# The Trilingual Acquisition of Gender –

# A case study of French, Dutch and German

Submitted in partial fulfilment of the Master in Linguistics (MPhil)

By Edith Schlag

Student Number 0325546

At Utrecht University

Supervisor:

Dr. Sharon Unsworth

Utrecht University

Second Reader:

Dr. Sergio Bauuw

Utrecht University

May 2010

## Table of Contents

## 1. Introduction

The present study investigates the acquisition of grammatical gender of nouns in a trilingual three-and-a half year old boy acquiring French, German and Dutch. He is exposed to French and German from birth and to Dutch before the onset of speech (11 months). The study examines the differences between the acquisition course of the three languages and the causes thereof. Related literature associates these differences with the degree of available assignment rules for gender. Moreover, it investigates differences and their causes between mono-, bi- and multilingual acquisition. These differences may be caused either by cross-linguistic influences (Hulk & Müller, 2000) or by reduced input (Unsworth, 2008).

Data from the acquisition of French, Dutch and German show that grammatical gender is not acquired in the same way across languages. In French, for instance, the acquisition in monolinguals is practically error-free (Müller, 1990, Karmilloff-Smith, 1979, van der Velde, 2003). Similarly, monolingual German is acquired with little to no errors (Szagun et al, 2007). Both French and German grammatical gender is mastered by the age of 3,0 to 3,5. Monolingual Dutch, on the other hand, is acquired comparably late. That is, errors, at least in one gender category, are only overcome by the age of around 6 (van der Velde, 2003; Bol & Kuiken, 1988). One possible reason lies within the characteristics of the gender systems in each language. Grammatical gender is said to be assigned to nouns in a rule-governed or in an arbitrary way (Corbett, 1991). It is suggested that the acquisition of gender is affected by assignment rules (Mills, 1986; Wegener, 1995; Szagun et al., 2007; Müller, 1990; Karmilloff-Smith, 1979; Hulk & Cornips, 2006b). A more arbitrary system such as Dutch may cause more difficulties than a comparably rule-governed system such as French or German. So far, there are only studies on bilingual acquisition of gender (Hulk & Cornips, 2006a and b; Unsworth, 2008; Cornips et al., 2006; Granfeldt, 2000; Hulk, 2004; Müller, 1990). Trilingual acquisition may give further insight whether rules may account for developmental differences, particularly as one of the languages is mostly arbitrary while the other two are mostly rule-governed. The question which shall be pursued here is whether the differences between the acquisition of French, Dutch and German are caused by the language specific availability of assignment rules.

There is consensus in related literature that bilingual children acquire their languages separate from the start (Meisel, 1989; Hulk & Müller, 2000). This does not prevent from cross-linguistic influences to occur, though (Hulk & Müller, 2000). As proposed by Hulk & Müller, cross-linguistic influences may affect particular language structures while others seem unaffected. Affected languages structures are supposed to lie at the syntax-pragmatic interface such as the CP. Hulk & Müller (2000) investigated potential effects on the acquisition of the CP based on the work of Platzack (1999, 2001). According to Platzack, the layer in a syntactic construction that encodes discourse information may cause problems in language acquisition, in SLI and also in Broca aphasics. Hulk & Müller extend this proposal to bilingual acquisition. They also propose that cross-linguistic influences only occur under the condition that there is a surface similarity among the languages involved. In order to test Hulk&Müller's proposal, Kupisch (2003) investigated the DP. Kupisch argued that the DP also encodes discourse information, such as definiteness, and hence is subject to

Hulk&Müller's proposal. Apart from definiteness, also gender is marked on DPs. Consequently, potential cross-linguistic effects could also occur in the acquisition of gender. It is suggested here that Hulk & Müller's proposal cannot be applied to the present investigation since grammatical gender does not encode discourse information. However, Hulk & Müller's proposal contributes to an alternative proposal on cross-linguistic influence which is made here. That is, for cross-linguistic influences to occur, the languages must be similar to a certain degree. This will be laid out in what follows.

Hulk & Müller proposed that for cross-linguistic influence to occur, the languages involved must be similar on a surface level. This concept of similarity potentially allow for cross-linguistic influence to occur is also known from L2 acquisition (Sabourin et al, 2006). Sabourin et al. propose that a gender category in one language may influence the acquisition of the same gender category in L2 when phonetic similarity is given. This influence seems to be beneficial in that the gender category is then learned with fewer errors. A further observation is made regarding the acquisition of gender categories. That is, it appears that certain genders undergo fewer errors in bilingual acquisition than others. Masculine and feminine is mostly correct in bilingual German and French (Müller, 1990) while neuter is moderately difficult in bilingual German (Müller, 1990) and considerably delayed in bilingual Dutch (Hulk & Cornips, 2006a,b). On the basis of this observation and Sabourin et al.'s (2006) suggestions on transfer effects of gender categories, the question arises whether identical gender categories, in other words, those which intersect within the languages involved, influence each other within bilingual acquisition. The effect would be that intersecting categories are learned with fewer errors while those which do not intersect are learned less fast and with more errors. For instance, French and German feminine and masculine intersect while Dutch common does not intersect with a gender category of another language. It shall be investigated here whether cross-linguistic influence can be said to occur within intersecting elements.

A further reason for differences between mono-, bi- and multilingual acquisition may lie within the effect of reduced input (Unsworth, 2008). That is, bilingual children undergo less exposure in the same time span as monolingual children. Less exposure brings about less data the child can use in order to build up the language system. It seems that for some languages and for some structures within those, the input reduction causes delays. For instance, in Dutch, it seems that the acquisition of neuter gender is sensitive to input reduction as it causes a delay (Unsworth, 2008). For other languages, such as French, the input reduction in bilinguals seems to have very little effect as gender is acquired almost error-free in mono- and bilinguals. For German, on the other hand, there is a difference between mono- and bilinguals as one gender category, namely neuter, is acquired with a certain delay. The reduction of input does not have the same effect across languages. The acquisition course of a language structure in bi- or multilingual contexts is then the result of reduced input on the one hand and language particular characteristics on the other. The present investigation of trilingual acquisition may provide with further evidence for both factors. That is, the attainments in each language shall be compared in the light of specific availability of rules on the one hand and the input reduction for each language on the other.

The paper is organized as follows. Chapter two describes the gender systems of French, Dutch and German and introduces briefly conditions on gender acquisition. Chapter 3 presents with the data of the acquisition of French, Dutch and German in mono- and bilingual contexts. Chapter 4 discusses potential causes for firstly, differences between the acquisition of the three languages, and secondly, differences between mono- and bilingual acquisition in for each language. Chapter 4 concludes with predictions for trilingual acquisition. In Chapter 5, the methodology is presented and in chapter 6, the data analysis and the results are given. Chapter 7 discusses the results in the light of the predictions made. Finally, chapter 8 presents with the conclusion of the present investigation.

## 2. Grammatical gender and its potential impact on acquisition

In order to outline the acquisition task of the acquisition of gender, a definition of gender is presented in what follows. Furthermore, the gender systems of French, Dutch and German are described. It occurs that gender differ in several respects over languages. They differ in the number of genders, in the scope of each gender level within the lexicon and also in respect to being assigned by formal rules or by no rule at all. The aspects number of gender levels, lexical scope and assignment rules are considered in depth as the present study investigates their potential impact on acquisition. Further relevant issues such as 'assignment versus agreement' and requirements for a gender rule to act as a cue in acquisition are considered. The chapter concludes with a summary of findings about gender levels, their scope and assignment rules in French, Dutch and German.

Grammatical gender classifies nouns into categories within a language, based on the gender feature said to be inherent to the noun (Corbett, 1991, van Berkum, 1996). Gender marking of the noun can be found in about one-fourth of the world languages. Within this fourth, all languages have a basic gender concept of masculine, feminine and neuter, referred to as 'semantic core' (Corbett, 1991)[1]. It appears that in all languages, a particular group of nouns denotes real-world entities with natural sex whereas a larger group of nouns are entities that are not sex-differentiable. Corbett (1991) refers to the former as 'semantic core', from which the gender system to all nouns evolved. For instance, in French, 'la fille'/the girl, the gender marking is assigned on the basis of natural sex. Accordingly, 'le garcon'/the boy bears masculine gender which is reflected in the masculine marking 'le'. The assignment of gender markings on the basis of natural sex is called Natural Gender Rule (henceforth: NGR, cp. Mills, 1986). As mentioned above, not all nouns are categorized by NGR. In fact, the majority of nouns does not have animate and sex-differentiable 'real-world' referents (Corbett, 1991). These nouns are nevertheless labeled 'feminine', 'masculine' or 'neuter'. In German, for instance, the fork is 'die Gabel' and marked feminine; the spoon is 'der Löffel' and marked masculine whereas the knife is 'das Messer' and marked neuter. These entities clearly do not have a natural gender. The nouns referring to them therefore bear what is called 'grammatical gender'[2]. The present investigation focuses on grammatical gender only. This is because, firstly, the distinction between natural and grammatical gender seems to play no role in acquisition (Szagun et al., 2007, Mills, 1986, Wegener, 1995, Müller, 2000). Secondly, the overall scope of natural gender within the lexicon is limited.

### 2.1. Formal rules of gender assignment

Having identified a rule assigning natural gender, the question arises whether the assignment of grammatical gender also follows assignment rules. Three options can be identified from related literature (Tucker, et al, 1977, Corbett, 1991, van Berkum, 1996): a noun may be assigned gender (i) by means of phonological or by (ii) morphological properties of the noun and finally (iii) in an arbitrary way (Corbett,1991)[3]. See the examples overleaf:

[1] These three concepts are not necessarily marked on determiners in all languages. In English, for instance, they are only visible on pronouns as he, she and it. In German, on the other hand, they are also marked on determiners such as 'der'/masc., 'die'/fem. and 'das'/neut.

[2] Corbett (1991) notes that the labels 'feminine', 'masculine' and 'neuter' for grammatical gender are misleading since they suggest natural sex. He proposes neutral labels such as 'gender A', 'gender B', and so forth. However, related literature maintains the labels based on natural sex and therefore, the common notions 'feminine', 'masculine' and 'neuter' for grammatical gender are used here.

[3] Corbett (1991) calls those properties 'gender assigners' or 'gender predictors'. Throughout the present paper, morphemes and phonemes are labeled 'gender assigners' to the noun.

(i) phonological: the final phoneme /z/ as in ‘chaise’/chair is associated with feminine gender in French

(ii) morphological: the morpheme [-chen] as in ‘Mädchen’/girl is associated with neuter gender in German

Since phonological and morphological properties of this kind apply to a group of nouns, they are referred to as phonological or morphological ‘rules’ (Corbett, 1991). Arbitrary gender assignment is a case where no rule for gender assignment can be identified, as in the following example:

(iii)arbitrary: de tafel/the table in Dutch

In French and German these three options of assignment can be found. Dutch only displays morphological rules and arbitrary assignment. The languages also differ in respect to the scope these options have over the noun lexicon. French, for instance, is said to be largely rule governed with mostly phonological gender assignment (Corbett, 1991; Tucker et al., 1977) and to a smaller part arbitrary where no rules apply. Dutch, on the other hand, displays very little rules for gender assignment, which are mostly morphological (Haeseryn et al., 1997), and hence, its gender assignment is largely arbitrary. German has phonological, morphological rules and arbitrary assignment (Köpcke & Zubin, 1984) with more arbitrary assignment then French (Corbett, 1991). It appears that for each of the three languages, the amount of nouns with gender assigned by rules varies. The relative portion of arbitrary versus rule-governed gender assignment is expressed by the notion of ‘overtness’ (Corbett, 1991). Languages where most or all nouns carry formal and discernable assigners are said to have an ‘overt’ gender system (Corbett, 1991). Languages where some but not all nouns carry an overt gender assigner have a covert or a semi-overt system. To a certain extent, the nouns in French, Dutch and German have no formal gender assigner. Therefore, they are said to be semi-overt (Corbett, 1991). Comparing their degree of overtness, it appears that French is more overt than German, which in turn, is more overt than Dutch. These findings are of particular interest for the present investigation since the degree of overtness may have an impact on the acquisition of gender (Wegener, 1995). That is, the more overt a particular system appears in the child’s input, the easier it might be acquired. As a consequence, a more overt language should be acquired with fewer errors and faster than a less overt language. Section 1. below presents with the overtness in form of assignment rules over the three languages. The degree of overtness is given in percentages.

### 2.2. Gender assignment and gender agreement and implications for acquisition

Apart from gender assignment, gender appears also in an agreement relation of a noun phrase. Agreement refers to the concord of elements in respect to features such as gender. In a DP such as ‘le grand ballon’/the big balloon, all elements carry the feature ‘masculine’ and thereby agree in this respect. It is assumed (Müller, 1996; Caroll, 1989, cited in Sisson (2006), Glück, 2000) that nouns carry gender as an inherent feature whereas associated elements such as adjectives and determiners carry gender via agreement. Hence, the gender concord of a noun and a determiner, for instance, is achieved via agreement. In this sense, a noun is assigned gender in an inherent and lexical fashion whereas a determiner receives gender via agreement with this noun as soon as it enters in an agreement relation within a DP.

According to Caroll (1989), gender assignment to the noun is not based on assignment rules but arbitrary only. Hence, the acquisition of gender is not based on formal rules. As a consequence, the inherent gender feature of the noun must be learned for each noun individually. When this gender feature is acquired, the agreement with further elements, such as determiners, can be established. Szagun et al. (2007), Müller (1990) and Mills (1989) assume that the acquisition of gender of a noun is based on rules. They suggest that the inherent gender feature for the majority of nouns are assigned by means of morpho-phonological cues of the noun form. This means that the gender feature of most nouns is not learned in an individual 'word-by-word' fashion. The child rather detects that a group of nouns have formal cues in common and can be associated with a particular gender. If this is the case, the use of assignment rules should be visible in children's determiner and noun use. This use can be two-fold. Firstly, the use of a gender is consistent over a group of nouns with the same formal cue. Second, if mistakes occur, these should be systematic. That is, if a child relies on a specific form to assign gender to a noun, it should overgeneralize this gender to exceptions. For example, the final consonant /-r/ in French is associated with masculine gender as in 'le beurre'/the butter. Exceptions like 'la chambre' [+fem] should be overgeneralized and being marked [+masc.] in children who acquire French. In other words, if children use assignment rules, they may pass through a stage of overgeneralization (Szagun et al., 2007) which should be visible in the data. If the acquisition of gender merely involves rote-learning and the establishment of an agreement relation (Caroll, 1989), no use of a rule or overgeneralizations should be visible during acquisition course. The present study may shed light on whether the acquisition of gender of a noun phrase involves rote-learning or whether formal assignment also plays a role.

### 2.3. Qualification of gender rules as cues to acquisition: a vague guideline

In related literature, little is provided which describes criteria of what qualifies a noun form to be a gender cue. Wegener (1995) suggests that the acquisition of a grammatical feature depends on its salience, its frequency, and, if a rule applies, the rule's scope and consistency in the input. To what degree a rule must be consistent or to how many entries in the lexicon this rule must apply in order to be salient enough for acquisition is not a trivial question. Literature on the acquisition of morphology does not provide with a straightforward answer. Therefore, Wegener's criteria may only give a vague guideline to the choice of formal cues for the present investigation. The cues chosen on this basis are those with a high consistency of the rule with as little exceptions as possible. The cue should also be discernable over many entries in the lexicon in order to appear salient to the child. Finally, the noun which carries the cue should be semantically accessible, that is, the nouns should denote concrete entities. In order to outline potential formal cues for acquisition in each of the languages under investigation, the gender systems of French, Dutch and German are presented in what follows.

#### 2.3.1. Gender systems in Dutch, French and German

The following section presents morphological and phonological assignment rules in the languages under investigation. Each section will conclude with a selection of morphological and phonological assigners which enter the present investigation. This selection will be based on Wegener's guidelines presented above.

##### *I. Dutch*

Dutch gender belongs to the predominantly covert systems with mostly arbitrary assignment (van Berkum, 1996). It has a two-way gender system spelled out on definite determiners, pronouns and adjectives. The definite determiner is marked for common gender

with ‘de’ and for neuter with ‘het’. Indefinites take an identical form for both genders. See the examples 1. to 2 below:

1. de mond (definite)/een mond (indefinite) – the/a mouth
2. het oog (definite)/een oog (indefinite) – the/a eye

The Dutch system evolved from a three-way gender system with ‘vrouwelijk’/feminine, ‘mannlijk’/masculine and ‘onzijdig’/neuter (van Berkum, 1996) gender. The feminine and masculine gender conflated into the common gender marked with ‘de’. The former three-way distinction is still visible on pronouns, though only for natural gender nouns. For example ‘de man’/the man is referred to as ‘hij’/he. Since feminine and masculine converged, van Berkum (1996) argues that Dutch can be seen as a two-way system with common and neuter gender.

*Morphological assignment:* As noted above, for most Dutch words, the assignment of grammatical gender cannot be derived from the form of the noun (van Berkum, 1996). Some morphological cues exist though, but no phonological ones (Haeseryn, et al., 1997). For instance, the final morpheme [-de] is associated with common gender marking as in ‘de kunde’/the lore. In contrast to common gender, morphological cues for neuter may also be prefixes. For instance, [be-] as in ‘het begin’/the start or [ont-] as in ‘het ontwerp’/the design. Suffixes for neuter gender include, for example, [-asme] as in ‘het enthousiasme’/the enthusiasm. Most of the words with these affixes denote abstract entities. An exception in this respect is the suffix [-je]. [-je] is a diminutive morpheme which can be attached to common and neuter words and denotes all kind of concrete or abstract entities. It also turns words with common gender into a neuter marked noun. For instance, ‘de hond’/the dog becomes ‘het hondje’/the little dog which is then marked for neuter gender. The use of [-je] is highly productive in colloquial Dutch (van Berkum, 1996).

*Distribution:* Common and neuter gender are not evenly distributed over the lexicon. There is agreement in related literature that the common marking ‘de’ occurs three times as often as the neuter marking ‘het’ (Haeseryn et al., 1997, van Berkum, 1996). Van Berkum (1996) carefully analyzed the frequency of gender occurrence in Dutch, using the CELEX database and dictionary counts. He concludes that the ratio of 3:1 can be confirmed.

In sum, Dutch has a two-fold gender system with common and neuter gender. The former is marked with ‘de’ and the latter with ‘het. Common and neuter gender appear in a ratio of 3:1. Mostly, Dutch gender appears to be assigned in an arbitrary way. To a limited part of the lexicon, gender is assigned on the basis of morphological but no phonological cues. Morphological gender markers tend to denote abstract entities. An exception is the suffix [-je] assigning neuter gender, even to originally common nouns, and it is often used in colloquial Dutch.

For the purpose of the present investigation, [-je] presents itself as the most suitable morpheme to test the use of a rule in acquisition. It is used in a high frequency and it is not restricted in its use such as morphemes assigning common gender, which mostly denote abstract entities. Moreover, the rule is consistent with no exceptions. The highly frequent use of [-je] as observed by Berkum (1996) makes it likely that this rule has a high scope in the child’s input.

## *II. French*

French is a two-way gender system where nouns are assigned to feminine and masculine gender. Gender is marked on definite and indefinite determiners, pronouns and adjectives. Definite determiners take the form ‘la’ for feminine and ‘le’ for masculine gender.

This distinction is also visible on indefinite determiners which take the form of 'un' for masculine and 'une' for feminine. See the examples below:

1. la bouche/une bouche – the mouth/a mouth
2. le nez /un nez – the nose/a nose

French belongs to the languages with overt and covert gender. The French gender system was seen as arbitrary (see Corbett, 1991, for references) until the extensive analysis by Tucker et.al. (1977) revealed that the system is in fact highly systematic. Further inspection by Corbett (1991) confirms that formal gender assignment rules cover about 85 % of the nouns in the lexicon. This renders French a more overt than covert gender assignment system. In what follows, morphological and phonological rules of gender assignment in French are presented.

*Morphological assignment:* Altogether, there are 17 morphological rules with few exceptions to the associated gender (Müller, 1990, Tucker et al., 1977, www.lexique.org). The morphemes assigning gender are exclusively word-final. For instance, [-ette] as in 'chaussette'/sock indicates feminine gender and [-ier] indicates masculine gender (Tucker et al., 1977) as in 'tablier'/apron. Except on the website www.lexique.org[4], no information about the scope is given in related literature. As opposed to its high consistency (100%), the scope of a morpheme is typically rather small. [-ette], for instance, amounts to 380 nouns (lexique.org)[5] which contrasts with the potentially great scopes of phonological gender assigners (e.g. up to 15.000 entries in the lexicon). The scope of masculine [-ier] amounts to ca. 459 entries in the lexicon.

The morphemes [-ette] as in 'la trotinette'/scooter and [-ise] as in 'la sottise'/foolery are the most frequent morphological assigners for feminine gender. Since [-ise] denotes mostly abstract entities, comparable with Dutch [-heid], preference is given to [-ette] to enter the present investigation, because it appears with concrete entities. [-ette] also displays a higher frequency in the lexicon, at least compared to other morphemes, and it is highly consistent (no exceptions). The same holds for the masculine assigner, the morpheme [-ier]. Hence, [-ette] and [-ier] are the morphological assigners chosen for the present investigation.

