L2 grammatical gender in a complex morphological system: The case of German*

PATTI SPINNER AND ALAN JUFFS

Abstract

In order to determine the nature of naturalistic learners' difficulty with grammatical gender in a complex morphological system, the longitudinal production data of an early naturalistic L1-Italian and L1-Turkish learner who are acquiring German are examined in light of current theories of gender within Chomsky's (1995) Minimalist Program. After analyzing the speakers' marking on determiners, adjectives and pronouns, we conclude that these learners' errors in the gender of German nouns are the result of at least four factors: inadequate lexical learning, mapping difficulty, processing pressure, and parsing errors that cause the paradigm to be inadequately learned. These factors may be particularly problematic for learners acquiring a system such as the one in German, where gender marking is conflated with case and number on determiners, adjectives and pronouns.

1. Introduction

Current concerns in the generative approach to second language acquisition of morphosyntax center on the development of formal features in the second language. Of particular concern is whether learners have these abstract features available and to what extent the morphophonological exponence of these features may be said to reflect the true nature of the underlying, abstract system. A whole series of papers on this topic have appeared since 2000 (e.g., Bruhn de Garavito and White 2002; Franceschina 2001, 2002; Hawkins and Liszka 2003; Hawkins 2004; Haznedar 2003; White 2003; White et al. 2004; Rule

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and Marsden 2006). White (2003) points out that research in this area of the grammar is critical to the debate on whether adult L2 grammars are: (i) fundamentally different in nature to L1 grammars (e.g., Clahsen and Muysken 1986; Bley-Vroman 1989); (ii) show local impairment (e.g., Beck 1998), or (iii) are essentially the same in terms of the computational mechanism, but show either L1 influence or surface failure at the morphophonological level (e.g., Haznedar and Schwartz 1997; Lardiere 1998a, b).

In this context, the acquisition of grammatical gender (that is, noun class) is an interesting case. While gender marking appears frequently in input, second language learners often produce inappropriate gender markers, such as inflection on determiners or adjectives (e.g., Holmes and de la Batie 1999; Dewaele and Véronique 2001). Consider the following errors, produced by an intermediate German student:

(1) *Ich sehe eine Tisch*-MASC *und eine Stuhl*-MASC.
I see a.FEM table and a.FEM chair
Correct: *Ich sehe einen Tisch und einen Stuhl.*

In German, both *Tisch* 'table' and *Stuhl* 'chair' are in the class of masculine nouns. However, the student has marked the associated determiners with feminine class endings, producing a non-native like utterance. Such errors appear to be common in second language learners' production data.

A number of recent studies have investigated the acquisition of grammatical gender. These have nearly all been cross-sectional studies, investigating a variety of factors: native language (e.g., Franceschina 2001, 2002; White et al. 2004; Sabourin et al. 2006); age or age of first exposure to the L2 (e.g., Franceschina 2005; Blom, et al. in press; Unsworth in press); L2 fluency (e.g., Dewaele and Véronique 2000); and L2 proficiency (e.g., Bartning 2000; White et al. 2004). A few studies have also investigated whether learners perform better with certain categories of gender marking, such as marking on definite versus indefinite determiners (e.g., Bartning 2000; Bruhn de Garavito and White 2000); marking on attributive versus predicative adjectives (e.g., Dewaele and Véronique 2000; Franceschina 2005) or marking on nouns with clear semantic or morphophonological cues versus marking on nouns without such cues (e.g., Carroll, 1999; Franceschina 2005). While the conclusions from these studies are mixed, the agreed-upon findings are that L2 learners frequently make errors in gender marking, with advanced learners outperforming less advanced learners; and that learner performance is better on nouns that have clear morphophonological or semantic cues to gender class (but see Unsworth, in press).

These studies have significantly advanced our understanding of patterns of behavior among learners; however, many questions remain about the exact nature of learners' gender errors and how the development of gender marking progresses over time in learners' interlanguage. This study seeks to fill this gap

by providing an in-depth, longitudinal case study of gender acquisition in two language learners, with the goal of obtaining a comprehensive picture of their interlanguage development and error patterns. In particular, we seek to examine errors closely to determine whether they are related to lexical learning, a morphological "mapping" problem, processing constraints, or a syntactic deficiency.

In order to achieve this goal, we have investigated the acquisition of a system of gender which is part of a complex, "highly layered" (Lardiere 1998a) morphological system. Our belief is that examining such a system may reveal patterns of error that have not been observed in previous studies. Note that all the studies mentioned above examine the acquisition of gender marking in Spanish, French or Dutch. In these languages, gender is a binary system (to some extent three-way, in the case of Dutch) with exponents that are independent of other morphological marking. However, few studies have investigated the acquisition of gender when marking is conflated with other morphosyntactic features. Most likely, this line of research has been avoided because of the difficulty of sorting out gender marking from other morphological issues. However, we argue that for a full understanding of learners' morphological errors, it is also important to investigate the acquisition of gender when it is conflated with other features, such as case and number. Therefore, we investigate the acquisition of German, a language with a complex determiner/pronoun/adjective system in which case, number and gender are all conflated.

Additionally, we have chosen to investigate the linguistic systems of naturalistic immigrant learners, as opposed to classroom learners. This choice is important because nearly all the studies to date have considered classroom learners. We feel that it is important to understand the particular difficulties that immigrant learners may have when confronted with a complex morphological system, so that instructional programs in Europe and elsewhere are better able to address this group's needs.

Our general research questions are as follows:

1. Are learners' gender errors the result of incorrect gender assignment, a lack of gender assignment, or a combination of both?
2. Are learners' errors the result of processing constraints, mapping errors, lexical learning errors, or a syntactic deficiency?
3. How does the conflation of gender marking with number and case marking affect the learners' production of morphological exponents?

In order to answer these questions, we analyze the longitudinal spontaneous production data of two early naturalistic learners of German with L1 Italian and L1 Turkish. Specifically, we examine the speakers' gender marking on determiners, adjectives, and pronouns. We also investigate the learners' use of case and number marking in order to determine how the conflation of feature marking may affect learners' production errors. Chomsky's (1995) Minimalist

approach to morphosyntax is used to try to pinpoint the exact area of difficulty.

The paper is organized as follows. Section 2 outlines the theoretical framework, including the status of gender in traditional syntactic theory. In Section 3, we review the morphological properties of the target language German, that is, inflectional markings on determiners, adjectives and pronouns. We also review relevant features in Turkish and Italian (the first languages of the learners). Section 4 describes the data and methodology used in the study. Results are given in Section 5 and discussed in Section 6. Concluding remarks are made in Section 7.

2. Theoretical framework and the syntax of gender

2.1. *Gender in Generative theory and Minimalism*

Considerable debate surrounds the status of gender in syntax. We take a traditional view and assume that gender is a grammaticized lexical feature (Aikhenvald 2000: 19). That is, gender features are associated with individual nouns in the lexicon, which enter the syntactic derivation already specified for gender. Under this analysis, gender on the noun is an interpretable feature, even if semantically vacuous in some cases (Carstens 2000: 328). Gender agreement features – that is, marking on determiners, adjectives or other elements associated with the noun – are uninterpretable.[1] Figure 1 illustrates the syntactic structure of the DP in an example sentence from German.

(2)

Die	*weiße*	*Katze*	*ist*	*freundlich.*
the-FEM	white-FEM	cat	is	friendly

The lexical item *Katze* enters the numeration already specified for interpretable feminine gender, while the definite determiner and the adjective have uninterpretable, unvalued gender features (represented as GENDER-U). The operation Agree matches the unvalued gender features on D and A with the feminine gender feature on N, thus both valuing the features on D and A, and also deleting them before they reach LF.[2]

1. According to current syntactic theory, interpretable features do not need to be checked or deleted in the syntax. Uninterpretable features need to be checked and deleted before reaching LF, or they will cause the derivation to crash.
2. A number of proposals argue for an alternate analysis, in which a Gender Phrase (Picallo 1991) or Word Marker Phrase (Bernstein 1993) checks an uninterpretable gender feature in the syntax. However, assuming this different model should not significantly alter the conclusions we draw in this paper.

