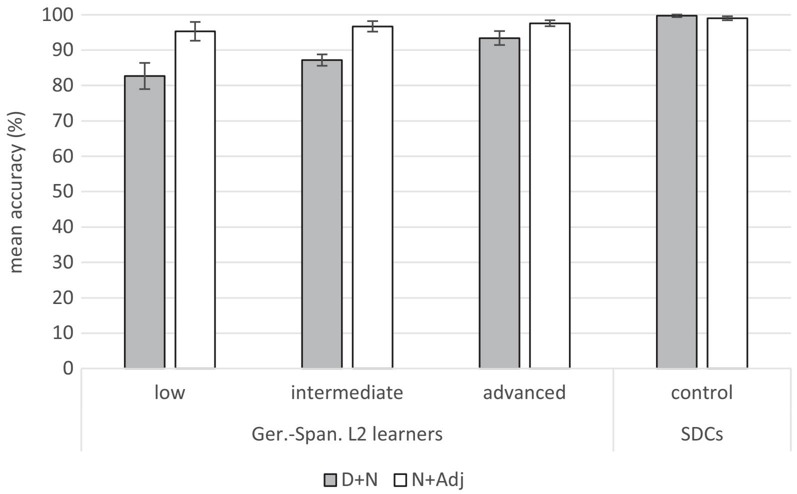

Figure 5.7: Ger.-Span. L2 learners' mean accuracy and standard error by agreement domain and proficiency level.

advanced L2 learners were more accurate with feminine nouns ending in *-e* than masculine ones. Both the low and intermediate proficiency groups were also less accurate with feminine nouns ending in *-o*. Figure 5.8 visualizes German-Spanish L2 learners' accuracy rates according to noun gender and ending.

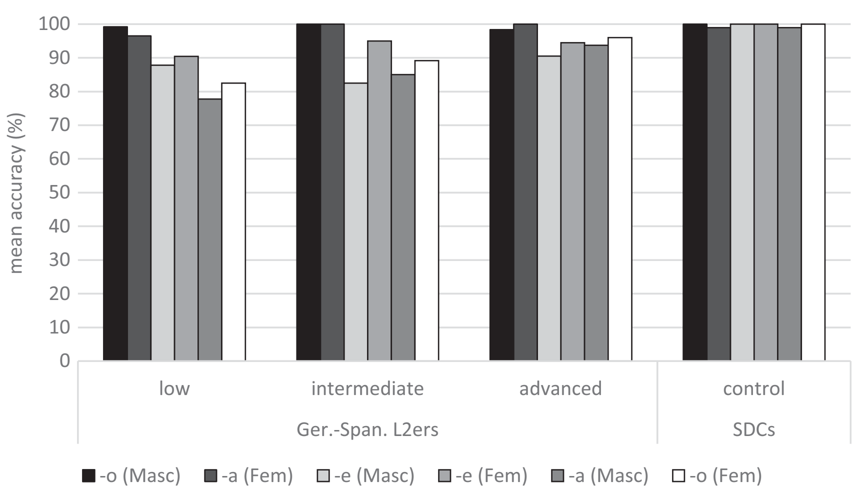

Figure 5.8: Ger.-Span. L2 learners' mean accuracy by noun gender and ending across proficiency levels.

German-Spanish HSs

Figure 5.9 shows that the intermediate and advanced German-Spanish HSs displayed similar accuracy rates for both gender agreement and assignment, while the low proficiency HS were somewhat more accurate with gender agreement ($M = 98.6\%$, $SD = 2.48$) than assignment ($M = 92.4\%$, $SD = 4.91$). A series of paired sample t-tests confirmed that the low-proficieny [t (15) = −5.58, $p < .001$] and intermediate German-Spanish HSs [t (19) = −2.37, $p < .05$] achieved statistically different scores across the two agreement domains, revealing that assignment is more error-prone than agreement. The advanced German-Spanish L2 HS [t (19) = −1.17, $p > .05$] achieved statistically comparable scores across both agreement domains.

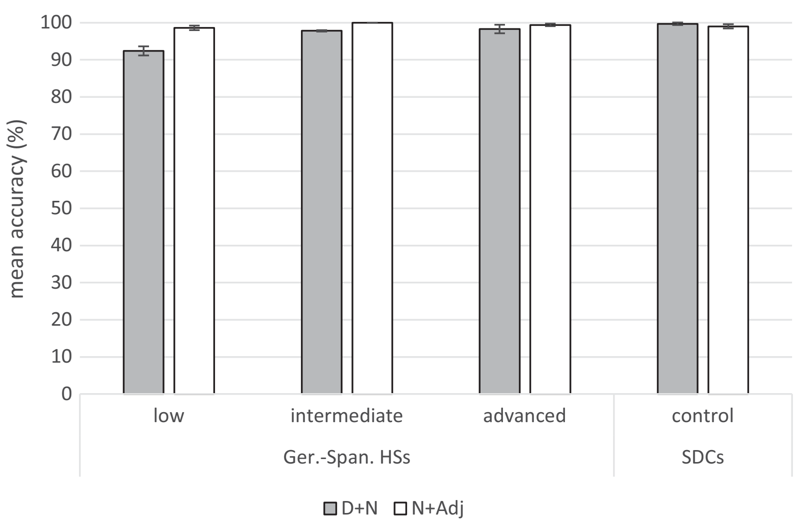

Figure 5.9: Ger.-Span. HSs' mean accuracy and standard error by agreement domain and proficiency level.

Figure 5.10 summarizes the distribution of accuracy rates in the German-Spanish HS groups by noun gender and ending. The intermediate and advanced HSs exhibited comparably gender accuracy rates ranging from 95–100% across the two genders and noun endings, whereas the low-proficiency HSs obtained lower accuracy rates with masculine nouns ending in *-a* ($M = 87.5\%$, $SD = 24$) and feminine nouns ending in *-e* ($M = 89.6\%$, $SD = 12$). Appendix 7.4 contains more details of these comparisons.

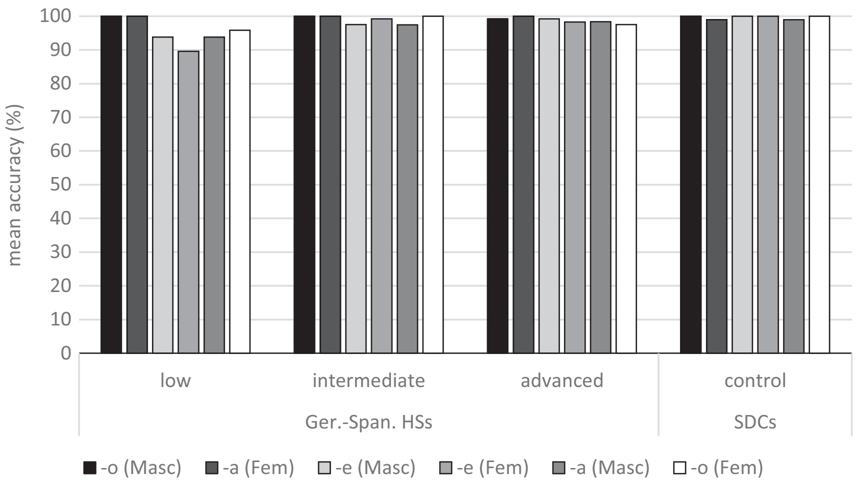

Figure 5.10: Ger.-Span. HSs' mean accuracy by noun gender and ending across proficiency levels.

5.4.3.1 Gender congruency effects

This section investigates possible effects of gender (in)congruency in the German-Spanish bilingual data. Data analyses were restricted to early and late German-Spanish bilinguals because both languages, unlike English, have gender. Recall that the FCST consisted of 9 gender congruent and 9 gender incongruent items.

Before proceeding with the inferential statistics of the results, descriptive statistics for the distribution of the accuracy means obtained in the gender congruent and incongruent conditions by group and proficiency level are provided in Table 5.15.

As shown in Table 5.15, low-proficient German-Spanish HSs performed across all conditions slightly lower than the intermediate and advanced HS counter groups. Low-proficient German-Spanish HSs were slightly more accurate in gender congruent conditions (M_{GCMasc} = 93.8% and M_{GCFem} = 95%) than incongruent ones ($M_{GICMasc}$ = 90% and M_{GICFem} = 90.6%). Intermediate and advanced German-Spanish HSs demonstrated ceiling performance with gender congruent and incongruent items in the Forced-Choice Selection Task (FCST), suggesting that they have qualitatively target-like knowledge of gender, despite some variability in the accuracy means. Interestingly, intermediate German-Spanish HSs supplied a lower accuracy rate on masculine nouns in the incongruent condition, whereas the reverse pattern applied for advanced German-Spanish HSs. They were 95% accurate on masculine noun and 100% on feminine nouns in the congruent condition. Turning to German-Spanish L2 learners, it is noticeable that their performance across all proficiency levels is better in gender congruent than

Table 5.15: Overall accuracy by gender congruency and by group and proficiency level.

Groups		*N*	Overall accuracy							
			Gender congruent				Gender incongruent			
			Masc		Fem		Masc		Fem	
			M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
German-Spanish HSs	Low	16	93.8%	11.2	95%	8.9	90%	10.3	90.6%	12.5
	Intermediate	20	97.5%	7.7	99%	4.5	95%	12.8	100%	–
	Advanced	20	95%	13.1	100%	–	100%	–	97.5%	11.2
German-Spanish L2 learners	Low	21	89.5%	15.2	89.5%	16.8	73.7%	28.3	78.9%	24
	Intermediate	20	93.8%	11.1	93%	11.7	74%	11.4	90%	15
	Advanced	19	95.2%	12.8	97.1%	7.2	87.6%	14.8	94%	13.5
Total		**116**	**94.2%**	**12.1**	**95.7%**	**10.2**	**86.7%**	**18.1**	**92%**	**15.7**

incongruent conditions with mean values ranging from 89.5% to 97.5% for the former condition and from 73.7% to 94% for the latter condition. The accuracy means for each German-Spanish L2 subgroup was nearly similar for both genders (i.e. masculine vs. feminine) in the gender congruent conditions, whereas the contrary holds true for the gender incongruent conditions. For all German-Spanish L2 subgroups, the accuracy was lower on masculine than on feminine nouns in the gender incongruent conditions. The difference in the accuracy means across the two gender in the incongruent conditions was as follows for the low-proficient German-Spanish L2 group (5.2%), the intermediate German-Spanish L2 group (16%) and the advanced German-Spanish L2 group (6.4%). Taken together the low accuracy rates for the L2 groups in the gender incongruent conditions, there may be a viable explanation. The poor rates of accuracy in the incongruent condition and, in particular, for the masculine items may be related to CLI effects, which will be pursed in more detail in the remainder of this section. A three-way repeated-measures ANOVA with 2× (congruency condition), 2× (gender) and 6× (group) factorial design was performed and revealed a significant main effect of congruency [F (1, 110) = 25.58, $p < .001$, *partial* $\eta^2 = .19$) and of gender [F (1, 110) = 10.08, $p < .01$, *partial* $\eta^2 = .84$], confirming that the groups were overall more accurate on congruent conditions. Furthermore, there was a significant interaction between congruency and group [F (5, 110) = 4.58, $p < .01$, *partial* $\eta^2 = .17$], indicating that German speaking L2 learners produced higher gender inaccuracy rates than German-Spanish HSs in incongruent conditions.

To investigate whether the accuracy of German-Spanish bilinguals was affected by CLI, the results were submitted to a factorial ANOVA with repeated-measures with congruency (congruent, incongruent) and gender (masculine, feminine) as within-subjects factors and group as the between-subjects factor. Following Müller and Hulk's (2001) proposal that CLI can occur if there is an overlap in surface structure, only those nouns which had the same phonological ending in German and Spanish were included in the statistical analysis. The same procedure was applied for the analysis of CLI effects in the GJT and OEPT. Figure 5.11 displays the overall accuracy means for early and late German-Spanish bilinguals across all conditions. Results revealed a main effect of congruency [F (1, 110) = 318.35, $p < .001$, *partial* $\eta^2 = .74$], showing that the groups were overall more accurate on gender in congruent than incongruent conditions. Furthermore, there was a main effect of gender [F (1, 110) = 29.98, $p < .001$, *partial* $\eta^2 = .21$], indicating that the overall accuracy on feminine gender was higher than on masculine gender. The statistical analysis failed to reveal a significant interaction between one of the linguistic variables and the factor group ($p > .05$). Nevertheless, there was a significant two-way interaction congruency × gender [F (1, 110) = 94.94, $p < .001$, *partial* $\eta^2 = .120$].

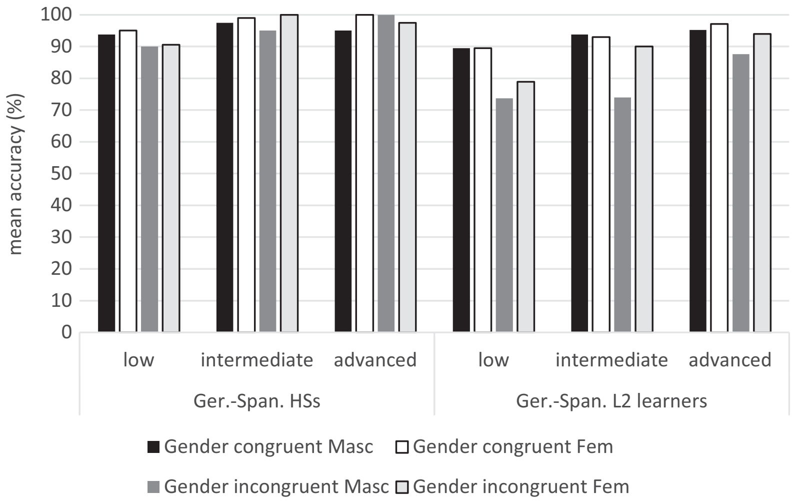

Figure 5.11: German-Spanish bilinguals' accuracy means by congruency condition and gender.

The groups were overall more accurate on feminine forms in gender congruent conditions than on masculine forms in gender incongruent conditions (see also Appendix 7.5 for CLI effects on nouns only ending in -*e*). On the whole, the results demonstrated that early and late German-Spanish bilinguals were equally susceptible to CLI from German noun equivalents with different genders in German and Spanish. For inaccuracies which occurred when the German and Spanish noun equivalents matched in gender, it should be noted that these can be attributed to cases of overgeneralizations (e.g. el_{Masc} $pijama_{\text{Masc}}$ vs. $*la_{\text{Fem}}$ $pijama_{\text{Masc}}$ 'pajamas') in the case of German speaking L2 learners, while this does not hold true for the HSs. These inaccuracies might be due to a wider influence from other Spanish dialects and varieties (such as Colombian Spanish) when communicating with other Spanish-speaking people or watching Spanish TV, where these Spanish varieties are used.

5.5 Grammaticality Judgment Task (GJT)

The main goal of the Grammaticality Judgement Task (GJT) was to investigate whether early and late bilinguals are able to distinguish between grammatical and ungrammatical sentences and in the latter case to correct those unacceptable sentences regarding gender assignment and agreement. The GJT also addresses the third research question (RQ#3) as it investigated whether any of the independent linguistic variables such as the noun morphology (overt vs. non-overt), the domain of agreement (determiner vs. adjective) and noun gender (masculine vs. feminine) affects the participants' judgement of the sentence as either grammatical or ungrammatical.

In light of the controversial debate on whether GJTs should be used in SLA and HLA research, the remainder of this section will reveal the motivation for choosing this specific task. Flynn and Manuel (1991), Ellis (1991), Cook (1992), Gass and Selinker (2001), among others, belong to the opponents of using GJTs because this task format lacks variability and reliability (see Sorace 1996 for criticism and caveats regarding GJTs). Flynn and Manuel (1991) voiced criticism regarding the interpretability of Likert scales in GJTs which have been very popular. Most research made use of Likert scales as psychometric item scoring schemes to quantify people's judgements of grammatical and ungrammatical sentences. This claim, in the researcher's view, is feasible. In view of these concerns, the researcher of the present study replaced the multi-category Likert scale with forced binary options (i.e. correct vs. incorrect) as it has proved to be more comprehensible for participants and reduced their time to complete the task (Grassi et al. 2007; Dolnicar et al. 2011). Ellis' (1991) and Cook's (1992) criticism relates to the view that L2 learners and HSs differ in their metalinguistic sensitivity not only from one another but also from monolingual speakers. Thereby, they raise methodological concerns about the comparability of grammatical judgements. Based on the results from previous research using GJTs (to name a few gender studies using GJTs Franceschina 2005; Kirova 2016; Klassen 2016) and piloting this task, the GJT designed for the current study proved to be a particularly suitable and informative tool for providing additional insights into L2 and HS grammars (Ayoun 2000). Furthermore, the successful piloting of the GJT showed that L2 learners and HSs are able to have metalinguistic sensitivity are not overtaxed by this written task type.

5.5.1 Experimental design

The offline GJT was similar in the design of the items in the FCST as the same target nouns were used. The GJT contained a total of 72 sentences. All items were counterbalanced and randomized to avoid task effects and instances of presenting the same experimental item in the two different agreement domains consecutively. Out of the 72 sentences, half were fillers ($N = 36$) and half were target sentences ($N = 36$), all designed in the same way as those reported in section 5.3.1. The fillers used in the task were dedicated to the correct or incorrect use of *ser* vs. *estar*, imperfect vs. preterit and subject-verb agreement, 6 filler sentences of each linguistic phenomenon were grammatical and 6 were ungrammatical.

The target sentences relevant for the present study were further manipulated to create 2 conditions testing gender assignment ($N = 18$) and gender agreement ($N = 18$). In each condition, half of the sentences were grammatical ($N = 9$) and half were ungrammatical ($N = 9$). All grammatical and ungrammatical sentences used in the GJT consisted of 7–12 words and had a similar syntactic structure. Note that the region of interest was not always in the same position (see example (5.3) vs. (5.4)). An example of the target sentence in each agreement condition and (un)grammatical condition is provided in (5.3)–(5.6).

(5.3) *D+N match* (grammatical condition)
El libro de Stephen King sale a la venta.
The$_{\text{MascSg}}$ *book*$_{\text{MascSg}}$ by Stephen King will go on sale.
'The book by Stephen King will go on sale.'

(5.4) *D+N mismatch* (ungrammatical condition)
*Hawái aparece en *la mapa* de los EEUU.
Hawaii appears on *the*$_{\text{FemSg}}$ *map*$_{\text{MascSg}}$ of the USA.
'Hawaii appears on the map of the USA.'

(5.5) *N+ Adj match* (grammatical condition)
Sergio no puede encontrar *el mapa amarillo*.
Sergio cannot find the$_{\text{MascSg}}$ map$_{\text{Masc.Sg}}$ yellow$_{\text{MascSg}}$.
'Sergio cannot find the yellow map.'

(5.6) *N+Adj mismatch* (ungrammatical condition)
*El hombre busca *el guante negra*.
The man looks for the$_{\text{MascSg}}$ glove$_{\text{MascSg}}$ black$_{\text{FemSg}}$.
'The man looks for the black glove.'

In order to control for the independent linguistic variables i.e. gender and noun ending, the grammatical and ungrammatical target sentences were evenly distributed among these variables.

As the effect of gender congruency can only be tested in early and late German-Spanish bilinguals, a total of 18 items for each noun gender congruency condition (i.e. congruent vs. incongruent) was included. The items were also distributed in equal numbers among the two agreement domains, that is, gender assignment ($N = 9$) and gender agreement ($N = 9$).[64]

Similar to the FCST, the offline GJT made use of the paper and pencil method and untimed responses. That is to say, all items were presented to the participants on a sheet of paper and encouraged them to complete the task as quickly as possible without going back to given responses. Prior to the initiation of the GJT, all participants were provided with detailed written instructions in the target language Spanish and an example to ensure that task instructions were understood. The task involved a two-step process. First, the participants had to read each sentence given in the paper. They were asked to judge, based on their first intuition, whether the sentence is grammatical or ungrammatical and to tick either the box marked C for *correcta* 'correct' or the box marked F for *falsa* 'false'. Second, if the participants judged the sentence to be ungrammatical, they were required to consciously analyze the sentence and to provide a correction (see Ellis 1991). The responses obtained from the GJT were coded for accuracy of (i) judging the sentence as grammatical or ungrammatical, (ii) providing an adequate correction of the gender mismatches. Participants received one point if they provide the appropriate judgement and correction. In all other cases they received a score of zero. In addition, the data were further coded according the following linguistic variables: (i) the agreement domain (either determiner or adjective), (ii) the gender of the noun and (iii) the noun ending (i.e. canonical, non-canonical, exceptional) and (iv) the noun gender congruency. Note that the variable noun gender congruency only applies to those participants of the language combination German-Spanish. The task was completed in 35–45 minutes.

5.5.2 Results of extralinguistic factors

First, a multivariate analysis of variance (MANOVA) was carried out to test the hypothesis of overall differences between groups due to extralinguistic effects. The MANOVA revealed a significant effect of AoO of bilingualism [$F(3, 241) = 9.78$, $p < .001$, Wilk's $\Lambda = .89$, *partial* $\eta^2 = .11$], language combination [$F(3, 241) = 3.84$, $p < .05$, Wilk's $\Lambda = .95$, *partial* $\eta^2 = .05$], and proficiency level [$F(6, 482) = 10.67$, $p < .001$, Wilk's $\Lambda = .78$, *partial* $\eta^2 = .12$]. Upon further examination, there were significant the following two-way interactions: language combination × AoO of

64 Although it would be desirable to have presented the test items embedded in a context, the researcher decided not to do so in view of the specific construction of the test items and to avoid participants' fatigue (see also Diaubalick and Guijarro-Fuentes 2016 for a similar task design on the Spanish Tense and Aspect system).

bilingualism [F (2, 242) = 6.785, $p < .001$, Wilk's Lambda $\Lambda = .92$, *partial* $\eta^2 = .08$] and language combination × group [F (4, 484) = 3.350, $p < .001$, Wilk's $\Lambda = .92$, *partial* $\eta^2 = .04$]. There was a significant three-way interaction of language combination × proficiency × AoO of bilingualism [F (6,482) = 2.785, $p < .01$, Wilk's $\Lambda = .93$, *partial* $\eta^2 = .03$]. Given the significant effects indicated by the MANOVA results, multiple univariate ANOVAs on each extralinguistic factor have followed and will be presented in more detail in the next sections.

5.5.2.1 Effects of AoO and language combination

Table 5.16 shows the mean accuracy rate and standard deviation for both the HSs and L2 learners across the language combinations.

Table 5.16: Group mean accuracy across conditions and AoO of bilingualism.

Groups	***N***	**Overall gender accuracy**	
		M	***SD***
English-Spanish HSs	65	85.6%	11.9
English-Spanish L2 learners	60	78.1%	13.6
German-Spanish HSs	56	90.4%	7.8
German-Spanish L2 learners	60	84.2%	12.6
Control group	16	93.9%	7.2
Total	**257**	**85.1%**	**7.2**

As indicated in Table 5.16, the mean accuracy across all experimental groups ranged from 78.1% to 90.4%. German-Spanish HSs were the most accurate group, with a mean value of 90.4%. This accuracy rate differs only in 3.5% from the one of the control group. The English-Spanish HSs and German-Spanish L2 learners produced nearly similar accuracy rates with 85.6% in former and 84.2% in the latter group. The lowest accuracy rate (78.1%) was provided by the English-Spanish L2 learners. These results suggest that the HS groups outperform the L2 groups when matched for the language combination. The significant effect of the language combination was further explored by Games-Howell post-hoc tests to detect the location of differences. The results revealed that there was a significant difference in the accuracy means between certain groups [F (4, 86.85) = 13.51, $p < .001$]. English-Spanish L2 learners were significantly less accurate than all other groups.

German-Spanish L2 learners and English-Spanish HSs were significantly less accurate than German-Spanish HSs and controls.

5.5.2.2 Effects of language proficiency

Given a significant interaction of proficiency × language combination × AoO of bilingualism indicated by the MANOVA results, a series of univariate ANOVAs were carried out to detect the locus of the differences. We now turn to the question what exactly does this interaction mean in the data (RQ#2). This section will start with the results regarding proficiency effects first by language combinations (i.e. English-Spanish and German-Spanish groups), then by AoO of bilingualism within language combinations (i.e. English-Spanish HSs vs. L2 learners and German-Spanish HSs vs. L2 learners), and finally by AoO of bilingualism across language combinations (i.e. English-Spanish vs. German-Spanish HSs and English-Spanish vs. German-Spanish L2 learners).

English-Spanish groups

Table 5.17 shows the overall mean accuracy rate and standard deviation for English-Spanish HSs and L2 learners across all proficiency levels.

Table 5.17: Mean accuracy in the overall condition by group and proficiency level.

Groups		*N*	Overall accuracy	
			M	*SD*
English-Spanish HSs	low	18	73.6%	11.6
	intermediate	26	87.8%	10.2
	advanced	21	93%	4.5
English-Spanish L2 learners	low	21	70.8%	12.9
	intermediate	20	78.6%	13
	advanced	19	85.7%	10.7
Control group		16	93.9%	7.1

As indicated in Table 5.17, the overall gender accuracy of both groups, HSs and L2 learners, decreased with decreasing proficiency. The results for the English-Spanish HSs revealed that advanced HSs behaved in a control-like fashion, with a mean accuracy of 93% and 93.9% respectively. Intermediate English-Spanish HSs supplied an 87.8% mean accuracy rate, while low-proficient English-Spanish HSs only reached a mean accuracy of 73.6%. The downward trend of the mean accuracy can also be observed in the English-Spanish L2 group. Across all levels of proficiency, gender accuracy declined from the average 85.7% produced by the advanced English-Spanish L2 learners, to 78.6% supplied by the intermediate English-Spanish L2 learners and, finally, to 70.8% reached by the low-proficient English-Spanish L2 learners.

A series of one-way ANOVAs with Games Howell Post-hoc tests were carried out on the accuracy rates of all groups to determine whether the preliminary observations as described above were statistically significant.[65] Results indicated that low-proficiency English-Spanish L2 learners differed significantly from the other English-Spanish L2 groups and the control group in their overall accuracy rates [$F(3, 72) = 13.80$, $p < .001$]. When the English-Spanish HS groups were compared to the control group, the low English-Spanish HS group differed significantly from the intermediate and advanced English-Spanish HS groups and controls [$F(3, 37.75) = 16.15$, $p < .001$].

German-Spanish groups

Table 5.18 presents the distribution of the overall average accuracy rates and standard deviations for German-Spanish HSs and L2 learners across all proficiency levels.

As the findings in Table 5.18 demonstrate, there was rather small variation in the accuracy means within each speaker group observed across the proficiency levels. The performance of HSs and L2 learners within their groups and across proficiency levels remained astonishingly stable. Only the advanced German-Spanish HSs constituted an exception to the observation. They performed with a mean accuracy of 96.7% above the controls' average accuracy rate of 93.9%. Intermediate German-Spanish HSs were clearly less accurate with a mean accuracy of 88.1% and low-proficient German-Spanish HSs with a mean accuracy of 85.4%. The mean accuracy within the German-Spanish L2 learners displayed only minimal differences among the different proficiency levels. The advanced German-Spanish L2 learners supplied an average accuracy of 87.2%, the intermediate German-Spanish L2 learners exhibited 84.2% accuracy and the low-proficient German-Spanish L2 learners obtained an average accuracy rate of 81%.

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65 Note that there was homogeneity of variance according to Levene's test ($p < .05$) for the analysis of the English-Spanish L2 group with the control group, so the ANOVA and Tukey post-hoc test were used. For all other groups, the assumption of homogeneity of variances was violated, so the results of the Welch ANOVA and Games-Howell post-hoc analysis are reported.

Table 5.18: Mean accuracy in the overall condition by group and proficiency level.

Groups		*N*	Overall accuracy	
			M	*SD*
German-Spanish HSs	Low	16	85.4%	5.3
	Intermediate	20	88.1%	5.7
	Advanced	20	96.7%	7.2
German-Spanish L2 learners	Low	19	81%	13.5
	Intermediate	20	84.2%	12
	Advanced	21	87.2%	12.2
Control group		16	93.9%	7.1

A series of one-way between-subjects ANOVAs using the overall gender accuracy on the GJT as the dependent variable and the controls and German-Spanish L2 subgroups as the grouping variable showed a significant difference [F (3, 72) = 3.86, $p < .05$]. Tukey HSD post-hoc analysis revealed that the German L2 learner groups were significantly less accurate than the controls. As far as the German-Spanish HS group was concerned, the advanced German-Spanish HSs and controls were significantly more accurate than low-proficient and intermediate German-Spanish HSs [F (3, 68) = 11.80, $p < .01$].

English-Spanish: L2 learners vs. HSs

Overall, the results revealed that the English-Spanish HS group, except for the low-proficient English-Spanish HS group, performed better than the English-Spanish L2 group. Advanced English-Spanish HSs exhibited an average accuracy rate of 93%, whereas advanced English-Spanish L2 learners only reached a mean accuracy rate of 85.7%. The intermediate English-Spanish HSs were accurate on 87.8% of their grammatical judgements in terms of gender, while intermediate English-Spanish L2 learners were less accurate, obtaining an accuracy rate of 78.6% in their grammatical judgements. The low-proficient English-Spanish HS group (73.6%) and L2 group (70.8%) provided nearly similar accuracy rates, differing only in 2.8%.

In order to test statistically whether advanced and intermediate English-Spanish HSs showed an advantage over proficiency-matched English-Spanish L2 learners, these groups at each proficiency level were compared in an independent-samples t-test with mean accuracy in the overall condition as a dependent variable. Analyses revealed that the advanced English-Spanish HS group differs from the advanced English-Spanish L2 group [t (23.52) = 2.77, $p < .05$]. The results of the t-test conducted on the intermediate English-Spanish HSs and L2 group also yielded a significance difference in the mean accuracy rates [t (44) = 2.70, $p < .01$]. Results for both the English-Spanish HS group and L2 group at the lowest proficiency level showed no significant difference [t (37) = .72, $p = .48$]. These results suggested that both speaker types were more prone to variation at the low proficiency level and the HSs outperformed the L2 learners at higher proficiency levels.

German-Spanish: L2 learners vs. HSs

Overall, the results revealed that the German-Spanish L2 and HS groups at the low and intermediate proficiency level showed similar accuracy patterns on gender. The two groups at the intermediate proficiency level differed in 4.1% in their mean gender accuracy rates, whereas the difference between the two groups at the low proficiency level dropped to 1.2%. Advanced German-Spanish HSs exhibited an average accuracy rate of 96.7%, whereas the advanced German-Spanish L2 learners only reached a mean accuracy of 87.2%.

The results of the German-Spanish HS group and L2 group at each proficiency level were separately analyzed via independent t-tests. As expected, the difference in the mean accuracy of the advanced German-Spanish HS group and German-Spanish L2 group reached significance [t (32.64) = 3.05, $p < .01$]. No statistically significant difference was found in the mean accuracy rates between the German-Spanish HS group and the German-Spanish L2 group at the intermediate proficiency level [t (27.19) = 1.31, $p = .201$] and the German-Spanish HS group and the German-Spanish L2 group at the low proficiency level [t (24.24) = 1.31, $p = .202$]. Hence, it seems that early and late German-Spanish bilinguals at the low and intermediate proficiency level show similar gender accuracy rates, whereas differences become more pronounced at the highest level of proficiency. At this proficiency level, German-Spanish HSs clearly outperformed proficiency-matched German-Spanish L2 learners.

L2 learners: English-Spanish vs. German-Spanish

As can be seen in Figure 5.12, the German-Spanish L2 learners at the low and intermediate proficiency level (81% and 84.2%, respectively) were more accurate than English-Spanish L2 learners matched for proficiency (70.8% and 78.6%). Both L2 groups at the advanced proficiency level obtained virtually similar accuracy rates, differing only by 1.5%. All L2 learners irrespective of their language combination and proficiency level behaved less accurately than the control group.

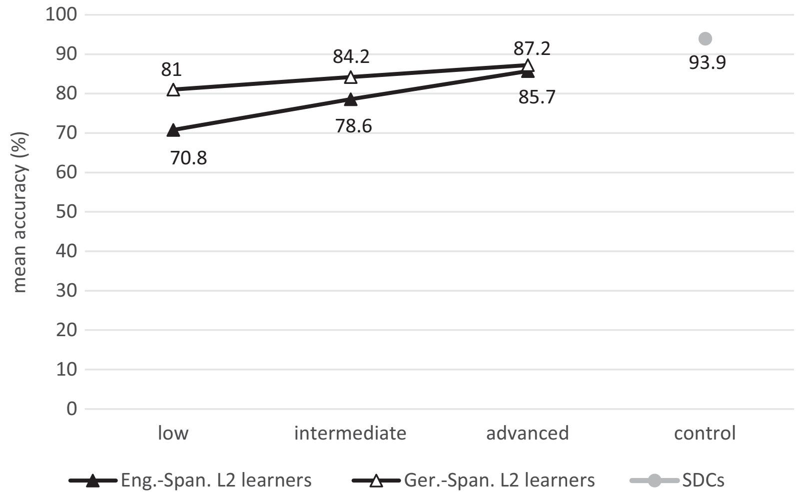

Figure 5.12: Comparison of mean accuracy rates by late German-Spanish and English-Spanish bilinguals and proficiency level.