*Phonological assignment:* There are about 30 phonological rules in French (Tucker et al., 1977). In contrast to the deterministic morphological assignment, phonological rules allow exceptions to varying degrees. Despite these exceptions, Corbett (1991) suggests that French gender system is nevertheless predominantly phonological since most of the nouns are assigned gender on the basis of phonological properties of the noun. The statistics in what follows are based on Tucker, et al. (1977) and further inspections on their data by Corbett (1991) and Müller (1990). The phonological rules mostly refer to final phonemes and vary in respect to consistency. That is, a rule may apply to about 60 to 100% of a group of nouns. For instance, /l/ as in 'le miel'/the honey applies to 58% of a total of 1581 entries. In contrast, /r/ as in 'le beurre'/the butter assigns masculine gender to 78% of a total of 3974 nouns. In respect to scope, the phoneme /r/ stands out among phonological assignment in French, not only for masculine gender. In an overall group comparison of all phonological assigners, /r/ applies to the highest number of entries. The phoneme /z/ for feminine as in 'la chaise'/the chair applies to 90% of 912 entries[6]. Compared to the phonological assigner, /z/ has a rather small scope in the lexicon but it is the most consistent of the phonemes assigning

[4] Run by Centre National de la Recherche Scientifique - http://www.lexique.org/

[5] [-je] in Dutch with it's high frequency is an exception among the languages under investigation.

[6] For a concise overview of morphological and phonological rules, see Müller, 1990 based on the analysis of Tucker, et al. 1977

feminine gender. Therefore, masculine assigner /r/ and feminine assigner /z/ shall be administered in the present investigation.

Distribution: As can be derived from the statistics in the lexique.org database, masculine gender occurs about to the same amount as feminine, namely 'la' to 52% and 'le' to 48%[7]. Hence, the scope of feminine and masculine in the French lexicon is balanced.

In sum, French gender assignment is seen as predominantly phonological (Corbett, 1991) where two third of the rules reach a consistency level of at least 70%. Altogether 17 morphological rules assign gender in a deterministic way (Müller, 1990) but cover only a limited scope in the lexicon (Corbett, 1991). Phonological and morphological rules taken together cover 85% of the nouns in the French lexicon (Corbett, 1991), which renders this gender system highly rule-governed. Hence, French gender assignment is mostly formal and highly systematic. For the present investigation, the morphemes [-ette] for feminine gender, [-ier] for masculine gender are chosen. The phonological rule is tested with the final phoneme /z/ for feminine and /r/ for masculine gender. The scope of the genders feminine and masculine is almost equal over the noun lexicon.

## *III. German*

German is a three-way gender system where feminine, masculine and neuter gender is marked on definite and indefinite determiners, adjectives and pronouns. Distinct forms exist for definite determiners, as mentioned above. The forms for indefinites are distinct only for feminine gender. These differences are illustrated in examples (5) through (7).

1. der Mund/ein Mund– the mouth/a mouth
2. die Nase/*eine* Nase – the nose/a nose
3. das Auge/ein Auge – the eye/an eye

As French, German was said to assign grammatical gender entirely arbitrarily (Maratsos, 1982; Carroll, 1989) whereas Köpcke & Zubin (1984), Wegener (1995), Müller (1990), and Mills (1986) argue that the assignment system, for the majority of the nouns, is based on rules, and hence, German gender should be considered semi-covert. In accordance with this view, van Berkum states that "whereas most linguists and psycholinguists view gender assignment as a largely random affair, an apparently well-informed minority takes it to be largely systematic." (1996, p. 39). Corbett (1991) also describes German gender assignment as resting on an interplay of phonological, semantic and morphological rules. These were extensively analyzed by Köpcke & Zubin (1984). They identified morphological rules which are, similarly to French, mostly deterministic and phonological rules which allow exceptions to varying degrees.

*Morphological assignment:* Compared to French, only a small range of affixes are associated with grammatical gender; this is in turn comparable to Dutch. The following examples are taken from Müller (1990). Nouns with prefixes such as [be-] are assigned masculine gender as in 'der Bereich'/the domain. Suffixes are also associated with gender. Examples are [-er] for masculine as in 'der Hörer'/the receiver, [-in] for feminine as in 'die Lehrerin/the teacher' and the diminutive [-chen] for neuter, and 'das Türmchen'/ the turret, where all of them assign gender with a high consistency, that is, they allow little, as in [-er], or no exception at all, as [-in] and [-chen] (Wegener, 2000). The diminutive [-chen] derives nouns of any original gender into neuter, identical to the Dutch morpheme [-je]. German [-

[7] 'La' and 'le' also occur as pronouns where the proportions are similar. The uses of 'la' and 'le' are derived from spoken corpora (e.g. movies).

chen] differs in that its use is less frequent than in Dutch. As in Dutch and French, the assignment of gender via derivational morphemes very rarely allows exceptions. No frequency of occurrences for the morphemes are presented in the literature (Müller, 1990, Köpcke and Zubin, 1984). The general assumption for these morphemes may hold, that is, the scope is rather small. Given the limited range of morphemes and the tendency of morphemes to denote abstract entities, the most suitable morphemes for the present study appear to be [-in] for feminine, [-er] for masculine and [-chen] for neuter gender. All of them can be associated with concrete entities.

Another morphological and also prominent rule for gender assignment shall be noted here, namely the so-called 'one'-syllable rule (Wegener, 1995, Szagun et al., 2007). This rule is associated with masculine gender and applies to 60% of one-syllable-words. The remainder is divided into 22% of neuter and 14% of feminine nouns. The prototype of words with masculine gender has a word-initial and -final consonant as in 'der Fuss'/the foot (Wegener, 1995) as opposed to 'die Kuh'/the cow with no final consonant The more clustering of consonants occurs at the end of the noun, the more likely is the masculine gender as in 'der Sitz'/the seat with a final sequence of /ts/ or 'der Scherz'/the joke with a sequence of /rts/ (Eisenberg, 2000). This represents an interplay of morphological and phonological rules. Eisenberg (2000) argues that the phonological part of this interplay has a stronger effect on gender assignment than the morphological 'one-syllable'-rule. The morpheme [-er] for masculine gender is more distinct than the one-syllable-rule in that it does not confound phonological and morphological rules. Moreover, it has a higher consistency. Hence, the morpheme [-er] is given precedence over the 'one-syllable-rule' and enters the present investigation.

*Phonological assignment:* The most prominent phonological rule in German is the so-called 'schwa' rule. Schwa is an unstressed word-final syllable as in 'Nase'/nose and it mostly occurs in two-syllable words. 'Nase' represents a trochaic word pattern where an unstressed syllable which consists of a schwa, phonetically noted as /nazə/, follows a stressed one. This pattern is said to be predominant in German word prosody (Fikkert et al. 1998). It indeed applies to 15.000 entries in the lexicon (Müller, 1990). Words with this pattern are marked for feminine gender with a consistency of 90% (Köpcke & Zubin,1984; Müller, 1990) which led to the term 'schwa-rule' for feminine gender assignment (Köpcke & Zubin,1984, Wegener, 1995). Given its great scope and high consistency, the schwa-rule will be examined in the present investigation. For masculine assignment, Köpcke & Zubin (1984) found the final word pattern /…XCs/ where X stands for any vowel or consonant and C for a consonant as in 'der Pelz'/the fur. This rule shall be called 'final-consonant-cluster-rule' (FCCR) in what follows. The consistency of FCCR amounts to 75% over 160 entries in the noun lexicon (Müller, 1990).[8] With 160 entries, FCCR has a comparably small scope. However, it represents the highest available rate of phonological assigners for masculine gender. Hence, for phonological assignment of masculine gender, the form /XCs/ is chosen.

*Distribution:* The distribution of the three genders in German is as follows: about 50% of the nouns are marked masculine, 30% are marked feminine and 20% are marked neuter (Wegener, 1995; Mills, 1986). According to Wegener (2000), assignment rules are

[8] Note that these phonological rules apply mostly to one-syllable words. Eisenberg (2000) presents with a closer inspection of those one-syllable words and comes to the conclusion that the predictive power of syllable length is weaker than the one of phonological patterns, as alluded to above. For example, sequences of /t/ preceded by /f/, /ç/ or /x/ as in 'die Luft'/the air, die Schicht'/the layer or 'die Frucht'/the fruit are assigned feminine gender. The one-syllable rule must therefore be treated with caution. The more predictive power seems to lie within phonological clusters in word-final position.

applied to the overall noun lexicon to 65.4 %. The consistency of these rules appears to vary between 50 and 100 percent, that is, up to 50% exception may occur to some rules.

One further remark is in order here. This concerns the apparently close relationship between masculine and neuter gender in German. Some phonological rules apply to both masculine and neuter gender whereas masculine gender always applies to the greater part of entries (Müller, 1990, Szagun et al 2007). Neuter assignment does not rest on a distinct phonological rule in its own right. For example, 15 German words start with the consonant cluster /kn/ from which 14 bear masculine gender, as in 'der Knopf'/button and one is neuter as in 'das Knie'/knee. This distribution led to the assumption that neuter gender is a 'subgender' to the masculine gender (Müller, 1999). The particular relation between neuter and masculine seems also to be reflected in gender fluctuation (Eisenberg, 2000). Both genders are allowed for some nouns in German, for instance, 'der/das Filter'/the filter or 'der/das Joghurt'/the joghurt. These fluctuations only appear between masculine and neuter gender (Eisenberg, 2000). Given the relation between neuter and masculine, the German gender distribution can also be described as 70% non-feminine and 30% feminine nouns. The suggestion made here is that this relation may play a role in the acquisition in that it could be particularly difficult to disentangle neuter from masculine.

In sum, German displays distinct morphological and phonological rules for gender assignment. German is semi-overt since about a third of the nouns display arbitrary assignment. Among the identified rules, the most prominent is the phonological 'schwa' rule for feminine gender since it applies to 15.000 entries of the noun lexicon and shows few exceptions. The one-syllable rule for masculine gender is morpho-phonological. Its phonological part, final clusters, is more predictive than word length. Neuter gender is specific in that it might be seen as a 'subgender' to masculine gender with no phonological rule in its own right. For morphological gender assignment, [-in] for feminine, [-er] for masculine and [-chen] for neuter are chosen. For phonological assignment, the schwa-rule /-e/ is employed for feminine and the FCCR in the form of /…XCs/ for masculine gender. No specific phonological gender assigner for neuter is available.

Table 1. below sums up those morphemes which, on the basis of the preceding discussion, have been selected for the present investigation.

Table 1: Selection of rules for gender assignment in Dutch, German and French

| ***Dutch*** | ***German*** | ***French*** |
|---|---|---|
| **Common**<br><br>-- | **Masculine**<br><br>*1. phonological:*<br><br>/X C s/ as in 'Ke-ks'/cookie *(FCCR)*<br><br>*2. morphological*<br><br>[-er] as in 'Räub-er'/burglar | **Masculine**<br><br>*1. phonological:*<br><br>/r/ as in 'zeb-re'/zebra<br><br>*2. morphological:*<br><br>[-ier] as in 'tabl-ier'/apron |

| | | |
|---|---|---|
| ***Dutch*** | ***German*** | ***French*** |
| --- | **Feminine**<br>*1. phonological:*<br>schwa-rule as in<br>'Bien-e'/bee<br>*2. morphological:*<br>[-in] as in 'Verkäufer-in'/clerk | **Feminine**<br>*1. phonological:*<br>/z/ as in 'chai-se'/chair<br>*2. morphological:*<br>[-ette] as in 'chaus-ette'/sock |
| **Neuter**<br>*1. phonological: --*<br>*2. morphological:*<br>[-je] as in 'muis-je'/little mouse | **Neuter**<br>*1. phonological: --*<br>*2. morphological:*<br>[-chen] as in 'Mäus-chen'/little mouse | |

The present chapter examined the three gender systems of the languages under investigation. This inspection outlined what a child is confronted with when acquiring gender in one or all of these languages. This chapter also intended to define the selection of gender assigners which will enter the present investigation. In chapter 3, acquisition data of mono- and bilingual French, Dutch and German are presented. These will reveal whether the differences of the gender systems are reflected in the acquisition processes. Moreover, data on bilingual acquisition are inspected to see whether there are differences to monolingual acquisition. In chapter 4, it will be examined whether these differences, if any, are attributable to language internal characteristics as presented in this chapter. Further potential causes for differences will also be discussed.

## 3. The acquisition of gender in French, Dutch and German in mono-, bi- and multilingual children– a data review

In the last chapter, the three gender systems French, Dutch and German were presented in order to outline the task of a gender learning child. This outline rests on the hypothesis that specific characteristics of a gender system impact its acquisition. Therefore, the systems where examined in respect to the number of genders, their distribution in the lexicon and whether they displayed assignment rules. In the present chapter, it is investigated whether related literature reports on influence of these characteristics on acquisition.

In order to build the background for comparison with trilingual data, the first sections present with the acquisition of gender in mono- and bilinguals. The section is dedicated to two aspects of the acquisition data. Firstly, it presents the acquisition course for each language under investigation. This concerns the age, the duration until mastery is reached, the use of assignment rules and potential errors. It is also investigated whether there are differences among the languages and whether the language specific gender systems are indeed reflected in the acquisition course. Secondly, the section inspects if there are differences in mono- and bilingual acquisition of gender. As stated in the introduction, the acquisition of gender in monolinguals appears to be different from the one of bilinguals in two ways. That is, there might be a quantitative difference in that bilinguals acquire the two gender systems later (e.g Müller, 1990) or qualitative in that the lag cannot be borne out (Hulk and Cornips, 2006b). The reason for these differences may lie within the language specific characteristics of the gender system described in Chapter 2 or the differences may have independent causes. This chapter will build the basis of chapter four which investigates the potential causes for these differences.

The last section of the chapter presents with a presentation of trilingual language acquisition being the subject of the present investigation. It turns out that studies with trilingual children are scant as opposed to studies investigating bilingualism. Studies with trilingual children are concerned with subjects such as the acquisition of questions (Barnes, 2006) or language choice and the exposure-production-relation (Quay, 2001). Quay's overview of studies illustrates the lack of research in trilingualism. These studies amount to only six over a span of 30 years (Quay, 2001, p. 154). To my knowledge, no data on the trilingual acquisition of grammatical gender exist to date, at least not with children.

### 3. 1. Mono- and bilingual acquisition of French, Dutch and German

#### 3. 1. 1. French in mono- and bilingual contexts

##### *a. Monolingual acquisition*

Studies on the acquisition of grammatical gender in French monolingual children are scarce. The two available studies are presented in what follows. Van der Velde (2003) reports on an almost error-less marking of gender in French monolinguals at the age of 4. Her experiment was dedicated to examine the acquisition of DPs in 4- and 6-year-olds so that

little can be said about the onset of acquisition. Van der Velde (2003) suggests that gender in French is not acquired via assignment rules. In contrast, Karmilloff-Smith (1979), who studied 341 children aged 3,2 to 7,10, assumes that this nearly error-less acquisition is related to the use of phonological assignment rules. She found that subjects were able to attribute the correct gender to non-words furnished with phonological cues within the youngest age group. Those were, for instance, morphological cues as [-ette] or phonological as /-on/. Karmiloff-Smith (1979) also reports on an almost error-less acquisition course. She observes that feminine gender is slightly more prone to errors than the masculine one. No further information on errors such as overgeneralization and its direction are given. Potential developmental stages of gender acquisition are not available from these studies. It seems though, that French children as soon as they use definite determiners gender is used in an almost error-free fashion.

### *b. Bilingual acquisition*

The results of Müller's (1990, 1994) studies, using spontaneous speech samples, suggest that the mono- and bilingual acquisition of French proceeds similarly. Her bilingual subject Caroline produces both feminine and masculine gender in an adult-like way by the age of around 3. This is about the same age as their monolingual peers reach mastery. Apart from being French-German speaking, Müller (1990) does not report on the kind of bilingualism her subject belongs to. No information, for instance, on exposure pattern or proficiency is given.

Unlike monolingual acquisition, bilingual acquisition of gender differs quantitatively in that it lags behind. Whereas monolinguals master the system by maximally 3;0, bilinguals do so by about 3,4. The difference is also qualitative. Bilinguals pass an initial phase where only masculine gender is used. This phase lasts only very short and ends well before the age of three where the system is fully mastered. This bilingual acquisition pattern for French is described in several studies (Müller, 1990, 1994; Hulk, 2004, Granfeldt, 2000).

Müller (1990) identifies five (A to E) phases for the acquisition of gender in French. As will become clear, the gender paradigm on definite determiners is in fact already established by phase D. In phase A, which lasts up to approximately one year of age, no gender marking occurs, because the DP is not yet fully acquired. The form preceding a noun is merely an underspecified pre-form without a gender distinction. Indefinite and definite determiners appear in phase B, which lasts up to 2 years. Definite determiners are only used with masculine marking as mentioned above. Müller (1990) suggests that children did not detect that a determiner carries a gender feature. If this is the case, the aforementioned masculine marking 'le' might not be specified for masculine but is rather used as a default form of a determiner . The role of the exclusive masculine marking in this phase is not clear from Müller's study. In phase C, Caroline uses both 'le' and 'la' whereas overgeneralizations from 'le' to 'la' occur but only for a quite short period, as mentioned above. Müller (1990) suggests that Caroline already assigns masculine gender on the basis of phonological rules. The gender rules she detects are the final sounds /e/ and nasal vowels being associated with masculine gender. Overgeneralizations always take the direction of masculine to feminine gender. At about 2, 0, Caroline uses 'la' more frequently and on the basis of phonological

rules. Errors in this phase are attributed to overgeneralized phonological rules such as nasal vowel in /*le maison/house (masc.) or *le main/hand (masc.). In phase D, which lasts until 2,7, the gender paradigm in French is almost entirely established. The errors which occur after are related to agreement features among adjectives and nouns which are not of concern here. In phase E which lasts from 3,0 until 4, 0, more specific aspects such as gender on pronouns are acquired. In fact, the gender paradigm investigated here is already established around 3 years of age. The difference between mono- and bilingual acquisition are the few overgeneralizations from masculine to feminine gender markings within a limited period before the age of 2,7. Morphological rules of gender assignment are not investigated in this study.

Another study by Müller (1994) confirms that the development of the French gender system in bilinguals is almost error-free from the start. In addition to Caroline from the study in 1990, the spontaneous speech data from Ivar are investigated, displaying a similar pattern with even less instances of gender errors on determiners.

Hulk (2004)'s data confirm the results of both of Müller's studies (1990, 1994). Hulk's investigation concerned the acquisition of DPs in bilingual French rather than gender, though. Her study centers around the data of one subject, Anouk. Additionally, data of two further subjects are considered. The results are similar to those of Müller in that, firstly, Anouk uses the masculine marker 'le' on definite determiners approximately a month before the feminine one. Subsequently, she uses both markers. Hulk's results differ from Müller's in that gender errors occur to slightly above 10% at the age of 3,3 years. Also, these errors are not restricted to overgeneralizations of masculine markers on feminine ones. For instance, Anouk marks 'zebra' erroneously with 'la'. Granfeldt (2000), whose subjects are French-Swedish bilinguals, also reports that the masculine gender undergoes errors, being overgeneralizations by feminine 'la'.

Hulk (2004) includes information on the kind of bilingual exposure, that is, the subject's father speaks Dutch and her mother speaks French. This information is particularly important since language proficiency and length/intensity of exposure may have considerable impact on the achievements in the acquisition of gender (Unsworth, 2008; Hulk and Cornips, 2006b). They will be discussed in chapter four. Unfortunately, this information is mostly not provided in acquisition studies.

To summarize, French bilinguals reach mastery of their gender system at almost the same age (Müller, 1990) or a little later (Hulk, 2004). A difference reported in these studies lies within the order of occurrence of gender marked determiners and the amount of gender errors. The masculine marker 'le' seems to occur before the feminine marker 'la'. Whereas monolingual acquisition is described as practically error-free, bilingual acquisition may display about 10% overgeneralizations from masculine on feminine nouns and vice versa by the age of 3,3. As for the use of assignment rules, Müller (1990) states that mono- and bilingual acquisition of gender is guided by them. However, only two rules are mentioned as being used by her subject and these refer to masculine markings. More data on French monolingual acquisition are needed to state with certainty that there is a difference to

bilingual data. Even though further evidence is needed, the data presented here shall suffice to discuss causes for potential differences in chapter four. Any conclusions on differences between mono- and bilingual French will be treated with caution.

### 3.1.2. Dutch in mono- and bilingual contexts

#### *a. Monolingual acquisition*

For the monolingual acquisition of Dutch gender, Hulk & Cornips (2006a) report on four phases within the age range of before 2,0 until around 6 years. In stage one, children have not yet established the use of the determiner within DP, that is, children use predominantly bare nouns. In stage two before the age two, children use a schwa-element before the noun which is seen as a pre-form of a determiner[9] This schwa-element is interpreted as non-gender marked and indefinite. In stage three where children are older than two, the DP is fully fledged in respect to syntax, but definite determiners are only marked for common gender. This marker in form of 'de' is over-generalized on neuter nouns. No instances of overgeneralizations in the other direction are observed. Neuter is not marked target-like before the age of 6. These phases sum up the results of four related studies (Bol & Kuiken, 1988; van Zonneveld, 1992; van der Velde, 2003 and 2004) and are provided in Hulk & Cornips (2006a). From their studies (2006 a and b), based on a production task with mono- and bilinguals in the age range from 3,0 to 10,5 years, the following data are available. At 3,0 to 3,10, common gender marking 'de' is used at a rate of 59% in obligatory contexts. It is not reported which gender marking is used in the remaining 41%. Hence, common is not mostly used correctly within this age range. By 5,0, the error rate drops to 10% and from then on, little development is observed up to the age of 10. Neuter 'het' is used at a rate of 7% at the age of 3,0. It mostly undergoes overgeneralizations by common 'de', namely to 70%. It is not clear what the subjects used in the remaining 23% of 'het'-contexts. The onset of use cannot be stated since the age range does not embrace first determiner use. In the age group around 5 years, correct use of 'het' increases to 77% which represents a distinct development. The age group 9 – 10 years produces mostly correct forms of neuter. The latter consists of one child only. More data are needed to state the general developmental level at this age. Since there is no age group around 6 in Hulk & Cornip's (2006a) study, where mastery is supposed to be reached, the ability to mark neuter at this age cannot be stated. However, it appears from their data that even children as old as 10 err in gender marking of 'het' to 10%. Blom et al. (2008) study confirms these results in that monolingual children have a high level of accuracy with 'de' in the age group 3;0 – 7;0. The development of neuter takes place a earlier than reported by Hulk & Cornips (2006 a and b), that is, the error rate for neuter declines to 33% already at the age of 3 – 5.