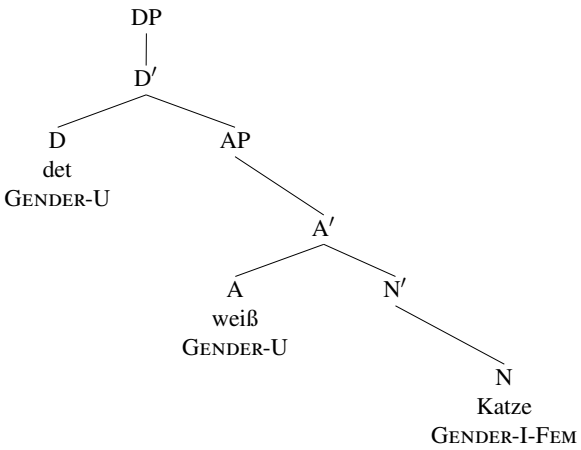

Figure 1. *The syntax of gender*

2.2. *Theoretical issues in the second language acquisition of gender*

In the Generative framework, a number of places exist where a breakdown could occur and cause a learner to make a gender error. This range of problems has not yet been fully identified in the literature; we will do so here. First, an error could be due to a simple lack of lexical learning; that is, the learner may not have associated a gender feature with a lexical item, or may have associated the wrong feature with a lexical item. (Granfeldt (2005) notes both types of error in learners of French.) Since the input that L2 learners receive is often different than L1 learners' in terms of quantity, quality, and medium (see, e.g., Cornips and Hulk, to appear), associating idiosyncratic gender features with nouns may be especially challenging. However, if lexical learning is the source of the problem, it is a theoretically simple issue; errors in gender marking should be correctible with increased input and improved vocabulary-learning techniques. Once the correct gender is learned, the operation Agree should fill in the correct values.

Second, a problem could reside in the interlanguage grammar, where there are a number of potential points of breakdown. One possibility is that some features in L2 grammars are permanently defective, even if they are instantiated in the L1 (e.g., Eubank et al. 1997; Beck 1998). If gender features are unavailable or defective, we should expect to see random gender assignment by language learners. A similar proposal is the Failed Functional Features Hypothesis (FFFH) (Hawkins and Chan 1997; Hawkins and Liszka 2003; Hawkins 2004). The FFFH claims that L2 learners are unable to acquire uninterpretable

functional features (e.g., ±strong *wh*-features and constraints on their interpretation) which are not present in their first language. If gender agreement is an uninterpretable feature, we expect learners with gender in the first language to have fewer errors, and to eventually acquire gender agreement marking accurately. Learners without gender in their L1 should make random errors in gender agreement and never acquire it well. Interestingly, if the gender feature on the noun is interpretable, as is increasingly being assumed, then the FFFH predicts that all learners should have the ability to 'know' the gender of nouns (i.e., all learners can appropriately match nouns with their gender features), but those without gender in the L1 will lack the ability to mark agreement.

A third potential explanation for learners' errors is that the problem lies not in the syntax, but rather in the surface spell-out of underlying features. This idea is referred to as the "mapping problem" or Missing Surface Inflection Hypothesis (MSIH; Haznedar and Schwartz 1997; Lardiere 1998a, b; Prévost and White 2000; White 2003). Under this explanation, the learner's syntax is intact and features are available, but there is a failure in the morphological component. Specifically, there is a breakdown in the matching of feature bundles on syntactic nodes with morphological marking because of phonological interference or other factors. These difficulties will be most pronounced when features are "highly layered" (Lardiere 1998a); that is, where there is a conflation of multiple features on a single morpheme or when the relationships between features and morphemes are particularly complex or opaque. In one way, the predictions of the MSIH for learners' production are similar to the predictions of FFFH; that is, the MSIH predicts that learners will have difficulty expressing appropriate agreement marking even if they "know" the gender of a lexical item. However, there are two important differences. First, the MSIH would predict that these difficulties could occur for learners both with and without gender in the L1. Second, the MSIH assumes that patterns of errors, such as "unidirectional errors" (Prévost and White 2000; White 2002), demonstrate that syntactic features are present. For the marking of gender, a unidirectional feature might manifest itself as the use of a default gender when learners are unable to produce the appropriate gender form (for any number of reasons).

Still another factor in learners' performance may be processing load, as suggested by Prévost and White (2000). If processing is part of the problem with gender marking, then learners will have special difficulty with long or complex DPs. Similarly, they will demonstrate superior performance in written versus oral communication or whenever there is less performance pressure.

In summary, an error in marking gender agreement on a determiner or adjective has the following possible sources, according to current Generative theory:

1. a. The learner has the gender feature in the grammar, but has not associated any particular gender feature with the noun.

   b. The learner has the gender feature, but has associated the wrong gender with the noun.
2. The learner does not have the uninterpretable gender feature and is therefore unable to realize uninterpretable gender features on agreeing elements (FFFH). (However, the learner may or may not have associated the correct *interpretable* gender feature with the noun.)
3. The error is a failure to select the appropriate morphological form in spell-out or "mapping" (MSIH).
4. The error is due to processing load. For instance, learners may have difficulty with long or complex DPs.

In order to tease apart these possibilities, we examined the data to answer the following questions:

1. a. Do learners perform better on the most frequently used nouns, nouns with phonological cues, or those with natural gender? These factors – familiarity and phonological or semantic transparency – make it easier to associate otherwise seemingly arbitrary gender features with nouns (Carroll 1999). If learners perform better on nouns they use most frequently, we can assume that they can associate gender with nouns when given enough practice. If learners perform better on these nouns, we can conclude that performance is enhanced when it is easier to associate gender features with nouns, and therefore some errors on other nouns may be attributable to an issue of lexical learning.
   b. When learners make gender errors, do they use *consistent* incorrect gender marking on determiners and adjectives each time a lexical item is used (i.e., they always make the same error with the same word)? If so, the problem is likely that the learner has incorrectly matched a gender feature with an item, but the rest of the system is still functioning.
   c. Do learners use pronouns that agree in gender with the lexical item, and/or with the selected determiners for that item? If the gender is correct on the pronoun, it provides evidence that the learner has correctly associated a gender feature with the item (and can realize the feature on pronouns).
2. Does the absence of gender in the learner's L1 lead to failure of the acquisition of gender in the L2? If so, it may be evidence for the FFFH.
3. Do learners make "unidirectional" errors (Prévost and White 2000; White 2002, 2003) or demonstrate other patterns of error in determiner and adjective marking? This may indicate that the syntax is intact, but "mapping" is difficult. However, if errors appear randomly in all categories, it may indicate failure of the entire system, possibly impaired features or Failed Functional Features.
4. Do learners have more difficulty with complex DPs, such as those containing adjectives? If so, processing may contribute to errors, even if the rest of the system is functioning.

3. The system of gender marking in German, Turkish, and Italian

3.1. *Determiners in German*

Since the assignment of most German nouns to a gender (masculine, feminine, or neuter) appears arbitrary, at least in synchronic grammar, each noun's gender must be learned on a case-by-case basis – a task which is made more difficult by the conflation of gender, number and case marking on German determiners. Additionally, there is a good deal of syncretism in the paradigm, as is observable in Tables 1 and 2. Note for instance that in the paradigm of definite determiners, six forms (*die, der, das, dem, des* and *den*) are used to express sixteen different feature combinations in terms of number, gender, and case. Note also that there is no gender distinction when nouns are plural, since the determiner for plural forms is uniform for all genders. These features of nominal marking in German created certain challenges in coding the data, which are outlined in Section 5.

In this study, we consider the following determiners: definite articles, indefinite articles, and possessives, because they are most frequent in the data. Table 1 shows the definite article paradigm. Table 2 shows the paradigm for both possessives (e.g., *mein*, 'my') and indefinite determiners (e.g., *ein*, 'a'). The cases listed in the first column are Nom (nominative), Acc (accusative), Dat (dative) and Gen (genitive).