A series of independent t-tests have been performed to test whether both L2 groups at each proficiency level differ in their mean accuracy rates. The results of the t-tests revealed no significant differences in the mean accuracy between German-Spanish and English-Spanish L2 groups at the intermediate [t (38) = 1.41, $p = .17$] and advanced proficiency level [t (38) = .41, $p = .68$]. Hence, it cannot be said that intermediate and advanced German-Spanish L2 learners significantly outperform proficiency-matched English-Spanish L2 learners. In fact, the opposite is true for the low proficiency groups. There was a significant difference in the mean accuracy between both groups [t (38) = 2.45, $p < .05$].

HSs: English-Spanish vs. German-Spanish

Figure 5.13 graphically presents the mean accuracy rates provided by the German-Spanish and English-Spanish HSs across all proficiency levels. Comparing the performance of advanced HSs across the language combinations, the results show that both groups behave control-like. The advanced German-Spanish HSs (96.7%) were slightly more accurate than their English Spanish counter group (93%) and even the control group (93.9%). In contrast, the results on both HS groups at the intermediate proficiency level were virtually similar as they minimally differed by 0.3%. Nevertheless, striking differences in the mean accuracy rates were observed between low-proficient German-Spanish and English-

Spanish HSs. German-Spanish HSs exhibited a high rate of accuracy (85.4%), whereas English-Spanish HSs obtained the lowest accuracy rate (73.6%).

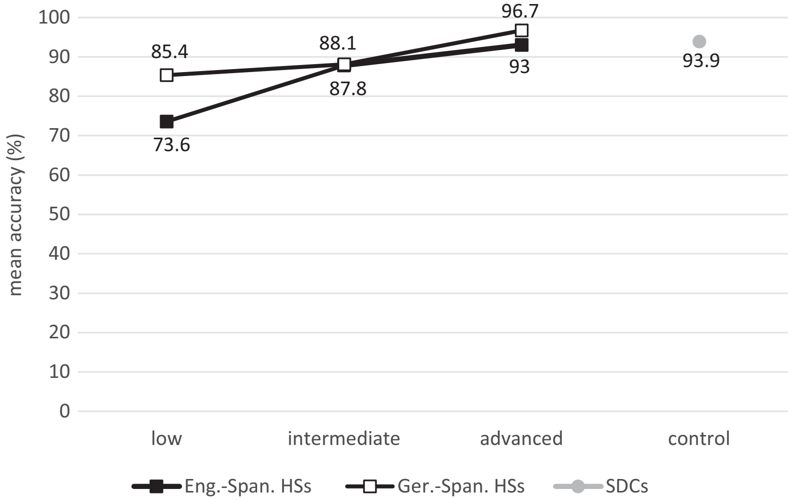

Figure 5.13: Comparison of mean accuracy rates by early German-Spanish and English-Spanish bilinguals and proficiency level.

The statistical analyses of the data revealed that there were no significant differences in the mean accuracy among German-Spanish and English-Spanish HSs at the intermediate [t (40.66) = 1, *p* = .92] and advanced proficiency level [t (39) = 1.98, *p* = .06]. Results of the t-test only showed significant differences between both HS groups at the lowest proficiency level [t (24.49) = 3.89, *p* < .01].

5.5.2.3 Effect of the amount of language use

A significant relationship between the amount of Spanish language use and participants' mean accuracy was observed in the following groups: advanced English-Spanish L2 learners [r = .544, n = 19, *p* < .05], low proficient English-Spanish HSs [r = .489, n = 18, *p* < .05], low-proficient [r = .568, n = 19, *p* < .05] and advanced German-Spanish L2 learners [r = - 468, n = 21, *p* < .05] and advanced German-Spanish HSs [r = .821, n = 20, *p* < .01]. The significant positive relationship between the amount of Spanish language use and participants mean accuracy indicates that the more participants use Spanish, the higher is the mean accuracy. A significant negative correlation between the amount of Spanish language use and participants' mean accuracy was observed in the group of advanced English-Spanish HSs [r = –.607, n = 21, *p* < .01]. No significant relationship between the amount of Spanish language use and participants' mean accuracy was observed in the following groups: low-proficient English-Spanish L2 learners, intermediate English-Spanish L2 learners, intermediate English-Spanish HSs, intermediate German-Spanish L2 learners, low-proficient and intermediate German-Spanish HSs. Table 5.19 contains an overview of the results of the Pearson correlations between the amount of Spanish language use and the overall mean accuracy on the GJT across all participants.

Table 5.19: GJT-Effect of the amount of language use.

Groups			*N*	Pearson's r
English-Spanish	L2 learners	Low	21	.191
		Intermediate	20	−.039
		Advanced	19	.544*
	HSs	Low	18	.489*
		Intermediate	26	.094
		Advanced	21	−.607**
German-Spanish	L2 learners	Low	19	.568*
		Intermediate	20	.351
		Advanced	21	.468*
	HSs	Low	16	.207
		Intermediate	20	−.184
		Advanced	20	.821**

*$p < .05$, **$p < .01$, ***$p < .001$.

5.5.3 Results of linguistic factors

One issue to consider in the interpretation of results for the GJT is whether linguistic factors do affect the participants' performance in terms of gender. As such the data of the GJT were submitted to a four-way repeated-measures ANOVA with 2 (agreement domain) ×3 (noun ending) ×2 (noun gender) ×2 (grammaticality) ×13 (group) factorial design. The results revealed a significant main effect of the agreement domain [$F\ (1, 244) = 10.09$, $p < .01$, *partial* $\eta^2 = .04$], noun ending [$F\ (1.9, 467.26) = 10.68$, $p < .001$, *partial* $\eta^2 = .04$] and noun gender [$F\ (1, 244) = 4.31$, $p < .05$, *partial* $\eta^2 = .02$]. The repeated-measures ANOVA also revealed statistically significant two-way interactions between agreement domain × noun ending [F (1.4, 344.63) = 36, $p < .001$, *partial* $\eta^2 = .13$], noun ending × gender [F (1.9, 473.84) = 68.3, $p < .001$, *partial* $\eta^2 = .218$], and the three-way interaction between agreement domain × noun ending × gender [F (1.9, 468.27) = 6.96, $p < .01$, *partial* $\eta^2 = .03$].

English-Spanish experimental groups

English-Spanish L2 learners

Figure 5.14 compares the average accuracy of the English-Spanish L2 groups across all proficiency levels in the D+N domain to the N+Adj domain. The results for the English-Spanish L2 groups across all proficiency levels show that the accuracy means in each agreement domain were similar. The low-proficient and intermediate English-Spanish L2 group were slightly more accurate on gender agreement than assignment (low-proficient Eng.-Span. L2 learners: $M_{D+N} = 67.1\%$, $SD = 17.3$; $M_{N+Adj} = 71.6\%$, $SD = 15.9$; intermediate Eng.-Span. L2 learners: $M_{D+N} = 75.6\%$, $SD = 13.3$; $M_{N+Adj} = 78.5\%$, $SD = 15.6$), whereas the reverse pattern was observable in the advanced English-Spanish L2 group ($M_{D+N} = 85.8\%$, $SD = 9.24$; $M_{N+Adj} = 82\%$, $SD = 12.84$). As results revealed a significant main effect of the agreement domain [F (1, 244) = 10.09, $p < .01$, *partial* $\eta^2 = .040$], further analyses

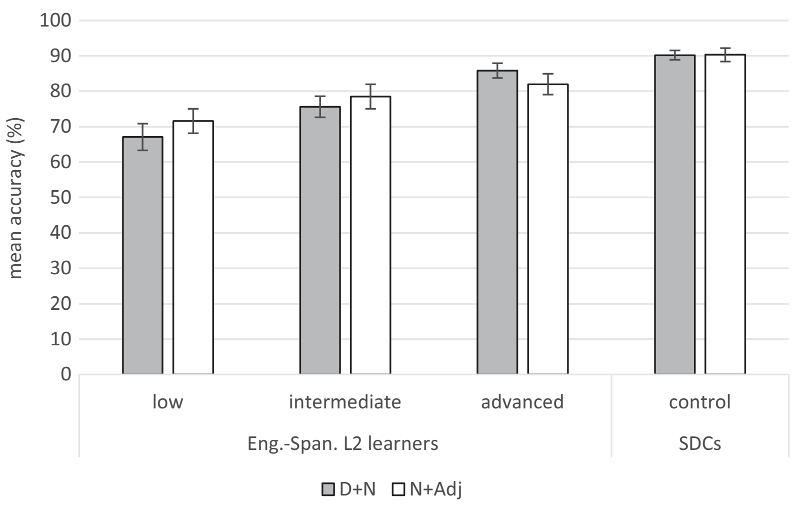

Figure 5.14: Eng.-Span. L2 learners' mean accuracy and stardard error by agreement domain and proficiency level.

were conducted. A series of paired-sample t-tests comparing the scores across the two agreement domains found no statistically significant difference for low-proficiency [t (20) = −1.30, $p > .05$], intermediate [t (19) = −.83, $p > .05$] and advanced [t (18) = 8.68, $p > .05$] English-Spanish L2 groups.

In order to consider the two-way interaction noun ending × noun gender, it is necessary to look at the distribution of accuracy rates across these two linguistic variables more closely as graphically presented in Figure 5.15. What is of interest from Figure 5.15 is that there was great variability in the mean accuracy rates across the noun endings and gender observable. Across all proficiency levels, English-Spanish L2 learners demonstrated more accuracy on canonical nouns ending in *-o* and *-a* than non-canonical or exceptional nouns. Regarding non-canonical nouns ending in *-e*, it is apparent that all English-Spanish L2 groups were more accurate with the feminine ($M_{low\ Eng.\text{-}Span\ L2\ learners} = 71.4\%$, $SD = 23.7$; $M_{intermediate\ Eng.\text{-}Span\ L2\ learners} = 77.5\ \%$, $SD = 23.7$; $M_{advanced\ Eng.\text{-}Span\ L2\ learners} = 83.3\ \%$, $SD = 17.6$) than masculine gender ($M_{low\ Eng.\text{-}Span\ L2\ learners} = 62.7\%$, $SD = 24.1$; $M_{intermediate\ Eng.\text{-}Span\ L2\ learners} = 67.5\ \%$, $SD = 18.3$; $M_{advanced\ Eng.\text{-}Span\ L2\ learners} = 68.5\ \%$, $SD = 22.2$). In terms of exceptional noun endings, the differing accuracy patterns were most pronounced at the highest proficiency level. Advanced English-Spanish L2 learners displayed a high level of accuracy with masculine nouns ending in *-a* compared to the other English-Spanish L2 subgroups, whose accuracy rates were extremely low (see Appendix 8.1 for a detailed overview of the results).

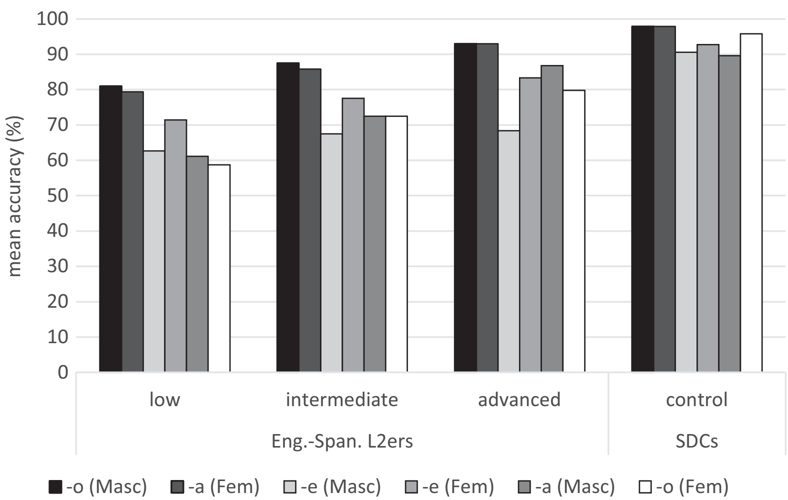

Figure 5.15: Eng.-Span. L2 learners' mean accuracy by noun gender and ending across proficiency levels.

A series of paired-samples t-tests were calculated to obtain more details about differences in the mean accuracy rates based on the gender values. There were no statistical differences between the two gender values across all English-Spanish L2 groups ($p > .05$).

English-Spanish HSs

Figure 5.16 illustrates the average accuracy rates across the two agreement domains. A comparison of means across the two agreement domains revealed that all English-Spanish HSs obtained a similar accuracy rate in both contexts. The intermediate English-Spanish HSs were slightly more accurate with gender assignment (86.3%) than agreement (82.4%). A series of paired samples t-test confirmed that the difference across the two agreement domains was statistically insignificant for the low-proficiency [t (17) = .13, $p > .05$], intermediate [t (25) = 1.78, $p > .05$] and advanced English-Spanish HS group [t (20) = .50, $p > .05$], suggesting that assignment did not appear to be more vulnerable than agreement.

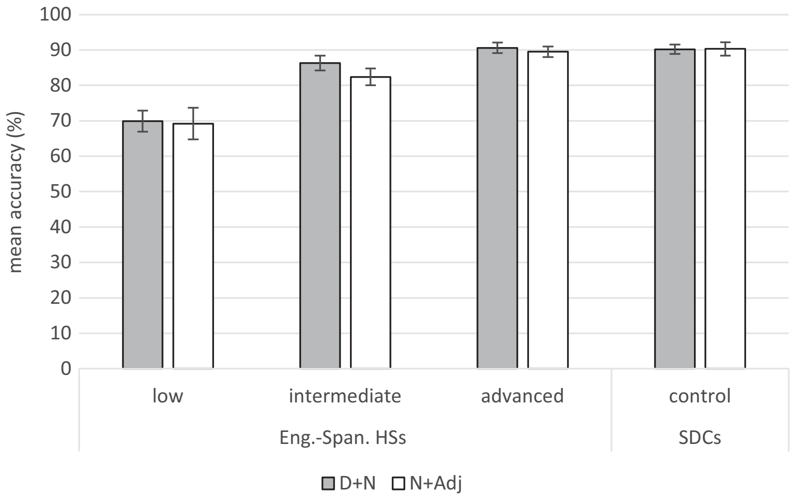

Figure 5.16: Eng.-Span. HSs' mean accuracy and standard error by agreement domain and proficiency level.

Looking at the results of the English-Spanish HSs in terms of noun ending and gender as presented in Figure 5.17 and Appendix 8.2, all groups performed most accurately on canonical masculine nouns ending in *-o* and feminine nouns ending in *-a*. The distribution of accuracy for each group with canonical and exceptional nouns ending in *-a* shows that the low-proficient HS group obtained comparable accuracy rates, whereas intermediate and advanced proficient HS groups tended to be more accurate with canonical feminine nouns ending in -*a* (*M* = 94.4%, *SD* = 9.6) than non-canonical masculine ones (*M* = 82.5%, *SD* = 14.4). This seems to suggest that -*a* is a very strong cue for feminine in Spanish, so accepting masculine -*a* nouns as feminine is more of an overgeneralisation rather than a default. In other words, it is a case of not learning or being sensitive to exceptions, rather than evidence against a general masculine as default strategy in these groups. As far as nouns ending in -*e* were concerned, intermediate and advanced English-Spanish HSs produced similar accuracy means, while low-proficient English-Spanish HSs exhibited a higher level of accuracy with masculine nouns ending in -*e* (*M* = 71.3%, *SD* = 19.6) than feminine ones (*M* = 63%, *SD* = 17.7). The high accuracy with masculine nouns ending in -*e* can be regarded as evidence in favour of masculine as default. Appendix 8.2 contains more details. A series of paired-samples t-tests were carried out to see if the English-Spanish HS groups differ in their accuracy on feminine and masculine gender. The results of the paired-samples t-test only revealed a significant difference for advanced English-Spanish HSs [t (20) = –3.29, *p* = .004], suggesting higher levels of accuracy on feminine than masculine gender.

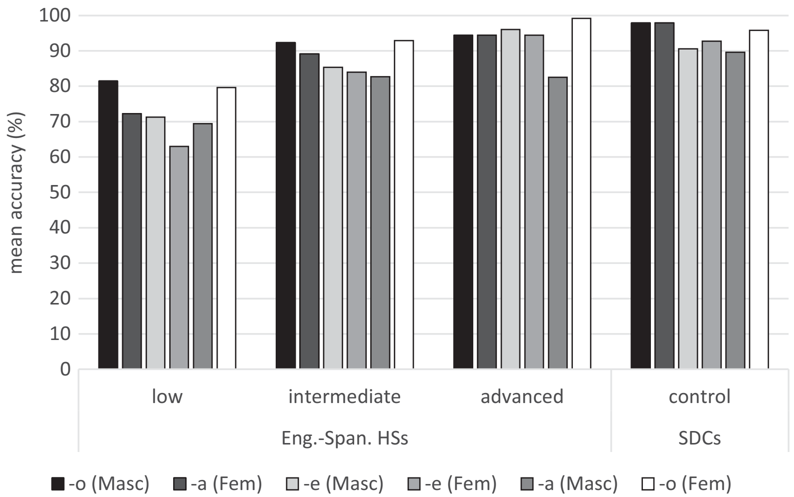

Figure 5.17: Eng.-Span. HSs' mean accuracy by noun gender and ending across proficiency levels.

Experimental groups with the language combination German-Spanish

German-Spanish L2 learners

Figure 5.18 shows the distribution of accuracy across the two agreement domains D + N and N + Adj for the German-Spanish L2 groups. Across all proficiency levels, German-Spanish L2 learners appeared to be slightly more accurate at gender agreement than assignment. A series of paired-samples t-tests were carried out to see if the German-Spanish L2 groups differ in their accuracy across the agreement domains. The results of the paired-samples t-test did not reveal a statistically significant difference for the low-proficiency [t (18) = −2.08, $p > .05$], intermediate [t (19) = −1.19, $p > .05$] and advanced German-Spanish L2 group [t (20) = −1.82, $p > .05$].

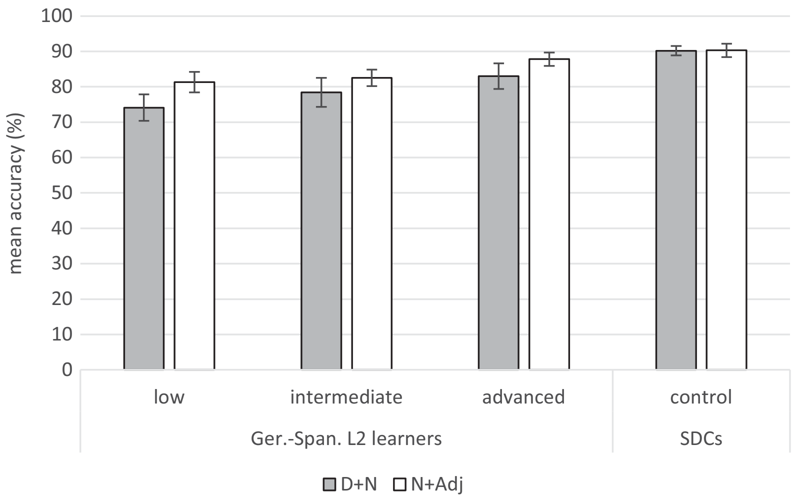

Figure 5.18: Ger.-Span. L2 learners' mean accuracy and standard error by agreement domain and proficiency level.

The distribution of accuracy across the noun ending and gender was determined for each German-Spanish L2 group as illustrated in Figure 5.19. The results indicated that German-Spanish L2 groups obtained the highest level of accuracy with canonical nouns ending in -*o* and -*a* as well as feminine nouns ending in -*e*, which suggest an incidence of L1 transfer. While advanced German-Spanish L2 learners showed similar accuracy means for feminine nouns ending in -*o* as well as masculine nouns ending in -*a* and -*e*, intermediate and low-proficient German-Spanish L2 learners behaved differently. Intermediate German Spanish L2 learners differed minimally in their accuracy rates with feminine nouns ending in -*a* and masculine nouns in -*e*, however, they seemed to struggle tremendously with feminine nouns ending in -*o* compared to the other German-Spanish L2 learners. For the low-proficient German-Spanish L2 learners, the results showed that the accuracy for masculine nouns ending in -*e* is surprisingly high (81.6%) compared to the other L2 groups. It is likely that the lower proficiency learners used masculine as default more often than the other groups. The lowest accuracy rates were supplied with exceptional nouns ending in -*a* or -*o*, however, the accuracy ranges between 71.9% and 74.6% and can be considered as roughly comparable (see Appendix 8.3 for a detailed overview of the results). Paired-samples t-tests were calculated to detect differences in the accuracy rates on feminine and masculine gender. For all German-Spanish L2 groups, no statistically significant differences were found ($p > .05$).

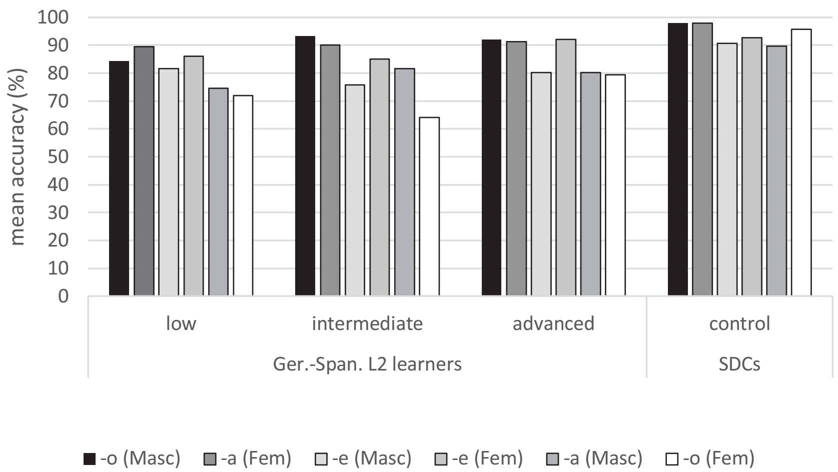

Figure 5.19: Ger.-Span. L2 learners' mean accuracy by noun gender and ending across proficiency levels.

German-Spanish HSs

The accuracy rates for each agreement domain are presented in Figure 5.20 and reveal that all German-Spanish HSs at each proficiency level produced nearly comparable accuracy rates. The intermediate and advanced German-Spanish HSs were slightly more accurate at producing gender agreement than assignment, while the reverse pattern can be detected for the low-proficient German-Spanish HSs. A series of paired-samples t-tests were carried out to see if the German-Spanish HS groups differed in their accuracy across the agreement domains. The results of the paired-samples t-test did not reveal a statistically significant difference for the low-proficiency [t (15) = 2.08, $p > .05$], intermediate [t (19) = –1.04, $p > .05$] and advanced German-Spanish L2 group [t (19) = 2.60, $p > .05$].

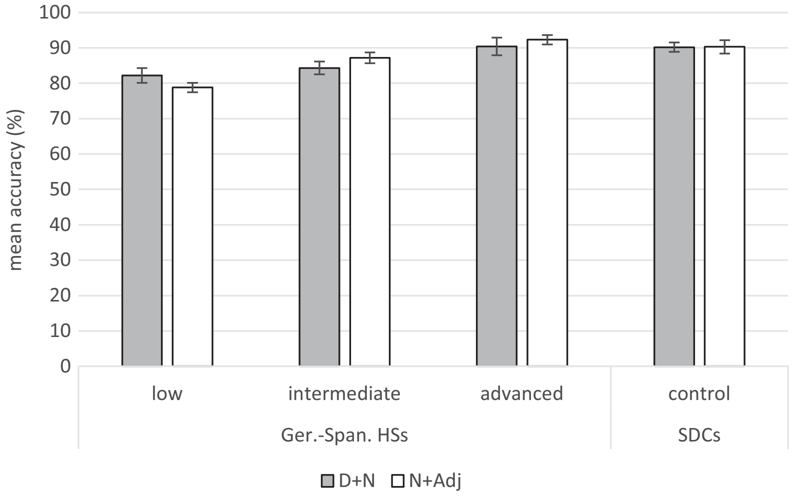

Figure 5.20: Ger.-Span. HSs' mean accuracy and standard error by agreement domain and proficiency level.

The results in Figure 5.21 present the distribution of mean accuracy for each noun ending and gender for the German-Spanish HSs across all proficiency levels. For the low-proficient and intermediate German-Spanish HSs, there were clear differences in the accuracy rates across the noun endings and genders. Low-proficient German-Spanish HSs produced the highest accuracy means with canonical nouns ending in *-o* and *-a*, followed by feminine nouns ending in *-o* (83.3%). The mean accuracy rates for all other noun endings and genders remained astonishingly constant (79.2%). By contrast, intermediate German-Spanish HSs supplied the highest accuracy rate with masculine nouns ending in *-o* (100%). This is followed by feminine nouns ending in *-o* and *-e* as well as masculine nouns ending in *-e* (accuracy ranging between 86.7% and 93.3%). The lowest performance is displayed on masculine nouns ending in *-a* (70%). In contrast to the low-proficient and intermediate German-Spanish HSs, the advanced German-Spanish HSs exhibited comparable accuracy rates ranging from 95%–100% for all noun endings, except for feminine nouns ending in *-o*, where they only reached an accuracy of 90.8% (see Appendix 8.4 for further details). A set of paired-samples t-tests was conducted for accuracy on feminine and masculine gender, indicating a statistically significant difference for the intermediate German-Spanish HSs ($p < .05$). They were significantly more accurate on items with feminine than masculine gender ($p < .01$).

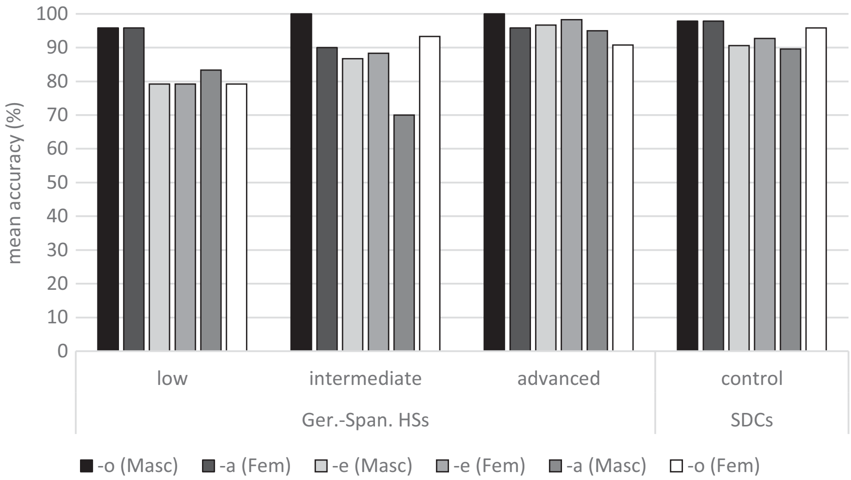

Figure 5.21: Ger.-Span. HSs' mean accuracy by noun gender and ending across proficiency levels.

5.5.3.1 Gender congruency effects

This section aims to examine whether there are any congruency effects on early and late German-Spanish bilinguals' accuracy rates in the GJT. Table 5.20 presents the distributions of accuracy for both congruency conditions (gender congruent vs. gender incongruent) and gender (masculine vs. feminine) across all proficiency levels.

A closer look at the groups' distributions of accuracy across the linguistic variables as presented in Table 5.20 reveals that in each of the low-proficient and advanced HS and L2 subgroups the accuracy did not vary across the gender values in the gender congruent conditions. In other words, each proficiency group supplied comparable accuracy rates on masculine and feminine gender equivalent nouns in German and Spanish. When the gender of the L2 noun did not match the gender of its L1 translation equivalent, each group, except for the intermediate HS group, is less accurate on feminine than on masculine nouns. Based on the results depicted in Table 5.20, one can see that the German-Spanish HS groups were more accurate than the proficiency-matched German-Spanish L2 groups. There was one striking exception. Intermediate German-Spanish L2 learners were considerably more accurate on masculine nouns in gender congruent conditions (93.8%) than German-Spanish intermediate HSs (85%). A possible explanation for the low accuracy rate might be that intermediate HSs are more susceptible to variability caused by exposure to and influence from Spanish varieties in Latin America. That is, the intermediate HSs in this study may have adopted the gender according to Latin American region, e.g. *pijama* '*pajamas*', which is feminine in most of Latin America but masculine in Spain. These results could also be accounted for in terms of a much stronger masculine as default effect with L2 learners than HSs.[66] The intermediate HSs were not more accurate with masculine than feminine congruent nouns, while the intermediate L2 learners clearly were.

Table 5.20: Overall accuracy in gender congruent and incongruent conditions by group and proficiency level.

Groups		***N***	**Overall accuracy**							
			Gender congruent				**Gender incongruent**			
			Masc		**Fem**		**Masc**		**Fem**	
			M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
German-Spanish HSs	Low	16	93.8%	11.2	95%	8.9	95%	9	75%	12.9
	Intermediate	20	85%	12.6	90%	13.8	88%	13.6	87.5%	12.8
	Advanced	20	97.5%	7.7	96%	13.9	98%	9	93.8%	13.8
German-Spanish L2 learners	Low	21	85.5%	25.4	84.2%	14.3	80%	20	69.7%	24.4
	Intermediate	20	93.8%	11.1	86%	20.6	83%	16.3	77.5%	24.2
	Advanced	19	91.7%	14.4	91.4%	16.2	85.7%	14.3	82.1%	25.2
Total		**116**	**91.2%**	**15.2**	**90.3%**	**15.5**	**88.1%**	**15.4**	**81.3%**	**21.1**

A three-way repeated-measures ANOVA with 2× (congruency condition), 2× (gender) and 6× (group) factorial design was conducted. The repeated-measures ANOVA found a significant main effect of congruency [F (1, 110) = 27.71, $p < .001$, *partial* $\eta^2 = .20$] and of gender [F (1, 110) = 8.24, $p < .01$, *partial* $\eta^2 = .07$], showing that the groups were overall more accurate on congruent conditions than incongruent ones as well as on masculine nouns (the default form), than on feminine nouns. Furthermore, there was a significant interaction between congruency and

66 Unfortunately it is difficult to distinguish between these two accounts in the current data set, given that the stimuli were not a priori controlled for gender variation in across varieties of Spanish.

group [F (5, 110) = 2.64, $p < .05$, *partial* $\eta^2 = .107$], indicating that German speaking L2 learners produced lower accuracy rates in incongruent conditions than German-Spanish HSs [F (1, 110) = 7.98, $p < .01$, *partial* $\eta^2 = .069$]. In addition, there was a congruency × gender interaction [F (1, 110) = 6.98, $p < .01$, *partial* $\eta^2 = .066$]. Further analyses showed that the accuracy rates with masculine nouns in congruent conditions were higher than with feminine nouns in incongruent conditions [F (1, 110) = 7.23, $p < .01$, *partial* $\eta^2 = .048$].

The next step was to reveal if there are any potential CLI effects from German affecting participants' accuracy rates across the two congruency conditions and gender values in the GJT (see also Appendix 8.5 for CLI effects on nouns with only non-canonical ending in -*e*). The groups' mean accuracy rates across the two linguistic variables (i.e. congruency conditions and gender values) are presented in Figure 5.22.

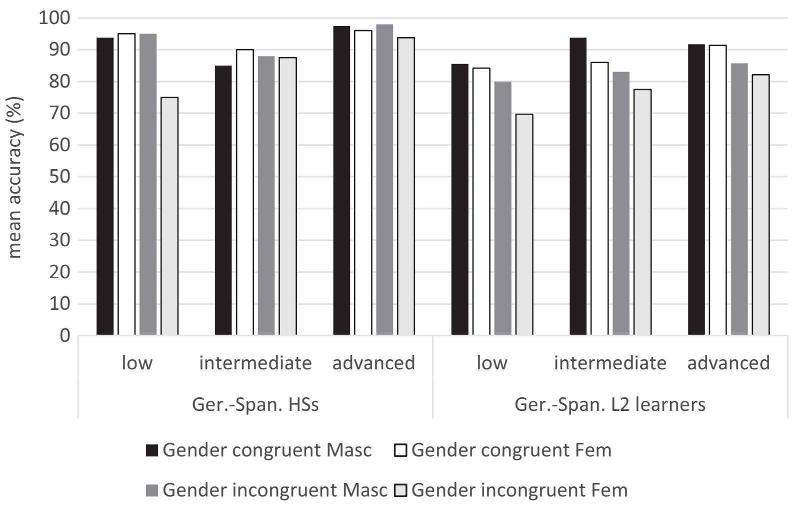

Figure 5.22: German-Spanish bilinguals' accuracy means by congruency condition and gender.