Hulk and Cornips (2004) suggests that the acquisition of neuter might be initiated by the morphological cue [-je]. This suggestion is pursued in Cornips & Hulk (2008) where van Ginkel's study (2006) is cited. Van Ginkel (2006) found that children (n=8) in the age range of 6; 0 – 7; 6 performed better with neuter nouns that carried the diminutive. This effect was

[9] This is also reported for bilingual French (Müller, 1990) but not for monolinguals. Since monolingual French data are so scarce, potential differences or similarities cannot be stated with certainty.

also observed in the age group 10; 3 – 11; 5. Cornips & Hulk (2008) suggest that the diminutive triggers the specification of the neuter gender in a DP. The accuracy rate of neuter increases in their subjects (Hulk & Cornips, (2006 a and b) at the age of 5;0 to 70%. Van Ginkel (2006) finds a better performance with neuter nouns carrying [-je] only at the age of 6;0 – 7;6. From this discrepancy, the role of a diminutive as a trigger for the marking of neuter nouns cannot be claimed with certainty. This is not to say that diminutives may not function as a trigger but more evidence of the use of [-je] at a younger age are needed and more data on the first correct use of neuter words.

Compared to monolingual acquisition of French, Dutch children acquire the gender system with a delay. Common gender is acquired with a small delay to French and German but mostly correct at the age of 3. The delay is largely due to the neuter gender with a considerable amount of erroneous gender selection, even at an older age.

### *b. Bilingual acquisition*

The Hulk and Cornips (2006b) study also included 14 bilingual subjects. Similar to the development of monolinguals, bilinguals show a distinct development of the common marker ‘de’. That is, between age range 3,0 – 3,11 and 5,0 – 5,2, accuracy level for the marking ‘de’ increases by 30% for monolinguals and by 20% for bilinguals. At the age of 3,0, accuracy level amounts to 36% of obligatory contexts , it increases to 55% at the age of 5 and finally evolves to 94% at the age of 9 – 10. The most prominent difference between mono- and bilingual development on the basis of Hulk & Cornips data (2006b) can be observed at the age of 5,0. Monolinguals mark common gender to 90% correctly in obligatory contexts whereas bilinguals do so only to 55%. This difference is made up for at the last age range where mono- as well as bilinguals mark ‘de’ to 92% - 94% correctly. From this comparison, it appears that bilinguals need more time to establish ‘de’ with common nouns but ultimately attain the same level as monolinguals. Unsworth (2008) found that common displays a higher accuracy rate at an early age. Her subjects (n=13) were exposed at an early age or from birth to Dutch and reached an accuracy rate in common of 95.8%. Hence, there is evidence that common may be acquired correctly almost from the onset of acquisition. This contrasts with the development of neuter marker ‘het’. At the age of 3,0, only 13% of neuter words are marked correctly in obligatory contexts, at the age of 5,0, they amount to 17% and evolve to 39% at the age of about 10. This represents a gradual development with the accuracy level in the oldest group well below chance. Even at an older age, there is little use of neuter in bilinguals. This remarkable difficulty in bilinguals to establish neuter gender is confirmed by several studies (Unsworth, 2008; Cornips et al, 2006, Hulk & Cornips, 2006b).

As mentioned above, monolingual children might use [-je] as a trigger for the acquisition of neuter gender. However, Van Ginkel’s (2006) data show that bilingual children, even at an older age, do not perform better with neuter words carrying the diminutive. No concluding explanation for this difference is found so far (Cornips & Hulk, 2008)

Mono- and bilinguals both pass through a stage of uni-directional overgeneralization of common ‘de’ on neuter ‘het’. Monolinguals overcome this overgeneralization at about the age of 6 where error rate drops to 10%. Bilinguals do so only significantly later (Unsworth, 2008) if at all (Unsworth, 2008; Cornips et al, 2006, Hulk & Cornips 2006 a,b). Monolinguals overcome the overgeneralization of ‘de’ on ‘het’ whereas bilinguals do not seem to overcome this error. The oldest age group in Hulk & Cornips’ studies were 9 – 10. They suggested that since there is little development of the neuter marker until this age with an accuracy level below chance, bilinguals fossilize at their low ability to mark ‘het’. Cornips et al. (2006) tested this hypothesis with 30 mono- and bilingual children of 10 to almost 13 years of age. The accuracy level in respect to neuter was slightly higher in this age group but still remained below chance level. They suggest that this provides evidence for a potential fossilization in bilinguals. However, they do not exclude the possibility of further development when children become older.

Hulk & Cornips (2006a, b), Cornips et al. (2006) and Unsworth (2008) address potential reasons for this remarkable delay in bilinguals. Hulk & Cornips (2006a, b) do not find evidence for cross-linguistic influence as an account for the delay. They rather suggest that quantity and quality of input, the latter being ‘ethnic’ Dutch, lead to fossilization. Unsworth (2008) examines data of 58 English/Dutch speaking children within the age range of 5,3 to 17,4 in order to investigate, among others, potential fossilization. She comes to the conclusion that fossilization cannot be claimed with certainty, also because one of her subjects used ‘het’ target-like by the age of 11. Rather, intensity of input as much as proficiency may contribute to these results. A detailed discussion for potential causes in respect to this specific difficulty will follow in section 4.

To sum up, monolinguals acquire the Dutch gender system by the age of 6 although error rates may still amount to 10% at the age of 10. These errors concern the neuter marker ‘het’ which undergoes overgeneralization by the common marker ‘de’. The latter develops gradually with a high accuracy rate by the age of 6. Bilinguals develop the common ‘de’ in a similar way, though delayed. The difference is most distinct at the age of 5. High accuracy of ‘de’ is reached by the age of 10. Bilinguals acquire ‘het’ remarkably late and in the data presented above, the vast majority does not reach mastery by the age of 10.

### 3.1.3. German in mono- and bilingual contexts

#### *a. Monolingual acquisition*

German monolinguals begin to use DPs by the age of one and a half (Mills, 1986, Szagun et al., 2007). Gender-marked forms appear at around age 2 (Mills, 1986) and are mastered about at the age of 3 (Müller, 1990, Szagun et al., 2007).

Mills (1986), who analyzed spontaneous speech samples of three children over an age span of 1,8 to 2,6, reports that as soon as the definite article occurs, the gender marking is mostly correct and errors very rarely occur. She found that children use formal assignment rules from early on, that is from the age of 2,0. Furthermore, she suggests that there is a hierarchy of rules within the acquisition course. This hierarchy seems to be related to the

number of exceptions which occur to a rule, comparable to the guidelines resting on Wegener (1995). For instance, the schwa-rule for feminine with its high consistency (90%) is acquired prior to the one-syllable-rule with a rule-consistency of 60%. Mills concludes that consistency matters more than the overall instances of a rule in the input.

According to Mill's data, feminine marker 'die' is less sensitive to errors than masculine and neuter. She notes that omission of masculine and neuter markings are significantly higher than feminine ones when the child is uncertain about the gender of a noun. Mills reports on two ways of gender errors. If children err with masculine nouns, they use the feminine marking. If they err with neuter nouns, the masculine marking is used. Mills observes a preference of the feminine marking and suggests that this preference is based on its consistency in the input. Mills argues that the rule consistency also serves to explain the low error rate in feminine markings.

Szagun et al. (2007) conduct their study explicitly to investigate rule-guided acquisition of gender in German. They examined spontaneous speech in 21 subjects with an age range of 1,4 to 3,8. Gender marked determiners occur by the age of 1,5 and the system is mastered latest by 3,0, confirming the findings of Mills (1986). As opposed to the results of Mills, Szagun's et al. finds that masculine markings are more robust against errors. Children err more with feminine and neuter nouns which undergo overgeneralizations by the masculine marking. The use of assignment rules is only evident for masculine nouns. The one-syllable-rule is detected whereas there is no evidence for the schwa-rule. Szagun who argue that children rely on high-frequent rules to acquire gender explains this remarkable result as follows. The schwa-rule, even though high consistent and high frequent, has a considerable amount of instances which are particularly frequent in child-directed speech. Those are 'der Löwe'/lion (masc.), 'der Käse'/cheese (masc.), ‚der Hase'/hare (masc.) and ‚das Auge'/eye (neut.). These instances are said to obscure the schwa-rule. Since high-frequent exceptions to a rule may outweigh the overall consistency, Szagun et al argue that the frequency of instances in the input matters more than rule-consistency. They illustrate their argument with data of nouns with morphological assigners. Non-conform nouns carrying these assigners do not undergo overgeneralizations. This contrasts with suggestions made by Mills who argues the contrary. Finally, Szagun et al. find that nouns with no overt gender assigner have a higher error rate than those where rules are available.

Even though both Mills (1986) and Szagun et al. (2007) state that children's error in gender assignment is based on phonological rules, that is, overgeneralizations on non-conform nouns, they differ in their findings. Mills finds feminine nouns to be more robust against errors. Szagun et al., on the other hand, find that masculine nouns are less prone to errors. From these results, no particular use of rules or a hierarchy can be claimed for German. It seems though, that children use rules and that neuter gender undergoes overgeneralizations whereas is never used to overgeneralize.

Bewer (2003) comes to different results in her analysis of spontaneous speech by her subject. She analyzed longitudinal data over a span of more than two years, namely from 1,9 to 4,0 years. Gender marked determiners are used from 1,9 but instances are scarce at the

onset. Most of these nouns are marked with the appropriate gender. In 38 samples of about 500 utterances , only 80 gender errors occurred. Bewer's data do not provide with the number of DP use of her subject. Hence, one cannot relate the number of errors to the number of article use. However, her subject uses uses DPs from 1,09 to 5% up to 5,0 with 75% and a total of 19000 utterances are analysed. One can assume a considerable amount of DPs present in the data. 80 errors seem amazingly few. From these 80 errors, Bewer finds that masculine, as much as feminine and neuter are prone to errors where 30 concerned masculine, 32 feminine and 18 neuter. Whether neuter as being least affected may be attributable to its overall occurrence in the lexicon of the child cannot be stated. In contrast to Mills (1986) data, Brewer's results show a higher accuracy rate in masculine markings. Overgeneralizations have no specific direction. Neuter is used for feminine or masculine nouns, and vice versa. There is no preference of one marking over another in the error analysis. Finally, none of the assignment rules mentioned above are evident. Bewer suggests that her subject acquires gender not with such an ease as alleged elsewhere (Mills, 1986, Müller, 1990,) since errors still occur at a relatively late age, namely, 3,9.. However, an overall error rate of 80 over a period of 2 years within 19.000 utterances cannot be interpreted as high. This result contrasts with the studies mentioned above. It seems odd that Bewer's results on the use of gender rules differ so strikingly those of the other studies mentioned. Closer inspection reveals that her subject uses definite articles in 75% of obligatory contexts only by the age of 3,0 and remains at this level up to the age of 5 whereas typically developing children at this age establish the DP in German at the age of 3,0. This indicates that the data of Brewer must be treated with caution since they might not represent the typical development of gender.

### *b. Bilingual acquisition*

In German bilingual acquisition, the development is roughly the same as in monolinguals (Müller, 1990). Müller's bilingual subject Caroline, introduced in the section 'Acquisition of French', acquires French and German from birth on. She establishes the German gender system by the age of 4,0, about a year later than their monolingual peers. The difference lies within the acquisition of the neuter 'das', which is prolonged and only mastered after the age of 4. Müller (1990) accounts for the difference by cross-linguistic influence. That is, Caroline might assume that German is as French a two-way gender system. The late mastery of neuter is confirmed by her study in 1994. Her two bilingual subjects establish masculine and feminine markings mostly target-like from the beginning whereas neuter only begins to occur after 3,0 years. Müller (1994) suggests that neuter might not be recognized as a gender in its own right but as a subgender to the masculine, as described in chapter 2. Koehn (1990) also finds that masculine is overgeneralized on neuter nouns in the bilingual subject of her study.

The acquisition course of French and German seems to be similar when comparing feminine and masculine gender. Both subjects use these genders almost error free, at least with the definite determiner under investigation here. Müller (1995) also finds evidence for the application of phonological rules in her subjects, that is, the 'one-syllable-rule' and the 'schwa-rule'. The one-syllable-rule is applied to masculine nouns and overgeneralized to

exceptions such as *'die Has-e'/the hare. Müller's study is based on data of three bilinguals and confirm the results described above in that feminine and masculine gender in both languages are acquired early and with little error whereas German neuter is problematic. The use of rules for gender assignment is also confirmed once more. The German schwa- rule and the one-syllable rule guide gender assignment from early on. One subject reduces the 'schwa'-ending in words which are an exception to the feminine rule, that is, he uses 'der Aff' instead of 'der Affe' where the latter is a non-conform assignment. This is interesting since the child seems to modify the noun in order to use the masculine marking on a one-syllable-noun. None of the studies investigating German provide information on the kind of bilinguals in the sense of language dominance, proficiency, ethnic German or the like.

In sum, German monolinguals master the gender system by 3,0 and do so in an almost error-less fashion. German bilinguals show one contrast to monolinguals namely the establishment of neuter. German feminine and masculine are acquired early and on the basis of phonological assignment rules, comparable to monolingual acquisition. In contrast, the neuter is problematic until the age of 4;0. Up to this age, neuter mostly undergoes overgeneralizations by the masculine marker. Due to the neuter marking, the acquisition course of the German gender system is delayed by approximately one year compared to monolinguals. Both mono- and bilinguals seem to use gender assignment rules. However, the results are not uniform in respect to whether the scope or the consistency of an assignment rules influences acquisition more. Since the results of the studies mentioned above differ, no primacy of one rule over the other can be claimed. However, the use of rules seems to be evident for German mono- and bilinguals.

### 3.2. Trilingual language acquisition

As alluded to at the beginning of this chapter, little is known about language acquisition in trilinguals even though interest in this area of research increased over the last decade (Barnes, 2006). This is expressed by a note of Quay where she states that "work on trilingual families and early trilingual development is still in its infancy" (Quay, 2001, p.149). Barnes (2006) and Hoffmann (2001) note that studies of trilingualism usually 'borrow' the theoretical framework from bilingual studies in the sense that trilingualism is explained as an extension of bilingualism.

The definition of trilingualism in literature is based on the one of bilingualism (Barnes, 2006; Hoffmann, 2001). In an early definition by McLaughlin (1978), a distinction is made between successive and simultaneous bilingual children. 'Successive' refers to the acquisition of a second language after the age of three. 'Simultaneous' refers to exposure to two languages before the age of three. De Houwer (1995) proposes a stricter definition. Following Meisel (1989), she defines bilingualism as a result of 'simultaneous, regular and continued exposure to more than one language' and the onset of this exposure must be birth. Quay (2001) does not find evidence for 'exposure from birth' as requirement for multilingualism. A more relevant factor seems to be 'amount of input'. Quay's (2001) subject Freddy is exposed to German, English from birth and Japanese only later. Freddy heard Japanese from the age of 0,11 onwards and became more proficient in it than in German by the age of 1,9. This is interpreted as an effect of amount of input. Quay defines

multilingualism less strict than De Houwer but tighter than McLaughlin (1978). She states that multilingualism requires exposure to three languages before the production of first words. She defines exposure to three languages after the first words as second or third language acquisition. On the basis of Quay's study, it seems convincing that the degree of Freddy's language proficiency, as a measure of multilingualism, is clearly not a result of 'exposure from birth' but from 'amount of input'. This is further illustrated by the finding of proficiency change. Quay states that the change of exposure patterns leads to change in proficiency. Therefore, her definition of trilingualism shall be adopted here.

There may be different kinds of multilingualism depending on where the input languages come from. For instance, the input may come from a trilingual community or bilinguals learning a third language at school. The most common condition is that trilingual children learn a language from each parent and another language in the community they live in (Barnes, 2006).

Trilingual acquisition is likely to differ from bilingual acquisition, at least quantitatively. Quay (2001) states that "the amount of growth in each language follows closely the amount of language the child hears" (p. 176). Since the input of one language in a trilingual is most likely more reduced than the input of one language in a bilingual, the data of the present study should show a difference to bi- and monolinguals in the attainment of grammatical gender. That is, given that In what follows, data on mono- and bilingual acquisition of gender are presented to build the background for the comparison with the trilingual subject investigated here.

Since there is a marked difference between at least Dutch and German mono- and bilinguals, there might well be differences between bi- and trilingual data. Hulk & Cornips (2006a) note that, what is difficult for a monolingual child might be even more difficult for a bilingual. In this sense, it might be the case that what is difficult for a bilingual may be even harder for a trilingual. That is, for instance, the difficulty to acquire Dutch neuter in mono- and even more in bilinguals may be particularly difficult if not impossible for a trilingual. Furthermore, the delay of neuter in German in bilinguals may be more pronounced in trilinguals. Moreover, since there are no problems with neuter in German monolinguals but there are in German bilinguals, trilingual data may show difficulties which were not observed so far. In this sense, trilingual data may reflect qualitative difference between genders which are not visible in mono- and bilingual acquisition.

The following chapter discusses potential causes for these differences between mono- and bilingual acquisition are presented in order to define potentially vulnerable areas for trilingual acquisition. The discussion of these causes concludes with a range of predictions on trilingual development of gender.

## 4. Potential causes for differences between French, Dutch and German and mono and bilingual Acquisition

From Chapter 3, it appears that there are two kinds of differences when comparing the acquisition of the French, Dutch and German gender in mono- and bilinguals. Firstly, the acquisition course varies over languages in respect to age of mastery and occurrence of errors. Secondly, there are quantitative and potentially qualitative differences between mono- and bilingual acquisition. The following table shall give a brief overview of the main findings presented in chapter 3.

Table 2. Mono- and Bilingual Acquisition of French, Dutch and German (age indicates mastery)

| | Monolingual | Bilingual |
|---|---|---|
| French | *Masculine* by 3,0 years<br>*Feminine* by 3,0 years<br><br>*Main features:*<br>• almost error-free acquisition<br>• feminine slightly more prone to errors<br>• early use of assignment rules suggested | *Masculine* by 3,3<br>*Feminine* by 3,3<br><br>*Main features:*<br>• almost error-free acquisition<br>• exclusive use of masculine marker for short initial period<br>• few errors in both genders<br>• slightly more errors in feminine nouns<br>• early use of assignment rules suggested |
| Dutch | *Common* by 5,0 years<br>*Neuter* by 6,0 years<br><br>*Main features:*<br>• Few errors with neuter until the age of 9,0<br>• uni-directional overgeneralization of common marking on neuter nouns, surmounted gradually | *Common* by ca. 10,0 years*:*<br>*Neuter:* virtually no mastery found in data<br><br>*Main features:*<br>• sustaining use of common marking for neuter nouns<br>• neuter marking used below chance on neuter nouns in 10-year-olds, one instance of mastery at the age of 12 |
| German | *Masculine by* 3,0 years<br>*Feminine* by 3,0 years<br>*Neuter* by 3,0 years<br><br>*Main features:*<br>• only few errors<br>• bi-directional overgeneralizations of masculine and feminine<br>• neuter overgeneralized only by masculine<br>• early use of assignment rules suggested | *Masculine* by 3,0 years<br>*Feminine* by 3,0 years<br>*Neuter* by 4,0 years<br><br>*Main features:*<br>• delayed acquisition of neuter<br>• overgeneralization of masculine to neuter, but surmounted by the age of 4,0<br>• feminine and masculine gender acquired as in monolinguals<br>• early use of assignment rules suggested |

The purpose of the present chapter is to investigate the potential causes for differences, firstly, between the acquisition course over the three languages and secondly, between mono- and bilingual children. These shall build the background to explain acquisition data of the trilingual subject investigated here.

### 4.1. Causes for differences in the acquisition of French, German and Dutch

In what follows, the differences between the acquisition of French, German and Dutch are presented, starting with the similarities between French and German. Subsequently, the differences and similarities to Dutch are considered.

The acquisition of the French and the German gender system is, at least in respect to the time frame, similar for monolinguals. For a start, both languages show evidence for the use of assignment rules. As for bilingual acquisition, French children have only few difficulties with feminine gender, and only at the onset of gender acquisition and evidence for these are scarce. In German, the genders feminine and masculine are mastered at about the same age in both French and German mono- and bilinguals. In German bilinguals, one difference to French becomes apparent. This concerns the establishment of the neuter gender which undergoes about one year delay. German neuter gender is prone to errors and is mostly overgeneralized by masculine, as described in chapter 3.

The cause for this difficulty to acquire neuter as opposes to feminine and masculine may be twofold. Firstly, German is a three-way system as opposed to the two-way system in French. Moreover, neuter does occur less often than both French and German feminine and masculine in the child's input. This may cause a delay and errors in assignment on the basis of a reduced input in comparison with feminine and masculine. Secondly, assignment rules for neuter are less accessible compared to those in French and German feminine and masculine. That is, neuter does not have a phonological rule in its own right but is interpreted as subgender to the masculine one (Müller, 1990, Eisenberg, 2000). The child may have difficulties to access the association of a noun form with neuter gender if it is the masculine gender which is predominantly associated with this form. Neuter may be regarded as an exception to masculine from the learner's perspective. The assumption that neuter is a subgender to masculine seems to be reflected in the fact that neuter undergoes almost exclusively overgeneralization by masculine, at least in bilinguals. Regarding assignment rules, neuter has one morphologlical rule in its own right which is the diminutive rule of the form [-chen]. This rule has a high consistency but the frequency in the input is lower than those for feminine and masculine rules. The input might not suffice to enable the bilingual child to detect the rule in the same time course as monolinguals. From the above, the following factors which complicate the acquisition of neuter may be identified. Firstly, a three-way gender system may simply be more complex than a two-way gender system. This does not yet explain why in particular neuter, and not, for instance, feminine or masculine is affected. Secondly, neuter as an exception to masculine may be difficult to detect. However, this effect is not seen in monolinguals. The particular status of neuter may only become apparent in bilinguals as an effect of reduced input. The amount of input in a monolingual may overcome the difficult status of neuter while bilinguals have problems on the basis of reduced input. In other words, it may be the case that only bilingual contexts make the difficult status of neuter visible.