There are a few phonological cues to nouns' gender; for instance, most nouns that end in *-e* or *-ung* are feminine (e.g., *die Rose* 'the rose' and *die Zeitung*

Table 1. *German definite determiner inflection*

	Masc	Fem	Neut	Plur
Nom	der	die	das	die
Acc	den	die	das	die
Dat	dem	der	dem	den
Gen	des	der	des	der

Table 2. *German possessives and indef. determiner inflection*

	Masc	Fem	Neut	Plur
Nom	mein	meine	mein	meine
Acc	meinen	meine	mein	meine
Dat	meinem	meiner	meinem	meinen
Gen	meines	meiner	meines	meiner

'the newspaper'). However, nouns with phonological cues to gender represent only a small percentage of the words to be learned (Hammer 1983). There is also some semantic cueing for natural gender. Words denoting humans are generally categorized as masculine or feminine based on biological sex, so *Mann* 'man' and *Vater* 'father' are in the masculine class, while *Frau* 'woman' and *Mutter* 'mother' are feminine. However, even natural gender cues can be misleading; consider for example that 'gorilla' (*Gorilla, m.)* takes masculine gender regardless of the sex of the referent, while 'girl' (*Mädchen, n.)* is in the neuter class because of the diminutive suffix *-chen*.

3.2. *Personal pronouns in German*

Gendered personal pronouns are used to refer to both humans and inanimate objects, and in both cases, the pronoun must agree in gender with the antecedent. For instance, consider (3) and (4) below:

(3) *Wo ist Alfred? Ich habe **ihn** nicht gesehen.*
where is Alfred I have **him** not seen
'Where is Alfred? I haven't seen him.'

(4) *Wo ist der Computer? Ich habe **ihn** nicht gesehen.*
where is the computer I have **him** not seen
'Where is the computer? I haven't seen it.'

As with determiners, gender is conflated with case and number on pronouns. There is gender distinction only for third person singular pronouns. Masculine pronouns are: *er* (nom.), *ihn* (acc), and *ihm* (dat). Feminine pronouns are *sie* (nom and acc) and *ihr* (dat).

3.3. *Adjective endings in German*

Gender is also reflected in attributive adjective endings, which are attached to the bare adjective in noun phrases. The endings are often divided into the so-called "weak" and "strong" forms. Weak forms are used when an overtly gender-marked determiner is in the noun phrase (as in [5]), while strong forms are used when no determiner is present, or when a bare indefinite determiner or possessive (e.g., *ein*) is used (as in [6]). Strong forms are shown in Table 3 and weak forms in Table 4.

(5) *Gut-er Wein ist köstlich.*
good-MASC.NOM wine is delicious
'Good wine is delicious.'

Table 3. *Strong adjective endings*

	Masc	Fem	Neut	Plur
Nom	-er	-e	-es	-e
Acc	-en	-e	-es	-e
Dat	-em	-er	-em	-en
Gen	-en	-er	-en	-er

Table 4. *Weak adjective endings*

	Masc	Fem	Neut	Plur
Nom	-e	-e	-e	-en
Acc	-en	-e	-e	-en
Dat	-en	-en	-en	-en
Gen	-en	-en	-en	-en

(6) *Der* *gut-e* *Wein* *ist* *köstlich.*
the.MASC.NOM good-MASC.NOM wine is delicious
'The good wine is delicious.'

Note that these endings are only used for attributive adjectives. Predicate adjectives (i.e., those not in a DP) are never inflected. An example is given in (7).

(7) *Wein* *ist* *gut.*
wine is good

In sum, the selection of the correct form of German determiners, adjectives and pronouns depends on definiteness, case, number and gender. In this way, German determiners and adjectives display a "highly layered" structure in that there is conflation of multiple features on a single morpheme, and therefore pose increased challenges to the L2 learner.

3.4. *Nominal marking in Turkish and Italian*

Kornfilt (1997) explains that Turkish is an agglutinative language which uses bound suffixes to express both verbal and nominal inflection, including six cases (nominative, accusative, dative, genitive, ablative and locative). Number is marked on the noun with the suffix *-ler/-lar*, depending on vowel harmony. Importantly, Turkish does not require determiners in DPs; specificity is marked either with the use of an optional nonspecific determiner *bir* or with accusative case marking on nouns in direct object position. (See White 2003, for discus-

sion.) Turkish completely lacks the gender feature; nouns are not marked for gender in any way. Pronouns referring to humans are also genderless; the pronoun *o* can refer to a man, woman, or sexless entity.

If transfer of L1 features occurs, it is predicted that the L1 Turkish speaker will be successful at marking German nouns for case and number, but fail when marking gender. L1 transfer also predicts a failure to realize determiner forms by the Turkish-speaking learner.

On the other hand, Italian does have gender, resembling German in that it requires the use of definite and indefinite articles which agree with the noun in masculine (*il, un*) or feminine (*la, una*) gender. Pronouns are also marked for gender. In contrast with German, there are separate forms for masculine plural (*i*) and feminine plural (*le*). Nouns and determiners are not marked for case in Italian, although indirect objects are preceded by the preposition *a.*

If transfer of features occurs, it is predicted that the Italian-speaking learner will realize determiners and mark gender more successfully than the Turkish learner, at least in early stages of learning. However, we would expect that the learner would not be successful at marking case, at least initially.

4. Methodology

4.1. *The data and participants*

Our data is taken from the ESF database (Feldweg 1991; Klein and Perdue 1992) which consists of transcripts of interviews with speakers of Turkish and Italian who were learning German in Germany. All data are transcribed and coded in CHAT format and were analyzed using Carnegie Mellon's CLAN (Computerized Language Analysis) program, designed for use with the CHILDES database (MacWhinney 1991). Because the original investigators who collected the data had the goal of collecting spontaneous speech, meetings with the participants were loosely organized and often consisted of short, simple conversations about vacation, family, etc. Some sessions involved role-plays, such as a customer returning a sweater or explaining how a rented bicycle was stolen. Interviewers also played a silent Charlie Chaplin film and asked participants to narrate the story.

We analyzed longitudinal production data from two learners of German, one with L1 Turkish and one with L1 Italian. "Cevdet",[3] a 17-year-old from Turkey, moved to Walldorf, Germany in 1981 with his family shortly before

3. Cevdet's data was also analyzed by Schwartz and Sprouse (1994, 1996). Detailed information about Cevdet's background and the interviews can also be found in Schwartz and Sprouse (1994) on p. 332–333.

data collection began. At the time he knew little German and no other foreign languages aside from some schooling in English. Although he used Turkish at home with his family, he worked in a partially German-speaking environment. Interviews with Cevdet began in July 2, 1982 and continued until November of 1984 (22 files, a period of 24 months).

"Marcello", the L1 Italian informant, moved to Heidelberg in 1981 at age 21 to join his fiancée, who had grown up in Germany. At the time of his first interview, his speaking was assessed as "very little". He lived with Italian speakers, but worked in a café where he was required to speak German with customers. Interviews began in November, 1982 and continued until September of 1984 (20 files, a period of 22.5 months).

The learners took no formal proficiency test and presumably differed to some extent in working memory, motivation, etc. Therefore, we will avoid making direct comparisons between them. As a very general measure of proficiency as it relates to DPs, we noted the number of unique nouns used by each learner: 130 for Cevdet, and 195 for Marcello.

4.2. *Coding the data*

4.2.1. *Determiners.* As Bley-Vroman (1983) points out, learners may impose their own system (and not that of the target language) to cope with the input. We therefore decided to code the determiners and pronouns for not only gender but also definiteness, number and case, so as to see any patterns of error related to other nominal features. We believe that this analysis provides insight into the learners' interlanguage system.

If the learner made an error in nominal marking, we noted the case, gender, number or definiteness that the learner used, along with the target form. We also recorded whether a determiner or pronoun occurred with a preposition, since prepositions assign case and can be contracted with determiners. For reasons of space, not all results are reported in this paper.