A repeated-measures ANOVA with 2× (congruency condition), 2× (gender) and 6× (group) factorial design was carried out. To reiterate for the statistical analysis as in the FCST, only those nouns overlapping in their phonological ending in German and Spanish were included. The ANOVA revealed a main effect of congruency [F (1, 110) = 5.79, $p < .05$, *partial* $\eta^2 = .05$]. Statistical analyses pointed to the following significant interactions: congruency × group [F (1, 5) = 4.17, $p < .01$, *partial* $\eta^2 = .16$], gender × group [F (1, 5) = 4.81, $p < .01$, *partial* $\eta^2 = .18$], congruency × gender [F (1, 110) = 80.73, $p < .001$, *partial* $\eta^2 = .42$] and congruency × gender × group [F (1, 5) = 2.40, $p < .05$, *partial* $\eta^2 = .1$].

Despite the numerous interactions, further analyses were conducted to examine the congruency × gender × group interaction more closely as it relates to the third research question (RQ#3) of the present study. There was no statistically significant interaction with the advanced-proficient German-Spanish HS group. The other groups were more accurate on feminine than on masculine nouns in gender congruent conditions ($p < .01$) whereas in gender incongruent conditions participants were less accurate on feminine than on masculine nouns ($p < .01$). In other words, participants were more accurate on masculine than on feminine nouns in gender incongruent conditions. Overall, the results reveal that L1 effects are at play. In gender congruent conditions, all groups showed considerable accuracy. The accuracy rates on feminine nouns for the L2 group were lower than those of the HS group which can be attributed to overgeneralizations of phonological cues. In gender incongruent conditions, the lower accuracy rates for low-proficient HS and all L2 proficiency groups may result from negative transfer from German and/or the incorrect (re)assembly of gender features in the L2 /HL.

5.6 Oral Elicitation Picture Task (OEPT)

While the aforementioned experimental tasks tested early and late bilinguals' knowledge of gender in the written modality, the aim of the Oral Elicitation Picture Task (OEPT) was to assess the performance of producing orally gender assignment and agreement in the NP. Previous studies have found that the modality of experimental tasks (i.e. written vs. oral) has an effect on subjects' task performance. Unlike early bilinguals, late bilinguals tended to obtain lower accuracy scores in oral than written tasks (see section 4.2.2). This task was designed to examine the potential effect of modality on participants' task performance as addressed in the fourth research question (RQ#4). Furthermore, this experimental task also attempts to answer the research question (RQ#3) which investigates whether early and late bilinguals respond differently to nouns with transparent and non-transparent gender marking as well as masculine and feminine gender.

The task was modeled after Montrul et al.'s (2008) Oral Picture Description Task (OPDT), which has also been replicated by Alarcón (2011) and Grüter et al. (2012). For the present study, the task as well as the experimental conditions were substantially modified. Similar to Montrul et al.'s (2008) OPDT, the experimental task in this study included test items (i.e. nouns) showing dialectal variation for gender (*el radio* 'the radio' (Latin) American Spanish[67] vs. *la radio* 'the radio' Peninsular Spanish) but excluded test items which were animate to avoid any interference from natural gender (e.g. *modelo* 'model' or *rata* 'rat').

5.6.1 Task design

The task consisted of 30 linguistic trials, 18 of which were experimental items and 12 distractors. For each trial, two pictures of objects were created which differ in at least one dimension, for instance, size, color or nationality. It is important to note that only those adjectives were used that are marked for gender. The experimental items were selected according to their gender and morphological ending. The experimental nouns were evenly distributed among the two gender values (masculine vs. feminine) as well as the noun endings. In other words, nine of the experimental nouns were masculine and the other nine experimental nouns were feminine. Within each gender, three nouns had canonical gender endings, while the remaining nouns had either non-canonical gender endings (e.g. *puente* 'bridge') or exceptional endings (e.g. *mano* 'hand'). All trials were randomized to minimize any carry-over effects from previous sessions and interactions with other participants.

The task was administered as a PowerPoint presentation on a laptop computer. The participants were tested individually. The experimental task began when the participants had successfully read and understood the short description of the task appearing on the first slide of the PowerPoint presentation prior to its implementation. The participants were instructed to look at the two pictures depicting the item which differs in size or color. Then, they were requested to answer the stimulus question *¿Qué te gusta más?* ('What do you like more?'), using the carrier sentence *Me gusta más* ('I like … better') *determiner + noun + adjective*. Both the stimulus question and the carrier sentence appeared in written form in each trial on every PowerPoint slide.

When the participants produced adjectives with a non-overt gender ending (e.g. *interesante* 'interesting') or a prepositional phrase (e.g. *a la derecha* 'to the right'), they were asked the aforementioned stimulus question again or prompted with either *¿Qué más me puedes decir?* ('What else can you tell me?') or *Dame otra característica del objeto que ves*. ('Give me another characteristic of the object you see.') by the researcher until the target item and size or color adjective

67 In Mexico, Central America, the Antilles, Ecuador, Columbia and Venezuela the masculine gender is used instead of the feminine one in order to refer to the radio. Retrieved from RAE *Diccionario panhispánico de dudas ©2005* http://lema.rae.es/dpd/srv/search?key=radio (28.8.2018.)

was provided (for a similar procedure see Alarcón 2011: 340). In some cases, participants also produced answers consisting of a null nominal such as *el rojo* 'the$_{\text{Masc}}$ red$_{\text{Masc}}$ one'. These answers were accepted because the two pictures on each slide showed only the target item contrasting in size/color adjective and not gender. In other words, the participants may produce gender assignment and agreement including a null nominal, for example, when selecting the masculine definite article and the color adjective *rojo* 'red$_{\text{Masc}}$' for the picture of the object *el libro* 'the$_{\text{Masc}}$ book', whose gender is masculine. The participants' oral responses were untimed and audio-recorded and later transcribed and coded for correct or incorrect gender marking on the determiner (gender assignment) and on the adjective (gender agreement) for each participant. In other words, there were two possible points for each item, one for assignment, and one for agreement.

Table 5.21 summarizes the possible response types obtained from this task. Due to a technical failure in the recording of the test item *el chocolate* 'the$_{\text{Masc}}$ chocolate' in some participants' obtained audio files, the test item was withdrawn from the analysis of all participants. The task lasted 5 to 10 minutes.

Table 5.21: Possible response types in OEPT (adapted from Grüter et al. 2012).

	D-N match	**D-N mismatch**
N-Adj match	*Target* el$_{\text{Masc}}$ libro$_{\text{Masc}}$ rojo$_{\text{Masc}}$	*Assignment error* *la$_{\text{Fem}}$ libro$_{\text{Masc}}$ rojo$_{\text{Masc}}$
N-Adj mismatch	*Agreement error* *el$_{\text{Masc}}$ libro$_{\text{Masc}}$ roja$_{\text{Fem}}$	*Assignment and agreement error* *la$_{\text{Fem}}$ libro$_{\text{Masc}}$ roja$_{\text{Fem}}$

5.6.2 Data analysis

Overall, the interviews made up a total of 22 recording hours, yielding 8738 analyzable tokens (e.g. determiners, adjectives). Each audio-recorded interview was transcribed and checked at least once by one out of two Spanish native speakers, working as student assistants in the project. The transcriptions were transcribed following the conventions used by Schmitz, Di Venanzio and Scherger (2016). In each transcript, intonations, repetitions, hesitations and breaking ups of utterances have been encoded. Table 5.22 provides an overview of the data which are analyzed for the purpose of the study.

Following Patton's content analysis (1990), the researcher identified all patterns (i.e. determiners, adjectives) marked for gender, coded and categorized them according to the the coding scheme (i.e. dependent vs. independent variables).

Table 5.22: Overview of tokens by group and task.[68]

	OEPT
English-Spanish HSs	2210
English-Spanish L2 learners	2040
German-Spanish HSs	1904
German-Spanish L2 learners	2040
Control group	544
Total	8738

5.6.3 Results of extralinguistic factors

An initial MANOVA was carried out on the overall accuracy rate as the dependent variable and three independent variables AoO of bilingualism (i.e. early vs. late bilingual), language combination and proficiency level. The analysis revealed a significant effect of AoO of bilingualism [F (3, 241) = 33.97, $p < .001$, Wilk's $\Lambda = .70$, *partial* $\eta^2 = .30$], language combination [F (3, 241) = 6.79, $p < .001$, Wilk's $\Lambda = .92$, *partial* $\eta^2 = .08$]; and proficiency level [F (6, 482) = 7.98, $p < .001$, Wilk's $\Lambda = .83$, *partial* $\eta^2 = .09$]. The MANOVA comparisons also showed a two-way interaction between language combination × proficiency level [F (6, 482) = 3.35, $p = .003$, Wilk's $\Lambda = .92$, *partial* $\eta^2 = .04$] and a three-way interaction between language combination × AoO of bilingualism × proficiency [F (6, 482) = 2.79, Wilk's $\Lambda = .93$, $p = .011$, *partial* $\eta^2 = .03$].

5.6.3.1 Interaction effect of extralinguistic factors

To further examine the interaction between language combination × AoO of bilingualism × proficiency, we will take a closer look at the descriptive and inferential statistics in the sections to follow. For the ease of the reader, we will, thereby, maintain the structure used in the previous sections.

68 The smaller group size for the controls compared to the experimental groups accounts for the large difference in number of tokens.

English-Spanish groups

Table 5.23 presents the descriptive statistics of the OEPT for early and late bilinguals with the language pairing English-Spanish across the three proficiency levels: low, intermediate and advanced.

Table 5.23: Group mean accuracy across conditions and AoO of bilingualism.

Groups		*N*	Overall accuracy	
			M	*SD*
English-Spanish HSs	Low	18	71.7%	13.5
	Intermediate	26	91.9%	8.8
	Advanced	21	98.9%	2.0
English-Spanish L2 learners	Low	21	66.4%	14.4
	Intermediate	20	71.9%	15.0
	Advanced	19	77.1%	14.0
Control group		16	99.8%	0.7

The results for the English-Spanish HSs showed that the accuracy rates slightly differed by approximately 8% at the intermediate and advanced proficiency level and then drastically declined at the lowest proficiency level. A closer look at the English-Spanish HS groups across the different proficiency levels showed that intermediate and advanced English-Spanish HSs exhibited accuracy rates above 90%. Interestingly, advanced English-Spanish HSs ($M_{advanced\ Eng.\text{-}Span.\ HSs} = 98\%$, $SD = 2$) produced a similar mean accuracy as controls ($M_{control\ group} = 99.8\%$, $SD = .7$), whereas intermediate English-Spanish HSs ($M_{intermediate\ Eng.\text{-}Span.\ HSs} = 91.9\%$, $SD = 8.8$) produced a notable lower accuracy rate than controls. Low-proficient English-Spanish HSs' accuracy rate decreased by 20% compared to that of intermediate English-Spanish HSs. In looking at the English-Spanish L2 group, it is noticeable that the accuracy rate ranges between 66–77% across the proficiency levels. The trend for the average accuracy, thus, goes in different directions for the English-Spanish L2 learners and controls. The English-Spanish L2 learners' accuracy rate at the intermediate and advanced as well as intermediate and low proficiency level differed by 5%, respectively.

To find out where the significance is, an independent univariate one-way ANOVAs and post-hoc procedures (Games Howell) were carried out for the overall gender accuracy and each group at the different levels of proficiency.

Results indicated that all English-Spanish L2 groups differed significantly from the control group in their overall accuracy rates [F (3, 31.81) = 73.91, *p* < .001]. Note that the ANOVA with post-hoc tests did not find any statistically significant difference among the English-Spanish L2 group means [F (2, 57) = 2.74, *p* = .73]. This finding lent support to the assumption that the English-Spanish L2 group across the different proficiency levels form a homogenous group. When the English-Spanish HS groups were compared to the control group, the advanced English-Spanish HS group did not differ significantly from the controls, but the intermediate and low proficiency groups differed significantly both from each other and from the advanced and control groups [F (3, 36.92) = 32.60, *p* < .001].

When comparing the accuracy means of English-Spanish L2 learners to English-Spanish HSs, the results showed, in general, that there was an upward trend of accuracy. As proficiency increased, accuracy increased too. Nevertheless, there were some differences within and between the two groups. As can be seen in Figure 5.23, there was a more linear development visible in the English-Spanish L2 group ($M_{low\ L2ers}$ = 66.4%, $M_{intermediate\ L2ers}$ = 71.9% and $M_{advanced\ L2ers}$ = 77.1%) than in their counterpart group. For the English-Spanish HS group, there was a sharp decline in the accuracy from the intermediate to the low-proficient English-Spanish HS group ($M_{intermediate\ HSs}$ = 91.9% and $M_{low\ HSs}$ = 71.7%). Comparisons between English-Spanish early bilinguals and proficiency-matched late bilinguals demonstrated quite high differences in the mean accuracy rates among the groups,

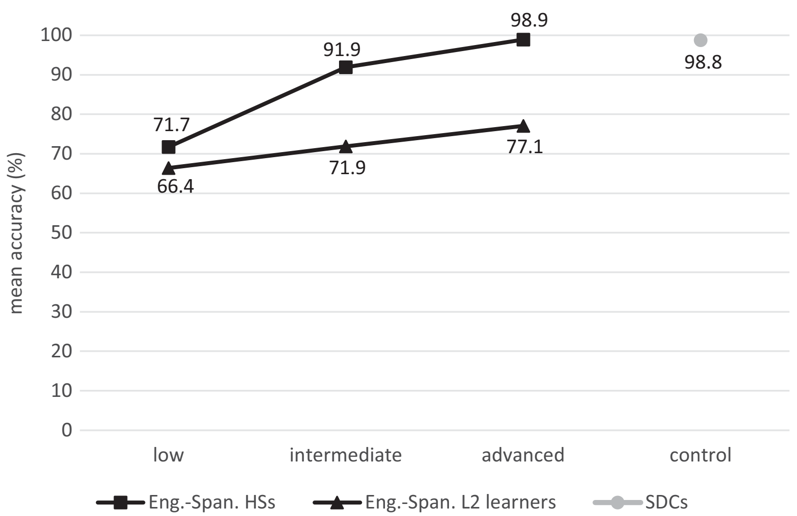

Figure 5.23: Comparison of mean accuracy rates by English-Spanish bilinguals and proficiency level.

including a 20.0–21.8% difference at the intermediate and advanced proficiency levels. The difference in the mean accuracy rates between early and late English-Spanish bilinguals was less pronounced at the lowest proficiency level as the they differ only by 5.3%.

A series of follow-up analyses using independent-samples t-tests were carried out to detect statistically significant differences in the overall gender accuracy means between proficiency-matched early and late bilinguals. All in all, the independent-samples t-tests indicated that there was a statistically significant difference in the mean accuracy rates across advanced-proficient early and late bilinguals [t (18.65) = 6.75, $p < .001$] and intermediate-proficient ones [t (28.79) = 5.29, $p < .001$]. There was no significant difference across low-proficient early and late bilinguals [t (37) = 1.19, $p = .849$].

German-Spanish groups

Table 5.24 presents the distribution of the gender accuracy rates across German-Spanish HSs and German-Spanish L2 learners at each proficiency level.

Table 5.24: Group mean accuracy across conditions and AoO of bilingualism.

Groups		*N*	Overall	
			M	*SD*
German-Spanish HSs	Low	16	93.4%	6.8
	Intermediate	20	97.9%	2.7
	Advanced	20	97.5%	4.5
German-Spanish L2 learners	Low	19	80.8%	14.4
	Intermediate	20	82.2%	16.7
	Advanced	21	86.8%	9.5
Control group		16	99.8%	0.7

In general, the overall accuracy in each group of bilinguals was quite high and differed only slightly across the proficiency levels. As far as German-Spanish HSs are concerned, the accuracy ranged between 93–97% and, thus, lay slightly below the one exhibited by the control group ($M_{control\ group} = 99.8$, $SD = 0.7$). While intermediate and advanced German-Spanish HSs produced a similar accuracy rate ($M_{intermediate\ Ger\text{-}Span.\ HSs} = 97.9\%$, $SD = 2.7$; $M_{advanced\ Ger\text{-}Span.\ HSs} = 97.5\%$, $SD = 4.5$), the low-proficient German-Spanish HSs produced a slightly lower one, decreasing by approximately 4%. Similar to the trend in the accuracy rates for the HSs, accuracy in the German-Spanish L2 group across all proficiency levels was relatively stable and only ranged from 80.8% to 86.8%. Clearly, their accuracy rate was below the one exhibited by the control group, which performed at ceiling. As far as the differences in the accuracy rates within each proficiency level of the German-Spanish L2 learners were concerned, we see that the accuracy from advanced to the intermediate proficiency level declines by 4%. By contrast, the differences in the accuracy rates from the intermediate to the low proficiency level of the German-Spanish L2 learners only made up 2%.

A series of one-way ANOVAs and post-hoc procedures (Games Howell) were computed for the overall gender accuracy and each experimental group across all levels of proficiency. The ANOVA found that all German-Spanish L2 groups differed significantly from the control group in their overall accuracy rates [$F\ (3, 31.88) = 29.80$, $p < .001$]. There was no statistically significant difference in the accuracy means among all German-Spanish L2 learners [$F\ (2, 57) = 1.06$, $p = .353$]. The results of the ANOVA for the German-Spanish HS groups revealed that only low-profiency German-Spanish HSs differed significantly from all the other German-Spanish HS groups and the control group in their overall accuracy rates [$F\ (3, 31.19) = 8.51$, $p < .01$].

Figure 5.24 shows the overall results of the mean accuracy rates obtained from the German-Spanish L2 learners and HSs at each proficiency level.

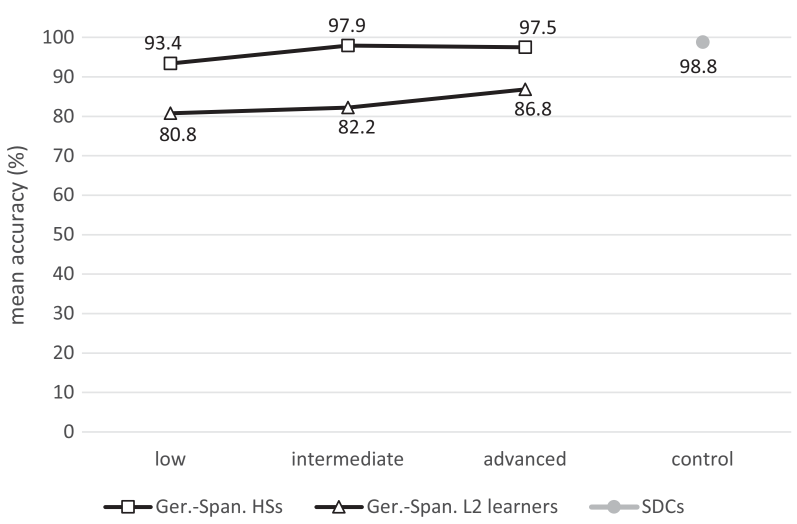

Figure 5.24: Comparison of mean accuracy rates by German-Spanish bilinguals and proficiency level.

German-Spanish HSs across all proficiency levels performed better than their counterpart group, that is, the German-Spanish L2 group. The differences in the gender accuracy means between the proficiency-matched pairs ranged from 10.7% to 15.7%. Advanced German-Spanish HSs exhibited a 97.5% accuracy rate, whereas advanced German-Spanish L2 learners only reached an 86.8% accuracy rate, showing a 10.7% difference in means. Comparing intermediate HSs ($M_{intermediate\ HSs}$ = 97.9%) to intermediate German-Spanish L2 learners ($M_{intermediate\ L2ers}$ = 82.2%), the difference in the means made up 15.7%. For the low-proficient German-Spanish HSs and L2 learners the differences in the means did not further increase. There was only a difference in the means of 12.6% for the low-proficient groups.

The aforementioned differences were further pursued by using independent-samples t-tests. The results indicate that there was a statistically significant difference in the means for the pairwise comparison between advanced-proficient [t (28.84) = 4.62, $p < .001$], intermediate-proficient [t (20) = 4.16, $p < .001$] and low-proficient German-Spanish L2 learners and HSs [t (26.44) = 3.39, $p < .01$]. These results suggest that German-Spanish HSs behaved differently from German-Spanish L2 learners. In short, German-Spanish HSs outperformed German-Spanish L2 learners, when matched for proficiency.

L2 learners: English-Spanish vs. German-Spanish

Figure 5.25 visualizes the results for each proficiency level and language pair.

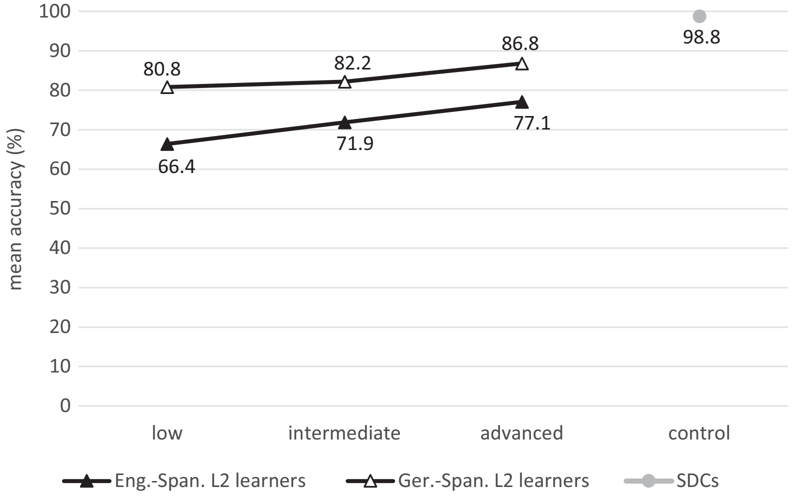

Figure 5.25: Comparison of mean accuracy rates by late German-Spanish and English-Spanish bilinguals and proficiency level.

As can be seen in Figure 5.25, there was a striking difference in the mean accuracy rates across the language combinations. The performance of the German-Spanish L2 groups across all proficiency levels was better than that of the English-Spanish L2 groups. Furthermore, the difference in the mean accuracy rates between the L2 groups increased as proficiency decreased. The difference between the L2 groups at the advanced proficiency level was at 9.7%. The difference in the means at the intermediate proficiency level added up to 10.3% and at the low proficiency level to 14.4%. These differences were further analyzed statistically by using a series of independent t-tests between the two groups matched for proficiency. The results confirmed that the previously observed differences between the proficiency-matched groups across language combinations are significant: the advanced German-Spanish L2 learners performed better than the advanced English-Spanish L2 learners [$t\ (31.34) = 2.55$, $p < .05$], the intermediate German-Spanish L2 learners performed better than the intermediate English-Spanish L2 learners [$t\ (38) = 2.05$, $p < .05$], and the low-proficiency German-Spanish L2 learners outperformed the low-proficiency English-Spanish L2 learners [$t\ (38) = 3.16$, $p < .01$]. The differences between the groups were strongest at the lowest proficiency level ($p < .01$) compared to the higher ones ($p < .05$).

HSs: English-Spanish vs. German-Spanish

The mean accuracy rates achieved by the English-Spanish and German-Spanish HS groups across all proficiency levels are given in Figure 5.26.

When comparing German-Spanish HSs to proficiency-matched English-Spanish HSs, it was noticeable that both groups of HSs across all proficiency levels, except for the low-proficient English-Spanish HSs, exhibited a high rate of accuracy. In general, the German-Spanish HSs' performance on gender remained nearly constant across the proficiency levels, whereas the performance of English-Spanish HSs decreased with decreasing proficiency. Looking at the differences in the mean accuracies across the language combinations, we can see that the advanced German-Spanish and English-Spanish HSs produced a very similar accuracy rate (1.4% difference). The difference in the mean accuracy between intermediate German-Spanish and English-Spanish HSs was also low as it differed by 6.0%. The performance of the low-proficient German-Spanish and English-Spanish HSs, by contrast, strikingly differed from one another. The low-proficient German-Spanish HSs supplied an accuracy rate of 93.4%, whereas low-proficient English-Spanish HSs displayed the lowest accuracy rate, that is, 71.7%.

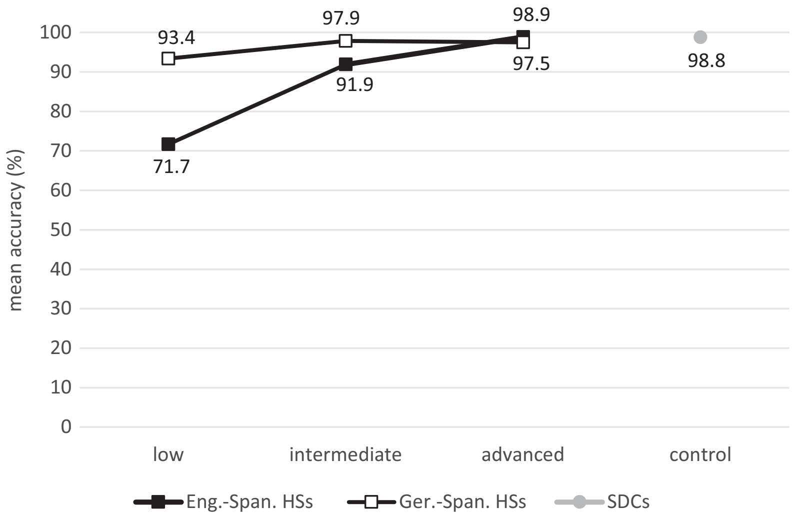

Figure 5.26: Comparison of mean accuracy rates by early German-Spanish and English-Spanish bilinguals and proficiency level.

To investigate whether the aforementioned observations were reliable, a series of independent t-tests have been run. The results revealed that there was no significant difference in the accuracy means between advanced English-Spanish and German-Spanish HSs [t (25.73) = –1.38, $p = .21$]. The results for the pairwise comparison of both groups at the intermediate [t (30.98) = 3.33, $p < .01$] and low proficiency level [t (25.65) = 6.02, $p < .001$] indicated significant differences in the accuracy means.

5.6.3.2 Effect of the amount of language use

Pearson correlation coefficients between the amount of Spanish language use and overall gender accuracy are presented in Table 5.25. A strong negative correlation between the two variables was noticeable within the German-Spanish HS group at the intermediate proficiency level [r = –.701, n = 20, $p < .001$], meaning that as the amount of Spanish language use increases, the accuracy tends to decrease. We can detect a strong positive correlation within the English-Spanish HS group at the advanced proficiency level [r = .549, n = 21, $p < .01$], suggesting that when the amount of Spanish language use increases, the accuracy tends to increase as well. For all other experimental groups, there was no significant correlation between the amount of Spanish language use and overall gender accuracy.

Table 5.25: OEPT-Effect of language use.

Groups			*N*	Pearson's r
English-Spanish	L2 learners	Low	21	.304
		Intermediate	20	−.158
		Advanced	19	.367
	HSs	Low	18	.232
		Intermediate	26	.074
		Advanced	21	.549**
German-Spanish	L2 learners	Low	19	.135
		Intermediate	20	−.165
		Advanced	21	.325
	HSs	Low	16	.124
		Intermediate	20	−.701***
		Advanced	20	−.055

*$p < .05$, **$p < .01$, ***$p < .001$.

5.6.4 Results of linguistic factors

The previous sections have looked at possible effects of extralinguistic factors on the participants' accuracy. Within this section, we investigate which role linguistic factors play. To answer this question, a four-way repeated-measures ANOVA with a 2 (agreement domain) ×3 (noun ending) ×2 (noun gender) ×13 (group) factorial design has been carried out. The results revealed a significant main effect of the agreement domain [F (1, 243) = 42.47, $p < .001$, *partial* $\eta^2 = .15$], noun ending [F (1.9, 464.71) = 151.53, $p < .001$, *partial* $\eta^2 = .38$], noun gender [F (1, 243) = 59.98, $p < .001$, *partial* $\eta^2 = .20$] and the following two significant interactions: agreement domain × noun ending [F (1.9, 438.73) = 5.12, $p < .01$, *partial* $\eta^2 = .02$] and noun ending and gender [F (1.8, 438.73) = 95.81, $p < .001$, *partial* $\eta^2 = .28$].

Experimental groups with the language combination English-Spanish

English-Spanish L2 learners

As shown in Figure 5.27, English-Spanish L2 learners across all proficiency levels did not behave in a control-like fashion in terms of the gender accuracy in the two agreement domains (accuracy below 99%). They tended to be slightly less accurate on the N + Adj domain ($M_{low\ English\text{-}Spanish\ L2ers}$ = 63.6%, *SD* = 14.5; $M_{intermediate\ English\text{-}Spanish\ L2ers}$ = 68.5%, *SD* = 16.8; $M_{advanced\ English\text{-}Spanish\ L2ers}$ = 74%, *SD* = 15.97) than D + N domain ($M_{low\ English\text{-}Spanish\ L2ers}$ = 69.2%, *SD* = 15.8; $M_{intermediate\ English\text{-}Spanish\ L2ers}$ = 75.3%, *SD* = 14.1; $M_{advanced\ English\text{-}Spanish\ L2ers}$ = 80.2%, *SD* = 12.6). Several paired-sample t-tests were applied to statistically compare the L2 group's scores across the two agreement conditions. The difference in the scores across the two domains was significant for the low-proficiency [t (20) = 2.68, $p < .05$], intermediate [t (19) = 3.93, $p < .01$] and advanced English-Spanish L2 group [t (18) = 9.53, $p < .01$]. The results revealed that all L2 groups were more accurate on gender assignment than agreement in the OEPT.

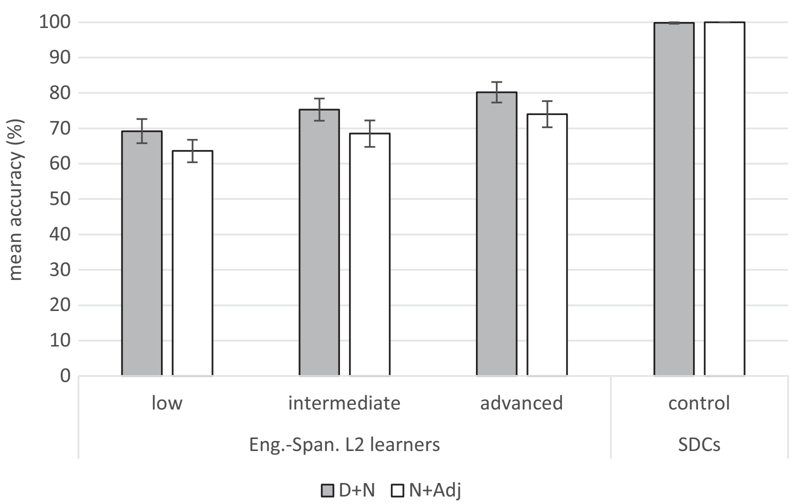

Figure 5.27: Eng.-Span. L2 learners' mean accuracy and standard error by agreement domain and proficiency level.

A closer look at the noun gender and noun endings separately (see Figure 5.28) shows that the accuracy of the three groups of English-Spanish L2 learners differed across the noun endings. All English-Spanish L2 learners exhibited the highest level of accuracy with canonical nouns (accuracy ranging from 84.9% to 99.1%) and the lowest accuracy with exceptional nouns (accuracy ranging from 46.7% to 70.2%) followed by non-canonical nouns (accuracy ranging from 62.5% to 75.8%). The English-Spanish L2 learners' accuracy with different noun endings increased with proficiency, except for feminine nouns ending in *-e*. For a detailed overview of the results, see Appendix 9.1.

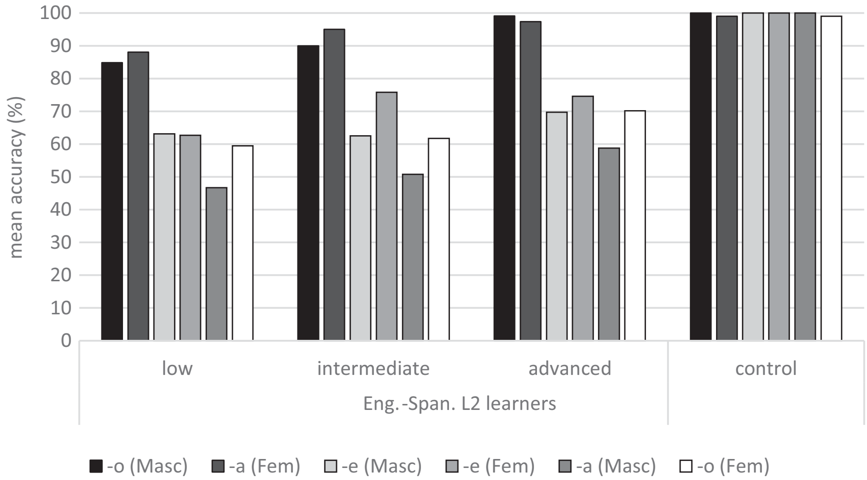

Figure 5.28: Eng.-Span. L2 learners' mean accuracy by noun gender and ending across proficiency levels.