From the above, it seems that accessibility of assignment rules may cause not only the difference between languages but also between mono- and bilinguals. That is, since the input in bilinguals is reduced, a gender which is regarded as an exception to another gender with an assignment rule of limited scope and frequency is more difficult for bilinguals than for

monolinguals. Bilingual data seem to show a combined effect of language specific gender systems and reduced input. The role of reduced input as a cause for differences between mono- and bilinguals will be discussed in 4.2.2. .

Having suggested that two-way gender systems may be easier to acquire than a three-way gender system, counter-evidence is provided by the comparison between the data of French and Dutch. Both systems have two genders whereas the Dutch acquisition course is mastered comparably late. The difference is even more pronounced when comparing bilingual Dutch and French. Dutch bilinguals have considerable problems to establish neuter gender. Bilingual French, on the other hand, is acquired almost error-less. This illustrates persuasively that the level of genders, at least whether it is two or three, may not explain differences in acquisition courses and other factors must be at work.

The greatest difference over languages lies within French and German on the one hand and Dutch on the other. Dutch mono- and bilinguals master their gender system at least 3 years later than German and French mono- and bilinguals. The reason for this difficulty in Dutch is unclear. It is suggested above that 'accessibility of assignment rule' may cause difficulties in bilingual acquisition for German neuter. Since this cause is applied to explain the problems with German neuter, the accessibility of assignment rules for Dutch neuter shall be inspected here. Berkum (1996) notes that the highly consistent diminutive rule [-je] for neuter is frequent in colloquial Dutch, as opposed to German where this rule is not reported to be used frequently. The use of this rule in gender assignment tasks is reported on in Cornips & Hulk (2008) who cite the study of van Ginkel (2006) but only with children at the age of 6;0 and older while Dutch neuter emerges before the age of 6. It is unclear whether the diminutive rule indeed triggers the acquisition of neuter as suggested by Cornips & Hulk (2008). However, the diminutive rule for Dutch neuter is detected late compared to French and German rules. In what follows, two reasons for this late detection are discussed. Firstly, it could be related to the overall scope of neuter gender over the noun lexicon in Dutch. Secondly, it may lie within the overall abritrariness of the Dutch gender system. Regarding gender scope, it appears that neuter in Dutch covers the noun lexicon to 30%. This is comparable to German feminine which also covers 30%. Note that Dutch neuter is different from German neuter since the latter has a scope of 20%. Since German feminine is acquired with ease and neuter is acquired with a delay of one year in bilinguals, neuter gender scope in Dutch is unlikely to explain the difficulty. Regarding arbitrariness, the situation is less straightforward. The diminutive rule is quite frequent in Dutch. The frequent [-je] rule is the most prominent assignment rule arbitrary in the Dutch system. Nevertheless, common gender is acquired prior to neuter. The usual reasoning is that common gender has a greater scope in the lexicon. However, when comparing with feminine in German, gender scope can not serve as the only reason why neuter is acquired with such a considerable delay. The same holds for opaqueness. Since the diminutive rule is the most prominent assignment rule, it surprises that the gender associated with it causes such difficulties. Referring back to the data of van Ginkel's (2006) study, it might be the case that morphological rules for gender assignment are only used comparably late. That would explain the difference between French, German and Dutch. The former two have ample phonological gender assigners which children use from early on. Morphological assignment is maybe only used at a later stage in development which would explain the relative late detection of neuter in Dutch. The question arises why German neuter is acquired earlier than Dutch neuter. This issue shall be addressed in the following section.

Since there are similarities between the German and the Dutch gender system, Dutch neuter shall be compared to German neuter where the former causes difficulties and the latter

does not. Both are said to be largely the same gender category (Sabourin, et al. 2006) whereas there are distinct differences. Firstly, German neuter has a overall gender scope (20%) as mentioned above. Secondly, it is regarded as subgender to masculine as mentioned in previous chapters. For instance, the FCCR rule is associated with masculine as in 'der Spatz'/the sparrow whereas 'das Herz'/the heart is neuter and is seen exception. Dutch, on the contrary, is described as being independent from common gender. Furthermore, Dutch does not have phonological gender assignment as German neuter, even if the latter does so only as an exception to the rule. Finally, the diminutive rule in German is not reported as being as frequently used as the Dutch equivalent. As alluded to above, the overall gender scope may not account for the difficulties with neuter since Dutch neuter and German feminine have the same overall gender scope. Hence, the difference between German and Dutch neuter may not be meaningful. The fact that German neuter is a subgender to masculine could have a negative but also a positive effect on acquisition. The effect could be negative in the sense that neuter must be acquired as an exception to a rule and it could be positive in that neuter could benefit from being associated to the most frequent gender, namely masculine in German. Hence, being a subgender might be an advantage over not being a subgender, as neuter in Dutch. The role of a subgender entails that German neuter does not only have a morphological rule but also phonological rules, even though the latter are said to be the rules for masculine gender. The high frequency of the Dutch diminutive may, as alluded to above, only be used at a later stage in development. This could serve as an explanation for the difference between German and Dutch neuter.

It indeed appears that the diminutive rule in Dutch affects gender assignment in children as reported by Cornips & Hulk (2008), at least at the age of 6;0 – 7;6. It seems that morphological gender assigners are used far later than phonological ones.

In sum, the difference in the number of gender in the system, namely two or three, seems not to account for the differences in acquisition over languages. Further evidence from the acquisition of other languages may shed light on this issue. The accessibility of assignment rules, that is, the overall lexical scope and the consistency of a rule seems to account for firstly, the almost error-free acquisition of feminine and masculine in French and German, secondly, the late acquisition of neuter in German and lastly for differences in the acquisition course of genders within a language. For the acquisition of neuter in Dutch, the size of a gender scope may not explain difficulties in acquisition since Dutch neuter and German feminine have a similar scope over the lexicon. The comparably late acquisition may lie within the fact that it has only one morphological gender assigner in an otherwise arbitrary system at its disposal. The comparison to German neuter suggests that phonological rules may be used prior to morphological ones. This would explain the differences between the acquisition course of Dutch and German neuter. Moreover, if morphological gender assigners are only detected until relatively late, it may explain the delay in the acquisition of Dutch neuter. Hypotheses and predictions for the acquisition of each language are presented at the end of this chapter.

### 4.2. Causes for differences between mono- and bilinguals

Two causes shall be discussed here. The first concerns the role of cross-linguistic influences and the second the potential role of the input. Within approaches to cross-linguistic influences, the investigation focuses on the explanatory power of Hulk & Müller's (2000) hypothesis. It will turn out that their proposal does not apply to the subject of the present investigation. An alternative proposal will be given.

The second cause concerns the potential role of the input, such as its length and intensity. It can be considered a fact that the input for each language is reduced in bilingual children as opposed to the input in monolinguals. This may bring about a quantitative effect which may be visible in a later establishment of the gender system and a later detection of assignment rules, if applicable. It turns out that the hypothesis of a quantitative effect may explain the data of bilingual acquisition to a certain degree.

A qualitative effect is also possible and may result from the quantitative one in that the reduced input causes a manifest delay in the child[10]. For instance, Dutch bilingual children remain well below mastery level by the age of ten which is regarded as qualitative delay by Hulk &Cornips (2006b). The age range in which the present study operates does not allow conclusions on a potentially qualitative delay. The experiments conducted here span over 3 months in a 3,7 – 3,10 year old. The question of qualitative delay must therefore remain open.

### 4.2.1. The role of cross-linguistic influences: Hulk & Müller's (2000) hypothesis

There is consensus in the literature on bilingual acquisition that languages develop separately from the start (Hulk and Müller, 2000, Hulk and Cornips, 2006a and references cited there). This does not exclude the occurrence of cross-linguistic influences, though (Hulk & Müller, 2000, among others). The question arose as to where and how these influences may manifest themselves. A hypothesis which draws considerable attention in this respect is provided by Hulk & Müller (2000) which restricts cross-linguistic influences to a particular location in the language system. In what follows, it shall be examined whether their hypothesis may explain bilingual data on the acquisition of gender. Initially, it shall be tested if their proposal is applicable to the phenomenon 'gender' at all. For this purpose, their alleged conditions on cross-linguistic influence are presented below. Subsequently, problems with its application to gender are presented. On the basis of these problems, an alternative proposition will be made at the end of this section.

According to Hulk & Müller (2000), two conditions which must be met in order for cross-linguistic influence to appear. These are:

i. two modules of language must be involved, in particular the interface between syntax and pragmatics such as the CP domain

ii. there must be some surface overlap between the languages concerned (with respect to the target phenomenon in question)

The CP domain is located at the syntax/pragmatic interface and hence expresses discourse information such as topicalizations and questions-words. Following Platzack (1999, 2001), the CP domain has shown to be problematic with very young children, children with SLI and with aphasic patients. Syntactic domains lower than the CP, for instance, the order between verb and object or verb and adverbial are supposedly not affected. Extending Platzack's proposal, Hulk & Müller (2000) investigated a specific part of the CP in bilinguals. The subject of investigation, among others, were topic/object-drop which is discourse related. They examined whether topic-drop languages like German and Dutch would influence non-topic drop languages like Italian and French. Hulk & Müller (2000) found that cross-linguistic influence indeed occurs in this domain. The influence takes the form of a object

[10] The paper focuses on the role of *reduced input* only. Hulk and Cornips (2006a) proposal includes also the *quality of the input*. They suggest that so-called 'ethnic' Dutch may cause the considerable difficulties with neuter seen in bilinguals. This hypothesis is challenged by the study by Unsworth (2007). She finds that the problem remains when the input is non-ethnic or 'normal' Dutch.

drop in a non-object-drop Romance language as a result of bilingualism with a Germanic language. The influence is a delay in bilinguals which is described as being quantitative.[11] Kupisch (2003) tested whether Hulk & Müller's (2000) proposal can be extended further since the CP is not the only domain where discourse information is encoded. Logically, as long as the requirement syntax/pragmatics is met, cross-linguistic influence could also occur in other areas. Condition 1 above may then be rephrased to '..and structures must encode discourse information'. Kupisch (2003) argues that this is the case for the DP since the DP also anchors discourse information, that is, it carries the feature [+/- definiteness][12] which is meaningful in discourse. It is therefore said to carry the feature 'interpretable' (Kupisch, 2003). Hence, the DP may undergo cross-linguistic influence if Hulk & Müller's (2000) hypothesis holds. Kupisch (2003) did not find cross-linguistic influence in the two bilingual subjects she investigated and rejected Hulk & Müller's proposal for DPs in bilinguals.

In contrast to topic drop in the CP and definiteness as a feature of the DP, grammatical gender does not seem to encode interpretable and meaningful information in respect to discourse. Berkum (1991) notes that the function of grammatical gender is still under debate and the meaning of gender cannot be identified straightforwardly. Wegener (1995) explains the later acquisition of gender as opposed to plural with the fact that children have no insight into its function. That is to say that grammatical gender has no meaning whereas number does. This observation is reflected in Alexiadou et al.'s (2007) analysis of grammatical gender. They put forward that grammatical gender is semantically unpredictable and not contentful. Alexiadou et al. note that '(grammatical) gender is predetermined on nouns, it is arbitrary, and as a consequence, it is uninterpretable' (p.246). They further propose that grammatical gender is a feature inherent to N without a functional 'gender' projection in its own right. Given this analysis, gender can not be part of the syntax-pragmatics interface. This opposes the view of Hulk & Cornips (2006b) ,who argue that gender, at least neuter, belongs to the syntax-pragmatics interface and hence, present a potential area for cross-linguistic influence[13].

According to Alexiadou et al (2007), the gender feature, at least for grammatical gender, is attached to the number and definiteness projection but does not project by itself. This is in accordance with Hulk & Cornips (2006b). However, Hulk & Cornips (2006b) suggest that grammatical gender is not 'un-interpretable' as a whole. Common gender is regarded as the un-interpretable default case whereas neuter gender is the non-default and interpretable case. Given Alexiadou et al. 's (2007) assumption that gender is the un-interpretable part of the noun inflection, this analysis is not plausible. It remains unclear why grammatical gender with the value neuter is interpretable whereas common gender is not. Moreover, it seems implausible why neuter would be meaningful to discourse while common gender is not. Pursuing the view that grammatical gender, be it neuter or common, is not interpretable means that it may not be located at the syntax/pragmatic interface. As a consequence, Hulk &Müller's first condition is not satisfied. Hence, cross-linguistic influence should not occur in bilingual gender acquisition if Hulk & Müller's hypothesis holds. However, if cross-linguistic influence was to explain bilingual data on the acquisition of gender, the first condition of their proposal would be falsified and their hypothesis must be extended beyond the domain of discourse information.

[11] Note here that a qualitative delay is not predicted. A qualitative influence is rather attributed to L2 learners in the sense of transfer (Hulk & Müller, 2000, Hulk, 2004).

[12] Additionally, she argues that, given that there is parallelism of structures, the CP and DP may be affected in a similar way and thereby justifying DP as potentially affected domain.

[13] Note that Hulk&Cornips don't find cross-linguistic influence in grammatical gender.

Disregarding that the first condition is not met on the basis of the analysis above, and that Hulk & Müller's (2000) hypothesis cannot be applied to bi- and multilingual acquisition of gender, the potential use of their second condition for cross-linguistic influence shall be tested. The second condition requires 'surface overlap' which is defined as follows. The input data of one language allow two possible analyses, for example analysis A and B. The input of the second language provides evidence for one of the two, for example analysis B. Thereby, it reinforces analysis B. The notion overlap means that both languages provide input evidence for one analysis. This overlap must reside on a superficial level only, that is, they are homophonous while they do not have an identical underlying structure . An example for surface overlap is provided in Unsworth (2003) where root infinitives (RI) in German and English have a potentially same analysis. In German, RIs occur, among other contexts, in ellipsis such as 'Kaffee trinken'/drink coffee as an answer to 'was machst du?'/what are you doing?' and are relatively frequent and common[14]. In English, the inflectional paradigm on present tense verbs is mostly phonetically identical with RIs in main declarative clauses. Only the third person singular is audibly marked for [+fin]. Cross-linguistic influence may then occur from English to German in that the child analyses German declaratives potentially as RIs. Apart from this illustration of overlap taken from Unsworth (2003), it shall be noted here that her data did not provide with evidence of cross-linguistic influence.

Unsworth (2003) criticizes that the notion of overlap is not presented clearly enough in Hulk & Müller's proposal. This concerns the scope this overlap takes among the languages involved and also which exact effect it induces. Concerning the scope of overlap, Unsworth (2003) notes it can only be meant to be partial. That is, if two languages overlap entirely, they are in fact congruent and cross-linguistic influence cannot be visible. For instance, if two languages both display a two-way gender system with feminine and masculine gender levels, it can not be stated how influence from one language to another should manifest itself. According to Unsworth (2003), the requirement may be refined in stating that overlap must be partial and that the languages must not be identical for the structure in question. In respect to the effect such an overlap may induce, Hulk & Müller (2000) note that this might be accelerating or inhibiting. An inhibiting effect may occur if the input of one language hinders or delays the development of a structure in another. In the case of an accelerating effect, bilinguals should be faster than monolinguals to acquire the given structure. Unsworth(2003) argues that, even though both accelerating and hindering effects are theoretically possible, there is virtually no evidence for bilinguals being faster than monolinguals. When comparing mono- and bilingual acquisition of gender, bilinguals either tend or are indeed delayed compared to their monolingual peers. Consequently, if there is any potential cross-linguistic influence at all, it is certainly not accelerating but rather hindering. The following section explores if and how the gender systems in Dutch, French and German overlap on surface level. The table below illustrates the gender levels of French, Dutch and German in comparison.

*Table 3. Gender Levels in French, Dutch and German*

| Language/Gender | Number | Masculine | Feminine | Neuter | Common |
|---|---|---|---|---|---|
| French | 2 | le | la | -- | -- |
| Dutch | 2 | -- | -- | het | de |
| German | 3 | der | die | das | -- |

[14] Unworth (2003) notes that RIs are contextually restricted and only few examples exist in the child's input. As a native speaker of German, I find that RIs in elliptic contexts, as described above, are rather common and frequent in child directed speech.

There is no superficial ‘overlap’ in terms of phonetic similarity between the languages. The similiarity between German and Dutch gender is restricted to the initial /d/ and not regarded as overlapping. However, there is an overlap between the number of genders. French overlaps with German in that French has two genders and German 3. Dutch overlaps with German in the same way. Hence, French and Dutch could influence German in that they reinforce a two-gender system. French and Dutch are congruent in respect to number of gender levels and there is no overlap. Hence, no cross-linguistic influence should occur.

From the overlap relations presented above, French and Dutch could reinforce a two-way gender system on the German three-way system in a bilingual. This hypothesis is supported by an observation made by Müller (1990). She notes that French-German bilinguals initially interpret the German system as having two genders. Theoretically, any German gender may be affected. This seems not to be the case because German bilinguals lag exclusively in the acquisition of neuter. Only feminine and masculine are acquired almost error-less. It seems not to be a coincidence that those are the gender types where German and French intersect. Seemingly, not the number but the type of gender plays a role. This would mean that German and French feminine and masculine as overlapping gender types benefit from each other. The gender type which is not within the overlap is neuter and it is indeed lagging behind monolingual acquisition. There are, to my knowledge, no data on German and Dutch bilinguals. If there was indeed a beneficial effect, neuter would be affected the gender type. One should observe that neuter in one of the two languages is acquired easier. Logically, since neuter is problematic in Dutch, it would benefit from German neuter.

Hence, one may hypothesize that not the gender levels but the gender types may overlap and thus are subject to cross-linguistic influences. If it is indeed the type of gender that matters, and not the levels, the notion of overlap becomes problematic. In Unsworth’s (2003) notion of overlap the underlying structures may not be identical because this would result in a congruence. The reasoning, as alluded to above, is that in congruent structures of two languages, cross-linguistic influence may not be claimed since it is impossible to determine whether this influence took place.

Since the gender types are identical, namely feminine and masculine in French and German or neuter in German and Dutch, they must be seen as congruent and not as overlapping. They are, in contrast to Hulk & Müller (2000) not similar on a surface level, though, since their phonological form differs. Given this difference, the similarity among French, German and Dutch as given in table 3 cannot be called overlap in Hulk & Müller’s (2000) or Unsworth’s (2003) sense. Therefore, condition two of Hulk & Müller’s (2000) hypothesis is not met.

To sum up, gender does not encode discourse information and among the languages under investigation, rather congruence than overlap may play a role. It seems impossible to explain potential cross-linguistic influences in bilingual gender acquisition by Hulk & Müller’s (2000) proposal.

That congruent gender types of two languages in acquisition may have an effect on each other is investigated in second language acquisition research. A related study is conducted by Sabourin et al. (2006). They tested L2 knowledge of grammatical gender in adult speakers. The study aimed at the investigation of transfer effects of one language to the other. The present study is not related to L2 research. Nevertheless, the theoretical underpinning of transfer presented by Sabourin et al. may be of interest for the understanding

of cross-linguistic influence. Sabourin et al. base their hypothesis on transfer on the failed functional feature hypothesis (Hawkins and Chan, 1997). The hypothesis sets a condition on the ability to acquire a feature or structure in L2. That is, L2 learners may only successfully acquire a feature in L2 if this feature is present in their L1. Sabourin et al apply this proposal to transfer effects of gender knowledge in L1 on the acquisition of gender in L2. They investigated whether adult speakers of German, English and Romance languages use their gender knowledge when acquiring the gender system of Dutch. Since the theoretical underpinning is of import for the present study, their research shall be inspected in more depth.

Two levels of transfer are proposed, that is, there might be surface transfer and deep transfer. In order for surface transfer to occur, L1 and L2 must be similar in their morpho-phonological realization of a feature. In order for deep transfer to occur, the abstract grammatical gender category must be present in L1. Sabourin et al. try to show that these different transfer types may have distinct effects. They investigate the effect of L1 with and without surface similarity on Dutch L2. Likewise, they look at the effect of L1 with and without a similar abstract gender category on L2. They claim that German may have a surface transfer effect on Dutch because the gender systems are similar. Romance languages have a deep transfer effect because of the gender categories in L1. English does not mark gender on determiners and hence, it may not transfer, neither on a surface nor on a deep level. Their findings show that all groups have high scores in L2, namely, they perform between 86, 8% - 99,3% of accuracy. The English group performs worse so that a negative effect of L1 (no gender system) on L2 acquisition is claimed. The Romance language group performs at a similar level as the German group. Even though Sabourin et al. claim that the German group performs better, the data don't show that the Romance group does significantly worse. Sabourin et al claim that German as L1 with surface similarity has a stronger positive effect than Romance languages do. However, Romance languages with the categorical similarity to Dutch have a stronger effect than English. Sabourin et al. claim that there is 'an advantage of surface transfer over deep transfer' (p. 24) which is not convincingly evident from their data. Since their data do not give strong evidence for the effect of surface similarity, it might be the case that the German and Dutch system is less similar than Sabourin et al. assume. They introduce German and Dutch to be congruent in respect to gender assignment. This is shown not to be the case in previous chapters. The similarity between common 'de' and masculine 'der' or feminine 'die' in German is in fact less similar than the surface similarity to English 'the' where only the phonological modus differs (fricative instead of plosive). Even though the languages might have similar roots since Dutch evolved from a three-way gender system, German is distinct in that it maintained feminine and masculine while Dutch did not, at least not on the determiner. Dutch common gender may then rather be regarded similar to English. This corresponds with the analysis that Dutch common gender does not have a gender value (Hulk & Cornips, 2006b).