Reduced articles, that is, forms which are clearly intended as articles but lack gender or case specification (e.g., [ei] or [də]) were recorded separately, along with the missing characteristics. Omitted articles were similarly coded. Very common phrases, like *es geht mir gut* 'I'm fine' were excluded from the coding because they are likely to be unanalyzed chunks. In the case of self-correction or the use of a string of determiners, we included only the last form in the string, whether or not it was the correct one.

Because of the high degree of syncretism in the German determiner and pronominal system, it is impossible to draw simple one-to-one correspondences between a form and its features. For instance, consider the following example from Marcello's data:

(8) *wie viele eh wie viele, wie lang ist eh* ***die Probezeit****?*
how many how many how long is **the trial period**
'How long is the trial period?' (Marcello, 15j, 757)

In this case, the learner has used the form for a definite, feminine, nominative determiner, and the coding records this as a correct use. It is, however, possible that Marcello intends a *plural* form, committing a number marking error. There is no way of knowing, since the form (*die*) is exactly the same. Following Dewaele and Véronique (2001) in their study of French gender, in ambiguous instances such as these, the learner is given the "benefit of the doubt"; that is, if he uses the correct form, it is marked as such.

Some errors of gender are clear, however. For instance, in the following selection, Cevdet uses *eine* with the noun *Wagen* 'car (masc)'. There is no case in which masculine gender can be expressed with the form *eine*, and so it is marked as incorrect.

(9) *do eh und* ****eine Wagen*** *gekommen so fe- die Pferde*
eh and a car come.PERF so fe- the horses
'a car came, and the horses . . . ' (Cevdet, 23f, 89)

In contrast, in (10), Cevdet uses the determiner *dem*. While it is unclear whether Cevdet intends masculine or neuter gender (the form is the same), the form is correct and therefore marked as such.

(10) *dem Wag, die sind rune, runa, gefallen von* ***dem***
the ca- they have fall- fall- fallen from **the**
Wagen
car
'They fell out of the car' (Cevdet, 26i, 187–192)

While we have attempted to be as objective as possible, there are occasionally cases requiring interpretation and therefore having the potential for coding error. Note, for example, that the form *der* is used to mark masculine nominative as well as feminine dative and genitive: how should it be coded? With questionable instances, a determination is made based on learner patterns of response. For instance, in the following extract, Marcello uses *der* twice with the masculine noun *Zug* 'train':

(11) *Un er ate hinter* ****der*** *Zuge gelaufen und er hate* ****der***
and he has behind **the** train run and he has **the**
Zug endlisch eh abholen
train finally caught
'And he ran behind the train and finally he caught the train' (Marcello, 33p, line 636-641)

Both of these instances require a determiner marked for accusative case, masculine gender. Marcello's use of the determiner *der* is coded as a correct use of masculine gender marking, but a failure to mark case appropriately. Another, highly unlikely, possibility is that Marcello has made both a gender and case error, by using feminine dative case (note that the dative form of a feminine determiner is also *der*). This is unlikely because throughout the two years of interviews there are no instances in which Marcello uses an unambiguously case-marked determiner such as *dem, den, einen*, or *einem*; in fact he appears to lack case marking at all except in chunked phrases like *jeden Tag* 'every day'. Instead he uses nominative forms consistently throughout the interviews. For this reason, this has been coded as a case – not gender – error.

Thus, although coding the data did require a certain amount of interpretation, a degree of uncertainty is inevitable when studying the linguistic system of learners acquiring a complex morphological system. To be certain that data coding issues did not skew the results, we consider separately the singular nouns that are in nominative positions (where gender marking is clearer) versus those that are in dative or accusative positions. However, we consider all the results when examining the data for interactions of case, number, and gender. For these results we do not focus on overall percentage correct but rather examine (a) the types of errors made and where those errors occur; (b) which forms are avoided or missing from the data (Schachter 1974) and (c) which forms are overgeneralized.

4.2.2. *Analyzing adjectives, pronouns, and consistency of gender marking.* We extracted all noun phrases with adjectives. We recorded whether a determiner was present in the phrase and, if so, its number, case, and gender features relative to the noun. Similarly, we noted the case and gender markings on the adjective and checked for overall consistency in the phrase. Examples for each speaker are given in (12) and (13). Uses of predicate adjectives (not in a DP) were noted separately; an example is shown in (14). Recall that predicate adjectives remain uninflected in the target language, while attributive adjectives need to be marked for gender, number and case.

(12) *der nimmt *falsch Köpfer* [= *Koffer*, MASC]
he takes wrong.[NO ENDING] case
'he takes the wrong case' (Cevdet, 13f, 32)
Correct form: *der nimmt den falschen Koffer*.

(13) *Ja, is*[*t*] *ein *groß Problem* (NEUT)
yes is a big.[NO ENDING] problem
'Yes, it's a big problem.' (Marcello, 15j, 546)
Correct form: *ja, es ist ein großes Problem*.

(14) *Ja, die Polizei* (FEM) *war etwas schwer krank*
yes the.FEM police was something badly sick
'Yes, the policeman was quite sick' (Cevdet, 16i, 114)

To check our hypotheses regarding pronouns, we coded all pronouns in the text for gender, case, number, target form, and whether the pronoun referred to a person (for which gender is largely "natural") or to an inanimate object or animal (for which gender is largely arbitrary). An example is given in (15). Here, the pronoun *er* 'he' is coded as nominative, first-person, singular, maculine, human:

(15) *und do hat* ***er*** *eine Platz gefune und* ***er*** *ist also*
and then has **he** a place found and **he** is so
hingesitzt
sat.down
'And then he found a place and he sat down.' (Cevdet, 36i, 288)

We used Carnegie Mellon's CLAN program both to label the features and also to do the analysis.

To examine the consistency of feature marking on individual nouns, we "tracked" each learner's nouns through the two-year period. That is, we recorded which determiners and pronouns were used with a noun each time it was uttered. We also included the date of use, so that we could see improvement over time. Although some nouns were uttered only once, a number of common nouns (e.g., *Frau* 'woman', *Zug* 'train') were often repeated.

We predicted that learners would perform better on nouns that had a cue to learning gender. For this reason we calculated percentages of accuracy on three groups of nouns: those with natural gender, those with a phonological cue, and those with a high frequency of use. Natural gender nouns were nouns referring to either masculine or feminine people (e.g., *Vater* 'father').[4] When looking at phonological cues, we decided to test the most frequent cue in German, the *-e* ending which usually indicates feminine gender (Hammer 1983); this is also the first phonological cue that L1 German learners seem to identify (Mills 1986). We did not test other morphophonological cues to gender because they were not frequent in the data.

4. One complication in learning natural gender is the commonly used noun *das Mädchen*, 'the girl', which actually carries neuter gender in German but usually takes feminine personal pronouns. When evaluating learners' performance on naturally-gendered nouns, we decided to count as correct both (target-like) uses of neuter determiners and also (nontargetlike) uses of feminine. The reasoning is that for this measure we were interested in the learners' use of natural gender cues. For all other measures, only neuter determiners were considered correct with *Mädchen*.

Finally, as a measure of frequency we decided to use learners' own production, because no corpus could accurately reflect the two learners' input (working in a restaurant, etc.). Our reasoning is that learners will most frequently use those words they are familiar with. Any nouns they used more than ten times (an arbitrary cutoff) were considered to be high-frequency.

5. Results

5.1. *Gender accuracy on determiners*

In Table 5, results are presented for Marcello's use of gender marking on determiners in all 757 determiner environments. The table reports Suppliance in Obligatory Contexts (SOC), that is, the percentage of times in that period that a correct form was used when it was required. Both incorrect forms and reduced or omitted determiners are counted as errors. In order to be able to clearly see any changes in interlanguage over time, the two years of data are broken into three approximately eight-month periods, which are labeled *Time 1, 2*, and *3* in the table. A total for the entire 22.5 month period is given in the final column.

The same information is presented in graph form, in Figure 2.