English-Spanish HSs

Comparing the mean accuracy for gender assignment and agreement (Figure 5.29), there were slight differences for English-Spanish HSs across all proficiency levels. They performed more accurately on gender assignment ($M_{low\ English\text{-}Spanish\ HSs}$ = 75.2%, SD = 14.1; $M_{intermediate\ English\text{-}Spanish\ HSs}$ = 94.3%, SD = 7.3; $M_{advanced\ English\text{-}Spanish\ HSs}$ = 99.7%, SD = 1.3) than agreement ($M_{low\ English\text{-}Spanish\ HSs}$ = 68.3%, SD = 15; $M_{intermediate\ English\text{-}Spanish\ HSs}$ = 89.37, SD = 11.4; $M_{advanced\ English\text{-}Spanish\ HSs}$ = 98.04, SD = 3.4). A series of paired sample t-tests comparing the scores obtained in the two agreement conditions showed that there was no significant difference in the scores for the low-proficiency English-Spanish HSs [$t(17) = 2.67$, $p > .05$]. However, there was a significant difference in the scores across both conditions for intermediate [$t(25) = 3.85$, $p < .01$] and advanced English-Spanish HSs [$t(20) = 2.34$, $p < .05$].

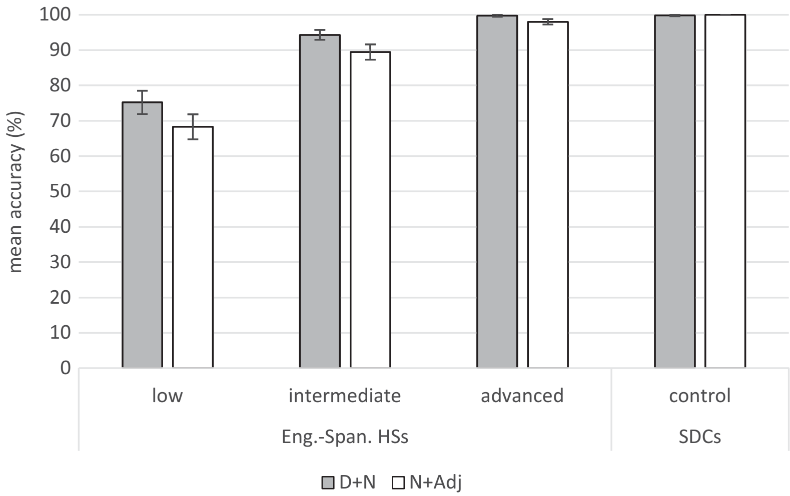

Figure 5.29: Eng.-Span. HSs' mean accuracy and standard error by agreement domain and proficiency level.

Figure 5.30 shows the English-Spanish HSs' mean accuracy distributed across the noun endings and the two gender values revealing differences in the accuracy across the noun endings and gender values between advanced and intermediate English-Spanish HSs, on the one hand, and low-proficient English-Spanish HSs, on the other hand. In the advanced English-Spanish HS group, there were only minimal differences among the noun endings (accuracy ranging from 97.6% to 100%), whereas in the intermediate English-Spanish HS group we observe the highest levels of accuracy with canonical nouns (98.1% for masculine nouns ending in -*o* and 96.2% for feminine nouns ending in -*a*) and the lowest with masculine nouns ending in -*a* (84.6%). The differences in the accuracy means across the noun endings become more pronounced in the low-proficient English-Spanish HS group. Low-proficient English-Spanish HSs were more successful with canonical nouns. In fact, they exhibited a slightly higher level of accuracy with feminine than masculine canonical nouns. For feminine nouns ending in -*o* and masculine nouns ending in -*e*, low-proficient English-Spanish HSs produce almost similar mean accuracy rates (73.1% and 70.8%). The results show that the accuracy rate was most vulnerable in low-proficient English-Spanish HSs with masculine nouns ending in -*a* (51.9%) and feminine nouns ending in -*e* (59.3%). Appendix 9.2 contains more details regarding the accuracy rate and noun endings.

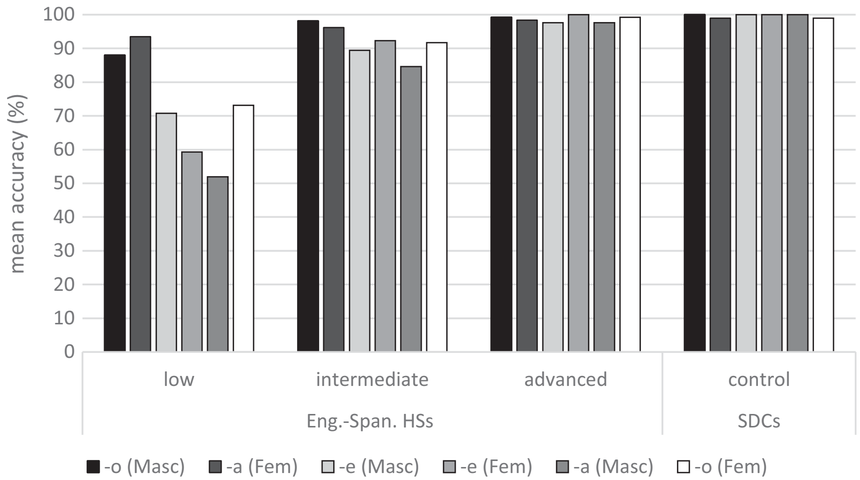

Figure 5.30: Eng.-Span. HSs' mean accuracy by noun gender and ending across proficiency levels.

Experimental groups with the language combination German-Spanish

German-Spanish L2 learners

Data on German-Spanish L2 learners' accuracy with respect to the two agreement domains are provided in Figure 5.31 and for a detailed overview see Appendix 9.3. The German-Spanish L2 groups at all proficiency levels clearly behaved non-control-like in their performance in terms of gender assignment and agreement. The advanced German-Spanish L2 learners produced virtually similar accuracy rates for both domains ($M_{advanced\ German\text{-}Spanish\ L2ers}$ = 87.7%, SD = 8.9 for the D + N domain and $M_{advanced\ German\text{-}Spanish\ L2ers}$ = 86%, SD = 10.3 for the N + Adj domain), whereas intermediate German-Spanish L2 learners exhibited a slightly higher level of accuracy on gender assignment ($M_{intermediate\ German\text{-}Spanish\ L2ers}$ = 84.1%, SD = 16.4) than agreement ($M_{intermediate\ German\text{-}Spanish\ L2ers}$ = 80.3%, SD = 16.2). We can observe a similar pattern in low-proficient German-Spanish L2 learners. They were less accurate on gender agreement ($M_{low\ German\text{-}Spanish\ L2ers}$ = 77.1%, SD = 17.4) than assignment ($M_{low\ German\text{-}Spanish\ L2ers}$ = 84.5%, SD = 11.8). A series of paired sample t-tests comparing the scores obtained in the two agreement conditions showed that there was a significant difference in the scores for the low-proficiency t (18) = 4.41, $p < .001$], intermediate [t (19) = 4.34, $p < .001$] and advanced German-Spanish L2 groups [t (20) = 2.83, $p < .01$].

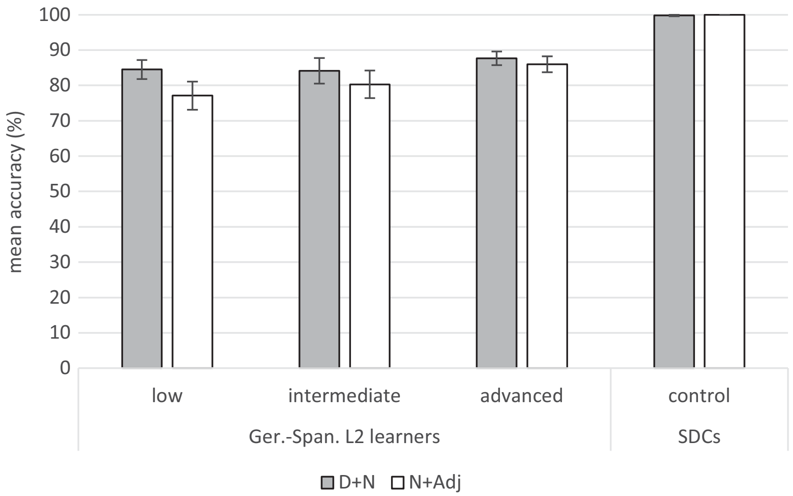

Figure 5.31: Ger.-Span. L2 learners' mean accuracy and standard error by agreement domain and proficiency level.

The results in Figure 5.32 show the German-Spanish L2 learners' mean accuracy on noun endings across the two gender values. Overall, the German-Spanish L2 learners' mean accuracy rates on overt nouns endings in *-o* and *-a* were control-like (accuracy 96.5% or above). Looking at the accuracy on non-canonical and exceptional noun endings by the German-Spanish L2 groups at each proficiency level separately, there were noticeable differences between the groups. Advanced German-Spanish L2 learners were more accurate with masculine nouns ending in *-a* (85.7%) and feminine nouns ending *-e* (81.7%) than feminine nouns ending in *-o* (77.8%) and masculine nouns ending in *-e* (70.2%). Intermediate German-Spanish L2 learners had more difficulties with exceptional nouns ending in *-o* or *-a* (65% and 70%) than non-canonical noun endings in *-e* (81.3% for masculine nouns and 78.3% for feminine nouns). Results for the low-proficient German-Spanish L2 learners showed that they were mostly less accurate with masculine nouns ending in *-a* and *-e* (57.9% and 53.9%), suggesting that they transfer *-e* as a cue for feminine from German, and overgeneralize *-a* as a cue for feminine in Spanish. In other words, it may be the case that morphological cues override any possible default strategies.

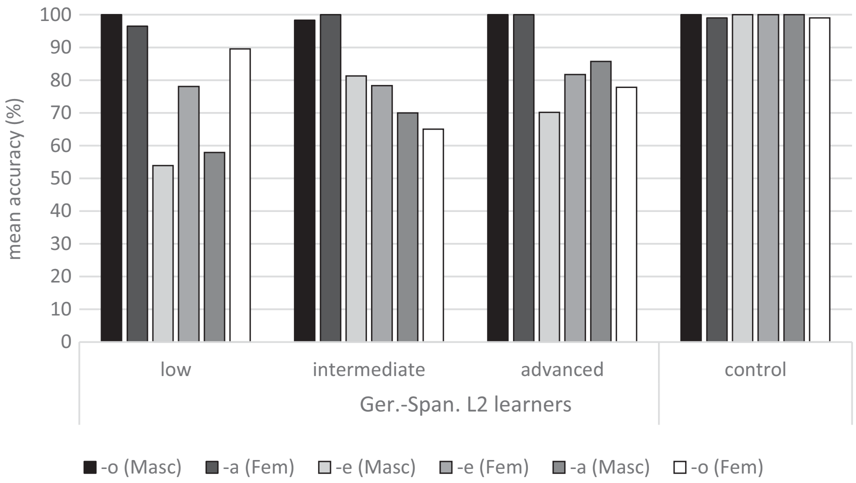

Figure 5.32: Ger.-Span. L2 learners' mean accuracy by noun gender and ending across proficiency levels.

German-Spanish HSs

Figure 5.33 compares German-Spanish HSs' mean accuracy across the two agreement domains. There were no main differences in the accuracy rates across the two agreement domains for low-proficient and intermediate German-Spanish HSs ($M_{low\ German\text{-}Spanish\ HSs} = 93.4\%$, $SD = 6.4$ and $M_{intermediate\ German\text{-}Spanish\ HSs} = 98.2\%$, $SD = 2.8$ for gender assignment versus $M_{low\ German\text{-}Spanish\ HSs} = 92.6\%$, $SD = 6.6$ and $M_{intermediate\ German\text{-}Spanish\ HSs} = 97.6\%$, $SD = 3$ for gender agreement). The results in Figure 5.33 displayed for the advanced German-Spanish HSs showed a lightly higher accuracy for gender assignment ($M_{advanced\ German\text{-}Spanish\ HSs} = 99.1\ \%$, $SD = 3.95$) than agreement ($M_{advanced\ German\text{-}Spanish\ HSs} = 95.9\%$, $SD = 6.36$). A series of paired sample t-tests comparing the scores obtained in the two agreement conditions showed that there was no significant difference in the scores for the low-proficiency [t (15) = 1.46, $p > .05$] and intermediate German-Spanish HS group [t (19) = 1.45, $p > .05$]. There was a statistically significant difference in the scores between the two conditions for the advanced German-Spanish HS group [t (19) = 2.60, $p < .05$], confirming that this group was more accurate on assignment than agreement.

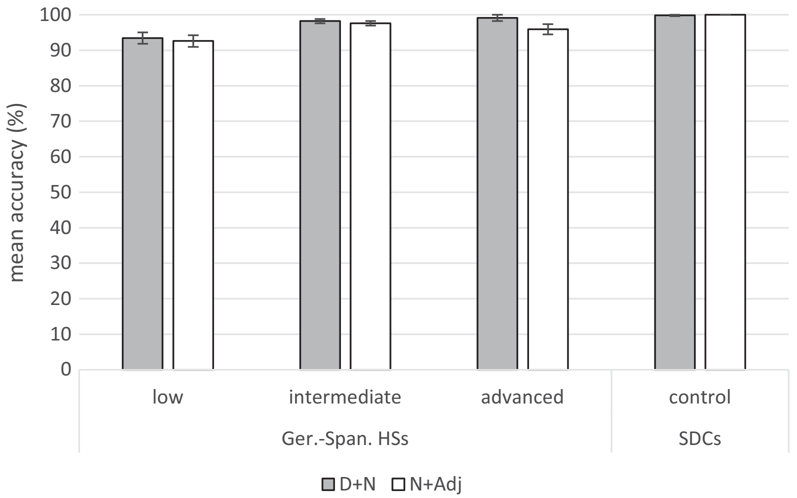

Figure 5.33: Ger.-Span. HSs' mean accuracy and standard error by agreement domain and proficiency level.

Turning to the distribution of German-Spanish HSs' mean accuracy on noun endings across the two gender values graphed in Figure 5.34, we can see control-like performance for the canonical noun endings across all proficiency levels and for non-canonical noun endings at the intermediate and advanced proficiency level. As far as exceptional noun endings were concerned, advanced

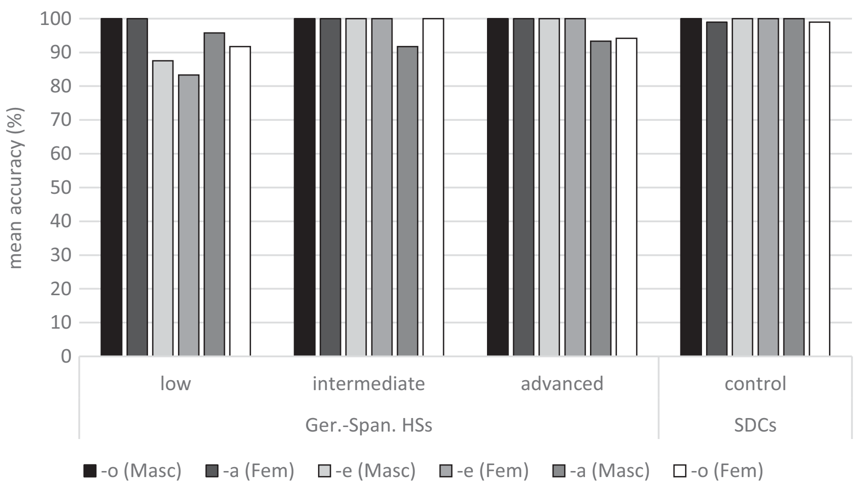

Figure 5.34: Ger.-Span. HSs' mean accuracy by noun gender and ending across proficiency levels.

German-Spanish HSs performed less accurate on both gender values (94.2% for masculine nouns and 93.3% for feminine nouns), whereas intermediate German-Spanish HSs were only less accurate on masculine nouns ending in *-a* (91.7%). For feminine nouns ending in *-o*, they behaved control-like (accuracy 100%). By looking at the low-proficient German-Spanish HS group more closely, non-overt nouns were most vulnerable irrespective of their gender (83.3% for feminine nouns and 87.5% for masculine ones; see Appendix 9.4 for a detailed overview).

5.6.4.1 Gender congruency effects

The accuracy rates for each participant group broken down by congruency condition (gender congruent vs. incongruent) and gender (masculine vs. feminine) are presented in Table 5.26.

Table 5.26: Overall accuracy in gender congruent and incongruent conditions by group and proficiency level.

Groups		*N*	Overall accuracy							
			Gender congruent				Gender incongruent			
			Masc		Fem		Masc		Fem	
			M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
German-Spanish HSs	Low	16	96.9%	8.5	90%	14.6	93.8%	11.2	93.8%	11.2
	Intermediate	20	100%	–	98%	6.2	95%	10.3	100%	–
	Advanced	20	100%	–	99%	4.5	97.5%	11.2	100%	–
German-Spanish L2 learners	Low	21	82.9%	11.9	97.9%	6.3	69.7%	24.4	84.2%	22.4
	Intermediate	20	95%	10.3	86%	18.5	77.5%	24.2	77.5%	26.8
	Advanced	19	92.9%	16.1	88.6%	17.4	84.5%	20.1	84.5%	18.5
Total		**116**	**94.6%**	**11.3**	**93.3%**	**13.4**	**86.2%**	**20.4**	**89.9%**	**18.6**

At first sight, the data presented in Table 5.26 show that the accuracy rates for German-Spanish HSs across the conditions are very different from that of the L2 group. German-Spanish HSs outperformed proficiency-matched L2 learners on the production of gender. Looking at the accuracy rates of the HS groups at each proficiency level more closely, it seems that each HS subgroup supplied comparable accuracy means across the two gender values within the respective congruency condition. The contrary appears to be true for two HS groups at the low and intermediate proficiency level. Low-proficient HSs were more accurate on masculine nouns in congruent conditions (96.9%) than on feminine nouns (80%). The reverse pattern holds true for the intermediate HSs. They exhibited a 100% accuracy rate on feminine nouns opposed to a 95% accuracy rate on masculine nouns, both in gender incongruent conditions. We turn now to a comparison among the German-Spanish L2 subgroups' results across gender congruency. In terms of the gender congruent condition, we can see that the low-proficient L2 group is accurate 97.9% of the time on feminine nouns and only 82.9% of the time on masculine nouns. By contrast, intermediate and advanced L2 groups showed high performance on masculine nouns ($M_{intermediate\ Ger.\text{-}Span.\ L2ers}$ = 95% and $M_{advanced\ Ger.\text{-}Span.\ L2ers}$ = 92.9%) than on feminine nouns ($M_{intermediate\ Ger.\text{-}Span.\ L2ers}$ = 86% and $M_{advanced\ Ger.\text{-}Span.\ L2ers}$ = 88.6%). As for gender incongruent conditions, intermediate and advanced L2 learners produced the same accuracy rates across both gender values nouns ($M_{intermediate\ Ger.\text{-}Span.\ L2ers}$ = 77.5% and $M_{advanced\ Ger.\text{-}Span.\ L2ers}$ = 84.5%), whereas low-proficient L2 learners reach higher accuracy (84.2%) on feminine nouns than on masculine ones (69.7%). On account of these observed results, the mean accuracy rates for the OEPT were each submitted to a repeated-measures ANOVA with a 2× (congruency condition), 2× (gender) and 6× (group) factorial design. There was a main effect of congruency [$F(1, 110) = 28.30$, $p < .001$, *partial* $\eta^2 = .21$] and significant two-way interactions. There was a gender × group interaction [$F(1, 5) = 3.18$, $p < .01$, *partial* $\eta^2 = .13$] and a congruency × gender interaction [$F(1, 110) = 11.61$, $p < .01$, *partial* $\eta^2 = .1$], lending support to the observed differences in the accuracy rates across the two linguistic variables in certain groups.

To determine whether early and late German-Spanish bilinguals show an effect of CLI in their gender productions, further statistical analyses were performed (see also Appendix 9.5 for CLI effects on nouns ending only in *-e*).

A repeated-measures analysis of variance (ANOVA) with 2× (congruency condition), 2× (gender) and 6× (group) factorial design was carried out. According to the analysis, there was no significant main effect of congruency or gender ($p > .05$). The analysis, however, revealed two significant interactions with respect to language transfer. One interaction was between gender and group [$F(1, 5) = 2.84$, $p < .05$, *partial* $\eta^2 = .11$]. The interaction revealed that all groups, except for advanced HSs, showed an effect of gender. This was confirmed statistically with follow-up repeated-measures ANOVAs within each group with gender as a within-subject factor (all groups: $p < .001$, except for the advanced HSs). The second interaction was found between congruency and gender [$F(1, 110) = 13.66$, $p < .01$, *partial* $\eta^2 = .11$], suggesting that the participants' gender productions are modulated by congruency conditions and gender values. Figure 5.35 provides a graphical representation of the results. As can be seen, low-proficient HSs as well as intermediate and advanced L2 learners provided the lowest accuracy rate on feminine nouns in gender congruent conditions (e.g. **el*$_{\text{Masc}}$ *fuente*$_{\text{Fem}}$ – *la*$_{\text{Fem}}$ *fuente*$_{\text{Fem}}$ 'the source').

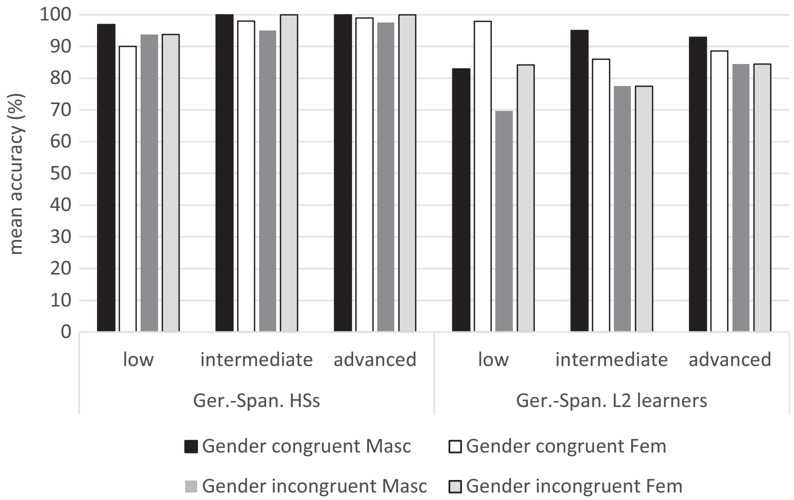

Figure 5.35: German-Spanish bilinguals' accuracy means by congruency condition and gender.

As mentioned in the previous sections, for low-proficient HSs the divergence might stem from contact with other Spanish varieties and dialects in Latin America or negative transfer from German. For L2 learners, by contrast, these inaccuracies may be attributed to the fact that L2 learners cannot retrieve the correct gender fast enough during oral production and thus resort to the default gender or may confuse the gender of the nouns *fuente*$_{\text{Fem}}$ 'source' and with *puente*$_{\text{Masc}}$ 'bridge'. Low-proficient L2 learners were highly inaccurate on masculine nouns with different genders in German and Spanish. These errors might be due to negative transfer from German in particular for Spanish nouns ending in *-e*. In these cases, L2 learners seem to make use of hypercorrection when using the feminine gender for nouns ending in a schwa [ə], a morpheme encoding feminine gender in German.

5.7 Effects of task types and modality

The final research question (RQ#4) of this study asked whether there are task effects and if so, do task types (production vs. comprehension) and/or modalities (written vs. oral) influence the linguistic performance of participants. To answer this question, we will look at the combined results of each task across all participant groups. A comparison of the overall results of the three tasks by group and proficiency are presented in Table 5.27.

A preliminary inspection of the accuracy rates presented in Table 5.27 reveals that there are differences in the accuracy means across tasks and groups. In general, the results show that both English-Spanish and German-Spanish L2 groups across all proficiency levels were better in written production than comprehension. For the English-Spanish L2 groups, the oral production of gender realizations seems to be the most problematic task. By contrast, the German-Spanish L2 groups supplied similar accuracy percentages in the comprehension and oral production task. Turning to the HS groups, one can see that each HS group displayed similar accuracy percentages in the written and oral production tasks compared to the comprehension task. For the HSs, comprehension was the most problematic task. In addition, a closer look at the L2 and HS groups displays differences in the accuracy rates modulated by type of tasks and participants' proficiency. In most low-proficient groups, lower accuracy rates can be found than in higher proficiency groups, who appear to have overcome difficulties in producing target-like gender realizations.

Table 5.27: Descriptive statistics for the overall accuracy in (%) in the three experimental tasks by group and proficiency level.

Groups			**Written Production FCST**		**Written Comprehension GJT**		**Oral Production OEPT**	
			***M* (%)**	***SD***	***M* (%)**	***SD***	***M* (%)**	***SD***
English-Spanish	L2ers	low	79.8	7.8	70.8	12.9	66.4	14.4
		Inter.	86.3	9.1	78.6	13.0	71.9	15.0
		adv.	90.1	6.0	85.7	10.7	77.1	14.0
	HSs	low	88.7	7.0	73.8	11.6	71.7	13.5
		Inter.	94.3	5.5	87.8	10.2	91.9	8.8
		Adv.	99.0	1.6	93.0	4.5	98.9	2.0
German-Spanish	L2ers	low	89.0	11.2	81.0	13.5	80.8	14.4
		Inter.	91.9	5.2	84.2	12.0	82.2	16.7
		Adv.	95.5	4.9	87.2	12.2	86.8	9.5
	HSs	low	95.5	3.2	85.4	5.3	93.4	6.8
		Inter.	99.0	2.1	88.1	5.7	97.9	2.7
		Adv.	99.0	3.2	96.7	7.2	97.5	4.5
	Control group		99.3	1.2	93.9	7.1	90.2	7.5

A repeated-measures ANOVA was carried out on the overall mean accuracy rates of the three tasks in order to explore whether there are statistically reliable task effects. Results revealed a main effect of task [F (1.69, 412.60) = 84.70, $p < .001$ *partial* $\eta^2 = .26$], a task × group interaction [F (24, 488) = 4.67, $p < .001$, *partial* $\eta^2 = .19$] and a task × modality × group interaction [F (12, 403) = 28.08, $p < .001$, *partial* $\eta^2 = .48$]. In order to further explore the tasks effects, follow up analyses (paired-samples t-tests) were conducted. Thereby, for each group, the difference in accuracy on production vs. comprehension and written vs. oral modality was examined. We will first turn to the results regarding a potential difference in accuracy on production vs. comprehension. Recall that the production tasks consisted of an oral and written production task. For the purpose of the analyses, the mean accuracy of each production task (FCST and OEPT) was compared to the comprehension task (GJT).

Table 5.28 presents the statistically significant results of the t-tests, comparing the mean accuracies of the FSCT and the GJT for each group. The results for the advanced English-Spanish L2 learners [t (18) = 1.82, $p = .085$] and the advanced German-Spanish HSs [t (19) = 1.99, $p = .061$] did not reach significance, indicating that these participants did not perform significantly differently. For all other groups, the results of the analyses revealed statistically reliable differences between the accuracy means in the FCST and GJT. The participants' performance was better on the production task (FCST) than on the comprehension task (GJT).

The next step was to reveal whether there are any significant differences in the mean accuracies between the two task modalities (i.e. written vs. oral). For a few groups the analysis showed statistically significant differences among the two modalities, revealing that some groups performed better on written than oral modalities. These results are illustrated in Table 5.29. The difference in the accuracy on the two modalities was not statistically different for the following experimental groups: intermediate English-Spanish HSs [t (25) = 1.85, $p = .076$] and advanced English-Spanish HSs [t (20) = .39, $p = .704$]. Furthermore, none of the German-Spanish HSs performed significantly differently on the written vs. oral tasks (cf. low German-Spanish HSs [t (15) = .95, $p = .356$], intermediate German-Spanish HSs [t (19) = 1.17, $p = .257$], advanced German-Spanish HSs [t (19) = 1.12, $p = .279$]). All these HS groups showed the same behaviour as the SDCs [t (15) = –1.33, $p = .203$], suggesting that these HS groups have had sufficient exposure to both modalities at home and school to perform statistically the same in the oral and written modalities.

Table 5.28: T-test results comparing mean accuracies in the FCST and GJT by group.

Proficiency	Group	written production vs. written comprehension			
		t-test			
		df	**t**	**sig.**	***p***
Low	Eng.-Span. L2 learners	20	4.09	**	.001
Intermediate	Eng.-Span. L2 learners	19	3.76	**	.001
Advanced	Eng.-Span. L2 learners	18	1.82	ns	.085
Low	Eng.-Span. HSs	17	5.57	***	.000
Intermediate	Eng.-Span. HSs	25	3.93	**	.001
Advanced	Eng.-Span. HSs	20	6.99	***	.000
Low	Ger.-Span. L2 learners	18	5.16	***	.000
Intermediate	Ger.-Span. L2 learners	19	3.50	**	.002
Advanced	Ger.-Span. L2 learners	20	4.13	**	.001
Low	Ger.-Span. HSs	15	8.91	***	.000
Intermediate	Ger.-Span. HSs	19	8.11	***	.000
Advanced	Ger.-Span. HSs	19	1.99	ns	.061
	Control group	15	3.05	**	.008

ns = not significant ($p > .05$), *$p < .05$., **$p < .01$., ***$p < .001$.

Table 5.29: T-test results comparing accuracy across task modalities by group.

Proficiency	Group	written vs. oral			
		t-test			
		Df	**t**	**Sig.**	***p***
Low	Eng.-Span. L2 learners	20	5.35	***	.000
Intermediate	Eng.-Span. L2 learners	19	4.15	**	.001
Advanced	Eng.-Span. L2 learners	18	3.94	**	.001
Low	Eng.-Span. HSs	17	5.99	***	.000
Intermediate	Eng.-Span. HSs	25	1.85	ns	.076
Advanced	Eng.-Span. HSs	20	.39	ns	.704

Table 5.29 (continued)

Proficiency	Group	written vs. oral			
		t-test			
		Df	t	Sig.	*p*
Low	Ger.-Span. L2 learners	18	2.78	*	.012
Intermediate	Ger.-Span. L2 learners	19	2.50	*	.022
Advanced	Ger.-Span. L2 learners	20	3.83	**	.001
Low	Ger.-Span. HSs	15	.95	ns	.356
Intermediate	Ger.-Span. HSs	19	1.17	ns	.257
Advanced	Ger.-Span. HSs	19	1.12	ns	.279
	Control group	15	−1.33	ns	.203

ns = not significant ($p > .05$), *$p < .05$., **$p < .01$., ***$p < .001$.

To examine how many of the early and late bilinguals scored within the range of variation of the Spanish-dominant controls (SDCs), the number of individuals in each experimental group scoring above the minimum score of the SDCs were counted (for a similar procedure see Montrul et al. 2008 and Alarcón 2011). Recall that the minimum score among the SDCs was 99.3% on the Forced-Choice Selection Task, 93.9% on the Grammaticality Judgement Task and 99.8% on the Oral Elicitation Picture Task. Table 5.30 presents the number and percentage of individuals in the L2 and HS groups who scored within the range of variation of the SDCs in each of the three tasks.

The individual results for each task and group are shown in Table 5.30. Before having a closer look at the results for each task, we will shed more light on the groups at the lowest proficiency level since we do not find many cases of control-like performance across all tasks. The comparison of the individual results for the low-proficiency groups shows that none of the English-Spanish L2 learners scored within the control-speaker range in the FCST and GJT. Only 2 of 21 English-Spanish L2 learners performed within the range of variation of the control group in the OEPT, whereas we found 4 German-Spanish L2 learners who scored within the control group's range in all three tasks. Among the low-proficiency HSs, 1 English-Spanish HS scored within the range of variation of the controls in the FCST and GJT, whereas in the OEPT 2 English-Spanish HSs performed at the level of the controls. For the low-proficiency German-Spanish HS groups, we find 2 out of 16 HSs who performed within the range of the controls

Table 5.30: Number and percentage of early and late bilinguals who scored within the range of variation of SDCs in each task.