Even though Sabourin et al.'s analysis is not entirely supported here, at least regarding their analysis of language similarities, their condition on transfer shall be adopted here. That is, the condition for cross-linguistic influence to occur shall be 'similarity on a deep or on a surface level'. The condition shall be rephrased as follows. Cross-linguistic influences may occur on intersecting elements of the languages involved. Intersecting elements must be similar on a surface (morpho-phonological) or on a deep (categorical) level. This effect may be beneficial for elements in the intersection. Elements outside the intersection may not benefit from this effect.

In what follows, the proposal of this condition shall be described in more detail. The proposal ‘intersection’ entails that the languages involved must be similar, for instance, both must have gender systems with the at least one similar element. In contrast to Sabourin et al., Dutch and German are not regarded as being similar on surface level, as described above. That is, common gender is not similar to masculine and feminine, neither on a deep level. Neuter is regarded as being similar to German neuter but only on a deep level since Dutch ‘het’ is not similar to German ‘das’. French and German are regarded to be similar on a deep level in that they share the gender category masculine and feminine. French and Dutch are not interpreted as being similar on either level. Since the effect in the languages involved in the present investigation may only manifest itself on a deep level, the surface level shall not be investigated further. Instead, the effect on the deep level within an intersection shall be described in what follows.

Cross-linguistic influence resulting from an intersection may be two-fold. Firstly, the intersecting items are acquired in a similar time course as observed in monolinguals. For instance, French/German bilinguals have a reduced input for each language, but since they have evidence for the feminine and masculine gender from two language sources, it may roughly equal the input of feminine and masculine of a monolingual. For instance, a monolingual child may be exposed to 100 instances of feminine and masculine per day from one language source while a bilingual child may be exposed to 100 instances of feminine and masculine from two language sources. Therefore, feminine and masculine as intersecting items may be acquired comparably to monolinguals. Strictly speaking, the proposal intersection does not claim cross-linguistic influence but ‘joined influence’ on the successful acquisition of a particular structure, in this case the gender categories feminine and masculine in French and German. The second consequence of the intersection is that items outside the intersection of the two languages may not benefit from similarity. For instance, a monolingual child may be exposed to 100 instances of neuter while a bilingual child may be only exposed to 50 instances of neuter, given that the languages are French and German. As a consequence, neuter as the element outside the intersection may be acquired later than in monolinguals. There is also an intersection between Dutch and German, namely neuter gender. Given that structures that intersect may benefit from each other, German/Dutch bilinguals should acquire neuter no later than monolinguals. To my knowledge, there are no studies involving this language combination.

It shall be noted here that similar to Sabourin et al. investigation, the judgment that gender levels in two languages are similar and may influence each other disregards that some nouns in French and German or Dutch and German may not be both marked the same way. For instance, in Dutch, the car is common while it is neuter in German. Similarly, the sun carries feminine in German while it is masculine in French. As Sabourin et al. study show, there may still a positive effect from one language to the other.

Data on trilinguals where German/Dutch and French combine, are of special interest. The proposal ‘intersection’ predicts the following scenario for the present investigation. Dutch and German intersect in respect to neuter. Hence, the instances of neuter come from two language sources and in the input in a trilingual may be comparable to a bilingual. That is, the amount of instances of neuter in a trilingual acquiring French, German and Dutch are comparable to the amount of instances of neuter in a bilingual acquiring French and Dutch. This means that neuter in a trilingual benefits from two languages sources and may therefore be acquired similarly to a bilingual. As a result, if the proposal of an intersection holds, the acquisition of an intersecting element in trilingual acquisition should be similar as the acquisition of the same element in bilingual acquisition.

French/Dutch bilinguals do not intersect in respect to gender type so that no cross-linguistic influence in the form of a beneficial effect should occur. Since there is no intersection, the acquisition of gender should be delayed in both languages. The delaying effect may manifest itself in a delay of non-intersecting structures. Facilitating effect in bilinguals may result in a acquisition course comparable to monolinguals, as described above. Likewise, the facilitating effect in trilinguals may result in comparable achievements to in bilinguals. The facilitating effect probably never results in a faster acquisition of a given item when compared to a monolingual since the input in bilinguals is reduced. That is, the amount of evidence for feminine gender in a bilingual context, for instance with French and German, is unlikely to be greater than the evidence for feminine in a French monolingual. In this sense, the proposal 'intersection' is a combination of language specific structures, either in or outside the intersection, and reduced input. At the end of this chapter, the predictions for trilingual acquisition are given.

### 4.2.2. The role of the input: quantitative effects

The potential role of reduced input as an explanation for differences between mono- and bilinguals is often mentioned in related studies whereas it is rarely pursued in depth. Unsworth (2008) investigates this role of the input in bilinguals in several respects. Her investigation aims at clarifying whether there is a role of quantitative and qualitative aspects of the input and whether the delay in bilinguals is rather qualitative or quantitative. Unsworth investigated the acquisition of Dutch gender in 58 Dutch-English bilinguals, ranging from 5,3 to 17,4. Her subjects are not homogenous and differ in several respects which enables to observe potential effects of the input. That is, they can be grouped in respect to age of first exposure, length of exposure, type of exposure and proficiency. The comparison of these groupings may shed light on the factors which influence the course and attainment in the acquisition of gender. Each group was divided in 2 to 3 subgroups to inspect potential differences. The following results are obtained. The age of onset of exposure did not have an significant effect on the development of 'de' and 'het' markings. It did not matter whether the children were exposed to Dutch from birth or from 4 years onwards. That is to say, that the early L2 or 2L1 show a similar development. In contrast, length of exposure affected acquisition, but only in respect to the development of 'het'. The group with the shortest exposure, ranging from age 0,7 to 3,9 was significantly different from the longest exposure group 9,1 – 15,2. Even though there was a distinct development between those groups, the marking of 'het' remained around chance level. Likewise, the group comparison in respect to 'type of exposure' revealed an effect on acquisition but only the 'limited' and the 'extensive' group were significantly different. The limited exposure group engaged into Dutch in school and basic interactions such as shopping. The moderate group also had interactions with friends and neighbors. The extensive group had exposure to native Dutch by a family member. Even in the most extensive group, the use of correct 'het' remained well below chance. However, there is a clear development found on the basis of extensive exposure. Lastly, the effect of proficiency was investigated. The children were tested in respect to their proficiency level in Dutch, excluding their abilities to mark gender. This factor also yielded an effect on accuracy of 'het'. Hence, proficiency, length and intensity of exposure are influencing factors in the achievements in bilingual acquisition of Dutch. However, most of the bilingual children failed to use 'het'. On the basis of these results, Unsworth suggests that a qualitative delay as proposed in Hulk & Cornips (2006b) cannot be ruled out but it can also not be stated with certainty. Individual analysis revealed that one subject, being member of the high proficiency and extensive exposure group, reached a mastery level in the use of 'het'. The subject was 11 years old. Unsworth suggests that bilinguals might need more and also intense exposure for the establishment of 'het'. The reasoning is as follows. Firstly, 'het'

is a low frequency gender marking. Assuming that gender of an arbitrary system must be learned on a word-by-word basis, the acquisition of a gender with a comparably low frequency in the input is likely to take long. Secondly, bilinguals have less input since they are exposed to two languages. The effect of low frequency and arbitrariness on the one hand and reduced input on the other seem to cause the massive delay of neuter. On this basis, Unsworth's suggests that a non-target like 'het' results not so much from qualitatively inferior input, namely 'ethnic Dutch' (Hulk & Cornips, 2006b), but rather from insufficient input of an arbitrary system. Both studies, Unsworth and Hulk & Cornips, highlight the role of the input to explain the differences between mono- and bilingual acquisition of Dutch and, crucially, they help to predict the acquisition in multilinguals. A trilingual child should acquire 'het' even later than bilinguals. Unfortunately, the present investigation examines a time-frame of before the age of 4. However, the 'input'-hypothesis may equally account for French and German multilingual data.

Given the results of the studies presented in chapter 3, it is assumed here that mono- and bilinguals, at least for German and French, acquire gender with the support of assignment rules. If a reduced input results in a prolonged acquisition course, as assumed above, this should also be visible in the later detection of assignment rules. A rule can only be identified if the input provides with sufficient information about this rule. That is, the amount of nouns carrying the form associated with a particular gender must reach a certain threshold, as suggested by Hulk & Cornips (2006b). For instance, the FCCR can only be identified if there are sufficient instances of nouns with the pattern /…xCs/ in the input. Anything below the threshold may result in a delay or a failure to identify the rule. Gathercole (2002) suggests the existence of such a threshold. She investigated the acquisition of gender in Spanish by means of a grammaticality judgment of grammatical gender. She compared the amount of input in Spanish bilinguals and found that those with a greater amount of input performed better than those with a smaller amount. Gathercole suggests that in order to establish a rule, a critical mass is needed. This suggestion may be extended here, namely that a critical mass is needed in order to detect gender assignment rules in the input. Hence, for every assignment rule, the instances in the input must reach a critical mass in order to be identified. This critical mass applies to all language learners, regardless of mono- bi- or multilingual contexts.

The effect of a reduced input may not be visible in the same way in all rules. For instance, the input may provide with more evidence of a frequent rule, such as the schwa-rule in German, and might therefore be detected earlier than a less frequent rule such as FCCR. In the actual acquisition course, the schwa-rule appears then to be mastered before the FCCR, as suggested along the same argumentation by Mills (1986) for monolinguals[15]. For the purpose of illustration, it is assumed here that the instances needed in the input in order to establish a rule for every gender marking is the arbitrary number of 100[16]. Anything below 100 results in a failure to establish the rule. Nouns with the schwa-rule may reach 100 instances much faster than those with FCCR, given its scope in the lexicon. The bilingual child is likely to need more time in order to establish a rule, since even a frequent rule may reach the critical mass of 100 slower. The bilingual needs as much information as a monolingual whereas the former has to cope with less input to reach the required critical mass. Rules with a smaller lexical scope such as FCCR take more time to reach 100 instances. The diminutive rule for neuter, for instance, are even more delicate since they reach 100 far later if at all. In this sense, assignment rules may function as a measure for the impact of a reduced input the child is

[15] Both rules have a high consistency in the input.

[16] The amount of instances ignores in which time frame these instances must be presented to the child and in which communicative setting. This certainly is a relevant issue but lies beyond the scope of the present paper.

faced with. In other words, if a child detects a rule with big scope *and* the one with a small scope, it is provided with sufficient amount of input for both. This seems, for instance, to be the case in monolinguals at the age of three for feminine, masculine and neuter in German. If it only acquires the more prominent rules, the input for the less prominent one may not yet have reached the threshold needed. This may be the case for bilingual German where feminine and masculine are acquired prior to neuter. Furthermore, if the amount of input decreases such that even a high frequency rule has too few instances in the input, it cannot be established either. This might be the case in multilingual children where the input in one language is very low. For instance, the schwa-rule in German may only be detected comparably late in a trilingual child. From the above, the achievements in the acquisition of gender may be a combination of language internal factors such as scope of a rule in the lexicon on the one hand and amount of input, depending on whether the child is mono- bi- or multilingual, on the other.

Regarding the consistency of a rule, there might also be an effect of reduced input which is closely linked to its scope. That is to say, in order to detect the consistency of a rule, there must be a certain frequency in the input. A rule with a high consistency but a low scope may take more time to reach the 100 instances needed than a rule with high scope but lower consistency. On the other hand, a rule with a low consistency requires enough instances in order to detect the rule. From the above, it seems clear that a rule with a high scope is acquired prior to a rule with low scope while both are comparably consistent. The precedence of scope over consistency is a issue of debate. Mills (1986) argues that the consistency of a rule matters more than the scope of a rule. As a result, morphological rules with a typical consistency of 100% should be detected prior to phonological rules where consistency varies between 60 and 90%. The present investigation may shed light on this issue since there will be a comparison of effects of

The data from French bilinguals show that there is a small delay of the feminine gender. This matches the scope and consistency of rules in the input. The assignment rule /-r/ for masculine gender has a great scope and hence, it may be easier to detect for the child, comparable to the schwa-rule in German. Since the difference between the scope of rules for masculine and feminine is not big, it seems to match the fact that overgeneralizations from masculine to feminine occur only for a short time and only in bilinguals. Only few data are available, more evidence is needed to state a delay of feminine and the prominence of the /-r/-rule with certainty. However, in both mono- and bilingual contexts, the input for feminine and masculine gender assignment rules certainly reach the critical mass as they establish the full system no later than by the age of 3,5.

The results of studies with German bilinguals vary in respect to the order of feminine and masculine in acquisition. Hence, they don't allow firm conclusions on which gender is acquired earlier than another. However, there is agreement in literature, that the whole system is acquired with few errors but some difficulties occur with neuter. This matches the frequency of neuter in the input and its rule consistency. That is, it is regarded as subgender to the masculine and only has less than half of the masculine gender scope. Moreover, neuter only displays one morphological gender assignment rule with limited scope. The reduced input in bilinguals causes a prolonged course in its acquisition. The combination of a smaller overall scope and the reduced amount of instances in the 'bilingual' input may serve as an explanation for the delay of neuter in bilinguals.

A potential reason of the lag in the establishment of the gender system in Dutch, particularly of Dutch neuter, is presented in section 4.1. It shall be summarized here. It is

argued that the overall scope of a gender may not suffice to explain a distinct lag as seen in neuter in Dutch. That is, feminine in German has the same overall gender scope in the lexicon as neuter in Dutch, that is, a scope of 30%. The difference between both lies within the one being endowed with a phonological rule of high scope and consistency while the other has a morphological rule which is said to be frequent[17] but covers only a limited scope. It seems likely that German feminine is acquired earlier because of the scope and/or the consistency of the rule in the input. However, German neuter is acquired prior to Dutch neuter in bilinguals even though the latter has a greater scope and a frequent gender assigner in the form of [-je]. The difference between German and Dutch neuter lies within the fact that German neuter is a subgender to the masculine. Apart from the fact that neuter must be disentangled from masculine, it may still benefit from the phonological rules that apply to neuter, even if it is only as an exception. Hence, German neuter has phonological and morphological gender cues. Data of diminutives in Dutch (van Ginkel, 2006) show that children use these only at about 6 years. It may be that children use phonological rules prior to morphological ones for the assignment of gender. This would explain the comparably late acquisition of Dutch gender as compared to German feminine and neuter. Furthermore, it explains why children acquire neuter comparably late despite of the relative frequent diminutive rule.

The difficulty faced by monolingual children might be more pronounced in bilingual children, as suggested by Unsworth (2008). This is in accordance with Hulk & Cornips who put forward that "when monolinguals have problems acquiring a certain phenomenon, we can be sure that bilingual children are to be expected to encounter even larger problems" (Hulk & Cornips, p.122, 2006b). Hence, Dutch neuter is acquired with such a distinct delay as it is already problematic for monolinguals.

If the effect of reduced input can indeed be measured by means of assignment rules, with the result of a delay or even a failure to acquire gender, the data of trilingual acquisition should magnify this effect. Rules with a great scope may be identified with a relative delay to bilinguals, in accordance with Unsworth's (2008) suggestion that children need double the time if only provided with half of the input. As a consequence, trilinguals may roughly be said to use only a third of the input and hence need three times the time.[18] The rules with a smaller scope might then be delayed when compared to bilinguals or not detected at all. The latter would be the case if the instances of a rule in the input don't reach the critical mass, as alluded to above. Whether there is precedence of scope over consistency or vice versa can not be stated with certainty. The results of the present study may shed further light on this issue. From the studies cited above, mono- and bilingual children, at least for German and French, use high- frequent assignment rules when acquiring gender. The present study investigates whether this is the case in trilingual acquisition and whether the reduced input affects the detection of assignment rules. Hypotheses and predictions for the potential role of the input are presented at the end of this chapter.

## 4.3. Summary

The goal of the present chapter was to find the causes for the differences firstly, between the acquisition of French, Dutch and German and secondly, between mono- and bilingual acquisition of these languages. From the above, it seems that the differences between French, German and Dutch can be attributed to the overtness of each gender system.

[17] It is unfortunate that there is no exact frequency of [-je] except for the label 'frequent' (van Berkum, 1996) available for Dutch.

[18] This rule of thumb 'factor of reduced input is multiplication factor for time' can be operationalized by counting the hours of exposure to each language as presented in Unsworth (2003). Exposure times for the three languages investigated here are presented in Chapter 5.

More specifically, the languages with assignment rules, such as German and French, are acquired with less errors and faster than those with a more opaque system, such as Dutch. The success of gender acquisition seems to depend on the detection of assignment rules in the input. However, the case of the Dutch gender system remains unclear since it displays rules, at least for neuter, for which no evidence of use can be found in related data.

Two main causes were discussed for differences between mono- and bilingual acquisition. That is, potential cross-linguistic influences following the hypothesis by Hulk & Müller and the role of the input. Concerning the former, it turned out that H&M cannot be applied to bilingual acquisition of gender. On the basis of H&M hypothesis, the proposal of 'intersection' as condition for cross-linguistic influence is made. If the languages in a bi- or multilingual provide with identical structures such as feminine and masculine gender, no difference between mono- and bilinguals, or bi- and multilinguals respectively, should occur. The second cause is the potential role of the input. A reduced input may complicate the detection of assignment rules. The input must provide with a critical mass in order to detect a rule. Rules with a high scope and consistency in the input are likely to be detected successfully whereas rules with a smaller scope might be acquired later or not at all. The acquisition of gender in a trilingual child may magnify this input effect found in bilinguals.

### 4.4. Hypotheses

1. The differences in acquisition between French, German and Dutch are caused by the variation of accessibility of assignment rules. The accessibility depends on the overtness, that is, the lexical scope of a rule and its consistency.

Prediction for trilingual acquisition:

(i) there are cross-linguistic differences since 'overtness' differs over languages:

- French feminine and masculine is acquired almost error-less
- German feminine and masculine is acquired with few errors, neuter causes problems
- Dutch is acquired comparably late, some evidence for neuter

(ii) the accessibility of rules generally affects the acquisition of gender:

- Consistent rules with great scope are acquired prior or with less errors than nouns with rules of lower consistency and smaller scope
    - French: masculine and feminine acquired similarly in respect to mastery and errors
    - German: feminine (rule with very high scope and consistency, but lower overall gender scope) acquired prior to masculine (rule with lower consistency and lower scopes but higher overall gender scope); neuter is acquired with a delay compared to feminine and masculine
    - Dutch: common (with a high overall gender scope) is acquired prior to neuter (smaller gender scope). There is evidence of neuter (with a highly consistent rule)

2. The differences between mono-, bi- and multilingual acquisition are caused by:

A. Cross-linguistic influences. The languages involved must build an intersection consisting of identical gender types for cross-linguistic influences to occur

Predictions for trilingual acquisition:

(i) intersecting elements of involved languages are beneficial for each other

- German and French masculine and feminine intersect and are acquired similar as in bilinguals
- German and Dutch neuter intersect and is acquired similar as in bilinguals

(ii) non-intersecting elements are acquired later than in bilinguals

B. Reduced input brings about a quantitative delay.

Predictions for trilingual acquisition:

(i) The language with smallest amount of input displays the greatest lag as compared to bilingual acquisition

(ii) The language with the greatest amount of input displays the smallest lag as compared to bilingual acquisition

(iii) Assignment rules may be detected in dependence of amount of input

- little input yields difficulties for rules with high scope/consistency
- high amount of input enables detection of rules with small scope/consistency

On the basis of these hypotheses and predictions made above, the following chapter presents the method to investigate these predictions. They will be tested with an experimental setting conducted with a trilingual child acquiring French, Dutch and German.

## 5. Methodology

The hypothesis and predictions made at the end of chapter four will be tested within a case study. The study employs a gender production task which tests knowledge of grammatical gender in French, Dutch and German. The task is administered to a trilingual three-and-a-half year old subject.

### 5.1. Subject

The subject is a boy called Julian being raised in the Netherlands by a native German-speaking mother and a native French-speaking father. Julian has been exposed to French and German since birth. He has attended a Dutch crèche since he was 11 months old. According to the definition of trilingualism by Quay (2001), Julian is trilingual since he was exposed to all three languages before the onset of speech. The data collection took place over a span of three months where Julian was 3, 6. 0 to 3, 9; 0 years old. Table 4 below presents Julian's exposure to the three languages within this time:

*Table 4. Exposure times of French, German and Dutch*

| Time | Weekdays | Weekends |
|---|---|---|
| 07.30h – 09.00h: | German with his mother | German with his mother |
| 09.00h – 16.00h: | Dutch in the crèche with friends and teachers | - German with his mother<br>- French with his father |
| 16.00h – 18.30h | - German with his mother<br>- occasionally Dutch in environment | - German with his mother<br>- French with his father<br>- Occasionally Dutch in environment |
| 18.30h – 19.30h | - German with his mother<br>- French with his father | - German with his mother<br>- French with his father<br>- Occasionally Dutch in environment |

On the basis of this table, an estimate of the weekly hours of exposure is given for each language. It is important to note here that French is almost never the sole exposure language. French is usually accompanied by German which is labeled 'dual exposure'. Dutch is usually the language with sole exposure. German has mostly sole exposure, too. It cannot be stated with certainty what the shares of one language in the dual exposure are. Therefore, an estimate is given in order to be able to compare the dual and exclusive exposure times of the three languages the estimate is calculated as follows. 100% of dual exposure of one language is roughly the same as 50% of exclusive exposure in one language. For instance, 2 hours of German in dual exposure can be compared to 1 hour of exclusive exposure. Hence, the time of dual exposure is divided in half in order to compare it to the languages with exclusive exposure, as given below:

- French: during the week: 5 hours
  during the weekend: 21 hours
  total: 26 hours of dual exposure (divided in half) = *13 hours*

- Dutch: during the week: 35 hours (exclusively Dutch)[19]
  total: *35 hours* of exclusive exposure

- German: during the week: 20 hours (exclusively German)
  5 hours (mixed exposure) = 2.5 hours
  during the weekend: 3 hours (exclusively German)
  21 hours (with French) = 10,5
  Total: *35,5 hours*

In sum, Julian is exposed to French for 13hours (15, 5%), to Dutch for 35 hours (42%) and to German for 35, 5 (42,5%) hours. On the basis of these calculations, exposure to German and Dutch is considerably more than his exposure to French, namely less than the half of each, German and Dutch.