Note that Marcello's accuracy on plural markers (where there is no gender distinction) is high, at 100 % suppliance in Times 1 and 3. However, his accuracy on singular forms is considerably lower. Note that accuracy on feminine nouns increases over time, while accuracy on other forms decreases. Marking on neuter forms is especially low, at chance or below; this low accuracy is likely due to the fact that Marcello uses *das* as a determiner only twice, in early files (see below). Marcello's overall use of gender marking does not improve over time; in fact, there is a slight decrease in accuracy between early and later files.

In order to determine whether the requirement for marked cases (accusative and dative) impacted the learners' marking of gender, we also considered separately the use of case in nominative contexts only. Learners did not use overt

Table 5. *Marcello's SOC of gender marking in all environments*

	Time 1	Time 2	Time 3	Total
Fem	47/74, 63.5%	55/84, 65.5%	55/78, 70.5%	157/236, 66.5%
Masc	34/71, 47.9%	50/104, 48.1%	51/122, 41.8%	135/297, 45.5%
Neut	24/67, 35.8%	13/62, 21.0%	13/55, 23.6%	50/184, 27.2%
Total singular	105/212, 49.5%	118/250, 47.2%	119/255, 46.7%	342/717, 47.7%
Plural	14/14, 100%	9/13, 69.2%	13/13, 100%	36/40, 90.0%

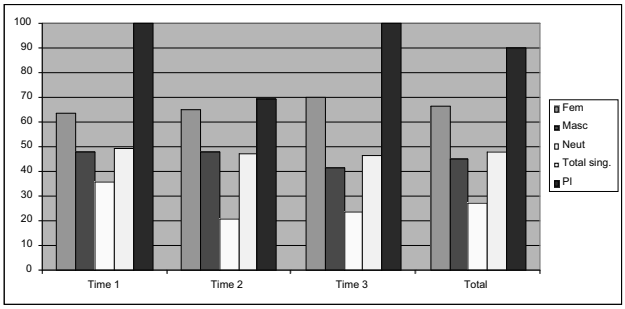

Figure 2. *Marcello's SOC on gender marking in all environments*

Table 6. *Marcello's SOC on gender marking in nominative environments*

	Time 1	Time 2	Time 3	Total
Fem	21/60, 35.0%	26/44, 59.1%	19/29, 65.5%	66/133, 49.6%
Masc	20/38, 52.6%	28/55, 50.9%	25/59, 42.4%	73/152, 48.0%
Neut	12/36, 33.3%	4/24, 16.7%	10/27, 37.0%	26/87, 29.9%
Total sing.	53/134, 39.6%	58/123, 47.2%	54/115, 47.0%	165/372, 44.4%
Pl	12/12, 100%	8/10, 80.0%	8/8, 100%	28/30, 93.3%

Table 7. *Cevdet's SOC of gender marking in all environments*

	Time 1	Time 2	Time 3	Total
Fem	43/60, 71.7%	60/78, 76.9%	57/94, 60.6%	160/232, 69.0%
Masc	57/71, 80.3%	74/99, 74.7%	119/148, 80.4%	250/318, 78.6%
Neut	24/42, 57.1%	30/67, 44.8%	41/68, 60.3%	95/177, 53.7%
Total singular	124/173, 71.7%	164/244, 67.2%	217/310, 70.0%	505/727, 69.5%
Plural	23/23, 100%	45/47, 95.7%	43/44, 97.7%	111/114, 97.4%

case marking in these positions, so that a straightforward measurement of their gender marking was possible. (Additionally, nouns in nominative position allows for more straightforward coding of data; see Section 4.2) This information is presented in Table 6 and Figure 3 below, which present SOC on only those nouns in nominative positions.

The pattern of results is similar to the results for all determiner contexts; that is, accuracy on feminine nouns is highest, while accuracy on neuter nouns is lowest. There is no apparent improvement over time.

We now present the results for Cevdet. First, Cevdet's SOC of gender marking in all environments is shown in Table 7 and Figure 4.

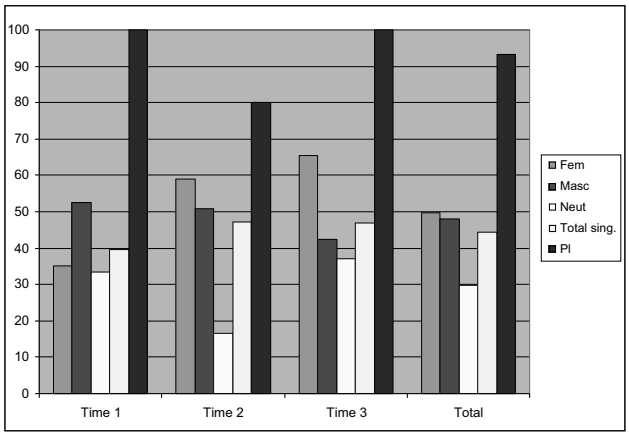

Figure 3. *Marcello's SOC on gender marking in nominative environments*

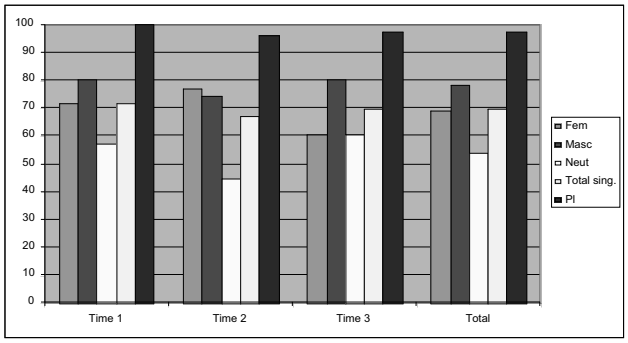

Figure 4. *Cevdet's SOC of gender marking in all environments*

Cevdet marks plural correctly nearly 100 % of the time; errors are not of form but omissions of the determiner. However, accuracy rates for singular nouns never surpass 80 %, although they are higher than Marcello's accuracy rates. Note that, like Marcello, Cevdet's lowest accuracy is on neuter nouns.

We also measured accuracy on only nouns in nominative positions. That information is presented in Table 8 and Figure 5.

Like Marcello, Cevdet shows similar patterns of gender marking in nominative contexts and in mixed contexts. Note that Cevdet's accuracy in nominative contexts is generally higher than accuracy in mixed contexts, presumably because in nominative contexts there is no need to mark case overtly. We now explore this finding further.

Table 8. *Cevdet's SOC on gender marking in nominative environments*

	Time 1	Time 2	Time 3	Total
Fem	14/21, 66.7%	16/20, 80%	20/25, 80%	50/66, 75.8%
Masc	39/44, 88.6%	44/52, 84.6%	70/83, 84.3%	153/179, 85.5%
Neut	16/25, 64%	5/15, 33.3%	9/20, 45.0%	30/60, 50.0%
Total singular	69/90, 76.7%	65/87, 74.7%	99/128, 77.3%	233/305, 76.4%
Plural	22/22, 100%	41/42, 97.6%	42/42, 100%	105/106, 99.1%

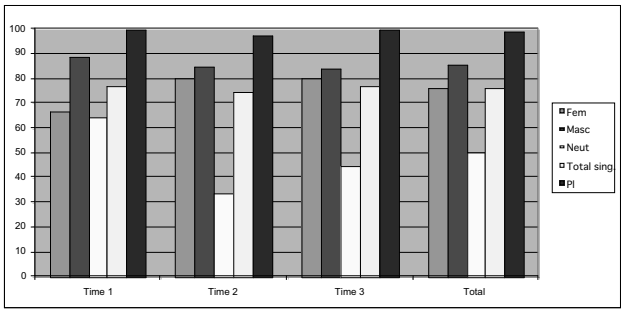

Figure 5. *Cevdet's SOC on gender marking in nominative environments*

In order to determine how case and gender interact to affect learners' marking of gender features, we compared the marking of masculine nouns in nominative and accusative contexts. We looked at masculine nouns because masculine determiners are the only ones that show a difference in overt marking in these contexts (*der/ein* in nominative contexts, *den/einen* in accusative contexts). Because learners tended to use feminine forms as a default (see below), we measured the rate at which each learner overgeneralized feminine to masculine contexts in each environment. An example token is shown below.