Groups			*N*	Written Production FCST		Written Comprehension GJT		Oral Production OEPT	
				Count	%	Count	%	Count	%
English-Spanish	L2ers	Low	21	–	–	–	–	2	9.6
		Inter.	20	1	5.0	1	5.0	3	15.0
		Adv.	19	1	5.3	5	26.4	5	26.4
	HSs	Low	18	1	5.6	1	5.6	2	11.2
		Inter.	26	4	15.4	12	46.1	17	65.4
		Adv.	21	15	71.4	12	57.1	21	100
German-Spanish	L2ers	Low	19	4	21.1	4	21.1	4	21.1
		Inter.	20	1	5.0	5	25.0	8	40.0
		Adv.	21	8	38.1	8	38.1	7	33.3
	HSs	Low	16	2	12.5	2	12.5	10	62.5
		Inter.	20	15	75.0	4	20.0	20	100
		Adv.	20	16	80.0	17	85.0	19	95.0

in the FCST and GJT. In the OEPT, we find 10 out of 16 German-Spanish HSs who performed at the level of the controls.

Turning to the results of the FCST, we find that both English-Spanish and German-Spanish HSs at intermediate and advanced proficiency levels performed more often within the variation of SDCs in the FCST than the proficiency-matched English-Spanish and German-Spanish L2 learners. When comparing intermediate and advanced English-Spanish HSs to proficiency-matched German-Spanish HSs, we find striking differences in the instances of overall control-like performance. Four out of 26 intermediate English-Spanish HSs (15.4%) scored above the control minimum in the FCST, whereas 15 out of 20 intermediate German-Spanish HSs (75%) managed to do so. In case of the L2 learner groups, only 1 out of 20 intermediate English-Spanish and German-Spanish L2 learners scored within the range of variation of the controls. Among the advanced L2 learner groups, 1 out of 19 English-Spanish L2 learners performed within the range of variation of the controls, while 8 out of 21 German-Spanish L2 learners succeeded in doing so.

Results for the GJT reveal that 12 out of 26 intermediate English-Spanish HSs (46.1%) scored above the control minimum, while only 4 out of 20 intermediate German-Spanish HSs (20%) succeeded in scoring within the range of variation of SDCs. The comparison between the L2 learners, by contrast, show that 1 out of 20 intermediate English-Spanish L2 learners obtained scores within the range of variation of controls, whereas 5 out of 20 German-Spanish L2 learners did so. At the advanced proficiency level, the difference between the English-Spanish and German-Spanish L2 learners becomes even more discernible. Only 5 out of 19 English-Spanish L2 learners obtained scores within the range of variation of controls, while 17 out of 20 German-Spanish L2 learners did so.

On the oral production task, 17 out of 26 intermediate English-Spanish HSs (65.4%) obtained scores within the range of variation of controls, whereas all intermediate German-Spanish HSs (20 out of 20, 100%) did so. Among the advanced HSs, 17 out of 20 German-Spanish HSs (85%) obtained scores like those of controls in the GJT, whereas 12 out of 21 English-Spanish HSs (57.1%) were found to perform at the controls' level. Similar to the HS groups, one can also detect differences between the L2 groups across language combinations.

Overall, German-Spanish L2 groups exhibited more instances of control-like performance than proficiency-matched English-Spanish L2 learners across all three tasks.

5.8 Overall summary of the results

This book set out to investigate the mastery of Spanish gender within the DP by early and late bilinguals across two language pairs, English-Spanish and German-Spanish. The objective was to inform the debate in the literature regarding whether L2 learners and HSs, whose grammars are often claimed to be non-native or incomplete in comparison to monolinguals, are ultimately able to achieve native-like attainment (RQ#1a). Previous research by Alarcón (2011), Montrul (2002, 2008, 2009, 2011) and Montrul et al. (2008), among others, has established that L1 English learners of L2 Spanish, whose L1 lacks gender, have more problems achieving target-like knowledge of gender than L2 learners with a gendered L1. These findings motivated the comparison of the two groups of learners with different L1s (RQ#1b). Building on previous research, the study also aimed to systematically investigate the role of (i) extralinguistic factors (RQ#2), (ii) intralinguistic factors (RQ#3) and (iii) different task types and modalities (RQ#4), all of which were found to impact early and late bilinguals' accuracy with grammatical gender. To address some of the methodological shortcomings of previous research, a triangulated approach was adopted in the present study in order to gather new data by means of a multiple experiment design (see section 5.3.1). The key findings of each from each task presented in this section are summarized in Table 5.31.

Table 5.31: Summary of results.

Factors	FCST[1]	GJT[2]	OEPT[3]
AoO of bilingualism	✓	✓	✓
Language combination *German-Spanish †English-Spanish	✓*	✓*	✓*
Proficiency	✓	✓	✓
Language use	x (only low Eng.-Span HSs & Ger.-Span HSs)	✓ (in most cases)	x (only for adv. Eng.-Span HSs and inter. Ger.-Span HSs)
Agreement domain *Assignment †Agreement	✓* (for almost all participants)	✓* (only for L2 learners)	✓† (only for L2 learners)
Noun ending	✓ residue & outercore vulnerable	✓ residue & outercore vulnerable	✓ residue & outercore vulnerable
Noun gender	x	✓ (adv. Eng.-Span HSs & all Ger.-Span. HSs) better with Fem. than Masc.	✓ (interacts with noun ending)
Congruency effect & CLI	✓ congruent > incongruent	✓ congruent > incongruent	✓ congruent > incongruent

[1]Forced-Choice Selection Task; [2]Grammaticality Judgement Task; [3]Oral Elicitation Picture Task.

Before turning to the individual results of each experiment, the overall results are briefly outlined. The evidence obtained across the experimental tasks reveals that AoO of bilingualism is a crucial factor and affects the participants' performance. Early bilinguals outperformed late bilinguals. Furthermore, it is clear from the results that the language combination makes an important difference with regard to the speakers' performance in gender across all tasks.

Spanish L2 learners with German as their L1 benefit from the presence of the feature gender in German as they are able to transfer the gender values from their L1 to the lexical items in the L2 and only need to reconfigure the gender values for those nouns which differ in the L2. In the case of HSs, differences between German-Spanish and English-Spanish bilinguals were greatest at the low-proficiency level. The variability in low-proficiency English-Spanish HSs was interpreted as an effect of the dominant language in their society as well as low HL activation patterns. It was also found that the groups differed in their performance across all proficiency levels. As predicted, L2 learners with a higher level of proficiency obtained higher gender accuracy rates than L2 learners with a lower proficiency level. In addition, the present study observed a more gradual development of gender knowledge in the English-Spanish L2 groups than their German-Spanish counterparts. Interestingly, the accuracy rates displayed by the intermediate German-Spanish L2 group did not statistically differ from those of the advanced German-Spanish L2 learners, suggesting that those intermediate German-Spanish L2 learners need more time to improve their accuracy with respect to gender. There was some progress noticeable, but the L1 and other extra- and intralinguistic factors may prevent these learners from acquiring full level of competence. In the HS groups, the correlation between the accuracy rates and the proficiency levels was not as strong as in the L2 groups. While mastery of Spanish gender by the English-Spanish HS groups appeared to be systematically influenced by proficiency, the differences in accuracy rates among the German-Spanish HS groups was not always significant. While all the German-Spanish HS groups performed near or at ceiling in oral production (OEPT), the proficiency groups did diverge in written production and comprehension (FCST and GJT, respectively). In the FCST, the intermediate and advanced German-Spanish HSs significantly outperformed the low-proficiency HSs, and in the GJT the advanced German-Spanish HSs outperformed lower proficiency HSs.

Turning from the overall results to the specific results of the FCST, the statistical analysis found that the amount of language use only had an effect on low-proficiency English-Spanish HSs and German-Spanish HSs. The examination of the intralinguistic factors has revealed four important results. First, all HS and L2 learners groups performed significantly better on gender assignment than agreement. Second, although HS and L2 learners produced errors with all noun endings, the results showed that most errors were made with non-canonical and exceptional noun endings. The effect of the gender value was assessed, but no significant differences were found in the performance of any of the groups. Comparing the accuracy rates for gender-congruent and gender-incongruent conditions, German-Spanish bilinguals were, as expected, more successful in gender-congruent than incongruent conditions. This finding fully confirms the prediction.

Moreover, the results show positive transfer effects from German when Spanish and German equivalents matched in gender and negative transfer effects when they did not match in gender, in particular, for those nouns which overlap in the phonological ending in schwa. As this finding applies to all three experimental tasks, it will not be repeated when presenting the results of the GJT and OEPT.

The GJT was a more demanding task than the FCST and some clear contrasts emerged from the groups' performance with regard to their amount of language use. Results revealed a significant correlation between the amount of Spanish use and accuracy in advanced English-Spanish L2 learners and German-Spanish L2 learners at the lowest and advanced proficiency levels. There was also a significant correlation between the amount of Spanish use and accuracy in low-proficient English-Spanish HSs and advanced German-Spanish HSs. Interestingly, a significant negative correlation was observed between the amount of Spanish use and accuracy in advanced English-Spanish HSs. This indicated that as the amount of Spanish language use increases, the accuracy tends to decrease in this group.

The results of the overall accuracy in the GJT across the two agreement domains showed that all L2 learner groups were significantly more accurate in gender assignment than agreement. All participants were significantly less accurate on non-canonical and exceptional noun endings. There were also marked differences in the advanced English-Spanish HS group and all German-Spanish HS groups in the different gender value conditions as compared with the other groups. These HS groups performed better with feminine than masculine nouns. Overall, the results revealed that the speakers‘ performance is affected by a significant interaction between agreement domain, noun ending and gender value. Most gender errors were made in the agreement domain with non-canonical-ending and exceptional masculine nouns.

Results from the OEPT indicated a significant correlation between the amount of Spanish use and accuracy only in advanced English-Spanish HSs and intermediate German-Spanish HSs, but no significant correlation was found for the other L2 learner and HS groups. The examination of the data in terms of the effects of intralinguistic factors revealed three important results. First, L2 learners groups were significantly less accurate on agreement than assignment. Second, the speakers' performance was affected by an interaction between noun ending and gender. Participants performed less accurately with masculine nouns with non-canonical (-*a*) or non-transparent word endings (-*e*). The fact that this pattern was also observed in all three experiments suggests that HSs and L2 learners are sensitive to morphophonological cues and gender. A careful investigation of the gender errors showed that different speakers even within one proficiency level choose different stategies such as overgeneralizing the feminine gender to masculine nouns or transfering the gender value from the translation equivalent noun in German.

In particular, Spanish L2 learners with German as their L1 benefit from the presence of the feature gender in German as they are able to transfer the gender values from their L1 to the lexical items in the L2 and only need to reconfigure the gender values for those nouns which differ in the L2. Having established that adult HSs and L2 learners are able to reach target-like performance in terms of gender in Spanish and that various extra- and intralinguistic factors affect HL and L2 grammars, in the following chapter we will discuss the results by revisiting the research questions of the present study and HL/L2 accounts.

6 Discussion, implications and conclusions

In this book I have examined the role of linguistic and extralinguistic factors and how they influence HSs' and L2 speakers' knowledge of gender in Spanish. The purpose of this chapter is to provide a discussion and linguistic interpretation of these results by addressing each of the research questions (RQs) and hypotheses that guided the present study (see section 5.1).

Furthermore, the results of the experimental study will be discussed in light of the ultimate attainment accounts proposed for SLA as well as HLA and some theoretical implications will be reviewed. Some limitations of the study and avenues for future research will be identified. Finally, this book concludes with some final remarks on what the study of Spanish gender in HL and L2 acquisition contributes to the understanding of linguistic competence.

6.1 Revisiting research questions and hypotheses

6.1.1 Feature availability and mastery of gender

The first two research questions, repeated for convenience below, asked whether early and late bilinguals are able to achieve gender accuracy in Spanish in a way that is indistinguishable from the control group in a range of tasks (RQ#1a) and what role the language combination plays (RQ#1b).

> 1a. Can adult L2 learners and heritage speakers exhibit target-like mastery of grammatical gender in Spanish?
>
> 1b. Are there differences between [+gen] L1 (German) and [-gen] L1 (English) speakers of L2 Spanish, on the one hand, and between heritage speakers with [-gen/+gen] L1s (English-Spanish) and [+gen/+gen] L1s (German-Spanish), on the other hand, in the way they master grammatical gender?

Based on these research questions, this section will first discuss the results for the L2 groups and will then turn to the results for the HS groups. In response to RQ#1a, the results of the German-Spanish and English-Spanish L2 groups revealed that they perform significantly differently from the control group in a range of tasks. L2 learners' divergence from SDCs could be taken to indicate that the acquisition of grammatical gender in Spanish is subject to differences in the AoO of bilingualism, the input conditions and the opportunities for language use, resulting in a failure to attain native-like linguistic competence.

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Indeed, the statistical analyses of the present study found an effect of AoO of bilingualism and effect of the amount of Spanish activation, indicating that late AoO of bilingualism and limited exposure to as well as use of the L2 yield increased grammatical variability in terms of gender. The strong relationship between these factors and non-target-like behavior is consistent with previous research on grammatical gender in general (e.g. Dewaele and Véronique 2001; Franceschina 2001, 2005; Montrul et al. 2008; Montrul 2011; Montrul et al. 2014). I will discuss these extralinguistic factors in the sections that follow.

It is important to note that L2 learners were not non-native-like across the board, as exceptions were revealed in several of the tasks. For instance, in the FCST, the accuracy rate of advanced German-Spanish L2 learners was not statistically significantly different from that of the control group. A possible explanation for this finding is that the task was less demanding at that proficiency level compared to the L2 groups at the intermediate and low-proficiency levels. If this is the case, the question that would still have to be answered is why advanced English-Spanish L2 learners differed statistically in their performance from the control group in this task. One possible explanation is that the performance on grammatical gender was affected by the L1 of the learners (here: English). The presence of the gender feature in German interacts with the high-proficiency level in the L2 and thus helps German-speaking L2 learners of Spanish to achieve more target-like results than English-Spanish L2 learners.

The data gathered from the GJT show that intermediate and advanced L2 learners, regardless of the language combination, performed within the range of the control group, whereas only the low-proficiency L2 groups performed significantly less well compared to the control group. The reason why low-proficiency L2 learners performed differently than the other L2 learners may lie in the fact that asking them to judge whether a sentence is correct or not challenges them. In the context of L2 instruction, teachers normally avoid to present ungrammatical structures to low-proficiency L2 learners because they could be memorized.

As noted previously, the control group did not perform at or near 100% in the GJT. This result coincides with previous studies which documented slight variability in control groups in various grammatical areas such as cleft left dislocation (Valenzuela 2005), word order (Belletti et al. 2007) and mood selection in relative clauses (Borgonovo et al. 2015). The variability that I found in the control group could be attributed to the fact that members of the control groups, like HSs (see 5.5), feel uncertain about judging the grammaticality of a sentence as they are used to producing language. However, this explanation needs to be investigated in more detail and must be left as a project for future research. It is important to point out that SDCs and German-Spanish L2 learners showed a ceiling effect in detecting gender matches in the GJT. Rather surprisingly, the advanced English-Spanish L2 learners produced a higher accuracy rate when there was a gender mismatch than when there was a match. A possible explanation for this high accuracy rate in detecting and correcting gender mismatches could stem from priming effects, even though the test items were randomized in the GJT. The fact that advanced English-Spanish L2 learners had been exposed to a couple of ungrammatical sentences at the beginning of the GJT could have led them to become more cautious of ungrammaticality and more likely to produce a correction the next time they were faced with a gender mismatch. If we look at the data and how the accuracy rates have changed throughout the task, the previous assumption that advanced English-Spanish L2 learners provide a correction for sentences judged as ungrammatical can be confirmed. Although the results can be explained in terms of overcaution, further factors such as teaching methods and tasks involving GJT may also have influenced the results. However, the present study did not control for teaching methods and tasks to which L2 learners were exposed.

The second part of the first research question (RQ#1b) revolves around the role of the L1 in the successful mastery of gender in L2 Spanish. As shown in chapter 5, there were notable differences between the performance of English-speaking learners of L2 Spanish and German-speaking learners of L2 Spanish. German-speaking L2 learners of Spanish outperformed proficiency-matched English-speaking L2 learners in all tasks except for the GJT. This finding suggests that the gender accuracy of L2 learners is conditioned by their L1. The idea behind this suggestion is that learners whose L1 has instantiated the feature of gender have an advantage over those whose L1 lacks gender. This view lends support to previous studies that have also found an L1 effect when comparing L2 learners of different L1s in which the functional feature of gender is either present or absent (e.g. Franceschina 2001, 2005 and Sabourin 2001, among others). Although the present study found L1 effects, the high rates of accuracy among English-Spanish L2 learners for all proficiency groups clearly bear out the claim that the acquisition of gender features can be achieved regardless of their status in the L1. Section 6.2 will revisit and discuss this issue in more detail.

We now turn to discussing the results of the HSs. By and large, the results of the present study indicate that at least for the high-proficiency HS group, it is possible to obtain native-like knowledge of gender (RQ#1a). Across all the tasks, advanced HSs patterned like SDCs and were thus largely indistinguishable from each other. These findings demonstrate that German-Spanish and English-Spanish HSs succeed in achieving native-like performance in terms of gender in the HL provided that they have a high level of proficiency.

By contrast, the low- and intermediate-proficiency HS groups of both language combinations showed a high level of non-target-like behavior and were statistically different from the control group. There were, however, some exceptions. The results of the FCST and OEPT indicate that intermediate-proficiency German-Spanish HSs were also able to exhibit accuracy rates which do not differ statistically from the control group (see section 5.4.2). Regarding English-Spanish HSs, the combined results (i.e. grammatical and ungrammatical conditions collapsed) of the GJT also showed no significant difference between the intermediate-proficiency English-Spanish HS group and the control group. In the case of intermediate-proficiency HSs, the findings suggest that native-like mastery of gender is possible but heavily depends on the experimental task used in the study and the language pairing (see Bowles 2011; Montrul et al. 2008; Benmamoun, Montrul and Polinsky 2013). The effects of task type and modality will be further explored in section 6.1.4 Among all the HSs groups, the low-proficiency groups diverge to the greatest extent from the control group. This finding corroborates Montrul (2016a). The need to explain why HSs exhibit increased variability has led researchers to suggest various accounts that consider the role of insufficient input or activation of the HL. In section 6.2.2, I will revisit these factors and how they can serve as an explanation for variability among HSs with lower proficiency.

With regard to the research question pertaining to the effect of the language combination (RQ#1b), the results from the statistical analyses showed a clear difference in performance between German-Spanish and English-Spanish HSs, particularly at the intermediate- and low-proficiency levels. Across the board, low and intermediate German-Spanish HSs were more accurate on gender than proficiency-matched English-Spanish HSs. The difference between the two HS groups is moderate and less pronounced at the intermediate-proficiency level than at the low-proficiency level. These results suggest that variability in the grammars of HSs appears to be attenuated when both the majority language and the HL instantiate gender, as in the language combination German-Spanish. If the feature gender is present in only one language, i.e. present in Spanish but absent in English, a higher degree of variability in HSs is more likely to arise. If this reasoning is correct, and the results point in this direction, German-Spanish HSs have a slight advantage and a more stable command of gender due to the typological similarities between the majority language and the HL than English-Spanish HSs, who seem to face greater difficulties in the remapping of functional features onto their morphological forms in the HL, especially when they are predominately exposed to English as the majority language in their environment. This idea will be revisited in section 6.2.2.

6.1.2 Extralinguistic effects

The second research question (RQ#2) was proposed as a way of investigating which extralinguistic factors might affect participants' performance and cause variability. For the reader's convenience, the research question is reproduced below:

> 2. To what extent do extralinguistic factors such as AoO of bilingualism, proficiency in the weaker language/L2 and frequency of Spanish language use modulate bilinguals' knowledge of gender assignment and agreement?

In the following subsections, I will discuss each specific extralinguistic factor in light of the predictions proposed in this book.

6.1.2.1 The role of AoO of bilingualism

In the literature, there is a long-standing debate on whether AoO of bilingualism is one of the determining factors which affect the achievement level of bilinguals. The results of the present study revealed significant differences between HSs and L2 learners with respect to their gender accuracy rates, and these can be ascribed to age effects.[69] Based on the assumption that L2 learners are able to reach quite advanced levels of attainment in L2 acquisition regardless their AoO of bilingualism (see 3.2.2), it was predicted that there is no correlation between speakers' AoO of bilingualism and gender accuracy. The results do not confirm this prediction as age effects were found. Consistent with previous research findings on the effect of age (e.g. Montrul 2002; Montrul et al. 2008; MacKay, Flege, and Imai 2006; Lardiere 2007; Alarcón 2011), HSs who are exposed to Spanish from birth and beyond puberty appear to have an advantage over adult late L2 learners whose exposure to Spanish is post-puberty and, thus, tend to be more vulnerable to morphosyntactic variability.

It is crucial to understand that a late AoO of bilingualism for L2 learners as compared to HSs does not necessarily imply that native-like attainment is impossible. The accuracy range from the advanced Spanish L2 learners (see Table 5.30) makes clear that they acquire complex knowledge of gender in Spanish and attain complete mastery of L2 grammar.

Further analyses in the current study revealed that despite the observed age effects, other related variables such as proficiency, the amount of Spanish

69 Nevertheless, it is important to note that these age effects were only statistically significant when all the participants were analyzed as a group, irrespective of the language combination and proficiency level.

language use and the language combination are also significant predictors of learning outcomes among bilinguals. These variables can outweigh the factor AoO of bilingualism and enable L2 learners to achieve native-like command despite their later exposure to the L2 (Unsworth 2008; Montrul 2008; Perez Cortes 2016). This said, AoO of bilingualism is an important factor, though not the most determinining one, in influencing performance by early and late bilinguals. The following subsections will shed more light on the other extralinguistic variables, starting with how proficiency affects the gender accuracy of both L2 learners and HSs.

6.1.2.2 Proficiency effects

Based on the DELE scores, the experimental groups were divided into three proficiency groups (low, intermediate and advanced) in order to examine whether the gender accuracy of early and late bilinguals is affected by their language proficiency. Following previous findings on the acquisition of gender, it has been hypothesized that proficiency is an important predictor of bilinguals' linguistic achievements (e.g. Montrul 2004; White et al. 2004; Alarcón 2006, 2011; Sagarra and Herschensohn 2011; Grüter et al. 2012). Psycholinguistic studies assume that a high proficiency level in the L2/weaker language helps speakers to establish stronger connections between lexical items and their corresponding semantic/syntactic features, resulting in faster access and retrieval in online processing and production (Van Hell and Tanner 2012; Perez Cortes 2016: 244). On the whole, the results of the present study corroborate previous findings as they reveal that differences in the proficiency levels modulate the ability of bilinguals to make target-like form-feature mappings in the L2/HL. Participants with a high proficiency level in Spanish performed significantly more target-like than low-proficiency participants. Across all language combinations and tasks, advanced HSs and L2 learners obtained high accuracy levels ranging from 90%–99.4%, suggesting that they are able to access and retrieve the feature specification involved in Spanish gender assignment and agreement better than both intermediate- and low-proficiency HSs and L2 learners (accuracy range from 77.1%–93.4%). The only exception was found for German-Spanish and English-Spanish L2 learners at the advanced proficiency level in the GJT and OEPT. In these cases, the intermediate and low proficiency HSs outperformed the advanced L2 learners. One possible explanation for the high error rate on the GJT could be the fact that L2 learners at all levels felt overloaded and uncertain about judging the grammaticality of the sentences presented to them, whereas on the OEPT L2 learners may have felt under pressure to produce the gender realization rapidy (less waiting time and quick response). This latter proposal is further supported by various studies, including Lardiere (1998a, b), Prévost and White (2000), Bruhn de Garavito (2003), Montrul et al. (2008) and Imaz Agirre (2015), who also found variability in oral production tasks.

As far as the performance of the L2 learners is concerned, the findings reveal a developmental trend: accuracy increases steadily as proficiency increases. Even though the results of the present study confirm this developmental trend to a certain extent, there are differences between the proficiency groups across the language combinations and tasks, implying that the performance of bilinguals is modulated by various factors. Table 6.1 illustrates the differences between all the L2 proficiency groups across the language combinations and tasks. Note that the bold numbers indicate the L2 proficiency group that differs statistically from all of the other groups in its overall accuracy rate on the specific task (see Appendix 10.1–10.3 for the statistical analyses).

Table 6.1: L2 learners' gender accuracy rates in percentage across tasks.

		FCST	GJT	OEPT
Eng.-Span. L2 learners	Adv.	90.1%	85.7%	77.1%
	Int.	86.3%	78.6%	71.9%
	Low	**79.8%**	**70.8%**	77.1%
Ger.-Span. L2 learners	Adv.	95.5%	87.8%	86.8%
	Int.	91.9%	81%	82.2%
	Low	**89%**	85.7%	80.8%

In the FSCT, the English-Spanish L2 learners at the intermediate and advanced proficiency level are more homogenous compared to the group of low-proficiency L2 learners. These results differ from those obtained for the L2 group with the language combination German-Spanish. German-Spanish L2 learners at the intermediate and advanced proficiency level are more homogenous on the FCST compared to the group of low-proficiency L2 learners. As can be seen, English-Spanish L2 learners at the advanced and intermediate-proficiency level seem to achieve similar results on the GJT since there was no statistical difference in the accuracy means between these groups. The results showed that both groups deviate significantly from the low-proficiency L2 group. In the OEPT, the German-Spanish L2 learners outperform the English-Spanish ones. However, the accuracy rates were not significantly different from each other. In general, the analyses showed that the advanced and intermediate German-Spanish L2 learners performed equally well in the GJT and OEPT.

The differences between the L2 proficiency groups with the language combinations English-Spanish and German-Spanish seem to indicate that their performance is also affected by task types, modalities and the level of difficulty. In particular, the results for the English-Spanish L2 groups in the FCST suggest that the developmental sequence is more gradual. In the FCST and GJT it seems that their knowledge of gender is developing constantly, whereas for the German-Spanish L2 group the effect of proficiency is only visible when comparing low- and intermediate-proficiency L2 learners, where there is an increase in accuracy.

In the case of intermediate German-Spanish L2 learners, the interlanguage scarcely develops beyond the level of the low-proficiency learners in the FCST and OEPT. One may regard the accuracy rates obtained from the intermediate German-Spanish L2 group to be indicative of fossilization. In this book, the term 'fossilization' refers to non-progression of the knowledge of grammatical gender in the interlanguage Spanish when comparing an L2 group of a particular language combination at all the different proficiency levels (Selinker 1972).[70] The assumption of fossilization casts doubts when looking at the accuracy rate of the advanced German-Spanish L2 learner groups, who perform better than the intermediate group. The proficiency effect might be stronger when comparing the low- and intermediate-proficiency L2 learner groups with each other, given that low-proficiency L2 learners have less access and exposure to Spanish outside the classroom.

The reason why there is a difference in the developmental sequence between German-Spanish L2 learners and English-Spanish L2 learners could be the fact German and Spanish have more in common with respect to gender than English and Spanish (see section 2.4). The German gender system could help German-Spanish L2 learners to acquire gender in Spanish because the gender feature of German can be transferred to Spanish and thus only needs to be reassembled for L1 and L2 lexical items which do not share the same gender values. In the case of English-Spanish L2 learners, knowledge of grammatical gender in Spanish starts to emerge at the lower proficiency levels and becomes more stable and target-like as their command of the L2 improves.

In view of possible proficiency effects on HSs' knowledge of gender, it is to be expected that lower proficiency HSs are hindered in their lexical access and

70 There are numerous definitions and interpretations of the term 'fossilization'. In the SLA literature, many researchers have followed and built on Selinker's definition of fossilization (1972).

retrieval of the appropriate feature specifications involved in Spanish grammatical gender. As a result, they are more likely to use "morphological defaults to manage the added cognitive load derived from weaker connections" (Perez Cortes 2016: 244) which could lead to variability in their performance. Conversely, higher proficiency HSs would seem to have fewer problems with lexical access and retrieval, allowing them to perform in a more target-like manner and closer to the control group (Polinsky 1997, 2008; Ivanova-Sullivan 2014). The present results confirm that gender accuracy was modulated by the HSs' level of proficiency. The proficiency effects were, however, more pronounced for HSs with the language pairing English-Spanish than for those with the language combination German-Spanish. The reason why proficiency effects in the German-Spanish HSs are less noticeable than in English-Spanish HSs could be due to the fact that they have a more stable knowledge of gender as there is a partial overlap between German and Spanish. To illustrate the proficiency effects across the two groups of HSs, Table 6.2 gives a comparison of the accuracy rates for HSs across the language combinations and tasks. The numbers in bold indicate those proficiency groups which differ significantly from the other proficiency groups (see Appendix 10.1–10.3 for the statistical analyses).

Table 6.2: HSs' accuracy rates in percentage across tasks.

		FCST	GJT	OEPT
Eng.-Span. HSs	Adv.	**99%**	93%	**98.9%**
	Int.	**94.3%**	87.8%	**91.9%**
	Low	**88.7%**	**73.6%**	**77.7%**
Ger.-Span. HSs	Adv.	99%	**96.7%**	97.5%
	Int.	99%	88.1%	97.9%
	Low	**95.5%**	85.4%	93.4%

As can be seen from Table 6.2, intermediate and advanced English-Spanish HSs were more sensitive to gender and thus produced more target-like gender realizations than low-proficiency HSs in a range of tasks. Despite the positive effect of proficiency, the intermediate English-Spanish HSs perform statistically different from the other HS groups in the FCST and OEPT. They are outperformed by advanced HSs. In the GJT, the intermediate English-Spanish HSs do not perform statistically differently from the advanced English-Spanish HS group. What causes intermediate English-Spanish HSs to perform differently from the other groups in these two tasks? One explanation could be that there is too much variability within the intermediate English-Spanish HS group, leading to significant differences between the proficiency groups. An alternative explanation is that “the patterns of results obtained in this study are a function of the tasks used and the types of linguistic behavior elicited” (Montrul et al. 2008: 542). Seeing the results of this study in this way would explain why there are significant differences between all three proficiency levels on these two specific tasks. Clearly, this question needs to be further investigated.

As far as the performance of German-Spanish HSs is concerned, the study found no overall differences between the three proficiency levels in the oral production task. The only effect of proficiency was found for the written tasks. In the FCST, intermediate and advanced German-Spanish HSs produced the same gender accuracy rates, whereas in the GJT advanced German Spanish HSs (96.7% accuracy) were significantly more accurate than intermediate HSs (88.1%). These findings seem to suggest that the initial advantage of intermediate German-Spanish HSs seems to disappear in written tasks. Advanced-proficiency German-Spanish HSs may have an advantage over low- and intermediate-proficiency HSs in written tasks because they have been exposed to more instruction and writing in the HL (Ellis 2006; Geeslin 2010; Montrul 2012; Perez Cortes 2016). Thus, they may feel more confident about the written tasks, with this being reflected in the difference between the proficiency groups. Up to this point, the discussion of the results has shown that proficiency shapes the knowledge of gender of early and late bilinguals but it is not the sole determining factor. In the next section, we will consider how the amount of Spanish use affects the linguistic performance of L2 learners and HSs.

6.1.2.3 The role played by the amount of Spanish language use

Thus far, we have seen that both factors, AoO of bilingualism and proficiency, have an effect on the participants’ performance in terms of gender. It is important to keep in mind that none of these variables is, in and of itself, the determining factor as they may interact. In this section, I discuss the results in terms of potential effects due to the frequency of Spanish use. In previous research (e.g. McCarthy 2006, 2008, 2012; Schmid, Köpke and de Bot 2013; Putnam and Sánchez 2013; Montrul et al. 2013; Perez Cortes 2016; Giancaspro 2017), it is postulated that the amount of HL/L2 use plays a substantial role in predicting the extent to which early and late L2 learners display morphological variability or/ and instances of attrition/language loss. Research investigating the potential effects of the frequency of Spanish use on a participant’s performance in the field of SLA and HLA is limited. The present study aimed to contribute to this gap in the literature by examining the extent to which the amount of Spanish use correlates with participants' gender accuracy. In accordance with previous findings, it was hypothesized that an increasing amount of L2/HL use (i.e. Spanish) correlates with higher gender accuracy rates and vice versa. The results presented in chapter 5 on this issue show that the amount of Spanish language use modulates early and late bilinguals' response patterns only in specific proficiency groups and tasks.

Across all tasks, the effect of the amount of Spanish use was strongly visible in almost all the L2 and HS groups at the lowest and advanced proficiency level. In the case of advanced L2 learners and HSs, their frequent use of Spanish appears to positively affect their maintenance of their grammatical knowledge of gender, whereas the rate of Spanish use entails an advantage for low-proficiency L2 learners and HSs decreasing their rates of morphological optionality.