## 5.2 Data collection

As described in chapter 2, a selection of the most suitable morphological and phonological rules is tested in order to investigate the acquisition of gender. Moreover, arbitrary gender assignment is included to investigate potential differences between rule- and rule-free assignment. As described above, Szagun et al. (2007) Müller (1990) and Mills (1989) argue that assignment rules facilitate correct gender assignment in acquisition. If children indeed use rules which are then also facilitating this should be visible when comparing performance in rule-governed and arbitrary assignment. The latter may yield less correct answers, at least when the child is still in the process of acquisition which can be assumed here. A further means to detect the use of assignment rules is the test of gender assignment with non-conform nouns. These nouns have the same morphological or phonological form as conform nouns but are assigned to an idiosyncratic and different gender. If rule-conform nouns are assigned the correct gender and non-conform nouns are assigned the wrong but rule-conform gender, this is seen as the application of a rule (Szagun et al. 2007). This test is naturally only possible, if there are non-conform nouns to a certain rule. For Dutch [-je], for instance, there are no non-conform nouns and none can be administered to the subject. In French, there are non-conform nouns to the masculine rule with final /r/, as in ‘la chambre’ [+fem]. The table overleaf represents the tested rules. The asterisk indicates where non-conform nouns to a rule exist and hence, where there are tested.

[19] The occasional exposure of max 2 hours in the environment (shopping, friends) is not included into the total since those occasions were not regular.

*Table 5 Tested rules including arbitrary assignment and number of test nouns*

| | French | | Dutch | | German | | |
|---|---|---|---|---|---|---|---|
| | Feminine | Masculine | Common | Neuter | Feminine | Masculine | Neuter |
| Morpho-logical | [-ette] = 30 | [-ier] = 30 | no rule = 30 | [-je] = 30 | [-in] = 30 | [-er]* = 30 Non-conform = 15 | [-chen] = 30 |
| Phono-logical | /-z/ = 30 | /-r/* = 30 Non-conform = 15 | no rule = 30 | no rule = 30 | /-e/* = 30 Non-conform = 15 | /..xCs/* = 30 Non-conform = 15 | no rule = 30 |
| Arbitrary | 30 | 30 | 30 | 30 | 30 | 30 | 30 |

Each rule is tested 30 times. For instance, the morphological rule for feminine in French, [-ette], is tested with 30 nouns. The non-conform nouns were presented with 15 nouns for each rule where non-conform nouns exist. For instance, in German, 30 rule-conform nouns with a schwa associated with feminine, as in [die Nase/the nose] [+fem], were administered and 15 nouns, for instance, [der Löwe/the lion] [+masc], test whether the rule is applied across non-conform nouns. The rules were tested on nouns which differed to a greater part for each session. Four out of ten nouns remained the same over every set of nouns. This is due to the frequency of a noun in the lexicon. For instance, the nouns for the /-z/ rule for French feminine vary over high-frequency words such as 'la chaise'/chair and low frequency words such as 'la fallaise'/cliff. In order to balance out the frequency effect, familiar words, new words, high- and low frequency words were roughly mixed. This mixture was applied to every tested rule. In what follows, the administered task is described and the procedure of data collection is presented.

*Task:*

The data are collected by means of an elicited production task. The task is the naming of colored drawings aiming at the elicitation of a noun with a definite determiner carrying the gender marking to be investigated. Two differently colored drawings are presented to the subject. The experimenter names the drawings without using the respective determiner. Subsequently, the subject is asked to name one of the drawings which has a particular color. The naming of the item with this color involves the use of a definite determiner and hence, the marking of gender. The dialogue representing the task is given in the paragraph 'Procedure'.

*Procedure:*

The subject is administered with the test nouns within three sessions for each language in order to avoid fatigue to influence the test results. The sessions had an interval of approximately 3 weeks, starting from mid of June to end of July. Each language is tested

separately. Dutch, being the language with the smallest amount of test nouns, namely 30, because it has only one tested rule, could be tested within one day. Each session is completed within one day and 30 nouns are administered. Each session in French took two days with a total of 65 nouns per session and ca. 30 nouns per day. An example for a French session is given below. Each German session, with the highest number of tested rules, took three days with ca. 30 nouns per day and a total of 110 tested nouns per session[20]. On each test day, the test time was less than one hour to avoid tiredness. The subject is given the possibility to take little breaks of up to approximately 3 minutes. An example of French is given below:

*Session I:* (Total of 65 test nouns)

| | | | | |
|---|---|---|---|---|
| Test nouns: | 1. Masculine: | a. arbitrary | | = 10[21] |
| | | b. phonological rule: | i. conform nouns | = 10 |
| | | | ii. non-conform nouns | = 5 |
| | | c. morphological rule: | i. conform nouns (only)[22] | = 10 |
| | 2. Feminine: | a. arbitrary | | = 10 |
| | | b. phonological rule: | i. conform nouns (only)[23] | = 10 |
| | | c. morphological rule: | i. conform nouns (only) | = 10 |

The order of pictures was changed for each session, that is, the test nouns were not grouped in respect to rules but occurred in a random order over rules and genders within a given language.

The elicitation of the determiners takes the form of a dialogue. An example of the dialogue and the pictures used is given in (1).

(1) Dialogue example:

Experimenter: Guck mal. Das Bild heisst: ‘Pferd’ (no determiner/gender) und das Bild heisst ‚Roller‘ (no determiner/gender).

Look. This drawing is called ‘horse’, and this one is called ‘scooter’.

Was ist braun?

Which one is braun?

[20] Test dates for each language can be found in Appendix B.

[21] Number of test nouns for arbitrary and rule-conform nouns, non-conform nouns as well as new/old nouns for each rule was decided upon in a personal communication with supervisor S. Unsworth (May 2008).

[22] No exceptions are available to this rule.

[23] There are a few exceptions to the phonological rule for feminine nouns /-z/ but these are mostly abstract entities which are not child-appropriate.

Subject: Das (+gender) Pferd.

The (+gender) horse.

The following pictures are going with this dialogue:

This procedure is conducted with every language under investigation. The languages are each investigated by a native speaker. Note that the experimenter must not give a hint of the noun gender when presenting the pictures to the child (neither with definite nor indefinite determiner).The list of tested nouns is provided in the Appendix A.

The data collection took place at Julian's home (German and French) and in his crèche (Dutch) and was recorded with a JVC High Band Digital Video Camera.

The data are coded regarding accuracy, that is, whether the gender was correct or not correct. The code for accuracy for each noun is 1 for correct and 0 for not correct. The mean is percentage of correct answers is calculated for each rule.

Furthermore, it is documented whether a determiner is used[24]. However, this documentation will not enter the analysis since the aim of the present study is not the acquisition of the determiner but the grammatical marking which occurs on it. The gender assignment task could also yield indefinite determiners. That is, instead of a determiner that is distinctly marked for gender, the subject could also use an indefinite determiner. In this case, the elicitation of the noun is repeated in order to elicit a definite determiner. Nevertheless, indefinites could occur. Since indefinites give no information on gender, they are excluded from the analysis, in accordance with the procedure followed in Blom et al. (2008).

The following chapter presents with the analysis and the results of the data. As mentioned above, the present data consist exclusively on correct answers and of definite determiners. The analysis and results present with firstly, the data of the present study. Secondly, a

[24] This coding can be inspected in the Appendix A.

qualitative analysis that compares these data with the data of bilinguals provided by related literature in order to reveal potential differences.

## 6. Analysis and Results

The present chapter presents with the results of the data analysis. In section 6.1., the data are analyzed by means of an ANOVA. In section 6.2, a comparison is made between existing bilingual data as presented in previous chapters and the data of trilingual child of the present study. This comparison and the results rest on a qualitative analysis.

The raw data of accurate gender assignment in French, Dutch and German are summarized in tables 6 – 8 below.

*Table 6: French raw data*

| | **Masculine** | | | **Feminine** | | |
|---|---|---|---|---|---|---|
| | Session I | Session II | Session III | Session I | Session II | Session III |
| Arbitrary Assignment | 8/10 | 7(1*)/10 | 10/10 | 1 (6*)/10 | 1 (6*)/10 | 1 (9*)/10 |
| Det Omission | 2 | 2 | 0 | 3 | 3 | 0 |
| Morphological Rule | 5/10 | 8(2*)/10 | 10/10 | 1 (2*)/10 | 3 (5*)/10 | 1 (9*)/10 |
| Det Omission | 5 | 0 | 0 | 7 | 2 | 10 |
| Phonological Rule | 10/10 | 10/10 | 8/10 | 1 (3*)/10 | 3 (5*)/10 | 0 (9*)/10 |
| Det Omission | 0 | 0 | 2 | 6 | 2 | 1 |
| Non-conform Phonological | 0/5 | 0/5 | 0/5 | -- | -- | -- |
| Det Omission | 3 | 2 | 0 | | | |

* number of overgeneralizations by feminine ‘la’ or masculine ‘le’

*Table 7: Dutch raw data*

| | **Common** | | | **Neuter** | | |
|---|---|---|---|---|---|---|
| | Session I | Session II | Session III | Session I | Session II | Session III |
| Arbitrary | 10/10 | 10/10 | 10/10 | 0(8*)/10 | 0 (10*)/10 | 0 (10*)/10 |
| Det Omission | 0 | 0 | 0 | 2 | 0 | 0 |
| Morphological | -- | -- | -- | 0/10 | 0 (7*)/10 | 0/10 |
| Det Omission | | | | 0 | 3 | 2# |

***** number of overgeneralizations by common ‘de’; **#** indefinite determiner is used

*Table 8: German raw data:*

| | **Masc.** | | | **Fem.** | | | **Neuter** | | |
|---|---|---|---|---|---|---|---|---|---|
| | Session I | Session II | Session III | Session I | Session II | Session III | Session I | Session II | Session III |
| Arbitrary | 10/10 | 10/10 | 10/10 | 2/10 (4*) | 5/10 (4*) | 5/10 (5*) | 1/10 (7*) | 1/10 (8*) | 0/10 (10*) |
| DetOm | 0 | 0 | 0 | 4 | 1 | 0 | 2 | 0 | 0 |
| Morpho | 10/10 | 9/10 | 10/10 | 6/10 (3*) | 4/10 (6*) | 0/10 (10*) | 2/10 (6*) | 0/10 (10*) | 0/10 (10*) |
| DetOm | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Phono | 9/10 | 10/10 | 8/10 | 8/10 | 6/10 (4*) | 4/10 (6*) | -- | -- | -- |
| DetOm | 1 | 0 | 2 | 2 | 0 | 0 | | | |
| Non-Conform Morpho | 1/5 | 1/5 | 0/5 | -- | -- | -- | -- | -- | -- |
| DetOm | 1 | 0 | 0 | | | | | | |
| Non-Conform Phono | 0/5 | 1/5 | 0/5 | 3/5 | 3/5 | 4/5 | -- | -- | -- |
| DetOm | 0 | 0 | 1 | 1 | 0 | 0 | | | |

* overgeneralization by masculine ‘der’

### 6.1. Effects of language, gender and rule on accuracy

A Oneway ANOVA is run on the data groups French, Dutch and German. The data consist of correct answers that are made on definite determiners. The accuracy is given in the form of mean percentages. The following sections present with firstly, the accuracy over languages, secondly the accuracy of genders within each language, thirdly, the effect of rule on accuracy across languages and the latter for each language individually. The section concludes with a comparison of accuracy in rule-conform and non-conform nouns.

### 6.1.1. Accuracy over languages

The means and standard deviations of French, German and Dutch are given in table 9.

*Table 9: Means and Standard Deviation French, German and Dutch*

| Language | Mean | N | Std. Deviation |
|---|---|---|---|
| German | .54 | 240 | .499 |
| French | .49 | 180 | .501 |
| Dutch | .33 | 90 | .474 |
| Total | .49 | 510 | .500 |

The ANOVA of means in French, German and Dutch are given in table 10:

*Table 10: ANOVA of means in French, German and Dutch*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 2.843 | 2 | 1.421 | 5.786 | .003 |
| Within Groups | 124.561 | 507 | .246 | | |
| Total | 127.404 | 509 | | | |

There is a significant difference between the accuracy means of French, German and Dutch. The post-hoc test Tukey reveals between which languages the difference lies. It turns out that there is a significant difference of German (mean 54%) and French (mean 49%) on the one hand and Dutch (mean 33%) on the other.

### 6.1.2. Accuracy of French feminine and masculine gender

The means and standard deviations are given in table 11, the ANOVA of means is given in table 12.

*Table 11: Means and standard deviations of feminine and masculine in French*

| Gender | Mean | N | Std. Deviation |
|---|---|---|---|
| Masculine | .84 | 90 | .364 |
| Feminine | .13 | 90 | .342 |
| Total | .49 | 180 | .501 |

*Table 12: ANOVA of meansof feminine and masculine in French*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 22.756 | 1 | 22.756 | 182.272 | .000 |
| Within Groups | 22.222 | 178 | .125 | | |
| Total | 44.978 | 179 | | | |

There is a significant difference of accuracy between the means of feminine (mean 13%) and masculine (mean 84%) gender with $p < 0.05$.

### 6.1.3. Accuracy of German feminine, masculine and neuter gender

The means and standard deviations are given in table 13 and the ANOVA of means is given in table 14.

*Table 13: Means and standard deviations for Feminine, Masculine and Neuter in German*

| Gender | Mean | N | Std. Deviation |
|---|---|---|---|
| Masculine | .96 | 90 | .207 |
| Feminine | .44 | 90 | .500 |
| Neuter | .07 | 60 | .252 |
| Total | .54 | 240 | .499 |

*Table 14: ANOVA of means feminine, masculine and neuter in German*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 29.806 | 2 | 14.903 | 118.611 | .000 |
| Within Groups | 29.778 | 237 | .126 | | |
| Total | 59.583 | 239 | | | |

There is a significant effect of gender on accuracy with $p < 0.05$. The post-hoc test Tukey[25] reveals which gender levels are significantly different from each other and which potentially aren't. The results indicate that masculine (mean 96%), feminine (mean 44%) and neuter (mean 07%) are all significantly different from each other.

### 6. 1.4. Accuracy of Dutch common and neuter gender

The means and standard deviations are given in table 15 below.

*Table 15: Means and standard deviations of Dutch common and neuter*

| Gender | Mean | N | Std. Deviation |
|---|---|---|---|
| Neuter | .00 | 60 | .000 |
| Common | 1.00 | 30 | .000 |
| Total | .33 | 90 | .474 |

The mean for neuter is 0% with no instance of a correct answer and the mean for common is 100% with no instance of a incorrect answer. The results indicate a significant difference between neuter and common.

[25] The post-hoc test Tukey is recommended to calculate multiple comparisons to reveal differences between means in Rietveld and van Hout (2005).

### 6.1.5. Effects of rule on accuracy

Table 16 below presents with the means of accuracy, depending on arbitrary, morphological and phonological rule across languages.

*Table 16: Accuracy means across languages for arbitrary, phonological and morphological rules*

| Rule | Mean | N | Std. Deviation |
|---|---|---|---|
| Arbitrary Assignment | .49 | 210 | .501 |
| Phonological Rule | .64 | 120 | .482 |
| Morphological Rule | .38 | 180 | .488 |
| Total | .49 | 510 | .500 |

Table 17 below presents with the ANOVA on these means.

*Table 17: ANOVA of means of arbitrary, phonological and morphological gender assignment*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 4.805 | 2 | 2.403 | 9.936 | .000 |
| Within Groups | 122.599 | 507 | .242 | | |
| Total | 127.404 | 509 | | | |

The ANOVA reveals that there is a significant effect of rule on accuracy across languages with $p < 0.000$. The mean of arbitrary assignment lies at 49%, the phonological rule has a mean of 64% and the morphological rule has a mean of 38%. The post-hoc test Tukey was conducted in order to reveal differences between the means of these rules. It turned out that the means of the morphological (mean 38%) and the arbitrary rule (mean 49%) are significantly different from the mean of the phonological rule (mean 64%).

### 6.1.6. Effects of rule on accuracy in German

Table 18 below presents the means of accuracy depending on arbitrary, morphological and phonological assignment in German.

*Table 18: Means and standard deviations of accuracy by rules in German*

| Rule | Mean | N | Std. Deviation |
|---|---|---|---|
| Arbitrary Assignment | .49 | 90 | .503 |
| Phonological Rule | .75 | 60 | .437 |
| Morphological Rule | .46 | 90 | .501 |
| Total | .54 | 240 | .499 |

Table 19 below presents with the ANOVA of these means.

*Table 19: ANOVA of accuracy means of rules in German*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 3.522 | 2 | 1.761 | 7.445 | .001 |
| Within Groups | 56.061 | 237 | .237 | | |
| Total | 59.583 | 239 | | | |

The results indicate that there is a significant effect of assignment rule on accuracy in German.
The post-hoc test Tukey is conducted to reveal between which rules this significant difference lies. The results indicate that the means of the phonological rule (mean 75%) is significantly different from both the arbitrary assignment (mean 49%) and the morphological rule (mean 46%).

### 6.1.7. Effects of rule on accuracy in Dutch

The mean of neuter (mean 0%) in Dutch indicates that there is no instance of use of neuter. Only neuter provides with a rule. Without instances of neuter, no effects of rule can be observed.

### 6.1.8. Effects of rule on accuracy in French

Table 20 below presents with the means of accuracy depending on arbitrary, morphological and phonological assignment in French.

*Table 20: Means and standard deviations of accuracy by rules in French*

| Rule | Mean | N | Std. Deviation |
|---|---|---|---|
| Arbitrary Assignment | .47 | 60 | .503 |
| Phonological Rule | .53 | 60 | .503 |
| Morphological Rule | .47 | 60 | .503 |
| Total | .49 | 180 | .501 |

An ANOVA was run on these means. The ANOVA is presented in table 21 overleaf.

*Table 21: ANOVA of accuracy means of rules in French*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | .178 | 2 | .089 | .351 | .704 |
| Within Groups | 44.800 | 177 | .253 | | |
| Total | 44.978 | 179 | | | |

The results of the ANOVA indicate that there is no effect of rule on accuracy in French. The mean of arbitrary assignment and morphological assignment is both 47%. The mean of accuracy of the phonological rule is slightly higher but not significantly different from the former. The mean lies at 53%.

### 6.1.9. Effects of a rule on feminine and masculine gender in German

An individual analysis was run on German feminine and masculine in order to reveal potential individual effects of rules on the accuracy of each gender.

#### *6.1.9.1. Accuracy of German masculine by rule*

Table 22 below provides with the means of masculine, depending on arbitrary assignment, phonological and morphological rule

*Table 22: Means and standard deviations of German masculine by rule*

| Rule | Mean | N | Std. Deviation |
|---|---|---|---|
| Arbitrary Assignment | 1.00 | 30 | .000 |
| Phonological Rule | .90 | 30 | .305 |
| Morphological Rule | .97 | 30 | .183 |
| Total | .96 | 90 | .207 |

Table 23 presents with the ANOVA run on these means.

*Table 23: ANOVA of means of German masculine by rule*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | .156 | 2 | .078 | 1.845 | .164 |
| Within Groups | 3.667 | 87 | .042 | | |
| Total | 3.822 | 89 | | | |

There is no effect of rule on accuracy with a $p < .164$. The means of German masculine in arbitrary assignment (mean 100%), in the morphological rule (mean 97%) and the phonological rule (mean 90%) are not significantly different.

### *6.1.9.2. Accuracy of German feminine by rule*

Table 24 provides with the means of feminine, depending on arbitrary assignment, phonological and morphological rule.

*Table 24: Means and standard deviations of German feminine by rule*

| Rule | Mean | N | Std. Deviation |
|---|---|---|---|
| Arbitrary Assignment | .40 | 30 | .498 |
| Phonological Rule | .60 | 30 | .498 |
| Morphological Rule | .33 | 30 | .479 |
| Total | .44 | 90 | .500 |

Table 25 presents with the ANOVA run on these means.

*Table 25: ANOVA of means of German feminine by rule*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1.156 | 2 | .578 | 2.386 | .098 |
| Within Groups | 21.067 | 87 | .242 | | |
| Total | 22.222 | 89 | | | |

There is no significant effect of rule on German feminine with $p < .098$. The means for arbitrary assignment lie at 40%, for the morphological rule at 33% and for the phonological rule at 60%. A significant effect lies only at a .098 probability level. This effect regards the phonological rule which has the highest accuracy rate.

### 6. 1. 10. Accuracy of phonological feminine and masculine in German

The means for phonological feminine (schwa-rule with a consistency 90% and a scope over 15.000 nouns) and masculine in German (FCCR rule with a consistency of 75% and a scope over 160 nouns) are given in table 26 below.

*Table 26: Accuracy means of phonological feminine and masculine in German*

| Gender | Mean | N | Std. Deviation |
|---|---|---|---|
| Masculine | .90 | 30 | .305 |
| Feminine | .60 | 30 | .498 |
| Total | .75 | 60 | .437 |

The ANOVA of means is given in table 27 overleaf.

*Table 27: ANOVA of means of phonological feminine and masculine in German*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1.350 | 1 | 1.350 | 7.909 | .007 |
| Within Groups | 9.900 | 58 | .171 | | |
| Total | 11.250 | 59 | | | |

The ANOVA reveals that there is a significant difference between accuracy means of phonological feminine and masculine in German with $p < 0.05$. Masculine has a mean of 90% and feminine of 60%.