(16) *der Charlie hate eine Brief gekrieg*
the Charlie has a.FEM letter gotten
'Charlie got a letter' (Cevdet, 36i)

Results for both learners are shown in Table 9.

Table 9 shows a very strong tendency for learners to overgeneralize feminine forms for masculine forms in accusative contexts. Note that the rate of overgeneralization is much lower in nominative contexts; the difference is highly significant for both learners as measured with a χ^2 analysis.

Interestingly, notice that the same overgeneralization of feminine forms does

Table 9. *Use of feminine forms with masculine nouns*

	Fem default, nom	Fem default, acc	χ^2
Marcello	25/82 = 30.5 %	42/47 = 89.4 %	$p < .0001$
Cevdet	35/170 = 20.6 %	19/36 = 52.8 %	$p < .001$

Table 10. *Use of feminine forms with neuter nouns*

	Fem default, nom	Fem default, acc	χ^2
Marcello	32/72 = 44.4 %	29/82 = 35.4 %	not sig.
Cevdet	22/62 = 35.4 %	21/75 = 28.0 %	not sig.

Table 11. *Use of* das *as a determiner*

	Time 1	Time 2	Time 3
Marcello	2/28	0/41	0/30
Cevdet	1/8	5/26	9/13

not occur with neuter nouns; the difference is non-significant as measured with χ^2 (see Table 10). Note that the neuter determiner is the same for both nominative and accusative contexts (*ein/das*).

These results will be discussed further in the Discussion section.

We found that certain determiner forms were not used at all by the learners, at least at first. For instance, both learners avoid the use of *das* (definite neuter nominative and accusative determiner). Marcello only uses *das* twice in 22.5 months of data, despite the presence of a large number of definite neuter contexts. Cevdet initially fails to produce *das*, although he improves over time. These results are shown in Table 11 as suppliance in obligatory contexts. That is, 2/28 indicates that Marcello used *das* twice out of all definite neuter nominative and accusative contexts.

Learners also fail to produce indefinite masculine and accusative determiners, *einen* and *einem*. Neither learner produces these forms at all, either in early or later files.

5.2. *Personal pronouns*

Cevdet used 640 personal pronouns and Marcello used 316. Of these, Cevdet used 301 (gendered) third person singular pronouns and Marcello used 83. There were no apparent errors of number or gender. While this result was expected for Marcello, it is somewhat surprising that Cevdet has little difficulty

here, because Turkish does not differentiate between masculine, feminine and neuter personal pronouns.

Interestingly, we found that neither the L1 Turkish nor the L1 Italian learner uses personal pronouns to refer to objects. For instance, Marcello has 316 personal pronouns to refer to humans, and 0 to refer to objects, while Cevdet uses 639 pronouns to refer to humans and one to refer to a dog. Results with demonstrative pronouns (e.g., *der* 'the one (masc.) there') were the same. Unfortunately, we were therefore unable to answer our research question regarding pronouns (question 1c): we had predicted that correct or incorrect use of pronouns would have enabled us to determine whether the gender on the head noun was known to the learner or not. It is possible that the learners' omission is due to an underlying difficulty with gender marking on pronouns; however, further research is necessary to discover the root of the problem.

5.3. *Adjectives*

Cevdet produced 34 determiner phrases with adjectives; Marcello produced 83. Both learners' accuracy on DPs with adjectives is extremely low (13 % accuracy for Marcello; 24 % for Cevdet). Many of the errors appear to be due to the use of certain default patterns. Determiners in DPs with adjectives were generally either "bare" indefinite determiners (e.g., *ein*), nominative feminine determiners (*die* or *eine*), or omitted. Adjectives either had a feminine/weak-marked ending (*-e*) or no ending at all. It was rare for learners to use masculine or neuter determiners, strong adjective endings, case marking, or the weak *-en* ending. These patterns account for fully 100 % of Marcello's data and 55 % of Cevdet's. Examples are given below.

(17) *in eine schön-e Haus* (NEUT)
in a.FEM nice-FEM house
Correct: *in einem schönen Haus* (Marcello, 16i, 745)

(18) *hier ist eine schon Walde* (MASC)
here is a.FEM nice-Ø forest
Correct: *hier ist ein schöner Wald* (Marcello, 35j, 693)

Cevdet's use of agreement with adjectives is somewhat more variable in that he uses strong adjective endings. Some of these uses are correct, but others appear almost random. This lack of consistency in adult L2 learners' production of adjective endings has also been found by Blom et al. (in press) for Dutch.

Consider Cevdet's utterance in (19); he uses a feminine determiner with a masculine noun, while marking the adjective for a neuter noun with no determiner (i.e., the strong neuter form):

(19) *er hat eine falsches Koffer genommen*
he has a-FEM wrong-NEUT suitcase-MASC taken
'He took the wrong suitcase' (Cevdet, 23p, 135)
Correct: *er hat den falschen Koffer genommen*

Although Cevdet produces variable adjective endings, including strong adjective endings such as *–es*, his use of determiners is much more limited. He uses only nominative feminine or "bare" determiners in DPs with adjectives, never a masculine or neuter determiner or a case-marked determiner.

Based on these data, it appears that including an adjective in a DP may lead to the use of default determiners, making errors more likely. For instance, when Cevdet uses the adjective *reich* 'rich' to describe *ein Mann*, he uses a feminine determiner, even though he is otherwise extremely consistent in correctly using masculine forms with this noun:

(20) *wie er eine reiche Mann*
as he a.FEM rich man
'as a rich man' (Cevdet, 36a, 23)

Similarly, in (21), Marcello begins with an (incorrect) masculine determiner for the neuter noun *Boot* 'boat', but then changes to the incorrect feminine determiner *die* when he adds an adjective to the phrase:

(21) *und eh der der Boot, die große Boot in seh ine Wasser*
and eh the the.MASC boat the.FEM big boat in in water
'And the boat, the big boat in the water' (Marcello, 16i, 93)

Other researchers (e.g., Bruhn de Garavito and White 2002; White et al. 2004) have also found that the inclusion of an adjective reduces accuracy on gender marking on determiners.

We also noted that both learners omit determiners much more often when an adjective is present in a DP – a result that is especially striking for Cevdet, who omits over six times as many determiners in phrases with adjectives. Statistics are given in Table 12.

Performance on predicate adjectives was more accurate than on attributive adjectives. Although both learners frequently leave attributive adjectives uninflected, neither makes the error of adding gender marking to predicate adjectives. For example, in (22) Marcello correctly omits case and gender marking from the adjective *fröhlich* 'happy.'

Table 12. *Omission of determiners when an adjective is present in DP*

	Adj in DP	No adj in DP	χ^2
Cevdet	17/35, 48.6%	59/810, 7.3%	$p < .001$
Marcello	23/82, 28.0%	112/689, 16.3%	$p < .01$

(22) *Charlot unde Mädsche sin sinde fröhlisch*
Charlie and girl are are happy
'Charlie and the girl are happy.' (Marcello, 16i, 814)

5.4. *Consistency of gender marking on individual nouns*

Learners are inconsistent in their use of gender marking on nouns. Out of 87 nouns that Marcello uses more than once, only 23 are used with determiners of only one gender; these are nearly always feminine determiners (with only three exceptions), regardless of the gender of the noun. Of the 64 nouns that Cevdet uses more than once, only 19 are used with determiners of one gender only.

Sometimes the choice of gender appears random. For instance, Cevdet marks the noun *Koffer*, MASC. 'suitcase' with masculine forms twice, feminine forms four times, and neuter/bare forms three times. He also omits the determiner with *Koffer* once. With the noun *Bahnhof*, MASC. 'train station', Marcello uses three masculine determiners, four feminine determiners, and one neuter/bare form; he omits the determiner once. There is little evidence of progress or stabilization over time. This result contrasts with Granfeldt's (2005) findings that his learners of French eventually "settled" on one gender for each noun, whether or not it was correct. Our result also contrasts with Berger-Morales's (2005) results for German children, who usually assign one gender to a noun and use it reliably (either correctly or incorrectly). On the other hand, it is consistent with Blom et al.'s (in print) finding that adults are inconsistent in their use of agreement markers on determiners and adjectives in L2 Dutch.