Interestingly, the effects of frequency of Spanish activation failed to reach statistical significance for all the groups at the intermediate-proficiency level across all tasks. The only exception was for the intermediate German-Spanish HSs in the OEPT. Their amount of Spanish language use significantly correlated with their performance on the OEPT. The results indicate that their amount of Spanish activation positively affects their gender ability in so far as they were able to retrieve the correct lexical and grammatical information from memory when they were asked to respond rapidly and automatically in this less naturalistic oral production task (Paradis 2004; Lardiere 1998a, b, 2009). In the data for these tasks, an effect of frequent Spanish language use was found only for the advanced English-Spanish L2 group, who became more accurate in gender than lower proficiency groups. Broadly, the results obtained from the present study are partially in line with those of previous studies. Contrary to the findings documented by Perez Cortes (2016: 252) on the target-like selection of indicative/subjunctive mood in Spanish as a HL and L2, the effects of language use were observed in low- rather than intermediate-proficiency bilinguals. An explanation for the lack of any correlation effects between the amount of Spanish use and accuracy at intermediate-proficiency levels could be the fact that the amount of Spanish language use at this proficiency level evolves over time and requires a longer amount of exposure to Spanish in order to achieve a statistically significant effect. As mentioned earlier, the intermediate groups showed high levels of variation, so it may be possible that the lack of significance is an artefact of this.

6.1.3 Linguistic effects

Previous studies on the acquisition of gender have established that morphological variability among early and late bilinguals seems to be strongly influenced by linguistic variables such as agreement domain, noun morphology and noun gender (Finnemann 1992; Fernández-García 1999; Schlig 2003; Franceschina 2001, 2005; Montrul et al. 2008; Martínez-Gibson 2011; Alarcón 2011, among others). In light of the mixed results reported in chapter 4, it still remains unclear which linguistic variables lead to variability with grammatical gender in HSs and L2. The third research question (RQ#3) tackles precisely this issue and is reproduced below:

> 3. To what extent do linguistic factors such as agreement domain (gender assignment vs. gender agreement), noun gender (masculine vs. feminine), noun ending (morphology), and noun gender congruency (gender congruent vs. incongruent) affect the participants' accuracy?

It was hypothesized on the basis of previous research that early and late bilinguals will be more accurate on gender assignment than agreement, on masculine than feminine forms, on canonical noun endings than non-canonical and exceptional noun endings, and on gender-congruent than incongruent conditions. Starting from these hypotheses, the following sections will revisit the results of the experimental study to provide a more fine-grained analysis of the effect of each variable examined in the present study, namely type of agreement domain (6.1.3.1), noun gender and ending (6.1.3.2) and noun gender congruency (6.1.3.3).

6.1.3.1 Gender acquisition a matter of learning lexical or syntactic properties?

The present study examined whether the source of variability is lexical (gender assignment) or syntactic (gender agreement). The literature reports diverging results concerning the question on whether the domain D+N or N+Adj is more problematic. While some studies observed problems in the D+N domain (e.g. Grüter et al. 2012; Hopp 2012; Stöhr et al. 2012), others found the N+Adj domain to be more error-prone (Finnemann 1992; Fernández-García 1999; Montrul et al. 2008; Martínez-Gibson 2011; Alarcón 2006, 2011). The present study has also yielded mixed results, which are only partially in accordance with the proposed hypothesis that bilinguals will be more accurate on gender assignment than on gender agreement. A close look at the accuracy rates for gender assignment and agreement reveals that there are no statistically significant differences for bilinguals in the GJT as they perform equally well in both agreement domains, whereas the accuracy of participants on gender assignment and agreement differed significantly in the other tasks, most notably in the FCST and OEPT. The results show that early and late bilinguals produce more gender assignment errors in the FCST, while in the OEPT agreement was the problem.

One possible reason why early and late bilinguals produce more non-target-like realizations of gender assignment than agreement in the FCST could be that participants were given the definite article together with the noun when asked to establish gender agreement. Establishing gender agreement in the FCST seems to be less difficult than gender assignment, as bilinguals just had to apply the fundamental rule of Spanish grammar that adjectives must agree with the nouns they refer to in gender. Participants received a further advantage as there were no time limits set for the FCST, and thus they had time to consider how to apply the rule. If the results were really a by-product of methodological limitations, it is plausible to consider that gender agreement rather than assignment is the most problematic domain because it occurs less frequently in the input (Rodina and Westergaard 2013). However, this line of reasoning holds true only for the oral production task as there were no significant differences between the two agreement domains in the comprehension task when taking into account only the overall accuracy irrespective of the grammaticality conditions (grammatical vs. ungrammatical).

The finding that problems with gender agreement were more pronounced in the OEPT than in the other two tasks (FCST and GJT) could be taken to indicate that these results are influenced by the task type and its degree of implicitness or explicitness. The OEPT requires a higher degree of metalinguistic awareness compared to the other tasks used in the study. This explanation is consistent with the proposals of Bialystok and Ryan's (1985) model, suggesting that performance is influenced by the degree of task difficulty, by explicit vs. implicit knowledge and by the participants' control. Accordingly, tasks (i.e. spontaneous speech production) that require a high degree of cognitive control and a high level of analytical knowledge lead to higher performance levels by bilinguals, while tasks such as the OEPT, which allow low cognitive control and a low level of analytical knowledge, could affect the performance by bilinguals and trigger higher rates of variability in their responses. Support for this interpretation of the present results is further added by Montrul's (2013) study on the knowledge of Spanish morphosyntax of a Guatemalan adoptee called Alicia, who was raised in a small Mid-American town in the US. Similar to the findings in the present study, Alicia made more gender errors in the oral production task which specifically elicited gender agreement than in spontaneous speech. In Montrul's view, the degree of metalinguistic awareness was higher in the oral production task than spontaneous speech and affected the accuracy of gender agreement on nouns and adjectives. Since

Alicia performed better in the implicit than in the explicit task, Montrul (2013: 105) concludes that "Alicia's performance seems to be similarly affected by the degree of explicitness of these tasks". This view offers a plausible account of the statistical differences between the two agreement domains detected in the OEPT but fails to explain why only English-Spanish L2 learners at all proficiency levels also display a statistical difference in the two agreement domains in spontaneous speech. There is a possible set of factors that could have triggered this. For instance, differences in the frequency and amount of exposure to Spanish inside and outside the classroom as well as differences in formal instruction could have affected the English-Spanish L2 group more than the German-Spanish group (Alarcón 2011; Diebowski 2013).

Furthermore, the varying results between the two L2 groups could also be ascribed to the different profiles of the two groups, namely that the English-speaking L2 Spanish learners do not have gender in their L1, whereas German-speaking L2 learners have gender instantiated in their L1, and their accuracy on gender agreement on nouns and adjectives is only affected when performing a specific task, due to computation problems. This proposal is captured in the MSIH (Prévost and White 2000) and will be revisited in section 6.2.1.

6.1.3.2 The variables noun gender and noun ending

Research on the acquisition of Spanish gender by early and late bilinguals has provided ample evidence for significant effects of noun gender and noun ending. According to these studies, it has been established that early and late bilinguals opt for the use of unspecified forms in Spanish, namely the unmarked masculine default form, when they cannot access the appropriate form (e.g. Tarone et al. 1976; Finnemann 1992; Dewaele and Véronique 2001; Cain et al. 1987; White et al. 2004; Montrul et al. 2008; Alarcón 2006, 2011). Furthermore, most studies have reported that lower rates of accuracy are found with nouns that have a non-canonical or exceptional ending than with nouns that have a canonical ending (González 1978; Hernández-Pina 1984; Fernández-García 1999; Finnemann 1992; Franceschina 2001, 2005; Montrul et al. 2008; Montrul 2013; Diebowski 2013, among others).

Based on these findings, it has been hypothesized that bilinguals tend to overuse the masculine default form and to be more accurate with nouns that have a canonical ending. The present study has found a significant effect of noun gender and noun ending across all participants and tasks in the data. For the effect of noun gender, the present results are unexpected and appear to contradict previous results, as they show that L2 learners and HSs are more accurate with the feminine forms of determiners and adjectives than with the masculine forms. This corroborates the findings of Fernández-García (1999), Bruhn de Garavito and White (2000) and McCowen and Alvord (2006), who documented that the masculine form operates as a default for some, while others chose the feminine form as a default (assigning feminine forms to masculine nouns).[71]

There are many possible reasons why the participants in the present study could have used the feminine as a sort of default gender. In Bruhn de Garavito and White's (2000) study on L2 acquisition of Spanish DPs by French natives, the authors ascribe the occurrence of a feminine default form in their data to individual variation among participants. When looking at the data individually for the groups who appear to perform better with feminine than masculine nouns, various speakers even at the same proficiency level tended to adopt different strategies. This observation lends support to individual variation in the use of different gender values.

Another explanation for the emergence of the feminine form as a default, however, is that there can be a connection between a noun's gender and its ending. This implies that bilinguals tend to overgeneralize the feminine form in a masculine context, in particular with nouns that have a non-canonical or exceptional ending (e.g. **la*$_{\text{Fem}}$ *día*$_{\text{Masc}}$ – *el*$_{\text{Masc}}$ *día*$_{\text{Masc}}$ 'the day'). Added support for this interpretation comes from the significant noun gender and noun ending interaction, which was found in the data. The issue may be even more complex, as a closer look at the data for early and late German-Spanish bilinguals reveals. From the perspective of German-Spanish bilinguals, the overuse of the feminine form could have been influenced by the broader phenomenon of gender congruency. It seems that German-Spanish bilinguals tend to overuse the feminine gender for those nouns which are masculine in Spanish but feminine in the German translation equivalent of the noun. This is especially true for nouns ending in schwa, for example, *el*$_{Masc}$ *maquillaje*$_{Masc}$ – *die*$_{Fem}$ *Schminke*$_{Fem}$ 'the make-up' (for further discussion of this issue see section 6.1.3.3).

As far as the effect of noun endings is concerned, the present study found that the performance of early and late bilinguals was modulated by the noun ending. As in the results of previous research (including work by Fernández-García 1999; Finnemann 1992; Franceschina 2001, 2005; Montrul et al. 2008, 2014;

71 Some scholars, e.g. Tsimpli (2011), make a distinction between linguistic default and learner default. The linguistic default form is the unmarked form (here: the masculine gender), whereas learner default is the marked, morphologically salient form (i.e. the feminine gender). The present work agrees with Tsimpli's view, but considers this point to be more of a quibble over terminology. Thus, the term 'default' is used as a neutral umbrella term to refer to both instances.

Martínez-Gibson 2011; Alarcón 2006, 2011) and as predicted in the present study, bilinguals were less accurate with noun endings that were non-canonical and exceptional than with those that were canonical. This finding is not surprising. In Harris (1991), the author discusses in detail the connection between gender and phonological expression (also called inflectional or word class marker) in the Spanish gender system and assumes that there is "a correspondence between the form N and its gender" (Alexiadou, Haegeman and Stavrou 2008: 238). According to Harris, the phonological expressions are considered to correspond to word declension classes but not to the category 'gender' because there is not always a straightforward relationship between these two (see also Delfitto, Fábregas and Melloni 2008 for a similar claim). Based on this assumption, he distinguishes between three types of nouns in Spanish: (1) inner core nouns, (2) outer core nouns and (3) residues. Inner core nouns are those that show a correpondence between phonological expression and gender such as *la casa* 'the house' or *el libro* 'the book'. In other words, the word marker *-a* corresponds to the feminine and *-o* to the masculine. Outer core nouns consist of those nouns which lack a word marker but have interpretable gender such as *el coche* 'the car' or *la noche* 'the night'. The residual class comprises idiosyncratic words such as masculine nouns ending in *–a,* e.g. *el día* 'the day', or feminine nouns ending in *–o,* e.g. *la mano* 'the hand'. Harris's distinction of three groups allows us to maintain that the nouns of the inner core should be less prone to errors than those nouns belonging to the outer core or the residual class, which require that more information about gender and the noun class is stored in the lexicon. Looking at the results of the present study from this perspective, it seems to be a perfectly sound explanation to account for why bilinguals are better with nouns that have a canonical ending than with non-canonical nouns and nouns with an exceptional ending. Bilinguals appear to overgeneralize the correspondence between gender and word markers for nouns of the inner core (i.e. nouns ending in *-o* are masculine and those ending in *-a* are feminine) to nouns belonging to the residual class (e.g. **la mapa – el mapa* 'the map').

Note, however, that in cases such as *la pijama* it is hard to know whether L2 learners have assigned feminine gender to the noun due to its ending (i.e. overgeneralization of a rule) or have had this lexical item with its feminine gender value in their input. In the latter case, *la pijama* could not be considered as an error. Especially in the USA, there are many Spanish language instructors, who come from Latin- and South America and teach their Spanish variety such as Colombian or Mexican Spanish to students in which the noun *pijama* is feminine. This study has not gathered any information about the teaching material or the variety of Spanish used by the instructors, so this possibility cannot be ruled out. As mentioned in this section, it is also possible that some of these instances found in the data of early and late German-Spanish bilinguals are triggered by an effect of gender congruency and/or CLI. These potential factors will become the focus of discussion in the next section.

6.1.3.3 Congruency effects and instances of CLI

Previous studies (Alarcón 2006; van Hell and Tokowicz 2010; Foucart and Frenck-Mestre 2011; Renner 2014; Klassen 2016, among others) have observed a visible effect of gender (in)congruency on L2 grammars. To my knowledge, there are no studies which have investigated gender congruency effects in Spanish HL using offline tasks. The fact that the experimental items used in the FCST, GJT and OEPT were controlled for congruency and evenly distributed between the two conditions, i.e. gender-congruent vs. gender-incongruent, allows us to discuss how congruency effects shape the linguistic performance of early and late German-Spanish bilinguals. Following previous work (Alarcón 2006; Stöhr et al. 2012; Renner 2014), it was hypothesized that German-Spanish bilinguals perform better in gender-congruent than gender-incongruent conditions. The higher error rate in gender-incongruent conditions (i.e. where the grammatical gender of German nouns does not match that of the translation equivalent noun in Spanish) is considered to result from lexical transfer of the abstract grammatical gender feature from German to Spanish. The findings in the present study are in line with this prediction and fully support the claim I advance here. Consistent with previous research, the German-Spanish L2 learners and HSs in this study performed significantly better in overall gender-congruent rather than gender-incongruent conditions. The difference in the error rates between the two congruency conditions can be taken to indicate that German-Spanish bilinguals transferred the gender from the noun in German to the translation equivalent in Spanish, and thus affected their performance. Furthermore, the findings lend support to the gender integrated representation hypothesis (Salamoura & Williams 2007). According to this hypothesis, the activation of the same shared gender node for L1-L2 gender-congruent nouns has a facilitating effect as there is no competition between gender nodes within an L1–L2 shared system. In contrast, gender incongruent nouns activate two different – but shared – gender nodes, resulting in competition that must be resolved prior to selection. German-Spanish L2 learners and HSs may fail to prevent the use of the grammatical gender of the translation equivalent noun in German and thus select the incorrect gender node. Figure 6.1 illustrates the gender-integrated representation hypothesis for gender-congruent and incongruent nouns.

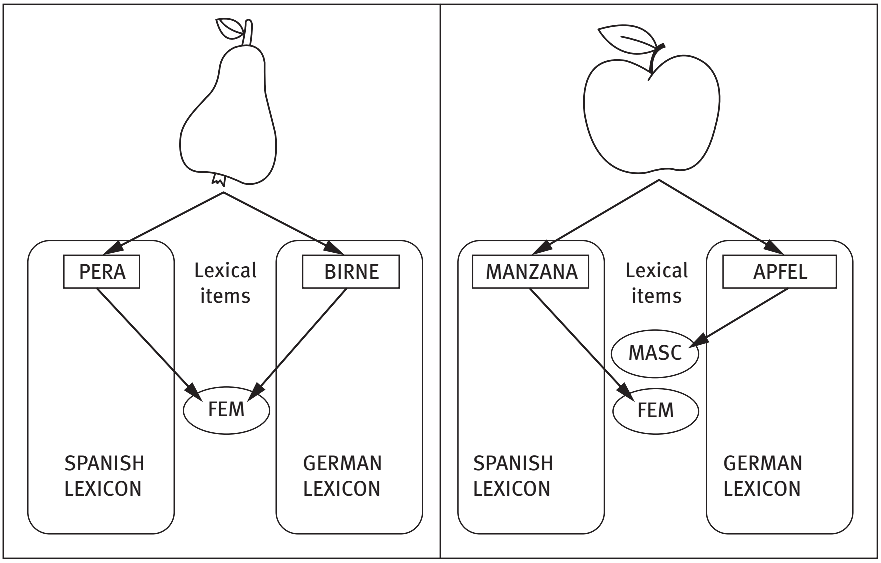

Figure 6.1: The gender-integrated representation hypothesis (Salamoura and Williams 2007) for L1-L2 gender-congruent nouns (left) and L1–L2 gender-incongruent nouns (right) (adapted from Costa et al. 2003).

It is important to note that the factor congruency was found to interact with gender. In other words, there are differences in the accuracy rates for gender-congruent and incongruent nouns across the two gender values (masculine and feminine). The findings in the present study revealed that the majority of early and late German-Spanish bilinguals were significantly more accurate with feminine nouns than with masculine nouns in the congruent condition. In the case of German-Spanish L2 learners, the higher error rate for Spanish masculine nouns which have the same gender value as the German translation equivalents seems closely related to the morphophonological shape of the Spanish noun, as discussed in section 6.1.3.2. A closer examination of the error patterns in the gender-congruent condition supports this claim, showing that most errors occurred with masculine nouns ending in *-a* (e.g. **la*$_{\text{Fem}}$ *pijama*$_{\text{Masc}}$**el*$_{\text{Mas}}$ *pijama*$_{\text{Masc}}$ 'the pajamas'). In these cases, L2 learners follow the morphophonological rule and assign masculine gender to these types of nouns (residues; see Harris 1991; Diebowski 2013). In fact, this error pattern cannot be considered as an instance of transfer from German but rather as an instance of overgeneralizing a learning strategy (i.e. nouns ending in *-a* are feminine). This proposal is recurrent in the literature since other researchers, (including Schachter 1974; Yip and Mathews 1991; Taraban and Kempe 1999; Franceschina 2005 and Diebowski 2013), have also suggested that L2 learners may resort to preventive and corrective strategies to reduce their error rate. Further support for this idea comes from psycholinguistic studies which have shown that language processing is strongly influenced by morphological cues (Alarcón 2010, 2011; Sagarra and Herschensohn 2011). For HSs, this explanation for these error patterns is not plausible. According to Montrul et al. (2008) and Martínez-Gibson (2011), these errors can be attributed to incomplete acquisition; yet a close scrutiny of this claim raises doubt about whether such analyses are correct. Given the fact that nouns such as *pijama* 'pajamas' can take either the masculine or the feminine determiner depending on the variety of Spanish, it is more plausible to attribute these errors to dialectal variation. In other words, the emergence of this error pattern may be triggered by the frequency and amount of exposure of German-Spanish HSs to other varieties of Spanish, e.g. Colombian Spanish. It is reasonable to assume that such contact modifies the grammar of German-Spanish HSs and that they regularize the dialectal differences between Spanish varieties, shifting the pattern of gender usage (*el pijama* used in Spain and the Southern Cone of Latin America) toward greater similarity with the gender pattern in other Spanish dialects, e.g. Colombian Spanish.

This proposal is not new in the literature. Based on a study on the use of subject personal pronouns in Spanish by English-Spanish bilinguals residing in NYC, Otheguy and Zentella (2012) also assumed that dialect and language contact shape the Spanish of English-Spanish bilinguals in New York City. They found that English-Spanish bilinguals from the Mainland exhibited an increased use of personal subject pronouns in Spanish which was not mainly due to influence from the majority language English but rather to daily interaction with other English-Spanish bilinguals originating from the Caribbean, who form the majority of Hispanics in NYC and tend to use subject pronouns more often in their variety of Spanish.

Turning from the results of the gender-congruent to the gender-incongruent condition, the findings demonstrate that there is a strong relationship between congruency, noun gender and task type/modality. In the FCST, HSs and L2 learners had considerable difficulty with masculine nouns, while the opposite pattern applied in the GJT. In oral production, not all the groups had the same difficulties but varied according to their level of proficiency. Intermediate and advanced German-Spanish HSs obtained statistically comparable results for both gender values in gender-incongruent conditions, while low-proficiency German-Spanish HSs were more accurate with masculine than feminine nouns in gender-incongruent conditions. The results for intermediate and advanced German-Spanish L2 learners in oral production show that they were much more accurate with masculine than feminine nouns, while the opposite applied to low-proficiency German-Spanish L2 learners.

The analysis of the interaction between gender-incongruent conditions and noun gender across the three tasks does not provide a clear picture but rather suggests that the different outcomes could be influenced by task effects, which will be discussed in greater detail in section 6.1.4. As found by Imaz Agirre (2015) for the acquisition of gender agreement in English by Basque-Spanish bilinguals, the nature of the task effects in each linguistic condition appears to pose different degrees of difficulty for early and late German-Spanish bilinguals in the present study. As a result, early and late German-Spanish bilinguals behave differently with regard to gender values and gender-incongruent conditions in the three tasks.

The effect of CLI was also investigated in this study, focusing in particular on those nouns with orthografic overlap (*-e*) in Spanish and German (see Appendices 7.5; 8.5 and 9.5). These nouns offer an excellent case for examining potential CLI in bilingual performance. Even though the accuracy rates for nouns ending in *-e* were quite low across all three tasks, the findings of the study revealed that in the FCST and GJT HSs and L2 learners were more accurate with feminine nouns than masculine nouns ending in *-e*. A comparison of the accuracy rates for both gender values illustrates clear transfer patterns and confirms the following prediction of the present study: German-Spanish HSs and L2 learners achieve higher accuracy rates in contexts in which Spanish nouns and their German translation equivalents, both ending in *-e*, have the same gender value (e.g. la_{Fem} $fuente_{\mathrm{Fem}}$ – die_{Fem} $Quelle_{\mathrm{Fem}}$ 'the source'). This result points to CLI as facilitation (Eichler et al. 2013; Unsworth et al. 2014; Egger, Hulk and Tsimpli 2017). In contexts in which Spanish nouns and their German translation equivalents have different gender values (el_{Masc} $puente_{\mathrm{Masc}}$ – die_{Fem} $Brücke_{\mathrm{Fem}}$ 'the bridge'), German-Spanish HSs and L2 learners tend to transfer the gender value from the German to the Spanish noun, leading to higher percentages of incorrect gender assignment and agreement. This is an indication of CLI with adverse effects on the mastery of Spanish gender. Similar to the finding by nonce word studies (e.g. Pérez-Pereira 1991), HSs and L2 learners seem to follow the morphophonological route (i.e. via noun endings) instead of the lexical route. It can be assumed that transfer may have arisen due to difficulties in reassembling gender features in Spanish, and in order to overcome these problems, participants resort to transfer (Lardiere 2009; Imaz Agirre 2015). Note that the high error rate of L2 learners with the noun *puente* could also stem from confusing the gender of the phonologically similar Spanish noun *fuente*. Both translation equivalents are feminine in German, but they have different gender values in Spanish.

Interestingly, the data obtained from oral production revealed unexpected findings. In the OEPT, HSs and L2 learners across all proficiency levels displayed statistically comparable accuracy rates for nouns ending in *-e* irrespective of the noun's gender. Task type and modality seem to be relevant factors for the emergence of transfer. Contrary to the written tasks, no transfer effects could be found in the oral tasks. The interaction between task modality and transfer effect has to be treated with caution and needs to be further investigated in future studies. So far, this section has shown that the emergence of divergent forms is triggered by overgeneralization of morphological cues, dialectal levelling, congruency effects and CLI. As outlined in this and earlier sections, it seems that morphological variability is influenced by the nature of the task type and by its modality. This issue will be taken up for discussion in the next section.

6.1.4 Task and modality effects

Thus far, the research questions related to ultimate attainment, and the extralinguistic and linguistic factors causing variability have been addressed. The fourth research question will discuss the findings in relation to task and modality effects. For convenience RQ#4 is repeated below:

> 4. Is there a correlation between participants' gender accuracy and the types of tasks and their modality?

It was hypothesized on the basis of the findings from previous research (e.g. White et al. 2004; Franceschina 2005; Montrul et al. 2008; Alarcón 2011) that there is an overall difference between the grammatical knowledge of gender among L2 learners and HSs that is deployed during comprehension and production as well as in the written and oral modalities. L2 learners should be more accurate on written production and comprehension than oral production, while the opposite should hold true for HSs.

With respect to task effects, the results of the present study show that all L2 and HS groups were more accurate in written production than comprehension. This result contradicts previous findings in the SLA literature according to which L2 learners show better performance in written comprehension than production (e.g. Imaz Agirre 2015). However, there seems to be a straightforward explanation for the present finding which lies in the degree of difficulty. Although both the written production and comprehension tasks tap into metalinguistic knowledge of language, the design of the tasks greatly impacted participants' performance. The written production task with the forced-choice format was quite easy compared to the GJT (see Boone 2007; Larrabee 2007). Another possible factor, as discussed in section 6.1, relates to the fact that L2 learners and HSs are substantially less exposed to GJTs inside and outside of the classroom and thus feel uneasy and unsure about judging the grammaticality of sentences. Furthermore, it is important to remember that HSs often do not consider themselves to be native speakers of their HL (Donnes-Herrera 2015) and therefore approach the GJT in a very different way from monolinguals. While the results of the present study showed a general trend for better performance on written production than comprehension, advanced German-Spanish HSs and English-Spanish L2 learners obtained statistically comparable accuracy rates in both tasks. This finding could be explained by several factors such as the amount and frequency of input and Spanish use (Putnam & Sánchez 2013), the context in which Spanish was learnt (Montrul 2010a, b) and the type of Spanish instruction e.g. traditional output-based vs. processing instruction (Potowski, Jegerski and Morgan-Short 2009; Potowski 2014). As discussed earlier, an increasing use and exposure to Spanish outside and inside the formal classroom setting may strengthen the speakers' language awareness and metalinguistic reflection capacity. In view of the effect of language instruction, there is support from a few studies in the field of SLA that have examined these factors. Scholars such as Isabelli-García (2010), Ellis and Sagarra (2010), Escandón and Sanz (2011) and Diebowski (2013) have considered instructional effects in their studies on the acquisition of gender. By and large, results indicated that instruction may enhance implicit and explicit knowledge of the L2.

In relation to oral and written task modalities, the present results showed a clear asymmetry between these two modalities. The results for the English-Spanish and German-Spanish L2 learners are in accordance with the prediction and previous studies (e.g. Franceschina 2001; Montrul et al. 2008; Grüter et al. 2012; Alarcón 2011). English-Spanish L2 learners across all proficiency levels were found to be less accurate in the oral modality that seems to tap into implicit knowledge than in the written modality measuring more explicit knowledge. This result implies that English-Spanish L2 learners have considerable explicit knowledge that is often developed in the classroom setting. Marull's (2017) study on the locus of L2 Spanish processing inefficiency in terms of gender and number supports the current findings. Similar to the present study, she studied a population of English-speaking learners of L2 Spanish in New Jersey and found that they performed at or near ceiling level in written tasks, maximizing their use of explicit knowledge, but did not do so in oral tasks.[72]

72 The explanation, based on the distinction between explicit and implicit knowledge, is, however, debated in the literature because it remains unclear "whether this distinction is a continuum or [a] dichotomy" (Alarcón 2011: 344). Furthermore, it is also unclear "whether explicit knowledge becomes implicit, automatic, or integrated" (Montrul 2016a: 279; see also Jiang 2007).

The results for the German-Spanish HS group across all proficiency levels and the English-Spanish HS group at the intermediate and advanced proficiency level in the present study are contrary to the prediction that HSs perform better on oral tasks than written ones due to their higher level of implicit knowledge. Consistent with Kupisch et al. (2013), the present finding showed that the aforementioned HSs performed equally well in both modalities. This finding is not surprising because the HSs involved in this study attended Spanish classes, which were not in all cases specific HL classes. This result does not preclude the possibility that an effect in these groups can be found when they have had no or little instruction in Spanish. In the case of the low-proficiency German-Spanish and English-Spanish HSs, the results indicated more accuracy in the written than the oral modality. The fact that low-proficiency HSs achieve better results in receptive than productive tasks could be explained by several factors, such as their frequent exposure to written (explicit knowledge) rather than oral tasks (implicit knowledge) in the majority language and HL because of attending Spanish classes, the limited amount of exposure to Spanish and its limited use. Furthermore, one has to take into account that the written tasks were not timed, and thus low-proficiency HSs had more control of the task. Evidence supporting this claim comes from van Osch and Sleemann's (2016) study on the judgment and production of Spanish mood by HSs of Spanish in the Netherlands. They found that Dutch-Spanish HSs behaved more similarly to monolinguals in a metalinguistic acceptability judgment task measuring explicit knowledge than in an oral production task requiring implicit knowledge. The authors attribute this finding to differences in the environmental circumstances. Similar to the claim made for the present results, van Osch and Sleemann (2016: 15) argue:

> Hispanic communities in the Netherlands are small and dispersed, Dutch heritage speakers of Spanish may lack the experience of speaking their heritage language on a regular basis that would help them in an oral production task. Furthermore, the multilingual nature of the Dutch educational system may give rise to a higher metalinguistic awareness from which the Dutch heritage speakers would benefit in a more explicit judgment task.

Even though the explanations put forward in the present study and in previous investigations are relatively conclusive, further research with a large variety of task types and modalities needs to be carried out as scholars use them as a basis for conclusions about ultimate attainment in Spanish SLA and HLA.

6.2 Exploring linguistic attainment and implications for language acquisition theory

6.2.1 Attainment of gender in Spanish and implications of SLA theory

In the ongoing debate on whether L2 learners are able to achieve ultimate attainment in L2 Spanish, several accounts (representational accounts, computational accounts and alternative accounts e.g. Feature Reassembly Hypothesis (FRH)) have been put forward and served as explanations for morphological variability in L2 grammars. The empirical results presented in this book show that no theoretical L2 account can fully explain divergent outcomes among the L2 learners. This is an interesting result. The results seem to support the view that problems in acquiring gender in Spanish may reside in a mapping problem.

In this section, I will discuss the extent to which these accounts explain the data in this study. The representational accounts such as Hawkins and Chan's (1997) Failed Functional Feature Hypothesis (FFFH) take morphological variability to be indicative of L2 learners' underlying syntactic deficits, which are due to maturational constraints. As stated in 3.2.1, the FFFH predicts that English-Spanish L2 learners encounter severe problems in acquiring uninterpretable gender features in Spanish due to their absence in the L1 English.

Consistent with the prediction of the FFFH, age and L1 effects have been found to have an impact on the performance of L2 learners in the present study. HSs who acquired Spanish early in childhood outperformed L2 learners. Concerning L1 effects, L2 learners with the language pair German-Spanish exhibited higher gender accuracy rates than those with the language pair English-Spanish. These results offer evidence that AoO of bilingualism and the L1 of L2 learners play a role in how linguistic knowledge is acquired. Nonetheless, the combined results in the present study for the groups of L2 learners still shed doubts onto the FFFH's claim that uninterpretable features not present in the L1 of L2 learners cannot be fully acquired. The data presented in chapter 5 show that L2 learners are able to attain target-like accuracy in terms of Spanish gender irrespective of whether gender is instantiated in their L1 or not (accuracy means: 70%–90% for English-Spanish L2 learners across all proficiency levels and tasks). Further evidence against a deficit in the underlying representation of gender features in L2 grammars comes from the observation of task effects, suggesting that variability is not a deficit in the underlying representation of morphosyntactic features but rather a problem of mapping and the failure to supply surface morphological forms (see Prévost and White 2000; McCarthy 2007; Lardiere 2000, 2008 for the same position).