### 6. 1. 11. Accuracy of phonological feminine and masculine in French

The means for phonological feminine (/-z/ rule with a consistency of 90% and a scope over 912 nouns) and masculine (/-r/ rule with a consistency 78% and a scope over 3974 nouns) in French are given in table 28 below.

*Table 28: Accuracy means of phonological feminine and masculine in French*

| Gender | Mean | N | Std. Deviation |
|---|---|---|---|
| Masculine | .93 | 30 | .254 |
| Feminine | .13 | 30 | .346 |
| Total | .53 | 60 | .503 |

The ANOVA of means is given in table 29 below.

*Table 29: ANOVA of means of phonological feminine and masculine in French*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 9.600 | 1 | 9.600 | 104.400 | .000 |
| Within Groups | 5.333 | 58 | .092 | | |
| Total | 14.933 | 59 | | | |

The results of the ANOVA indicate that there is significant difference between phonological feminine and masculine in French with $p < 0.00$. Feminine has a mean of 13% and the mean of masculine lies at 93%.

### 6.1.12. Rule conform-nouns versus non-conform nouns

Table 30 below presents with the results for conform and non-conform nouns in French and German[26].

*Table 30: Accuracy means of conform and non-conform nouns*

| | Accuracy conform nouns | Accuracy non-conform nouns |
|---|---|---|
| German Masculine [-er] | 29/30 = *97%* | 2/15 = *13%* |
| German Masculine FCCR /-XCs/ | 27/30 = *90%* | 1/15 = *7%* |
| German Feminine schwa /-e/ | 18/30 = ***60%*** | 12/15 = ***80%*** |
| French Masculine /-r/ | 28/30 = *93%* | 0/15 = *0%* |

The results indicate that there is a difference in accuracy between conform and non-conform nouns in German Masculine with the [-er]- and FCCR-rule. Non-conform nouns display an accuracy rate of 7% to 13%. In French masculine, the rate for conform nouns with 93% is higher than the one in non-conform nouns with 0%. In German feminine, the accuracy rate in non-conform nouns (80%) is higher than the one in conform nouns (60%).

## 6.2. Bi- and Trilingual acquisition of French, German and Dutch

In what follows, the results on the analysis of differences between bi- and trilingual acquisition are presented. Table 31 overleaf presents with results on bi- and trilingual acquisition of French, German and Dutch. The bilingual data are based on the data review in chapter 3 and the trilingual data of the present investigation. The latter embrace an age span of 3;8,13 – 3;9,25 years.

[26] These are all rules where exceptions are tested. French feminine /-z/ has also exceptions, but as mentioned earlier, there are no nouns with final /-z/ that have child-appropriate meaning.

*Table 31: Bi- and trilingual acquisition in French, German and Dutch*

| | Bilingual | Trilingual |
|---|---|---|
| Dutch | • *common* mastered from early on<br>• few errors on common at a later age (5 – 9)<br>• problems with *neuter*: virtually not mastered<br>• sustaining use of common for neuter<br>• data on neuter suggest correct use to 13% at the age of 3 and at chance level at the age of 10 - 11<br>• rarely mastered if at all by the age of 11<br>• overgeneralization is unidirectional<br>• no evidence of use of rules | • *common* with no errors<br>• problems with *neuter*: not evident in data<br>• all neuter nouns are overgeneralized by common<br>• use of rules not evident |
| German | • *masculine* almost error-less<br>• *feminine* few errors<br>mostly overgeneralized by masculine<br>• feminine and masculine mastered at ca. 3; 0<br>• problems with *neuter*: delayed, overgeneralized by masculine; mastered at ca. 4; 0 yrs<br>• use of rule evident for feminine and masculine | • *masculine* almost error-less (mean 96%)<br>• *feminine* accuracy below chance (mean 44%)<br>overgeneralized by masculine<br>• problems with *neuter*: little evidence (mean 07%)<br>overgeneralized by masculine<br>• overall use of rule evident, but weak |
| French | • *feminine* and *masculine* almost error-less<br>• initially (one month) only masculine used<br>• both mastered at ca. 3,0 yrs<br>• early use of rules evident | • *masculine* with few errors (mean 84%)<br>• *feminine* with many errors (mean 13%)<br>overgeneralized by masculine<br>• use of rules not evident |

## 7. Discussion

In the present chapter, the predictions made in chapter 4 will be discussed in the light of the results presented in chapter 6. Section 7.1. discusses the prediction that language specific overtness effects accuracy, resulting in differences of accuracy levels between French, Dutch and German. This section includes effects of rules, their scope and their consistency. Section 7.2. discusses the predictions for trilingual acquisition. Firstly, potential cross-linguistic influences within the present data are discussed. This involves the discussion of the proposal 'intersection'. That is, whether intersecting genders of involved languages may have a beneficial effect. Secondly, the effect of reduced input on the present data is discussed. Each section starts out with a summary of the results.

### 7.1. Effects of language specific overtness, assignment rules, their scope and consistency

In what follows, a summary of the results is presented. Subsequently, the results are discussed in the light of the hypothesis and predictions made at the end of chapter 4.

#### 7.1.1. Summary of the results

##### *7.1.1.1. Accuracy across languages and genders*

ANOVAs and post-hoc tests were run on the three data groups French, Dutch and German. Firstly, the effect of language accuracy was analyzed. The results indicate that language has an effect on accuracy with a significance level of $p < .05$. French (mean 49%) and German (mean 54%) differ significantly from Dutch (mean 33%). Within each language, there is a significant effect of gender on accuracy. The accuracy rate of every gender in each language is significantly different from each other. That is, French masculine (mean 84 %) is different from French feminine (mean 13%) with $p < 0.01$. Dutch common (mean 100%) and neuter (mean 0%) are significantly different with $p < 0.00$. German masculine (mean 96%), feminine (mean 44%) and neuter (mean 07%) are also significantly different with $p < 0.00$.

##### *7.1.1.2. Effects of rules on accuracy in French, Dutch and German*

There is an effect of rule on accuracy across languages with a level of $p < .05$. The difference between arbitrary (mean .49) and morphological (mean .38) marking, on the one hand, and phonological marking (mean .64), on the other, is significant. The results indicate that the accuracy in phonological rules is higher than the accuracy in morphological rules and arbitrary assignment. This result implies that morphological assignment across languages does not facilitate accuracy or that it is not used for gender assignment, at least not at the age of 3; 9. The result is in accordance with the data by van Ginkel (2006) in that morphological rules seem to be used only at a later age. Phonological rules yield a higher accuracy rate which could cautiously be interpreted as being used prior to morphological rules. The prediction that rule-governed assignment yields higher accuracy rates than arbitrary assignment is not entirely borne out. Only phonological assignment has an effect on accuracy, again, at least at the age of about 3; 9. The role of rules seems to be comparable across languages. Phonological rules yield higher accuracy rates in both German and French while morphological rules are comparable to arbitrary assignment. Note that the effect for the phonological rule counts for French and German only since there is no phonological rule in Dutch. Hence, there is an effect of a phonological rule on accuracy in the data group

French/German. It is important to note that even though there is an effect of rule over languages, the effect is very subtle. That is, the effect fades in an individual analysis. As will be shown below, when the Dutch and French data are analyzed individually, there is no effect of a rule. Only German data show an effect of a rule. The individual analysis of each language is presented in what follows.

An individual analysis for each language reveals that there is no effect of rule on accuracy in French, neither for feminine nor for masculine with $p < .704$. In Dutch, there is no rule effect in neuter since the means of arbitrary and morphological rule in neuter are both 0%. In German, the effect of rule is significant with $p < .001$. In contrast, an individual analysis of genders reveals that there is no effect of a rule in masculine where means for arbitrary (100%), phonological (90%) and morphological (97%) assignment are equally high. The effect also fades in feminine. The mean for the morphological rule lies at 33%, for arbitrary assignment at 40% and for the phonological rule at 60% with $p < .098$. Though this level of p is not significant, it appears to approach significance. There is no effect of rule on neuter in German with $p < 1.0$.

In respect to rule-conform accuracy, it turned out that in German and French, rule-conform nouns with masculine gender have a higher accuracy than non-conform nouns. In German, feminine non-rule conform nouns have a higher accuracy than feminine rule-conform nouns which is reverse to the prediction.

In respect to consistency, the results reveal that there is a significant difference between high and low consistency rules in German and French but the results are reverse to the hypothesis. In other words, the high consistency rule does not yield higher accuracy rates.

In respect to scope, the results indicate that rules with great scope do not consistently yield higher accuracy. In German, the schwa rule with a great scope has a lower accuracy rate than the FCCR, which has a smaller scope. In French, the /-r/-rule with great scope yields a higher accuracy than the /-z/-rule with a smaller scope. It shall be noted here that the discussion suggests that the result is not related to scope but rather to the use of a gender default.

### 7.1.2. Discussion of language-specific overtness and cross-linguistic differences

#### *7.1.2.1. Accuracy across languages*

It was predicted that the overtness of a gender assignment system in a language will affect the acquisition of gender. French is the most overt language where 85% of the nouns are assigned gender on the basis of rules and these are mostly phonological (Corbett, 1991). In German, assignment rules cover the noun lexicon to 64, 5% (Wegener, 2000). Both French and German are regarded as having semi-overt assignment systems. In Dutch, on the other hand, the majority of nouns do not have cues for gender assignment (van Berkum, 1996) and it is regarded as an opaque gender system (Corbett, 1991).

French and German were thus predicted to have a higher accuracy rate than Dutch. An overall comparison of accuracy rates in French, German and Dutch show indeed that there is a significant difference between French and German, on the one hand, and Dutch, on

the other[27]. This result was predicted. Hence, it seems that the hypothesis of overtness to affect accuracy is borne out. However, the difference in accuracy rates across languages may also be affected by other factors than overtness. In other words, the difference of accuracy rates across languages does not suffice to claim that overtness played a role. Overtness implies assignment rules. Thus, there must be an effect of rule related to the overtness of a language to confirm the hypothesis. In what follows, the effects of rules on accuracy are discussed.

#### *7.1.2.2. Effects of rules on accuracy across languages*

Results indicate that rules indeed affect accuracy across languages. That is, morphological rules (mean 38%) and arbitrary rules (mean 49%) differ from phonological rules (mean 64%). It appears that morphological rules have the same effect as arbitrary assignment. This result indicates that morphological rules are only used to a rather limited degree to assign correct gender, at least at the age of 3; 9 when the present data were collected. Hence, phonological rules seem to be the sole type of rule used for gender assignment within the tested age span. Since there are no phonological rules in Dutch, the results counts for German and French only. Hence, the effect of a phonological rule is evident in both French and German as a group. It appears that French and German yield higher accuracy rates on the basis of their overtness and this overtness rests on phonological rules, at least at the age of 3;9. Dutch has lower accuracy rates on the basis of its opaque system. The significant main effect of rules confirms the prediction that overtness is related to accuracy.

#### *7.1.2.3. Effects of rules in French, German and Dutch*

An individual analysis of languages reveals that the effect of overtness is not strong. French, for instance, does not show an effect of rules. The overall effect of a rule fades for French in an individual analysis. The effect is only visible as a main effect where French and German data were grouped[28], but French alone does not show this effect[29]. The effect of a rule in French must therefore be a very subtle one. In German, on the other hand, the effect of a rule is significant. This is an unexpected result, given that the data of mono- and bilingual acquisition show clear evidence for the use of phonological rules in French (Karmilloff-Smith, 1979, Müller, 1990). It may be the case that there are certain conditions for rules to affect accuracy. One condition may be that a higher amount of input is necessary so that rules can have a stronger effect on performance than found here. It seems that this effect cannot manifest itself when the input is reduced as is the case in trilingual acquisition. That is to say, an overt gender system can only facilitate the acquisition of gender if sufficient input of this system is available. In other words, only sufficient instances of a rule enable a child to detect this rule. The input of all three languages was reduced for the subject of the present study. This reduction of input is such that the rule may not be detected and the effect of rules turns out to be only subtle. The sole effect of a rule is evident for German. It seems that German as the language with a higher amount of input enables a stronger use of assignment rules than French with a lower amount of input. There is not effect of a rule in Dutch. The effect of the diminutive rule is not evident in the data as neuter has an accuracy rate of 0%. In sum, there a very subtle[30] to no effect[31] of a rule in French, a significant effect of a rule on German and there is no effect of the diminutive rule on accuracy in Dutch. Hence, the prediction of

[27] Means, SD and significance are given in tables 12 and 13 in chapter 6.

[28] Means and SD of rule effects over languages are given in table 16 in Chapter 6. The phonological rule has a significant effect over languages which only concerns German and French. That is, only German and French have phonological rules while Dutch has only a morphological rule. Thus, there is an effect of the phonological rule on French, but only when grouped with German.

[29] Means and SD of rule effects in French are given in table 20, significance in table 21 in chapter 6.

[30] This effect only appears as across languages where German and French data are grouped (Dutch has phonological rule).

[31] In an individual analysis of French shows no effect of rule on accuracy.

overtness to affect accuracy is borne out even though the effects are weaker than expected. It is suggested that the effect of rules in turn is influenced by the amount of input.

#### *7.1.2.4. Effects of gender, their rules and their scope on accuracy in French, Dutch and German*

In addition to general overtness, it was also predicted that individual genders would affect accuracy, depending on their associated assignment rules and their scope. French, for instance, should display a high accuracy level in both masculine and feminine. It was predicted that these genders should both be acquired almost error-less as both are endowed with consistent gender assigners. Moreover, they both cover a nearly equal gender scope where feminine covers 52% and masculine 48% in corpora counts (lexique.org). The results show, in contrast to the prediction, that there is a significant difference between feminine and masculine. Masculine is produced with few errors (mean 84%) whereas feminine is mostly incorrect (mean 13%)[32]. The low accuracy rate of feminine is an unexpected result. Feminine gender on nouns is as much rule-governed as those in masculine and cover a similar scope, as is expressed in the prediction. It seems unlikely that for masculine gender, assignment rules are used whereas feminine rules are not used. Moreover, there is no effect of a rule on accuracy in French, only an overall effect of the phonological rule on accuracy which includes French data. This very limited evidence of a rule indicates that the high accuracy of masculine cannot be caused by the use of rules. The overall gender scope may not account for the result since it is equal for feminine and masculine. There must be another factor at work. The high accuracy rate of masculine in French may to be due to a gender default. French feminine with its low accuracy rate would then present the non-default gender with a specific gender value. A high accuracy in one gender and a low accuracy in another are known from Dutch. Dutch gender acquisition is suggested to make use of a gender default. This may also be the case in French. Even though the use of a gender default is not suggested for mono- and bilingual acquisition, it may be used in trilingual French. In what follows, the results on Dutch are discussed. The use of a default is described and may in the same way hold for French.

In Dutch, the prediction was that common gender displays a higher accuracy rate than neuter on the basis of it's overall gender scope. It was also predicted that there is evidence of neuter since there is a consistent and moderately frequent (Berkum, 1991) assignment rule. The results indicated that there is a significant difference between common and neuter gender and thereby confirm the prediction[33]. However, it was not predicted that common gender is practically error-free and that there is no evidence of neuter at all. Concerning common gender, error-free data can not be explained on the basis of a greater gender scope alone. As data for French show, feminine and masculine genders have an almost equal scope over the lexicon while feminine displays a low and masculine a high accuracy rate. Hence, a gender scope is likely not to be the sole reason for high accuracy. A further argument against the effect of scope comes from the comparison between German feminine and Dutch neuter. Dutch neuter has a gender scope comparable to feminine in German (30%). German feminine has an accuracy rate of 44% while Dutch neuter does not occur in the data all. Hence, scope alone may not account for the results, that is, the lack of use of neuter and the predominant use of common gender might be caused by other reasons. As mentioned above, the use of a

[32] Means, SD and significance for French are given in table 6 and 7 of chapter 6.

[33] Means, SD and significance for Dutch are given in table 11 of chapter 6.

default gender in Dutch was suggested by Hulk & Cornips (2006a) and van der Velde (2003).[34] The present results seem to give further evidence of a gender default.

The following reasoning might explain the findings in Dutch and also in French. Common in Dutch and masculine in trilingual French are correct from early on and to a high rate. The high accuracy rate from the start is likely not to be due word-by-word learning. The latter would probably display a higher error rate. Furthermore, the system is largely opaque, either because the system itself is arbitrary or because it became opaque on the basis reduced input. Thus, the high accuracy may not be the result of assignment rules. It rather seems that the gender of all nouns would be assigned to a default gender. A non-default gender on the other hand, being neuter in Dutch and feminine in French, only occurs gradually and it must be learned word-by-word or on the basis of rules, if available. The more opaque the non-default gender is for the learner, the more likely is an extended acquisition course. Since neuter mostly rests on arbitrary assignment, this seems to be the case. Indeed, the data on mono- and bilingual acquisition show a comparably late acquisition of neuter. Since the assignment rules for French feminine are less accessible because of reduced input, this reasoning may also hold for French. The otherwise rule-governed and mostly error-less acquired feminine causes difficulties. As long as a non-default gender is not established, the default overgeneralizes to the non-default gender. This direction of overgeneralization is unequivocally evident for Dutch in related literature. This is also the case for masculine in French which overgeneralizes on feminine while the reverse direction is not found. In sum, it seems that a gender default is at work in Dutch and in trilingual French. As the gender default seems to play a role in all languages under investigation, its characteristics will be discussed further below.

In what follows, the acquisition of the non-default neuter in Dutch shall be discussed in more depth. Neuter seems to be particularly difficult to detect since its rule governed assignment rests only on a morphological rule in an otherwise arbitrary assignment. As apparent from present data, arbitrary and morphological assignment yield lower accuracy rates than phonological assignment. Neuter rests on the former two and on this basis, it seems plausible that neuter displays a considerable delay. The finding that the morphological rules for neuter seem not to be used at the age of the subject (ca. 3;9 years) is in accordance with the findings by van Ginkel (2006). That is, the detection of the morphological diminutive ending in Dutch as gender cue seems only to be used comparably late (van Ginkel, 2006), namely at around 6 years. Hence, it appears that neuter gender cannot yet be assigned on the basis of the diminutive rule, at least within the present data where the subject is 3;9. It's largely arbitrary assignment may render its acquisition difficult and cause a prolonged acquisition course in mono-, bi- and multilingual settings.

Regarding the individual genders in German, it was predicted that feminine and masculine would display high and similar accuracy levels, whereas neuter would display a low accuracy level. The prediction is only borne out for masculine with an accuracy mean of 94%. Feminine, in contrast to the prediction, has a significantly lower accuracy level with a mean of 44%. The prediction for neuter is also borne out since it has the lowest accuracy level with a mean of 07%[35]. All three means differ significantly. There is a main effect of a rule, that is, the phonological rule affects accuracy as mentioned above, but this effect is subtle since it fades in an individual analysis of feminine and masculine. Concerning feminine, the lack of an effect of rule as well as the low accuracy rate is unexpected. As the

[34] This suggestion was not only made for bi- but also for monolingual acquisition.
[35] Means, SD and significance for German are given in table 8 and 9 of chapter 6.

phonological schwa-rule for feminine has a scope of 15.000 nouns and a consistency of 90% (Köpcke & Zubin, 1984), the accuracy in feminine could be expected to lie even higher than the accuracy in masculine. Similar to French feminine, it seems that the input reduction hindered the detection of a rule. It may be that the effect of a reduced input was underestimated and that also rules with great scope and consistency, as the schwa rule, are strongly subjected to the amount of input. Even though the effect of the schwa-rule is not significant, it's p-value was the smallest among all tested rules, namely $p < 0.098$. As the schwa-rule is the rule with the greatest scope and with a high consistency, this could cautiously be seen as a subtle effect of scope and rule. Regarding the accuracy rate in neuter, the result was expected. There is little evidence of neuter which is in accordance with its role as a sub-gender and the limited scope of the morphological rule. There is a mild difference between German (mean 7%) and Dutch neuter (0%) even though the scope of Dutch with 30% is greater than the scope for German. This result may be explained by the fact that German neuter as a sub-gender benefits of the phonological rules for masculine. Dutch neuter on the other hand, does not have an additional source of cues for gender assignment.

As mentioned above, the difference between German masculine and feminine accuracy rates was unexpected. There is no effect of rule on masculine as accuracy rates are equally high across rules (percentages range from 90% - 100%). Since there is no reason to assume that masculine benefits from rules while feminine does not, as alluded to above, it may be the case that also in German, masculine acts as a gender default and feminine and neuter must be learned on the basis of assignment rules and word-by-word in the case of arbitrary assignment.

That masculine gender in German is also default seems plausible. Firstly, there is no effect of rule on masculine with $p < 0.16$ while the accuracy rate is high, also in arbitrary assignment. Secondly, there seems also not be an effect of reduced input. In contrast, feminine is affected since the accuracy rate is lower. Furthermore, there seems to be a very subtle use of rules in German feminine, though, and this subtle effect may be a consequence of reduced input. Also French feminine is affected by the reduced input, though French is affected more. The accuracy rate of French feminine is considerably lower (mean of 13%) than the one of feminine in German (mean of 44%). This finding is in accordance with the fact that French has a lower amount of input than German. It seems that both German and French feminine are sensitive to the input reduction while masculine in German and also masculine in French seem not to be effected. The high accuracy rate seems not to be caused by assignment rules and comes about despite reduced input. A gender default seems to be a plausible explanation to this observation.