However, learners are more consistently correct with certain types of nouns. First, they showed better performance on nouns with natural gender. This difference proved to be significant in a χ^2 analysis. Table 13 gives the percentages of accuracy for each learner on nouns with natural gender compared with all others. (Plurals are excluded from the count, since there is no gender distinction with plural nouns.) Note that chance is at roughly 33 %.

Learners are also more accurate on frequently used nouns than those they use more rarely – a very strong result. Table 14 shows this finding.

Because many of the most common nouns are also those with natural gender (e.g., *Mann* 'man' and *Frau* 'woman'), there is a confound between the two

Table 13. *Learners' accuracy on nouns with natural gender versus other nouns*

	Nat'l gender	Other	χ^2
Cevdet	177/214, 82.7 %	348/517, 67.3 %**	$p < .001$
Marcello	76/128, 59.4 %	281/587, 47.9 %*	$p < .05$

Table 14. *Learners' accuracy on nouns with high frequency versus other nouns*

	High freq.	Other	χ^2
Cevdet	139/169, 82.2%	371/562, 66.0%	$p < .001$
Marcello	86/127, 67.7%	258/588, 43.8%	$p < .001$

Table 15. *Learners' accuracy on nouns with high frequency versus other nouns (Natural gender nouns removed)*

	High freq.	Other
Cevdet	52/63, 82.5%	319/499, 63.9%*
Marcello	48/79, 60.8%	210/509, 41.3%*

$\chi^2 (* = p < .01)$

results. To avoid this confound, we removed nouns with natural gender and considered nouns with ten or more uses (an arbitrary cutoff). Table 15 demonstrates that results are similar, in that more frequently used nouns tend to have correct gender marking.

Finally, we expected learners to perform better on nouns with a phonological cue, specifically the *-e* ending for feminine, since other phonological cues were rare in the data. This expectation was not borne out, as is shown in Table 16. In this case, we compare percentages with other feminine nouns without phonological cues only, because learners perform at different accuracy rates for masculine, feminine and neuter gender overall.

Perhaps this cue is not strong enough for the learners to use at this point. Note, however, that neither Cevdet nor Marcello is at end state; it is certainly

Table 16. *Learners' accuracy on nouns with the phonological cue '-e' for feminine*

	-e ending	fem with no phon. Cue
Cevdet	39/54, 72.2%	118/148, 79.7% (not sig.)
Marcello	47/74, 63.5%	98/153, 64.1% (not sig.)

possible that they eventually learn to use phonological cues.[5] Cevdet in particular demonstrates some slight advantage with these nouns.

6. Discussion

We return now to the research questions and discuss them one at a time.

1.a Do learners perform better on the most frequently used nouns, nouns with phonological cues, or those with natural gender? If they do, certain errors may be attributable to lexical learning, since performance is enhanced when it is easier to associate gender features with nouns.

We found that learners performed better on frequently used nouns, regardless of natural gender. This finding indicates that when learners have enough experience with a noun, they are able to successfully associate a gender feature with it. Similarly, the learners had higher accuracy on nouns with natural gender, suggesting that part of the problem in marking gender is the highly abstract nature of the task: associating a seemingly arbitrary class with each noun. When the categorization of nouns into classes is more transparent, learners are able to learn the classes more easily. Indeed, Carroll (1999) also found that early adult L2 learners of French were more successful at marking gender on nouns with semantic or morphological cues. Apparently, the gender cue considered here – that is, the *-e* ending – was not strong enough to help these learners.

1.b When learners make gender errors, do they use *consistent* incorrect gender marking on determiners and adjectives each time a lexical item is used (i.e., they always make the same error with the same word)? If so, the problem is likely that the learner has incorrectly matched a gender feature with an item, but the grammatical system is still functioning.

Learners are not consistent in their marking of nouns. Therefore, we conclude that the problem is not a (permanent) incorrect assignment of gender features to nouns. It is possible that learners simply do not know a noun's gender and change their assignment of gender frequently. Sabourin et al. (2006) suggest that a large amount of input may be necessary in order for learners to fully assign a gender class to nouns; perhaps these learners have simply not had enough input to establish a gender marking on certain, less frequently used nouns.

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5. Marcello frequently added an epenthesized schwa at the ends of nouns (e.g., *Tische* for *Tisch, Buche* for *Buch*). We hypothesized that he might be creating a feminine class of nouns, parallel to the pattern in German. However, he was no more likely to use feminine gender with these epenthesized forms than with other nouns.

1.c Do learners use pronouns that agree in gender with the lexical item, and/or with the selected determiners for that item? If the gender is correct on the pronoun, it provides evidence that the learner has correctly associated a gender feature with the item.

Unfortunately, we were unable to answer this question, because learners failed to use pronouns in reference to non-humans. If the learners had correctly used the pronouns, the behavior would have suggested that the noun's gender had been acquired. The implications of the failure to use pronouns are less clear because correct use of pronouns depends on more than simply the gender of the head noun. For example, case may change on the form of the pronoun that is required compared to the antecedent noun, and processing the discourse may also cause complications. Future research could examine this question with experimental data.

In the meantime, however, the finding is quite interesting. Both learners do refer to non-human nouns with a pronoun, but only with the non-gendered generic demonstrative *das* – an option which is available in German. Consider this example from Cevdet, where *Int* is the interviewer:

(23) Int: *Aber ohne* ***den*** *Kassenzettel . . .*
but without the.MASC receipt
'But without the receipt . . . '
Cev: ***Das*** *habe ich schon weggeschmissen.*
that.NEUT have I already thrown away
'I already threw that away' (Cevdet, 26c, 101–102)

Here, Cevdet could have chosen to simply repeat the interviewer with the demonstrative pronoun *den*, but instead uses the generic *das*.

This use of *das* as a generic demonstrative is grammatical in German and is particularly common in phrases such as "I like that", "She knows that", or "That's great". Both learners use *das* appropriately in these contexts (Marcello uses *das* appropriately as a generic demonstrative 15 times and Cevdet 57 times). An example from Marcello's data is given below.

(24) *Ja, wi, wir wollen das tun.*
yes we want that.NEUT do
'Yes, we want to do that.' (Marcello, 35j, 577)

The fact that learners use *das* frequently in situations like (24) may help explain why they rarely use it as a determiner. We propose that *das* has been parsed and assigned in the learners' lexicon to the category of 'generic demonstrative'. At this point, the Uniqueness Principle (Wexler and Culicover 1980) plays a role in preventing the word *das* from playing a part in the learners' grammar as a determiner. This result indicates that misparsing the input can lead to gender errors, a problem that is perhaps more likely in naturalistic as

opposed to classroom learners; for instance, in this case, if Cevdet and Marcello had been required to use *das* as a determiner on written and oral assignments, perhaps misparsing would not have occurred.

On the other hand, both learners were highly successful with gender marking on personal pronouns referring to humans. This may be due to the relative simplicity of determining a pronoun's gender features. For instance, the need to assign gender is either eliminated (for forms like *ich*, 'I') or simplified because it equates to natural gender (e.g., *sie* 'she'). Similarly, there is no need to choose between definite and indefinite paradigms, which simplifies the choice of form. For now, we take it as significant that learners who have great difficulty marking gender on determiners are nearly perfect at doing so on pronouns. This finding implies that the gender feature either operates differently in these cases, or that an increase in salience and cues to natural gender makes it much easier to use gender marking appropriately.

2. Does the presence or absence of gender in the learner's L1 facilitate the acquisition of that feature in the L2? If so, it may be evidence for the FFFH.

The presence of gender in Italian did not appear to facilitate Marcello's use of gender in L2 German. Importantly, he does not demonstrate any advantage in very early files, when we would expect to see a difference between the two learners. Furthermore, he appears to make no improvement over time; his accuracy rates remain quite low at 47.7 % on singular nouns (as shown in Table 5) after 22.5 months.