Relating to the idea that variability is a problem in mapping, Prévost and White (2000) put forward the Missing Surface Inflection Hypothesis (MSIH), which predicts that L2 learners will be less accurate in oral production tasks than comprehension tasks due to difficulties accessing and assembling gender morphology under communication pressure. This prediction could not be confirmed by the findings in the present study. The comprehension task seemed to be more challenging than the written/oral production tasks. The findings in the present study, therefore, seem to be best explained by the Feature Reassembly Hypothesis (FRH, Lardiere 2000, 2005, 2009). According to the FRH, morphological variability is also not considered as a learnability problem but rather as a mapping problem. In other words, L2 learners have to discover how gender features which they have acquired are assembled in L2 Spanish. This view can help to understand why English-Spanish and German-Spanish L2 learners exhibit morphological variability (Zobl and Liceras 2006). The data in the present study suggest that L2 learners are able to achieve feature reconfiguration. In the case of German-Spanish L2 learners, the study shows that having a gender system in their L1 German which is partly similar to that of the L2 Spanish helps learners, especially in those contexts where the L1 and the L2 converge in terms of the feature configuration. In environments where the L1 and L2 diverge in their feature configurations, German-Spanish L2 learners have some difficulty reconfiguring the feature values in functional categories and lexical items from those of L1 German to L2 Spanish. Mapping difficulties in German-Spanish L2 learners are observed in particular for nouns ending in *-e* and can be accounted for by assuming direct transfer from L1 German. In contrast to German-Spanish L2 learners, the data for the English-Spanish L2 learner groups indicate that feature assembly is an arduous process which cannot be guaranteed to be complete. The fact that English, unlike Spanish, has no grammatical gender puts English-Spanish L2 learners in a disadvantageous position. This L1–L2 distance leads English-Spanish L2 learners to rely on morphological cues and rule-based learning (nouns ending in *-o*/*-a* are masculine/feminine), which may result in a mapping problem and ultimately non-target-like output. These mapping difficulties do, however, seem to decrease with increasing proficiency. Finally, it should be mentioned that though the FRH is able to explain to a certain extent the variability found in the L2 data, differences in the amount and type of instruction as well as individual factors such as an individual's working memory, or level of motivation may also play a role (Taraban and Kempe 1999). The fact that factors like individual differences and L2 instruction may also play a role cannot be dismissed especially when comparing the different degrees of variability of English-Spanish L2 learners to German-Spanish learners. We may speculate that the English-Spanish L2 groups may have practiced grammatical gender in their Spanish class to a certain extent but not enough in order to fully internalize it. To fully understand the role of the type and amount of instruction and what this means for the L2 acquisition of gender is a major topic for future research.

6.2.2 Attainment of gender in Spanish and implications of HLA theory

An important issue in the field of HLA concerns the question of how to account for the variability observed in the grammar of HSs. From a theoretical perspective, there are three different proposals (i.e. an incomplete acquisition account, an input-delimited differences account, and a HL activation account) that have been put forth to explain patterns of variation in HS outcomes. On the whole, the results obtained in the present study provide evidence that irrespective of the language-pair advanced HSs can achieve complete acquisition of grammatical gender as displayed by their consistently high accuracy rates, ranging from 93%–100%. In other words, they have a stable system of grammatical gender which is nearly indistinguishable from SDCs. Contrary to this 'perfect' performance, the low-proficiency English-Spanish HS group's accuracy rate of 71%–89% does not come as a surprise because these low-profiency bilinguals, regardless of AoO, are expected to perform less well than intermediate- and advanced-proficiency speakers.

In the following, each of the three accounts for divergence in HSs (see section 3.1) will be addressed in a discussion of how the data from HSs in the present study can best be explained. However, it must first be pointed out that the high accuracy rates compared to the low number of inaccuracies presents a challenge to the attrition/incomplete acquisition account (e.g. Montrul 2002, 2008, 2016a, b) as well as to the input-delimited differences account (e.g. Rothman 2007; Pires and Rothman 2009). Nonetheless, these accounts will be considered in order to describe in more detail the position that they adopt.

The attrition account (e.g. Polinsky 2011) is based on the assumption that HSs have acquired gender with native-like accuracy in their childhood but lost or failed to make use of this grammatical property later on in adulthood. The attrition account is neither in line with the results of the present study nor can this study actually comment on that account due to the absence of child data.

The incomplete acquisition account (e.g. Montrul 2016a), suggesting that divergence is an indication of a representation deficit, is also not compatible with the present data. However, if we accept the assumption that the low-proficiency English-Spanish HS group, which differs in accuracy rates from the other HS groups and SDCs, has a different – or in Montrul's words 'incomplete' – underlying representation of gender, the incomplete acquisition account would still fail to explain what triggered this less target-like representation of gender and what is actually meant by this (see Giancaspro 2017 for a similar view).

The input-delimited difference account (e.g. Pires and Rothman 2009) ascribes variability to differences in the quantity and quality of input HSs receive in their HL from first-generation immigrants (SDCs). The claim that HSs received variable input in terms of gender is not borne out by the data because the majority of HSs in the present study show categorically target-like (90%–100%) knowledge of gender. The fact that the first-generation immigrants (SDCs) tested in this study also showed categorically target-like (99%) knowledge of gender is counterevidence to the input-delimited difference account. Furthermore, it is important to note that gender marking on the determiner or adjective is by no means restricted to a certain heritage dialect to which they need to be exposed in order to acquire this property (see Rothman 2007; Pires and Rothman 2009 for this issue). This suggests that the variability of HSs found in the present study is triggered by other factors.

A fine-grained analysis of the HSs' gender systems has revealed that forms of variability in the current data arise from an interplay of various factors such as frequency and amount of Spanish language use, proficiency, CLI, etc. In view of this finding, the results presented in chapter 5 seem to be most consistent with Putnam and Sánchez' (2013) HL activation account. Putnam and Sánchez (2013) propose that morphosyntactic asymmetries in HSs result from a new process of feature reassembly of a complete HL (L1) system. The instances of feature reassembly/rebundling in HSs' grammars are triggered by the frequency and amount of Spanish language exposure and use and CLI from the majority language in the environment. More recently, Perez Cortes (2016) has found that the level of proficiency is an important component in HSs' feature reassembly and thus incorporated this variable into Putnam and Sánchez' (2013) account. If we follow this line of reasoning, it is predicted that the process of reconfiguration of formal features is less likely to emerge in high-proficiency HSs who have a good command of Spanish and a high level of HL activation than in those with a poor command of Spanish and a low level of HL use. The results of the present study provide evidence that there is a relationship between patterns of language use, level of proficiency and performance on gender. The minimal rates of gender variability displayed by intermediate- and advanced-proficiency English-Spanish and German-Spanish HSs appear to be motivated by higher levels of proficiency and higher patterns of exposure to and activation of Spanish, whereas a limited command of the HL and low patterns of activation negatively affect the gender accuracy of low-proficiency English-Spanish HSs. If we follow Putnam and Sánchez' (2013) account, the high rates of variability with feminine nouns among low-proficiency English-Spanish

HSs, which were in particular found in the OEPT, can be explained in the framework of feature reassembly. Adopting this view, the low-proficiency English-Spanish HS group may have experienced difficulties activating feminine gender features with certain nouns due to their limited patterns of HL activation and therefore resorted to the masculine gender value. This type of error seems to emerge from the process of restructuring Spanish [+strong] feminine gender features (e.g. Cinque 1994; Bruge 2002) and "the mapping of English [-strong] values onto Spanish lexical items (i.e. masculine forms take a neutral semantic value equally pertinent for both masculine and feminine representations in the absence of morphological cues on the noun)" (Cuza and Pérez-Tattam 2015: 15). This interpretation of the finding seems to be plausible and acknowledges the impact of Spanish language activation and the proficiency level on gender accuracy. However, Putnam and Sánchez' (2013) HL activation account does not fully explain cases of overgeneralization of feminine gender marking in gender agreement (e.g. **la*$_{\text{Fem}}$ *pijama*$_{\text{Masc}}$ 'the pajamas', **la*$_{\text{Fem}}$ *mapa*$_{\text{Masc}}$ 'the map'). For errors such as **la*$_{\text{Fem}}$ *mapa*$_{\text{Masc}}$ 'the map' the explanation of dialectal leveling does not hold. These errors could be related to the role of lexical learning. It may be the case that low-proficiency English-Spanish HSs have acquired gender but failed to learn how gender features are instantiated on certain lexical items. As a result, these lexical items are not firmly entrenched in the HSs' lexicon and may lead HSs to resort to the closest, more accessible gender feature (Langacker 2002; Montrul and Potwoski 2007; Irrizari van Suchtelen 2016). This simple cognitive principle may result in a divergent encoding of a definite article as exemplified in Figure 6.2.

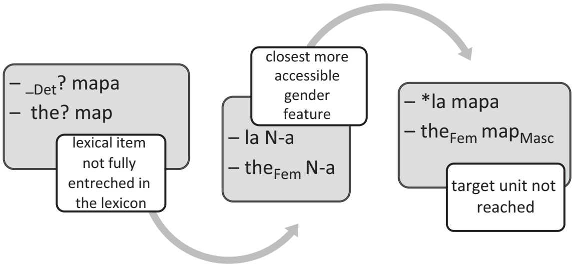

Figure 6.2: Divergent encoding of a definite article with the noun 'mapa'.

Given these plausible explanations, one major question still remains: Why do low-proficiency German-Spanish HSs not exhibit the same problems as their English-Spanish comparison group? It is not surprising that low-proficiency German-Spanish HSs, unlike their English-Spanish HS cohort, display a less dramatic range of morphological variability because they have acquired two [+gen] languages in which they access gender features. Another possibility that can be reasonably assumed is that low-proficiency German-Spanish HSs have had many more opportunities to be exposed to and use Spanish at home and school,[73] which has allowed them to develop their knowledge of gender in a different way from proficiency-matched English-Spanish HSs. It is important to note that task types and their modalities have also been found to shape the morphological knowledge of HSs to a certain degree and could thus account for some of the variability. Without doubt, HSs' variability is triggered by an interplay of various factors (proficiency, HL activation, instruction etc.) and it is hard to determine which of them is the driving factor as their relationship is dynamic.

Current HLA research has already shown that there is substainal gain in examing the role of extra- and intralinguistic factors as well as the process of feature (re)assembly in order to explain divergent grammars. The challenge for current HLA theory is to determine what the sources of divergence are. In this book, I have explored the sources of HL grammar divergence in the acquisition of gender in Spanish and argue based on the obtained results that various factors (see Figure 3.2 and Figure 6.3) have to be brought together in one HLA

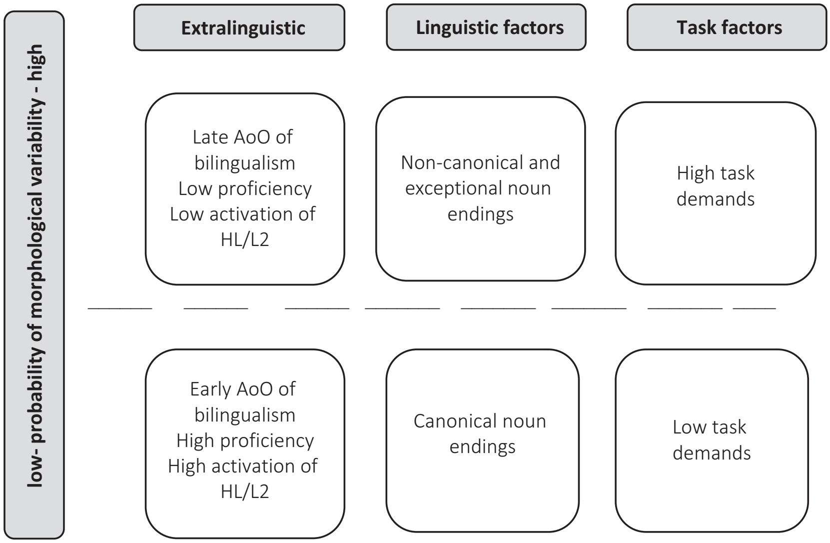

Figure 6.3: Model of factors increasing and decreasing the probability of morphological variability.

73 Contrary to the US, the German education system provides HSs with the opportunity to attend HL classes in order to maintain their HL (see also section 3.1)

approach in order to fully understand when and how variability in the grammars of L2 learners and HSs emerge. It is argued that L2 learners' and HSs' grammars are not incomplete, a view that has become firmly entrenched in the literature, but rather shaped by many factors and their complex interplay.

Figure 6.3 illustrates the factors which were found to increase and decrease the likelihood of morphological variability in the grammars of early and late bilinguals. The factors presented in the model are causally interrelated and, thus, it is difficult to determine which of them has the greatest influence in causing morphological variability. The model distinguishes between three main factors, that is: (1) extralinguistic factors, (2) linguistic factors and (3) task factors. Based on these factors, it is predicted that an early AoO of bilingualism, high level of proficiency and use of the HL/L2 decreases the likelihood of morphological variability. Furthermore, variability is less likely to emerge with canonical noun endings that follow the general rule (i.e. nouns ending in *-o* are masculine and those ending in *-a* are feminine) and in tasks which are low in demands and high in control. By contrast, factors involving a late AoO of bilingualism, low level of proficiency and use of the HL/L2 are proposed to be good predictors for feature reassembly and transfer from the dominant language. It is expected that variability is more likely to be found with non-canonical and exceptional noun endings and/or in metalinguistic tasks which demand higher levels of both analysis and control. Note that one or more of the factors can outweigh other factors and, thus, prevent HSs and L2 learners from exhibiting instances of variability in the use of grammatical gender. As mentioned earlier (see section 3.1.4), it is postulated that a high level of proficiency and increasing use of Spanish may prevent differences in AoO of bilingualism from affecting participants' accuracy (see e.g. Moyer 2004, 2011; Perez Cortes 2016). In fact, this study found that the proficiency level and amount of Spanish activation are important factors influencing the performance of early and late bilinguals. The model proposed here does not only provide some insights into the tenability and falsifiability of the linguistic approaches to HS divergence/variability but also profitably contributes to our understanding of HSs' linguistic competence. Among various factors, the use of the HL seems to be related to the level of proficiency of a speaker. It is possible that HSs reanalyze the gender system in their HL based on their limited amount of HL use. The reanalysis of the gender system in the HL may differ from the one of dominant Spanish controls. The question of what amount of HL use is required to acquire and retain gender features remains open to speculations, but knowing what factors lead individual HSs to alternate between target-like and non-target-like realizations of gender may help us to understand the complexity of HL grammars. Clearly, we must keep exploring this question by investigating knowledge of gender and other grammatical properties among heritage speakers of different dominant languages. A clear advantage of such research and approach which takes into consideration the interplay between different extra-and intralinguisttic variables on the knowledge of gender and other grammatical properties is that it helps us to answer the question of how to account for the variation in the gender realizations.

Understanding why, when and how variability in the grammars of L2 learners and HSs emerge has implications for language teaching (see Ortega 2012, Alonso Alonso 2018) as well as for SLA and HLA theory and for future studies (see section 6.3; Carreira 2011, 2012, 2016; Giancaspro 2017).

6.3 Limitations and avenues for future research

The research conducted in this project suggests that an approach which combines the investigation of linguistic (e.g. domain, nominal morphology) and extralinguistic factors (e.g. age, language combination) as the sources of divergence can achieve a better understanding of the nature of different acquisition contexts (HLA vs. SLA). That said, the present study has also some limitations. In this section, I provide some suggestions for future investigations which will play an important role in further enlightening the results obtained by this and previous studies on SLA and HLA. One particular practical and methodological limitation lies in the FCST. As acknowledged in chapter 5, the fact that participants were given the definite article in the experimental sentences when asked to establish gender agreement, may have helped them to be more accurate in the N+Adj domain compared to the D+N domain. To reduce the possibility that target-like responses on gender agreement can result from the presence of definite articles, future research could address this issue by using possessive pronouns that are not marked for gender in experimental sentences testing gender agreement between the noun and adjective.[74]

This study included a large number of bilinguals, the fact that the groups were relatively small when proficiency, language combination, and AoO is taken into consideration represents another limitation. In spite of this, the present study was still able to capture differences and trends in the linguistic performance of participants across different language pairs. Nonetheless, these results should be considered indicative and not conclusive. In order to

74 Note that most possessive pronouns in Spanish do not mark for gender, for further details see section 2.3.2.

determine the generalizability of the findings, future studies should include a larger sample size. It would be interesting for further investigations to also include bilinguals with other language pairings – both typologically related and unrelated – in order to obtain more data and a deeper understanding of the effect of the language combination on the acquisition of gender assignment and agreement in Spanish.

A third limitation is the lack of data regarding participants' educational history (e.g. type of instruction, classroom setting, teaching material and tasks, native or non-native teacher, Spanish variety taught) especially given that the results obtained in the present study suggest an effect of language instruction on participants' gender accuracy. To date, there has been little research on the effects of different types of language instruction and setting, such as immersion programs, on early and late bilinguals' mastery of gender (e.g. Bosworth Andrews 2004; Diebowski 2013; Hopp 2016). One future line of research should consider the impact of formal language instruction, the role of active language use in the classroom setting and the exposure to tasks in order to shed more light on how these factors affect the language development and linguistic performance of HSs and L2 learners in various grammatical areas, including gender acquisition (Polinsky 2015; Escobar and Potowski 2015; Fairclough and Beaudrie 2016; Zapata and Lacorte 2017). It would also be interesting to compare and contrast L2 learners and HSs who have been formally instructed in Spanish to those without any experience of formal language teaching. This line of research would enhance our understanding of the role of HL and L2 instruction and could contribute to HLA and SLA research as well as to the development of pedagogical strategies.

A fourth limitation of the study is the limited period of data collection from L2 learners and HSs, which was restricted to a single experimental session. As a result, the study provides only a snapshot of the knowledge of gender by L2 learners and HSs. A longitudinal experimental study, though not without its practical challenges, could shed more light on the complex nature of L2 development and HL maintenance as well as on the variation found in early and late bilinguals over time. Furthermore, it would be beneficial to employ data collected through online/processing tasks as such a design would allow us to "reveal information about L2 [and 2L1] gender representation, retrieval, and use" (Alarcón 2006: 91). Finally, a future line of research incorporating different types of tasks would be beneficial to further explore the effects of extralinguistic and linguistic factors found to be relevant in the present study.

6.4 Concluding remarks

The goal of this book was to investigate the effects of extralinguistic and linguistic variables on the mastery of gender by English-Spanish and German-Spanish early and late bilinguals. Multiple instruments, including written and oral as well as production and comprehension tasks, were used to collect data. The results of this experimental study revealed that a wide variety of extralinguistic (AoO of bilingualism, amount of Spanish language activation, task types and modalities) and linguistic factors (agreement domain, noun endings, gender value) influence the performance of L2 learners and HSs. Beyond these factors, language combination was found to play a crucial role in the degree of morphological variability. The present study also provided evidence that both L2 learners and HSs, irrespective of the language combination, have knowledge of gender in the L2/HL and that the source of variability in their performance does not lie in an inability to represent formal features (Hawkins and Chan 1997) but is rather a mapping problem (Lardiere 2009). The results obtained in this study further suggest that a proficient command of the L2/HL as well as high level of L2/HL activation patterns help bilinguals to successfully map the correct form onto the abstract gender feature. These findings provide invaluable information for L2/HL researchers and language instructors alike, as well as paving the way for further investigations.

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Appendices

Appendix 1: Overview of experimental nouns

	Test item		Translation of the test item		
	Spanish gender	**Spanish noun**	**German gender**	**German noun**	**English noun**
1.	fem.	fuente	fem.	Quelle	source
2.	masc.	zapato	masc.	Schuh	shoe
3.	fem.	guitarra	fem.	Guitarre	guitar
4.	fem.	mano	fem.	Hand	hand
5.	masc.	pijama	masc.	Pijama	pajamas
6.	masc.	sombrero	masc.	Hut	hat
7.	masc.	guante	masc.	Handschuh	glove
8.	fem.	leche	fem.	Milch	milk
9.	fem.	salchicha	fem.	Wurst	sausage
10.	masc.	chocolate	fem.	Schokolade	chocolate
11.	fem.	radio	neut.	Radio	radio
12.	masc.	mapa	fem.	Karte	map
13.	masc.	libro	neut.	Buch	book
14.	fem.	llave	masc.	Schlüssel	key
15.	fem.	camisa	neut.	Hemd	shirt
16.	masc.	sofá	neut.	Sofa	couch
17.	masc.	puente	fem.	Brücke	bridge
18.	fem.	foto	neut.	Foto	photo

*fem. = feminine; masc. = masculine, neut. = neuter.

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Appendix 2: Participant information

Spanish proficiency levels (self-reported scores in % and official DELE scores) for English-Spanish HSs ($N = 65$).

	Spanish[75]					English				PWMT[76]
	Production		Comprehension		DELE[77]	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
HS_US_1	50	29	70	21	54	42	29	65	28	18
HS_US_2	16	19	29	10	36	45	19	62	27	18
HS_US_3	35	30	59	18	40	50	30	70	30	18
HS_US_4	21	30	35	12	28	50	30	70	30	18
HS_US_5	50	28	69	19	46	50	28	66	30	18
HS_US_6	37	30	53	17	35	50	30	70	30	18
HS_US_7	34	28	47	18	30	50	28	69	30	18
HS_US_8	37	30	57	19	42	50	30	67	30	18
HS_US_9	47	30	67	20	41	50	30	70	30	18
HS_US_10	48	30	62	15	33	50	30	70	30	18
HS_US_11	35	30	69	20	40	50	30	70	30	18
HS_US_12	25	30	53	12	33	50	30	70	30	18
HS_US_13	23	30	30	9	34	50	30	70	30	18
HS_US_14	21	28	45	19	40	46	28	70	30	18
HS_US_15	50	30	70	21	33	50	30	70	30	18
HS_US_16	36	30	69	18	29	50	30	70	30	18
HS_US_17	17	27	31	15	33	45	27	62	30	18

75 The percentage of language proficiency in Spanish and English was calculated out of different possible situations presented (reading, watching TV, talking to friends, writing a letter/email, etc).

76 Recall that the maximum score of the PWMT was 18 points.

77 Recall that the maximum score of the DELE proficiency test was 56 points.

(continued)

	Spanish					English				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
HS_US_18	30	30	60	18	26	50	30	70	30	18
HS_US_19	40	26	60	17	40	46	26	65	26	18
HS_US_20	34	30	55	19	45	50	30	70	30	18
HS_US_21	50	30	70	19	42	50	30	70	30	18
HS_US_22	44	30	62	18	28	50	30	70	30	18
HS_US_23	29	30	62	16	30	50	30	70	30	18
HS_US_24	50	30	50	11	47	50	30	70	30	18
HS_US_25	31	30	49	15	33	50	30	70	30	18
HS_US_26	50	30	70	21	46	50	30	70	30	18
HS_US_27	45	30	63	19	40	50	30	68	30	18
HS_US_28	48	30	67	21	45	50	30	70	30	18
HS_US_29	30	30	60	10	32	50	30	70	30	18
HS_US_30	27	30	38	12	19	50	30	70	26	18
HS_US_31	50	30	70	21	49	40	30	69	30	18
HS_US_32	40	30	70	19	41	50	30	70	30	18
HS_US_33	36	30	52	16	42	50	30	70	30	18
HS_US_34	38	30	62	17	44	50	30	70	30	18
HS_US_35	32	30	47	15	44	50	30	70	30	18
HS_US_36	31	30	62	18	36	50	30	70	30	18
HS_US_37	50	29	70	21	44	47	29	70	30	18
HS_US_38	50	30	68	20	42	46	30	66	28	18
HS_US_39	28	30	48	14	29	50	30	70	30	18
HS_US_40	50	30	70	16	51	50	30	70	30	18
HS_US_41	42	30	64	11	43	50	30	70	30	18
HS_US_42	36	30	69	10	31	50	30	70	30	18

(continued)

	Spanish					English				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
HS_US_43	30	30	53	10	27	50	30	70	30	18
HS_US_44	45	27	63	19	51	45	27	63	27	18
HS_US_45	50	30	70	21	48	50	30	67	30	18
HS_US_46	50	28	70	19	50	50	28	70	28	18
HS_US_47	45	30	70	20	47	50	30	70	30	18
HS_US_48	50	27	70	21	50	45	27	63	27	18
HS_US_49	45	27	70	20	51	37	27	69	27	18
HS_US_50	43	30	70	18	47	50	30	70	30	18
HS_US_51	39	30	64	18	43	48	30	67	30	18
HS_US_52	50	30	70	21	46	50	30	70	30	18
HS_US_53	31	30	68	16	42	50	30	70	30	18
HS_US_54	28	30	56	16	45	50	30	70	30	18
HS_US_55	45	30	63	19	41	50	30	68	30	18
HS_US_56	38	30	70	21	48	50	30	70	30	18
HS_US_57	28	30	48	14	28	50	30	70	30	18
HS_US_58	50	29	70	21	46	45	29	70	28	18
HS_US_59	50	30	70	20	49	50	30	70	30	18
HS_US_60	30	30	53	10	31	50	30	70	30	18
HS_US_61	48	30	63	20	44	50	30	70	30	18
HS_US_62	37	27	58	17	43	47	27	66	29	18
HS_US_63	40	30	70	15	44	50	30	70	30	18
HS_US_64	50	28	70	21	46	34	28	69	29	18
HS_US_65	25	30	52	18	38	50	30	70	30	18

Appendix 3: Participant information

Spanish proficiency levels (self-reported scores in % and official DELE scores) for English-Spanish L2 learners ($N = 60$).

	Spanish					English				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
L2_US_1	16	30	28	22	36	50	30	70	30	18
L2_US_2	30	30	50	23	46	50	30	70	30	18
L2_US_3	36	30	51	27	46	50	30	70	30	18
L2_US_4	22	30	31	20	22	50	30	70	30	17
L2_US_5	6	30	10	12	14	50	30	70	30	16
L2_US_6	5	30	24	18	25	50	30	70	30	18
L2_US_7	27	24	46	21	46	44	24	61	25	17
L2_US_8	41	30	60	27	45	50	30	70	30	18
L2_US_9	13	30	28	15	24	50	30	70	30	17
L2_US_10	17	30	38	19	17	50	30	70	30	17
L2_US_11	30	30	32	16	22	50	30	70	30	18
L2_US_12	41	30	63	25	47	50	30	70	30	18
L2_US_13	13	30	28	15	20	50	30	70	30	18
L2_US_14	11	30	23	21	34	50	30	70	30	18
L2_US_15	34	30	53	27	36	50	30	70	30	18
L2_US_16	19	30	43	24	45	50	30	70	30	18
L2_US_17	21	29	33	22	36	50	29	70	30	18
L2_US_18	18	30	20	14	25	50	30	70	30	18
L2_US_19	13	30	47	7	19	50	30	70	30	17
L2_US_20	5	30	57	21	37	50	30	70	30	17
L2_US_21	33	30	55	24	34	50	30	70	30	17
L2_US_22	38	30	59	27	46	50	30	70	30	17
L2_US_23	20	30	47	19	24	50	30	70	30	17

(continued)

	Spanish					English				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
L2_US_24	37	29	58	27	36	47	29	69	27	17
L2_US_25	30	30	54	21	44	50	30	70	30	18
L2_US_26	32	30	54	22	34	50	30	70	30	18
L2_US_27	32	30	55	27	45	50	30	70	30	18
L2_US_28	44	30	61	25	35	50	30	70	30	18
L2_US_29	32	30	47	21	19	50	30	70	30	17
L2_US_30	35	30	49	22	25	50	30	70	30	18
L2_US_31	21	30	33	22	34	50	30	70	30	18
L2_US_32	25	30	30	13	46	50	30	70	30	18
L2_US_33	5	30	12	11	34	50	30	70	30	18
L2_US_34	41	30	63	25	47	50	30	70	30	18
L2_US_35	24	30	50	21	26	50	30	70	30	18
L2_US_36	35	30	52	26	36	50	30	70	30	18
L2_US_37	33	30	40	22	20	50	30	70	30	17
L2_US_38	24	30	47	20	46	50	30	70	30	18
L2_US_39	24	30	48	22	46	50	30	70	30	18
L2_US_40	16	30	23	20	34	50	30	70	30	18
L2_US_41	20	30	35	18	37	50	30	70	30	18
L2_US_42	33	30	50	21	22	50	30	70	30	18
L2_US_43	41	30	61	27	37	50	30	70	30	18
L2_US_44	33	30	49	21	46	50	30	70	30	18
L2_US_45	9	29	31	18	37	45	29	67	29	18
L2_US_46	35	28	49	26	20	45	28	63	30	17
L2_US_47	18	30	39	22	46	47	30	70	28	18
L2_US_48	40	30	56	26	46	50	30	70	30	18

(continued)

	Spanish					English				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
L2_US_49	16	30	19	10	24	50	30	70	30	18
L2_US_50	19	30	50	22	16	50	30	70	30	17
L2_US_51	25	30	52	21	45	49	30	68	29	18
L2_US_52	27	30	46	24	45	50	30	70	30	18
L2_US_53	37	30	48	22	35	50	30	70	30	18
L2_US_54	25	28	48	24	18	42	28	66	28	17
L2_US_55	24	30	40	18	46	50	30	70	30	18
L2_US_56	6	30	18	6	21	50	30	70	30	18
L2_US_57	24	30	32	23	35	50	30	70	30	18
L2_US_58	30	30	62	28	36	50	30	70	30	18
L2_US_59	35	30	51	22	34	50	30	70	30	18
L2_US_60	27	30	45	19	16	50	30	70	30	17

Appendix 4: Participant information

Spanish proficiency levels (self-reported scores in % and official DELE scores) for German-Spanish HSs ($N = 56$).

	Spanish					German				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
HS_G_1	39	30	55	21	32	50	30	70	30	18
HS_G_2	50	22	70	30	48	38	22	58	22	18
HS_G_3	43	30	60	27	43	50	30	70	30	18
HS_G_4	50	26	70	28	49	45	26	59	26	18
HS_G_5	37	30	56	26	43	50	30	70	30	18
HS_G_6	50	24	70	30	45	41	24	55	23	18
HS_G_7	50	18	70	30	55	34	18	54	24	18
HS_G_8	45	27	69	27	29	40	27	66	29	18
HS_G_9	50	24	70	30	55	42	24	56	24	18
HS_G_10	44	26	66	30	53	42	26	59	29	18
HS_G_11	50	22	70	30	55	38	22	58	22	18
HS_G_12	36	29	58	25	25	50	29	70	30	18
HS_G_13	50	17	70	30	56	38	17	63	26	18
HS_G_14	48	27	68	30	41	42	27	66	29	18
HS_G_15	24	24	38	20	47	43	24	70	30	18
HS _G_16	40	26	50	24	30	50	26	70	24	18
HS _G_17	45	27	69	27	41	40	27	66	29	18
HS _G_18	23	27	50	17	30	45	27	70	27	18
HS _G_19	45	27	69	27	37	40	27	66	29	18
HS _G_20	50	17	70	30	53	38	17	63	26	18
HS _G_21	50	18	70	30	50	34	18	54	24	18
HS _G_22	50	21	70	30	55	38	21	56	21	18

(continued)

	Spanish					German				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
HS _G_23	50	21	70	30	56	44	21	63	30	18
HS _G_24	50	21	65	27	23	47	21	66	27	17
HS _G_25	50	21	70	30	56	38	21	56	21	18
HS _G_26	35	27	59	21	21	50	27	70	30	18
HS _G_27	43	30	60	27	42	50	30	70	30	18
HS _G_28	50	30	70	30	43	50	30	70	30	17
HS _G_29	36	30	62	26	30	50	30	70	30	18
HS _G_30	40	26	50	24	44	50	26	70	24	18
HS _G_31	45	14	70	30	55	30	14	67	25	18
HS _G_32	39	30	55	21	40	50	30	70	30	18
HS _G_33	44	26	66	30	54	42	26	59	29	18
HS _G_34	44	30	67	27	42	50	30	70	30	18
HS _G_35	50	30	70	30	56	50	30	70	30	18
HS _G_36	50	25	70	30	49	46	25	70	30	18
HS _G_37	36	30	62	26	29	50	30	70	30	18
HS _G_38	37	30	56	26	40	50	30	70	30	18
HS _G_39	44	30	67	27	41	50	30	70	30	18
HS _G_40	47	27	68	30	38	42	27	66	29	18
HS _G_41	45	27	69	27	37	40	27	66	29	18
HS _G_42	45	27	69	27	34	40	27	66	29	18
HS _G_43	50	30	70	30	40	50	30	70	30	18
HS _G_44	40	26	50	24	41	50	26	70	24	18
HS _G_45	39	30	55	21	42	50	30	70	30	18
HS _G_46	43	30	60	27	39	50	30	70	30	18
HS _G_47	35	27	59	21	24	50	27	70	30	18

(continued)

	Spanish					German				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
HS _G_48	45	27	69	27	27	40	27	66	29	18
HS _G_49	50	21	65	27	22	47	21	66	27	18
HS _G_50	39	30	55	21	30	50	30	70	30	18
HS _G_51	23	27	50	17	29	45	27	70	27	18
HS _G_52	40	26	50	24	31	50	26	70	24	18
HS _G_53	36	29	58	25	30	50	29	70	30	18
HS _G_54	43	30	60	27	39	50	30	70	30	18
HS _G_55	50	25	70	30	46	46	25	70	30	18
HS _G_56	50	21	65	27	48	47	21	66	27	18

Appendix 5: Participant information

Spanish proficiency levels (self-reported scores in % and official DELE scores) for German-Spanish L2 learners ($N = 60$).