One explanation for this performance lies in the highly layered feature structure of German. Since gender, case and number must all be marked simultaneously on definite and indefinite determiners, it is possible that Marcello was unable to produce accurate gender marking because of "interference" from the other features. In particular, Marcello seems to be unable to mark case; he "switches" to a non-case-marked form (feminine) when a determiner would require overt case marking (masculine) (see Table 9).Since Italian does not overtly mark case, Marcello may have difficulty marking those features on syntactic nodes. This in turn may make it difficult to select an appropriate determiner from the German paradigm. We consider this finding to be particularly compelling and argue that cases such as this one – where multiple features are conflated on a single morpheme – should be examined more closely in future work.

On the other hand, the Turkish learner may have had an advantage in marking case, since overt case marking is present in Turkish. However, Cevdet's accuracy on gender marking also remains fairly low at 69.5 % (as shown in Table 7). This finding is not entirely surprising, given that there are many challenges in acquiring the German system. In particular, the complex and phonologically

opaque system of feature marking in German may have made it difficult to parse the input and accurately assign gender to nouns.

Of course, with only two learners in the study, we cannot generalize further about Turkish and Italian populations.

3. Do learners make "unidirectional" errors (Prévost and White 2000; White 2002, 2003) or demonstrate other patterns of error in determiner and adjective marking? This may indicate that the syntax is intact, but "mapping" is difficult. However, if errors appear randomly in all categories, it may indicate failure of the entire system, possibly impaired features or Failed Functional Features.

White (2003) showed that morphology errors of a Turkish speaker learning English consisted mostly of omissions of obligatory inflections like verbal morphology, noun plurals, and determiners. However, when the inflections were used, they were used correctly. White calls these types of errors unidirectional and invokes them as evidence that the feature system is operating correctly.

In the case of gender marking, it is less clear what a unidirectional error would look like. There is no way to completely omit gender marking, since it is represented on the determiner form. However, it may be the case that the learners, especially Marcello, are developing a feminine "default".[6] They both tend to use feminine determiners in determiner phrases with adjectives (see below); their accuracy on feminine determiners is higher than for other genders (see Tables 5 and 7); and they have a tendency to use feminine when overt case marking is required. This may be taken as evidence toward a unidirectional pattern of error. It is possible that phonological interference (for instance, a preference for CV syllables as in Italian) may have contributed to this pattern. An additional factor may be the frequency of *die* in the determiner paradigm; see Table 1.

We found an interesting pattern of interference between gender and case marking. That is, when masculine nouns in an accusative context require overtly case marked determiner forms, learners are much more likely to use feminine determiners than when masculine nouns are in nominative contexts. The same effect was not found with neuter nouns, which do not have an overtly case-marked form in accusative contexts. This pattern of error indicates that learners are in fact aware that an overt case marker is required for masculine accusative nouns; however, they have difficulty producing the correct overt form. To avoid the difficulty, they "change" the gender of the determiner. We interpret this gender error to be an issue of mapping difficulty. That is, learners have difficulty realizing overt case marking on accusative forms and are

6. Note that L1 German children also tend to overgeneralize the feminine form *die* (Mills, 1985: 174).

therefore unable to select an appropriate case- and gender-marked determiner from the German paradigm. An explanation based solely on the unavailability of the gender feature cannot account for the difference between performance in grammatical contexts.

Results with adjective endings also indicate a mapping issue. There is a very clear unidirectional pattern: the learners frequently omit adjective endings on attributive adjectives while they correctly leave predicate adjectives uninflected. This pattern indicates that the learners are sensitive to the presence of feature bundles on adjective heads in the syntax – or perhaps more accurately, to the contrasting lack of feature bundles on predicate adjectives. Thus we can conclude that feature percolation is correctly taking place in learners' grammars, at the very least onto adjectives. Mapping morphological forms to feature bundles must be a problem at least here, although we cannot speak directly to the issue of gender.

Regarding the attributive adjectives, it appears as though Marcello uses a default ending (*-e*), while Cevdet has a more random, variable use of adjective endings. It is not clear why the two learners pattern differently in this regard, because they both have similar patterns of determiner use in DPs with adjectives. This is an area that warrants further study. At any rate, a major factor in the learners' low success rate is complexity and low salience of the adjective system itself. Learners may be unable to parse the input well enough to determine which endings are associated with which features in the first place.

4. Do learners have more difficulty with complex DPs, such as those containing adjectives? If so, processing may contribute to errors, even if the rest of the system is functioning.

Cevdet and Marcello have much greater difficulty with DPs when there is an adjective present. Both adjective endings and determiners appear to be marked with default forms, that is, if they are included at all; Marcello omits significantly more determiners when a determiner phrase includes an adjective, and Cevdet omits a striking six times as many determiners in phrases with adjectives. The same results have been found in a number of other studies (e.g., Goad and White 2004; Trenkic 2004).

Why is there such difficulty with adjectives? A logical possibility is processing constraints; perhaps the addition of an AP phrase increases the processing load, leading to further errors. If this is the case, then these errors are attributable neither to a syntactic, morphological nor lexical problem.[7]

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7. An anonymous reviewer points out that due to the complex and ambiguous input, the learners could have developed the hypothesis that it is necessary to "change something" on the determiner when an adjective is present.

7. Conclusion

In this study, we conducted a detailed examination of the production data of two learners of German in order to learn about their use of gender in a language that bundles gender with other grammatical features. The learners appear to be constructing an interlanguage system, as Bley-Vroman (1983) might have predicted. Both learners appear to have a two-gender system (masculine and feminine); in addition, the forms *die* and *eine* have a tendency to appear in accusative case positions.

It appears that the two learners' difficulty with gender marking in German DPs stems from multiple factors. Some of the problems are almost certainly lexical, perhaps due to weakness of phonological and semantic cues in German. This hypothesis is supported by White et al.'s (2004) study, in which L2 learners were far more successful at learning the more regular system of Spanish gender.

Another problem can arise when learners fail to assign proper grammatical categories to morphemes. This may be the case with *das*. Given that *das* may have been assigned to the 'unique' category of generic demonstrative and not allowed to be homophonous with the determiner, it is unavailable to participate in the paradigm as the neuter determiner. This result is interesting and contradicts the role assigned to frequency and collocations in theories of second language acquisition which minimize a role for "structure" and "rules" (e.g., Ellis 2005). After all, since Marcello worked in a restaurant and presumably heard the words *das Bier* 'the beer' and *das Brot* 'the bread, roll' frequently, one would expect *das* to be included in the determiner paradigm, based on its frequent collocational position with nouns.

An additional factor appears to be a breakdown in processing, which explains the increased error rate when an adjective is present in the DP.

"Mapping" within the DP appears to be a problem, as well. In general, the conflation of multiple features on a single determiner form appears to create difficulties in marking those features. This is particularly interesting in the case of Marcello, who demonstrates low accuracy on gender marking despite having gender in his L1, Italian. Marcello demonstrates reduced gender accuracy rates in accusative positions, presumably because the requirement to mark case overtly interferes with his ability to select an appropriately case and gender-marked determiner.

Our key point here is that because gender is both an inherent lexical feature on N and thus subject to lexical error, as well as an unvalued, uninterpretable feature on D and A in DPs, errors may arise from multiple sources, including lexical learning, processing, mapping, and lexical assignment/parsing the input. It is therefore important to exercise caution when making claims about feature acquisition based on the gender feature, especially claims that errors are based on a syntactic deficiency.

We hope to have shown that the investigation of complex systems such as the one in German is a fruitful endeavor. We encourage researchers to tackle these "difficult" areas because they are needed for a full account of the nature of learners' errors in feature marking. In particular, we find it useful to consider cases in which transfer predicts success, but where learners nevertheless produce numerous errors, as with Marcello in this study. These errors are (presumably) not attributable to a syntactic problem, and may point the way to discoveries about the specific nature of learners' interlanguages.

Michigan State University
<spinnerp@msu.edu>
University of Pittsburgh
<juffs@pitt.edu>

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