	Spanish					German				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
L2_G_1	21	29	28	18	26	50	29	70	30	18
L2_G_2	33	30	43	9	45	50	30	70	30	18
L2_G_3	33	30	54	23	46	50	30	70	30	18
L2_G_4	33	30	55	20	52	50	30	70	30	18
L2_G_5	18	30	44	25	51	50	30	70	30	18
L2_G_6	39	30	55	19	48	50	30	70	30	18
L2_G_7	22	27	33	23	38	50	27	70	30	18
L2_G_8	31	30	52	19	34	49	30	70	30	18
L2_G_9	27	27	41	20	42	50	27	68	30	18
L2_G_10	22	30	54	23	45	50	30	70	30	18
L2_G_11	8	28	20	30	47	50	28	66	28	18
L2_G_12	15	30	15	27	21	41	30	70	30	18
L2_G_13	26	30	49	11	45	50	30	70	30	18
L2_G_14	34	26	62	17	50	50	26	70	30	18
L2_G_15	22	30	43	24	25	45	30	70	30	18
L2_G_16	36	30	54	21	50	50	30	70	30	18
L2_G_17	36	30	66	24	37	50	30	70	30	18
L2_G_18	36	14	54	27	51	46	14	43	16	18
L2_G_19	8	30	10	21	23	31	30	70	30	17
L2_G_20	7	30	17	13	21	50	30	70	30	17
L2_G_21	36	30	57	13	50	50	30	70	30	17
L2_G_22	36	30	55	22	32	50	30	70	30	18

(continued)

	Spanish					German				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
L2_G_23	30	30	47	24	50	50	30	70	30	18
L2_G_24	28	27	36	22	25	50	27	64	28	17
L2_G_25	44	30	64	18	41	48	30	70	30	18
L2_G_26	37	29	59	27	37	50	29	70	29	18
L2_G_27	24	30	49	23	31	49	30	70	30	18
L2_G_28	50	27	70	25	27	50	27	63	27	17
L2_G_29	42	30	58	30	52	45	30	70	30	18
L2_G_30	0	28	49	23	30	50	28	70	30	18
L2_G_31	33	30	63	21	29	50	30	70	30	17
L2_G_32	45	30	59	20	46	50	30	70	30	18
L2_G_33	6	30	4	26	20	50	30	70	30	17
L2_G_34	5	30	3	3	22	50	30	70	30	17
L2_G_35	34	30	48	3	45	50	30	70	30	18
L2_G_36	8	30	12	21	23	50	30	70	30	18
L2_G_37	17	30	30	2	27	50	30	70	30	18
L2_G_38	27	27	41	18	42	50	27	68	30	18
L2_G_39	47	27	68	23	38	50	27	69	27	18
L2_G_40	29	30	53	26	33	49	30	70	30	18
L2_G_41	40	30	63	23	49	50	30	70	30	18
L2_G_42	10	30	15	27	19	50	30	70	30	17
L2_G_43	26	25	34	9	21	50	25	70	30	17
L2_G_44	6	30	7	15	22	46	30	70	30	17
L2_G_45	20	27	30	3	34	50	27	68	27	18
L2_G_46	20	28	29	12	42	45	28	70	30	18
L2_G_47	44	30	70	12	49	45	30	70	30	18

(continued)

	Spanish					German				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
L2_G_48	25	30	63	30	37	50	30	70	30	18
L2_G_49	34	30	58	18	37	50	30	70	30	18
L2_G_50	38	30	52	18	38	50	30	70	30	18
L2_G_51	37	30	56	24	48	50	30	70	30	18
L2_G_52	16	30	35	26	35	50	30	70	30	18
L2_G_53	24	30	54	24	39	50	30	70	30	18
L2_G_54	37	30	51	20	40	50	30	70	30	18
L2_G_55	8	30	35	24	38	50	30	70	30	18
L2_G_56	20	30	46	27	47	50	30	70	30	18
L2_G_57	13	30	27	17	35	50	30	70	30	18
L2_G_58	24	30	54	30	39	50	30	70	30	18
L2_G_59	37	30	51	20	40	50	30	70	30	18
L2_G_60	50	30	69	24	54	50	30	70	30	18

Appendix 6: Participant information

Spanish proficiency levels (self-reported scores in % and official DELE scores) for SDCs ($N = 16$).

	Spanish					English/German				PWMT
	Production		Comprehension		DELE	Production		Comprehension		Score
	oral	written	oral	written	Score	oral	written	oral	written	
Control_1	50	29	70	21	54	42	29	65	28	18
Control_2	50	27	70	21	47	45	27	63	27	18
Control_3	50	27	70	21	45	46	27	63	27	18
Control_4	50	6	70	21	50	5	6	16	12	18
Control_5	50	27	70	21	46	44	27	63	27	18
Control_6	44	26	66	21	54	42	26	59	29	18
Control_7	50	22	70	21	55	38	22	58	22	18
Control_8	50	17	70	21	56	38	17	63	26	18
Control_9	45	27	69	19	45	40	27	66	29	18
Control_10	50	17	70	21	53	38	17	63	26	18
Control_11	50	18	70	21	55	34	18	54	24	18
Control_12	44	30	67	19	46	50	30	70	30	18
Control_13	50	30	70	21	50	50	30	70	30	18
Control_14	45	14	70	21	55	30	14	67	25	18
Control_15	50	30	70	21	56	43	30	63	30	18
Control_16	50	30	70	21	54	50	30	70	30	18

Appendix 7.1: FCST – detailed results of the linguistic factors for English-Spanish L2 learners

Domain of agreement	Group according to final vowel	English-Spanish L2 learners						SDCs	
		Low ($n=21$)		Intermediate ($n=20$)		Advanced ($n=19$)		Controls ($n=16$)	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Determiners	—o (Masc.)	96.8%	10.03	98.3%	7.45	100%	–	100%	–
	—a (Fem.)	85.7%	22.54	93.3%	13.68	94.7%	16.72	100%	–
	—e (Masc.)	66.7%	29.81	71.7%	32.94	77.2%	29.51	100%	–
	—e (Fem.)	60.3%	30.95	70%	14.91	84.2%	20.39	100%	–
	—a (Masc.)	39.7%	29.10	55%	31.11	64.9%	28.27	97.9%	8.33
	—o (Fem.)	60.3%	27.12	78.3%	27.09	80.7%	23.08	100%	–
Adjectives	—o (Masc.)	95.2%	11.95	98.3%	7.45	98.3%	7.65	100%	–
	—a (Fem.)	90.5%	15.43	96.7%	10.26	100%	–	97.9%	8.33
	—e (Masc.)	95.2%	11.95	96.7%	10.26	100%	–	100%	–
	—e (Fem.)	93.7%	17.06	98.3%	7.45	98.3%	7.65	100%	–
	—a (Masc.)	98.4%	7.27	93.3%	20.52	98.3%	7.65	100%	–
	—o (Fem.)	74.6%	23.35	85%	22.88	84.2%	23.22	100%	–

English-Spanish L2 learners' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 7.2: FCST – detailed results of the linguistic factors for English-Spanish HSs

Domain of agreement	Group according to final vowel	English-Spanish HSs						SDCs	
		Low (*n* = 18)		Intermediate (*n* = 26)		Advanced (*n* = 21)		Controls (*n* = 16)	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Determiners	—o (Masc.)	94.4%	17.15	97.4%	9.06	100%	–	100%	–
	—a (Fem.)	94.4%	12.78	96.2%	10.86	98.4%	7.27	100%	–
	—e (Masc.)	75.9%	33.93	91%	17.78	100%	–	100%	–
	—e (Fem.)	68.5%	26.75	87.2%	16.54	96.8%	10.03	100%	–
	—a (Masc.)	66.7%	25.57	92.3%	19.57	100%	–	97.9%	8.33
	—o (Fem.)	90.7%	19.15	96.2%	10.86	98.4%	7.27	100%	–
Adjectives	—o (Masc.)	98.2%	7.857	94.9%	12.27	100%	–	100%	–
	—a (Fem.)	92.6%	14.26	96.2%	10.86	98.4%	7.27	97.9%	8.33
	—e (Masc.)	96.3%	10.78	96.2%	10.86	100%	–	100%	–
	—e (Fem.)	94.4%	17.50	94.9%	12.27	98.4%	7.27	100%	–
	—a (Masc.)	98.2%	7.86	94.9%	12.27	100%	–	100%	–
	—o (Fem.)	94.4%	12.78	94.9%	12.27	98.4%	7.27	100%	–

English-Spanish HSs' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 7.3: FCST – detailed results of the linguistic factors for German-Spanish L2 learners

Domain of agreement	Group according to final vowel	German-Spanish L2 learners						SDCs	
		Low ($n = 21$)		Intermediate ($n = 20$)		Advanced ($n = 19$)		Controls ($n = 16$)	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Determiners	—o (Masc.)	100%	–	100%	–	100%	–	100%	–
	—a (Fem.)	94.7%	12.48	100%	–	100%	–	100%	–
	—e (Masc.)	79%	27.69	68.3%	27.52	84.1%	22.66	100%	–
	—e (Fem.)	80.7%	20.23	90%	15.67	92.1%	17.97	100%	–
	—a (Masc.)	63.2%	39.90	80%	27.36	88.9%	21.94	97.9%	8.33
	—o (Fem.)	79%	27.69	85%	20.16	95.2%	15.94	100%	–
Adjectives	—o (Masc.)	98.3%	7.65	100%	–	96.8%	10.03	100%	–
	—a (Fem.)	98.3%	7.65	100%	–	100%	–	97.9%	8.33
	—e (Masc.)	96.5%	10.51	96.7%	10.26	96.8%	10.03	100%	–
	—e (Fem.)	100%	–	100%	–	96.8%	10.03	100%	–
	—a (Masc.)	92.3%	23.78	90%	21.90	98.4%	7.27	100%	–
	—o (Fem.)	86%	25.62	93.3%	17.44	96.8%	10.03	100%	–

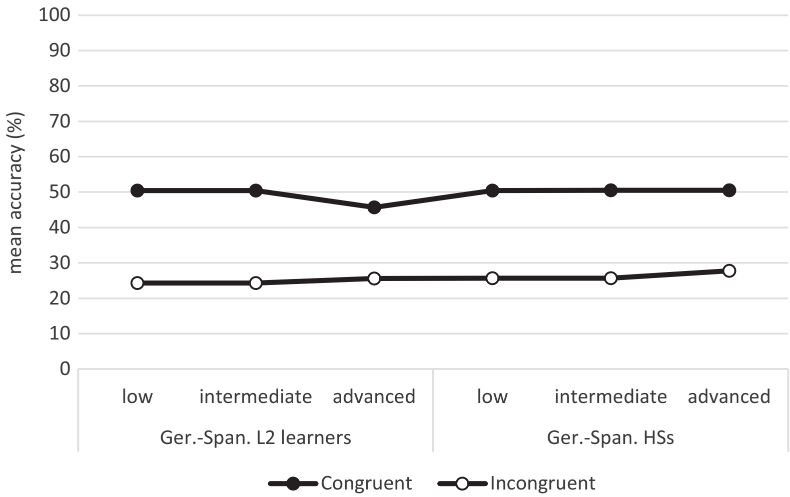
German-Spanish L2 learners’ mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 7.4: FCST – detailed results of the linguistic factors for German-Spanish HSs

Domain of agreement	Group according to final vowel	German-Spanish HSs						SDCs	
		Low (*n* = 16)		Intermediate (*n* = 20)		Advanced (*n* = 20)		Controls (*n* = 16)	
		M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Determiners	—o (Masc.)	100%	–	100%	–	98.3%	7.45	100%	–
	—a (Fem.)	100%	–	100%	–	100%	–	100%	–
	—e (Masc.)	87.5%	16.67	95%	12.21	98.3%	7.45	100%	–
	—e (Fem.)	83.3%	17.21	98.3%	7.45	100%	–	100%	–
	—a (Masc.)	87.5%	23.96	94.7%	12.49	96.7%	10.26	97.9%	8.33
	—o (Fem.)	95.8%	11.39	100%	–	96.7%	14.91	100%	–
Adjectives	—o (Masc.)	100%	–	100%	–	100%	–	100%	–
	—a (Fem.)	100%	–	100%	–	100%	–	97.9%	8.33
	—e (Masc.)	100%	–	100%	–	100%	–	100%	–
	—e (Fem.)	95.8%	11.39	100%	–	98.3%	7.45%	100%	–
	—a (Masc.)	100%	–	100%	–	100%	–	100%	–
	—o (Fem.)	95.8%	11.39	100%	–	98.3%	7.45	100%	–

German-Spanish HSs' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 7.5: CLI effects on German-Spanish bilinguals' gender accuracy in Spanish



FCST – Gender accuracy for nouns ending in -*e* by gender, group and proficiency level.

A repeated-measures ANOVA with a 2× (congruency condition), 2× (gender) and 6× (group) factorial design was carried out. There was a main effect of congruency [F (1, 110) = 1315.139***, *partial* η^2 = .923] revealing that there are differences in the accuracy rates across the two linguistic variables in all groups.

Appendix 8.1: GJT – detailed results of the linguistic factors for English-Spanish L2 learners

Domain of agreement	Group according to final vowel	English-Spanish L2 learners						SDCs	
		Low (*n* = 21)		Intermediate (*n* = 20)		Advanced (*n* = 19)		Controls (*n* = 16)	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Determiners	—o (Masc.)	93.7%	17.06	85%	31.48	98.2%	7.65	97.9%	8.33
	—a (Fem.)	69.8%	33.17	85%	27.52	93%	17.84	95.8%	11.39
	—e (Masc.)	69.8%	34.81	61.7%	40.86	66.7%	36.85	93.8%	13.44
	—e (Fem.)	79.4%	30.69	70%	37.31	87.7%	19.91	95.8%	11.39
	—a (Masc.)	61.9%	30.34	68.3%	29.57	86%	23.08	85.4%	20.97
	—o (Fem.)	61.9%	35.41	85%	25.31	91.2%	15.08	93.8%	13.44
Adjectives	—o (Masc.)	68.3%	37.23	90%	15.67	87.7%	19.91	97.9%	8.33
	—a (Fem.)	88.9%	19.25	86.7%	22.69	93%	13.96	100%	8.33
	—e (Masc.)	55.6%	38.49	73.3%	27.78	70.2%	33.14	87.5%	16.67
	—e (Fem.)	63.5%	34.81	85%	20.16	78.9%	27.69	89.6%	15.96
	—a (Masc.)	60.3%	37.44	76.7%	37.62	87.7%	27.69	93.8%	13.44
	—o (Fem.)	55.6%	30.43	60%	36.83	68.4%	30.38	97.9%	–

English-Spanish L2 learners' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 8.2: GJT – detailed results of the linguistic factors for English-Spanish HSs

Domain of agreement	Group according to final vowel	English-Spanish HSs						SDCs	
		Low (*n* = 21)		Intermediate (*n* = 20)		Advanced (*n* = 19)		Controls (*n* = 16)	
		M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Determiners	—o (Masc.)	87%	23.26	94.9%	15.47	95.2%	15.94	97.9%	8.33
	—a (Fem.)	75.9%	39.28	91%	24.14	95.2%	11.95	95.8%	11.39
	—e (Masc.)	72.2%	36.60	91%	17.78	96.8%	10.03	93.8%	13.44
	—e (Fem.)	55.6%	34.30	87.2%	19.04	92.1%	20.83	95.8%	11.39
	—a (Masc.)	66.7%	22.87	76.9%	26.28	69.8%	23.34	85.4%	20.97
	—o (Fem.)	88.9%	22.87	94.9%	12.26	100%	–	93.8%	13.44
Adjectives	—o (Masc.)	75.9%	39.28	89.7%	24.53	93.7%	17.06	97.9%	8.33
	—a (Fem.)	68.5%	37	87.2%	26.79	93.7%	13.41	100%	8.33
	—e (Masc.)	70.4%	37.73	79.5%	32.8	95.2%	11.95	87.5%	16.67
	—e (Fem.)	70.4%	25.28	80.8%	25.25	96.8%	10.03	89.6%	15.96
	—a (Masc.)	72.2%	26.20	88.5%	20.96	95.2%	11.95	93.8%	13.44
	—o (Fem.)	70.4%	30.01	91%	22.23	98.4%	7.27	97.9%	–

English-Spanish HSs' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 8.3: GJT – detailed results of the linguistic factors for German-Spanish L2 learners

Domain of agreement	Group according to final vowel	German-Spanish L2 learners						SDCs	
		Low (*n* = 21)		Intermediate (*n* = 20)		Advanced (*n* = 19)		Controls (*n* = 16)	
		M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Determiners	—o (Masc.)	96.5%	15.29	100%	–	100%	–	97.9%	8.33
	—a (Fem.)	82.5%	25.74	81.7%	29.57	82.5%	29.10	95.8%	11.39
	—e (Masc.)	89.5%	22.37	93.3%	13.68	93.7%	13.41	93.8%	13.44
	—e (Fem.)	94.7%	16.72	100%	–	98.4%	7.27	95.8%	11.39
	—a (Masc.)	61.4%	38.91	70%	34.03	71.4%	33.81	85.4%	20.97
	—o (Fem.)	56.1%	36.94	65%	33.29	81%	29	93.8%	13.44
Adjectives	—o (Masc.)	71.9%	29.94	86.7%	22.69	84.1%	24.99	97.9%	8.33
	—a (Fem.)	96.5%	10.51	98.3%	7.45	100%	–	100%	8.33
	—e (Masc.)	73.7%	30.6	58.3%	33.98	66.7%	29.81	87.5%	16.67
	—e (Fem.)	77.2%	31.53	70%	30.40	85.7%	24.88	89.6%	15.96
	—a (Masc.)	87.7%	25.36	93.3%	13.68	88.9%	19.25	93.8%	13.44
	—o (Fem.)	87.7%	16.52	63.3%	40.32	77.8%	28.54	97.9%	–

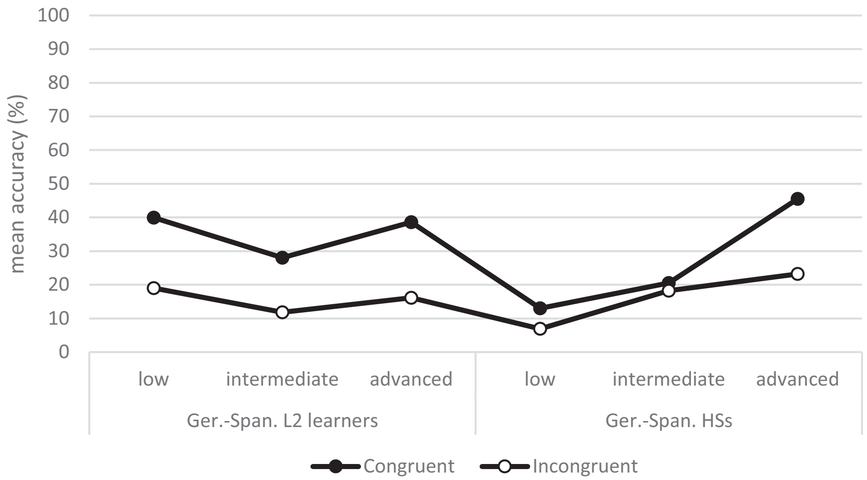
German-Spanish L2 learners' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 8.4: GJT – detailed results of the linguistic factors for German-Spanish HSs

Domain of agreement	Group according to final vowel	German-Spanish HSs						SDCs	
		Low (*n* = 21)		Intermediate (*n* = 20)		Advanced (*n* = 19)		Controls (*n* = 16)	
		M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Determiners	—o (Masc.)	100%	–	100%	–	100%	–	97.9%	8.33
	—a (Fem.)	91.7%	14.91	80%	31.34	91.7%	26.21	95.8%	11.39
	—e (Masc.)	100%	–	100%	–	100%	–	93.8%	13.44
	—e (Fem.)	100%	–	100%	–	100%	–	95.8%	11.39
	—a (Masc.)	83.3%	24.34	60%	25.59	93.3%	23.20	85.4%	20.97
	—o (Fem.)	66.7%	17.21	86.7%	16.75	93.3%	13.68	93.8%	13.44
Adjectives	—o (Masc.)	91.7%	14.91	100%	–	100%	–	97.9%	8.33
	—a (Fem.)	100%	–	100%	–	100%	–	100%	8.33
	—e (Masc.)	58.3%	22.77	73.3%	20.52	93.3%	17.44	87.5%	16.67
	—e (Fem.)	58.3%	14.91	76.7%	21.90	96.7%	10.26	89.6%	15.96
	—a (Masc.)	83.3%	17.21	80%	16.75	96.7%	10.26	93.8%	13.44
	—o (Fem.)	91.7%	14.91	100%	–	88.3%	16.31	97.9%	–

German-Spanish HSs' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 8.5: GJT – CLI effects on German-Spanish bilinguals' gender accuracy in Spanish



GJT – Gender accuracy for nouns ending in *-e* by gender, group and proficiency level.

A repeated-measures ANOVA with a 2× (congruency condition), 2× (gender) and 6× (group) factorial design was carried out. There was a main effect of congruency [F (1, 110) = 68.130***, *partial* η^2 = .382] lending support to the observed differences in the accuracy rates across the two linguistic variables in all groups.

Appendix 9.1: OEPT – detailed results of the linguistic factors for English-Spanish L2 learners

Domain of agreement	Group according to final vowel	English-Spanish L2 learners						SDCs	
		Low (*n* = 21)		Intermediate (*n* = 20)		Advanced (*n* = 19)		Controls (*n* = 16)	
		M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Determiners	—o (Masc.)	85.7%	22.54	91.7%	18.34	100%	–	100%	–
	—a (Fem.)	93.7%	13.41	96.7%	10.26	94.7%	12.49	100%	–
	—e (Masc.)	59.5%	43.64	65%	40.07	71.1%	38.43	100%	–
	—e (Fem.)	68.3%	35.71	76.7%	32.62	77.2%	33.43	100%	–
	—a (Masc.)	41.3%	40.70	55%	36.31	63.2%	34.95	100%	–
	—o (Fem.)	63.5%	31.46	63.3%	38.84	71.9%	29.94	100%	–
Adjectives	—o (Masc.)	84.1%	20.05	88.3%	19.57	98.2%	7.65	100%	–
	—a (Fem.)	73%	24.99	78.3%	29.17	80.7%	20.23	100%	–
	—e (Masc.)	66.7%	32.91	60%	41.68	68.42%	38.04	100%	–
	—e (Fem.)	57.1%	41.02	75%	28.36	71.9%	33.82	100%	–
	—a (Masc.)	46%	37.23	46.7%	36.51	54.39%	40.38	100%	–
	—o (Fem.)	55.6%	30.43	60%	36.83	68.4%	30.38	97.9%	8.33

English-Spanish L2 learners' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 9.2: OEPT – detailed results of the linguistic factors for English-Spanish HSs

Domain of agreement	Group according to final vowel	English-Spanish HSs						SDCs	
		Low (*n* = 21)		Intermediate (*n* = 20)		Advanced (*n* = 19)		Controls (*n* = 16)	
		M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Determiners	—o (Masc.)	90.7%	25.06	98.7%	6.54	100%	–	100%	–
	—a (Fem.)	94.4%	12.78	100%	–	100%	–	100%	–
	—e (Masc.)	72.2%	42.78	92.3%	23.20	100%	–	100%	–
	—e (Fem.)	59.3%	35.34	93.6%	16.38	100%	–	100%	–
	—a (Masc.)	57.4%	27.55	88.5%	22.98	98.4%	7.27	100%	–
	—o (Fem.)	75.9%	31.94	92.3%	19.57	100%	–	100%	–
Adjectives	—o (Masc.)	85.2%	23.49	97.4%	9.06	98.4%	7.27	100%	–
	—a (Fem.)	79.6%	20.26	88.5%	16.17	98.4%	7.27	100%	–
	—e (Masc.)	69.4%	34.89	86.5%	26.67	95.2%	15.04	100%	–
	—e (Fem.)	59.3%	37.15	91%	17.78	100%	–	100%	–
	—a (Masc.)	46.3%	32.62	80.8%	26.95	96.8%	10.03	100%	–
	—o (Fem.)	70.4%	30.01	91.0%	22.23	98.4%	7.23	97.9%	8.33

English-Spanish HSs' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 9.3: OEPT – detailed results of the linguistic factors for German-Spanish L2 learners

Domain of agreement	Group according to final vowel	German-Spanish L2 learners						SDCs	
		Low (*n* = 21)		Intermediate (*n* = 20)		Advanced (*n* = 19)		Controls (*n* = 16)	
		M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Determiners	—o (Masc.)	100%	–	100%	–	100%	–	100%	–
	—a (Fem.)	100%	–	100%	–	100%	–	100%	–
	—e (Masc.)	60.5%	39.37	85%	23.51	71.4%	40.53	100%	–
	—e (Fem.)	84.2%	23.22	80%	29.42	82.5%	30.95	100%	–
	—a (Masc.)	63.2%	41.42	73.3%	33.51	88.9%	16.10	100%	–
	—o (Fem.)	91.2%	15.08	66.7%	41.89	77.8%	24.34	100%	–
Adjectives	—o (Masc.)	100%	–	96.7%	10.26	100%	–	100%	–
	—a (Fem.)	93%	21.02	100%	–	100%	–	100%	–
	—e (Masc.)	47.4%	48.52	77.5%	25.52	69%	40.24	100%	–
	—e (Fem.)	71.9%	31.94	76.7%	36%	81%	30.86	100%	–
	—a (Masc.)	52.6%	40.55	66.7%	34.20	82.5%	22.65	100%	–
	—o (Fem.)	87.7%	16.52	63.3%	40.32	77.8%	28.54	97.9%	8.33

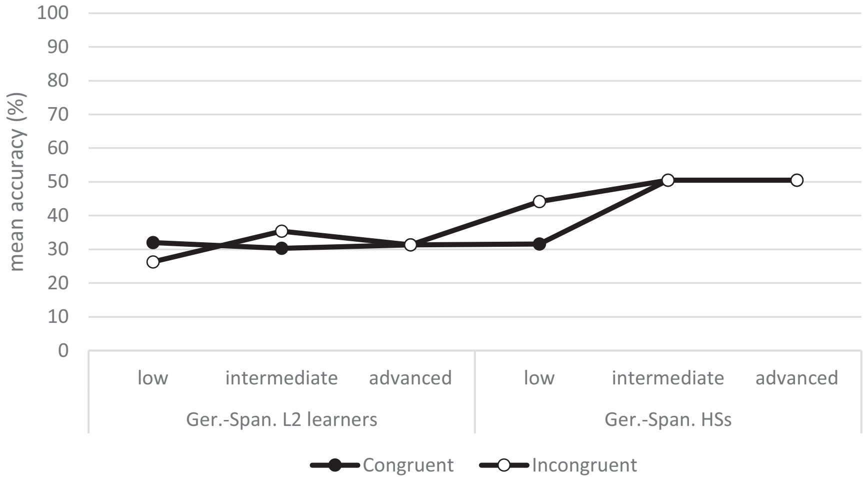
German-Spanish L2 learners' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 9.4: OEPT – detailed results of the linguistic factors for German-Spanish HSs

Domain of agreement	Group according to final vowel	German-Spanish HSs						SDCs	
		Low (*n* = 21)		Intermediate (*n* = 20)		Advanced (*n* = 19)		Controls (*n* = 16)	
		M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Determiners	—o (Masc.)	100%	–	100%	–	100%	–	100%	–
	—a (Fem.)	100%	–	96.7%	10.26	98.3%	7.45	100%	–
	—e (Masc.)	87.5%	34.16	100%	–	100%	–	100%	–
	—e (Fem.)	83.3%	24.34	100%	–	100%	–	100%	–
	—a (Masc.)	95.8%	11.39	93.3%	13.68	96.7%	14.91	100%	–
	—o (Fem.)	91.7%	14.91	100%	–	100%	–	100%	–
Adjectives	—o (Masc.)	100%	–	100%	–	100%	–	100%	–
	—a (Fem.)	95.8%	11.39	96.7%	10.26	98.3%	7.45	100%	–
	—e (Masc.)	87.5%	34.16	100%	–	100%	–	100%	–
	—e (Fem.)	83.3%	24.34	100%	–	100%	–	100%	–
	—a (Masc.)	95.8%	11.39	90%	15.67	90%	24.42	100%	–
	—o (Fem.)	91.7%	14.91	100%	–	88.3%	16.31	97.9%	8.33

German-Spanish HSs' mean accuracy and standard deviation on gender accuracy by domain of agreement, noun gender and noun ending.

Appendix 9.5: OEPT – CLI effects on German-Spanish bilinguals' gender accuracy in Spanish



OEPT – Gender accuracy for nouns ending in *-e* by gender, group and proficiency level.

The mean accuracy rates for the OEPT were each submitted to a repeated-measures ANOVA with a 2× (congruency condition), 2× (gender) and 6× (group) factorial design. There was a main effect of congruency [F (1, 110) = .538*, *partial* η^2 = .005] lending support to the observed differences in the accuracy rates across the two linguistic variables in all groups.

Appendix 10.1: FCST – Results of the ANOVA

Context	Group	ANOVA	Post-hoc test (Games Howell)
		Welch's F value	**Homogenous groups** ① low English-Spanish L2 learners ② intermediate English-Spanish L2 learners ③ advanced English-Spanish L2 learners ④ low English-Spanish HSs ⑤ intermediate English-Spanish HSs ⑥ advanced English-Spanish HSs ❶ low German-Spanish L2 learners ❷ intermediate German-Spanish L2 learners ❸ advanced German-Spanish L2 learners ❹ low German-Spanish HSs ❺ intermediate German-Spanish HSs ❻ advanced German-Spanish HSs
Overall gender accuracy	English-Spanish L2 learners	F (2, 37.25) = 10.92***	①⇔② ③
	German-Spanish L2 learners	F (2, 37.25) = 10.92*	❶ ⇔ ❷❸
	English-Spanish HSs	F (2, 30.27) = 25.64***	④⇔⑤⇔⑥
	German-Spanish HSs	F (2, 31.95) = 7.20**	❹ ⇔❺ ❻

ns = not significant (*p* > .05), **p* < .05., ***p* < .01., ****p* < .001.

Appendix 10.2: GJT – Results of the ANOVA

Context	**Group**	**F value or Welch's F value**	**Homogenous groups** (according to the Tukey HSD or Games Howell post-hoc test) ① low English-Spanish L2 learners ② intermediate English-Spanish L2 learners ③ advanced English-Spanish L2 learners ④ low English-Spanish HSs ⑤ intermediate English-Spanish HSs ⑥ advanced English-Spanish HSs ❶ low German-Spanish L2 learners ❷ intermediate German-Spanish L2 learners ❸ advanced German-Spanish L2 learners ❹ low German-Spanish HSs ❺ intermediate German-Spanish HSs ❻ advanced German-Spanish HSs
Overall gender accuracy	English-Spanish L2 learners	F (2,59) = 7.39**	①⇔ ③
	German-Spanish L2 learners	F (2, 57) = 1.20, p = .31 ns	–
	English-Spanish HSs	F (2,33.64) = 22.91***	④⇔⑤⑥
	German-Spanish HSs	F (2, 53) = 16.92**	❹ ❺⇔ ❻

ns = not significant (*p* > .05), **p* < .05., ***p* < .01., ****p* < .001.

Appendix 10.3: OEPT – Results of the ANOVA

Context	Groups	ANOVA	Poct-hoc test (Games Howell)
		Welch's F value	**Homogenous groups** ① low English-Spanish L2 learners ② intermediate English-Spanish L2 learners ③ advanced English-Spanish L2 learners ④ low English-Spanish HSs ⑤ intermediate English-Spanish HSs ⑥ advanced English-Spanish HSs ❶ low German-Spanish L2 learners ❷ intermediate German-Spanish L2 learners ❸ advanced German-Spanish L2 learners ❹ low German-Spanish HSs ❺ intermediate German-Spanish HSs ❻ advanced German-Spanish HSs
Overall accuracy	English-Spanish L2 learners	F (2, 57) = 2.74, p = .73 ns	–
	German-Spanish L2 learners	F (2, 57) = 1.06, p = .35 ns	–
	English-Spanish HSs	F (2, 28.78) = 41.757***	④⇔⑤⇔⑥
	German-Spanish HSs	F (2, 29.16) = 3.16, p = .06 ns	–

ns = not significant (*p* > .05), **p* < .05., ***p* < .01., ****p* < .001.

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