It shall be noted here, that the present data do not allow any claims about whether defaults are generally used in the acquisition of gender, that is, that defaults are used regardless of whether one or three languages are involved. The present data do not cover the onset of acquisition and the data on the acquisition of monolingual French are scarce. Nevertheless, the potential scenarios involving defaults in the acquisition of gender shall be discussed here. These could be meaningful in order to understand the mechanism of gender acquisition. For the use of a default, two options shall be presented. Firstly, it may be the case that a default is not inherent to the gender learning mechanism and it is only used when a system is opaque to the learner. The default may then be used as an interim solution until the full system, including one or more non-default genders, is acquired. At the onset of gender acquisition, the learner recognizes that the DP of the language she is exposed to has a gender system. If the input provides with arbitrary gender information, a gender default is used in order to satisfy a gender requirement on the DP. If a default is an option which is available if

the input does not provide with sufficient information, it should somehow exist in the first place. This represents the second option. That is, if there is an option for a default, the default should be inherent to the system. It might therefore be that a default is present in all acquisition settings from the start and the non-default emerges gradually. This suggestion is in accordance with the proposal for defaults made by Pinker (1999). A default is said to be part of the grammar, largely insensitive to characteristics of the input and non-lexical. A non-default, on the other hand, is lexical and thereby sensitive to the input. It is learned word-by-word and/or on the basis of rules. As soon as the non-default is established, the default is suppressed. For the learning mechanism of a non-default, instances in the input are crucial. If the input does not provide with sufficient information, the acquisition course of the non-default is prolonged or even hindered. In this case, the default overgeneralizes over a longer period.

If a default is indeed involved in the acquisition of gender, it may or may not necessarily be visible in all languages. It is visible if firstly, the default is correct to a high rate from the start as opposed to the non-default which undergoes errors. Secondly, the non-default gender(s) is (are) learned gradually and display varying degrees of errors over the acquisition course. Thirdly, the non-default gender as opposed to the default gender may show sensitivity to input reduction, arbitrary assignment and effects of rule, if these are available. For instance, its acquisition course reflects whether there are assignment rules or whether the assignment is arbitrary. Fourthly, the default overgeneralizes on the non-default gender. This overgeneralization is unidirectional. In the second scenario, the default may also not be visible. That is, if the non-default gender is learned very fast, for instance, on the basis of an overt gender system and in a fast and almost error-less fashion. Hence, there might be hardly any difference visible between the acquisition of a default and the non-default. An example of these two scenarios is given below.

Feminine and masculine in French may be an example where the default is not visible. Both are correct from early on and no overgeneralizations occur. In contrast, in opaque systems as Dutch and also in multilingual settings where reduced input renders the gender system more opaque since instances for rule detection are less, a gender default may become visible. This proposal could explain the observations made in the three languages under investigation. The use of a default is visible in Dutch on the basis of an opaque gender system. The delay of neuter as the non-default is based on arbitrariness and the strong delay in the bilingual setting on input reduction. The more arbitrary the system is, the longer may last the use of a default. In contrast, in a more overt system, the use of a default may be abandoned earlier. In trilingual French, for instance, a default seems to be visible as masculine has a high accuracy rate, overgeneralizes in a unidirectional fashion and feminine as a non-default is strongly delayed on the basis of reduced input. As opposed to Dutch, there are correct instances of the non-default as the system more overt. This difference in accuracy rates in non-defaults may be explained by the difference in overtness between Dutch and French. French is more overt thus the non-default is learned faster despite the input reduction. As introduced above, the default may also be used in trilingual German where masculine is mostly correct from the start and the overgeneralization is unidirectional. Feminine and neuter are acquired gradually and their accuracy rates rest on the characteristics of the associated assignment rule. The default seems to be visible in all languages under investigation. As accuracy rates across languages differ, with Dutch having the lowest accuracy rate while it is the language with the highest amount of input, it may be that the effect of an arbitrary system is stronger than the effect of reduced input. The effects of reduced input will be discussed further in section 7.2.

In sum, it may be that a gender default operates in the acquisition of gender in all language settings. It may not always be visible, depending on the information provided by the input.

The following paragraph discusses the results of rule conform and non-conform nouns. It was predicted that rule-conform nouns yield higher accuracy rates than non-conform nouns, in accordance with the findings on overgeneralizations by Szagun et al. (2007) and Müller (1990). Non-conform nouns should undergo overgeneralizations in the sense of the associated rule and hence, they would not be assigned the correct gender. For instance, the non-conform German noun 'das Herz'/the heart is marked neuter and is an exception to the FCCR rule for masculine, which states that nouns with the form (C)XXts are associated with masculine. If, as predicted, the FCCR rule is also applied to non-conform nouns, then 'das Herz' should appear with the masculine definite determiner, as in '*der Herz'.

The results presented in Chapter 6 indicate that the rules FCCR for German masculine, [-er] for German masculine and /-r/ for French masculine are indeed overgeneralized to non-conform nouns. As predicted, the accuracy of non-conform nouns is low and ranges from 0 to 13% while the accuracy for conform nouns ranges from 90 – 97%. This seems to indicate the use of assignment rules in the form of overgeneralizations. However, since the use of a rule is not evident as a main effect on French masculine and German masculine, it is not likely that it is indeed the overgeneralization of a rule which takes place on non-conform nouns. Rather, it is an overgeneralization by a default. This suggests that there are two ways of overgeneralizations. The overgeneralization by a default takes place as a consequence of the non-default not being fully acquired. There is no effect of a rule as the default is a part of the grammar and it is not sensitive to the input. The overgeneralization of a rule is evident if there is an effect of a rule in the data. Here, the basis of the overgeneralization is based on the use of a lexical rule onto a non-conform noun. In this sense, the latter is an overgeneralization in the sense of the word while a default is rather inserted as an 'elsewhere condition' (Pinker & Prince, 1991). As masculine is suggested to act as a gender default in French and German, it seems more likely that a default is also used here.

There is only little evidence of overgeneralizations from the schwa-rule for feminine in German. The schwa-rule overgeneralize only to 20% to non-conform nouns. Conform nouns have an accuracy rate of 60% and non-conform nouns have an accuracy rate of 80%. Non-conform nouns are mostly correctly marked with masculine and not, as a consequence of over-application of a rule, feminine. The reason for those few overgeneralizations may be that the effect of the phonological rule in German feminine is not significant. $P < 0.098$ only approaches significance. The effect of a rule may cautiously be interpreted as very subtle. The few overgeneralizations may confirm this subtle effect. It may be the case that the schwa-rule is only emerging but also, that those nouns are learned word-by-word. No concrete claims can be made on the basis of these results. In sum, the accuracy rates of German and French masculine seem once more not to be the result of overgeneralizations by a rule but rather by insertion of a default. In German feminine, only 20% of overgeneralizations occur and the use of the rule seems to be very subtle. Unfortunately, the data only embrace a period of three months, that is, around the age of 3; 8. More data over an extended period could reveal firstly, if the use of the schwa-rule is evident and secondly, if overgeneralizations occur on the basis of a rule. On the basis of the present data, the prediction that conform nouns have a high accuracy level as opposed to non-conform nouns as a result of overgeneralization is not borne out.

In the following paragraph, it is discussed whether the (i) consistency and (ii) scope of a rule affect accuracy. Even though the factors consistency and scope were mentioned before within the discussion above, the present discussion shall inspect their effects in more detail since their effect was specifically predicted. Note that the discussion is led even though the effect of rules is only evident as a main effect across languages and in German across feminine and masculine. The first prediction is that (i) rules with high consistency yield higher accuracy rates than rules with low consistency. Three test cases were inspected. Firstly, the effect of morphological rule as opposed to phonological rule was tested. Results indicate that the phonological rule (mean 64%) yields significantly better results across languages than the morphological rule (mean 38%), as mentioned above. As discussed above, it may be the case that gender assignment benefits from phonological rules earlier than from morphological assignment. This could be, apart from other reasons, one of the factors for the late acquisition of Dutch neuter, which is likely to rest only on a morphological rule with an otherwise arbitrary assignment. German feminine, on the other hand, is acquired considerably earlier which rests on both, phonological and morphological assignment. Hence, a highly consistent morphological rule does not necessarily yield a higher accuracy than a phonological rule with lower consistency. The second test case is the comparison between the German schwa-rule with a consistency of 90% and the German FCCR rule with a consistency of 75%. The latter is significantly different from the former because the FCCR rule yields higher accuracy rates[36]. This contradicts the prediction as the schwa-rule is more consistent. However, this result is not meaningful in terms of the prediction since there is no effect of a rule in German masculine. Moreover, German masculine is used as a default. Hence, this comparison may neither confirm nor reject the prediction. The same holds for the comparison of French. The more consistent rule for feminine (90%) displays a lower accuracy rate than the rule for masculine (78%). As there is no effect of a rule on French and masculine is likely to be a gender default, the comparison of these rules is not useful. That is, the comparison may not show whether the different degrees of rule consistency brings about different rates of accuracy, as was predicted.

The second prediction (ii) said that rules with great scope yield a higher accuracy than rules with small scope. Again three cases were tested. The results of the comparison between phonological rules and morphological rules indicate that scope seems to affects accuracy. Both are significantly different, as described above. The phonological rule across languages yields higher accuracy rates than the morphological rules. Typically, phonological rules have a lower consistency but a greater scope than morphological rules. Therefore, the prediction for 'scope' seems to be borne out. However, the comparison between the schwa-rule with a scope of 15.000 entries in the lexicon and the FCCR rule with 160 entries seem to give contradicting results. The FCCR rule yields higher accuracy rates than the feminine schwa-rule, which is unexpected, given the vast scope of the schwa-rule. The results of the FCCR rule are again likely to be due to the use of masculine as a gender default. The same holds for the third test case in French where results are likely to be skewed by the use of a gender default, too.

Two further comparisons of accuracy in relation to scope within and across languages seem to confirm these test cases. These examples may show that scope is not directly related to accuracy. French feminine, for instance, has a scope of 52% and French masculine a scope of 48%. They have a similar scope over the lexicon. This distribution does not correspond to the accuracy of the trilingual data. The same holds for a cross-linguistic comparison of German feminine and Dutch neuter which have a similar scope (30%) but differ largely in

[36] This comparison is made under the assumption that the consistency rates of 75% as opposed to 90% are different from each other.

their accuracy. From this discussion, it appears that the prediction of a great scope to affect accuracy is not borne out. Nevertheless, the schwa-rule has the greatest scope among all tested rules and it is the only rule being weakly evident in the present data. This seems to give some evidence for an effect of scope. Hence, the hypothesis that a great scope brings about high accuracy must largely remain unanswered because of these contradicting results.

In sum, an overall language comparison shows that the prediction that overtness affects accuracy is borne out. An analysis of the individual languages and genders, however, reveals that this effect is only subtle and it is suggested that this is likely to be due to the amount of input. The role of the input will be further discussed in section 7.2.2. The differences in results for genders across languages, namely high rates for masculine or common and low rates for remaining genders, is suggested to be due to a gender default. This reasoning is based on the fact that masculine has high accuracy rates without the evidence of a rule. The evidence of a rule would be that arbitrary assignment yields lower accuracy rates than rule-governed assignment which is not the case for common and masculine genders. The gender default was assumed for the acquisition of Dutch based on previous literature. It is suggested here that a gender default is used in trilingual French and German as a consequence of reduced input. As discussed above, it is not clear from the data if trilingual acquisition induces the use of a default or if it only makes it visible. However, as suggested above, it may be the case that defaults are present on the DP as part of the grammar in all acquisition settings. The difference in accuracy rates between Dutch on the one hand and German and French on the other seems to rest on the early use of phonological rules since there is an effect of rule in an overall comparison. Dutch neuter may be acquired on the basis of diminutive rules which might be used later than phonological rules. This suggestion must be left to future research as the present data only embrace an age span up to 3; 9. As the overall effect of rules is only subtle and a default gender is likely to be at work, a potential effect of scope and consistency of a rule is difficult to test. However, scope alone is likely not to account for the data since Dutch neuter and German feminine have a comparable scope but differ in their accuracy rates.

## 7.2. Causes for differences between mono-, bi- and multilingual acquisition

This section discussed the predictions regarding the causes for differences between mono- bi and trilingual acquisition. The discussion rests on the data collected here in comparison with the findings of related literature as presented in chapters 3 and 4. Section 7. 2. 1. discusses the prediction of beneficial effects of intersecting elements. Section 7. 2. 2. discusses effects of reduced input on the present data. Each section starts out with a summary of the results.

### 7.2.1. Cross linguistic influences occur with intersecting elements

In what follows, the results on the comparison between bi- and trilingual acquisition are summarized. The summary of the results is based on the tables 6 to 8 and 31 of chapter 6. Subsequently, the predictions are presented and discussed.

In bilingual Dutch, common is acquired mostly correct from the start (Unsworth, 2008) while errors may still occur within the age range of 5 – 9 (Hulk & Cornips, 2006b). Regarding the use of neuter ‘het’, there is a considerable delay and the majority of the data show only a low rate of correct use in an age range between 4 and 7 (Unsworth, 2008) and a accuracy rate below chance level at the age of about 10 to 12 (Cornips et al., 2006). Neuter undergoes overgeneralizations by common gender. The overgeneralization is reported to be unidirectional. There is no evidence of the use of assignment rules. In trilingual Dutch,

common is always marked correctly while there is no evidence of neuter. Neuter undergoes overgeneralizations by common gender. There is no evidence of the use of assignment rules.

In bilingual French, masculine and feminine are acquired almost error-less (Müller, 1990, 1994) and similar to monolinguals (Müller, 1990; Hulk, 2004). Feminine is slightly more prone to errors than masculine. Both feminine and masculine are mastered at the age of ca. 3;0. The use of assignment rules is evident. In trilingual French, masculine has only few errors with a mean of 84%. With three out of 105 test nouns, feminine overgeneralized to masculine. Feminine, on the other hand, has a very low accuracy rate with a mean of 13%. Masculine overgeneralizes to feminine. The use of rules is not evident in an individual analysis of French.

In German, bilingual feminine and masculine are acquired almost error-less (Müller, 1990). Feminine is slightly more prone to errors than masculine and undergoes overgeneralizations by masculine only. Both feminine and masculine are mastered at the age of 3;0. As opposed to feminine and masculine, neuter is delayed. It mostly undergoes overgeneralization by masculine. Neuter is mastered by the age of ca. 4;0 (Müller, 1990, 1994). In trilingual German, masculine is acquired almost error-less (mean 96%) while feminine only reaches an accuracy mean of 44%. Feminine is exclusively overgeneralized by masculine. The use of rules is evident as a general main effect in German but the effect is sublte since it fades in an individual analysis of genders. The p in feminine approaches significance, though, with a value of 0.098.

The prediction was that intersecting elements yield a beneficial effect. That is, French and German feminine and masculine would be acquired similar as in bilinguals. Also Dutch and German neuter intersect and would be acquired similar to bilinguals. Common would be acquired later than in bilinguals as it does not intersect. Intersecting elements are masculine and feminine in French and German on the one hand and neuter in German and Dutch on the other.

It was predicted that German and French masculine and feminine, and German and Dutch neuter intersect and hence, are acquired by trilinguals in a similar fashion to bilinguals. The similarity refers to the age when mastery is reached. This prediction rests on firstly, an observation made on data in bi- and monolingual acquisition (Müller, 1990, 1994; Koehn, 1990) and secondly, on a study on transfer in L2 (Sabourin et al. 2006) which may be applicable to cross-linguistic influences. The first basis of the prediction regards the similar acquisition course of feminine and masculine in French and German in bilinguals while German neuter, which has no equivalent in French, is acquired with a delay. Feminine and masculine are acquired as in monolinguals while neuter is not. Since the input in bilinguals is reduced, a delay in acquisition of feminine and masculine would have been plausible but the data did not show such a delay (Müller, 1990, 1994, Koehn, 1990). This inspired the hypothesis that gender categories may have a beneficial effect on each other. That gender categories of one language may affect the acquisition of another was tested for L2 in Sabourin et al. (2006), which constitutes the second basis of the prediction. The core idea is that identical gender categories in a bi- or multilingual setting may have a beneficial effect on each other. Sabourin et al. proposed that transfer of gender information from L1 to L2 may operate on two levels. The first level is a deep transfer on an abstract category such as masculine or feminine. The second level is surface transfer where morpho-phonological similarity of L1 may influence in a beneficial fashion the acquisition of L2. Since it is assumed, as discussed in chapter 4, that surface similarity does not apply to the languages investigated here; only the level of deep transfer is applied to the prediction on cross-

linguistic influence. It is important to note that the present proposal does not predict *transfer* from one language to another but a *joined effect of identical elements* of a gender category. That is, it is not predicted that knowledge of one language is used for the acquisition of another but that evidence for one gender category provided by two language sources may in sum be beneficial for these languages. In other words, the effect of intersecting categories may outweigh the effect of reduced input. In contrast, if there are two languages without identical gender categories, there may be a difference to bilingual acquisition. As described in chapter 4, if there is a cross-linguistic effect for the trilingual child studied here, then feminine and masculine in German and French and neuter in German and Dutch should be acquired similar to bilinguals. The gender categories outside an intersection should be acquired later than in bilinguals because they may not benefit from two language sources. Hence, the reduced input is not outweighed. In the languages under investigation, this concerns only common gender in Dutch. From the mono- and bilingual data available, it seems unlikely that Dutch common will be acquired later, though. It may be the case that the effect of a default plays a stronger role then the effect of intersecting element. That is, even though common should be acquired later on the basis of the prediction, the fact that common is a default hinders this effect to occur. As will become clear below, the predictions were to a large extent not borne out.

From the comparison made in chapter 6, it appears that masculine is acquired similar in bi- and trilingual German and French since they both display a high accuracy rate, which is in accordance with the prediction. However, feminine seems not to be acquired similar in bi- and trilinguals. Trilingual German feminine has an accuracy mean of 44% while bilinguals reached mastery in feminine at 3;0 years (Müller, 1990, 1994). The mastery level is achieved at the age of 3;0 in bilinguals and the accuracy rate for feminine found here, which lies below chance, is achieved with 3;9. This is interpreted as a difference between bi-and trilingual acquisition. Related literature does not report on difficulties with bilingual feminine in German beyond 3 years of age. The same holds for bi- and trilingual acquisition of feminine in French. Bilingual feminine is acquired almost error-less whereas trilingual feminine only amounts to an accuracy rate of .13. This can be interpreted as a considerable delay. Bi- and trilingual neuter show a similar result. In German, neuter is acquired by the age 4;0, while it is only evident with a mean of .07 in the trilingual data at the age of 3;9. This is interpreted as a distinct delay of trilingual neuter as compared to bilinguals. Dutch neuter is not evident in the data while it is used by bilinguals at the age of 3 to 4 at about a rate of 10%. This difference is cautiously interpreted as a delay in trilinguals as compared to bilinguals while the evidence for a delay with 10% difference is not strong. No beneficial effect of intersecting gender categories can be claimed from these results and the aforementioned prediction is thus not borne out. The prediction that a gender category which lies outside an intersection may be acquired with a delay compared to a bilingual is not borne out either. Common gender in Dutch may not benefit from the same gender category in another language. Nevertheless, it is highly accurate in the data; in fact it achieves the highest accuracy rate of all genders over languages in the present investigation. In sum, it appears that the acquisition of gender categories over languages is independent from each other. Cross-linguistic influences at the hypothesized ‘intersection’ of gender categories cannot be found.

### 7.2.2. Effects of reduced input

In what follows, the prediction that reduced input may cause a delay in trilingual acquisition as compared to bilingual acquisition is discussed. Section 7. 2. 2. 1. discusses an overall difference between the acquisition of gender in bi- and trilingual French, Dutch and German in relation to the amount of input for each language. Section 7. 2. 2. 2. discusses whether the reduced input affects the detection of assignment rules, depending on their scope and consistency. Each section starts out with a summary of the results.

#### *7.2.2.1. Effects of reduced input causes differences between bi- and trilingual acquisition*

The results on the comparison between bi- and trilingual French, Dutch and German are discussed in what follows. The results indicate that there is a difference between bi- and trilingual data across languages. However, the differences are not uniform. They seem to depend on the specific degree of input reduction in each language. This is in accordance with the prediction which says that the language with the highest reduction of input displays the greatest overall delay compared to bilingual acquisition.

German and Dutch are both the languages with the highest amount of input. German has a weekly exposure time of 35, 5 hours and Dutch of 35 hours. French, on the other hand, only amounts to 13 hours per week.

In German bilingual data, feminine is slightly more prone to errors than masculine while both are acquired with almost no errors and neuter is gender is delayed (Müller, 1990, 1994). The use of rules is evident, at least for feminine and masculine. In trilingual data, feminine is subject to a high amount of errors with an accuracy mean of .44. Masculine is almost error-free and neuter is strongly delayed. While the delay of feminine and neuter are clearly different from bilingual acquisition, the pattern may be recognized from bilingual data. That is, feminine is slightly more prone to errors in bilingual acquisition and this effect seems to be more pronounced in trilingual acquisition. Neuter is also delayed in bilinguals and strongly delayed in the trilingual data. In both bi- and trilingual data, there is evidence for the use of assignment rules but the effect is weak in the latter. However, beside the difference between bi- and trilingual feminine, there seems to be another difference and that is the use of a default, as discussed in section 7.1. Bilingual data of German do not seem to support the use of masculine as a gender default. That is, there both feminine and masculine are acquired almost error-less from the start and there appears to be no effect of reduced input on feminine and masculine strong enough to warrant the claim of a default. In both masculine and feminine, there are effects of rules in bilingual data. In trilingual data, there is a significant effect of rules but the effect is only subtle and there is no effect found for masculine gender while it seems that there is a very subtle one in feminine. As mentioned above, a default is insensitive to the amount of input and its use is not based on rules. Hence, a default may be at work in trilingual acquisition while it is at least not apparent in bilingual data. In sum, there are differences between bi- and trilingual German. However, the pattern of delay is not entirely different from bilingual data. Both bi- and trilinguals use assignment rules, even if this use is only subtle in the trilingual data.

A comparison between bi- and trilingual Dutch shows that there is little difference. In both, common gender is mostly correct and neuter is considerably delayed. The use of the assignment rule diminutive is evident only at a later age and as the subject is 3; 9 at the time of data collection, no difference can be claimed. In respect to the acquisition of neuter, bilingual data show little evidence of neuter at the age of about 3; 0, while there is no evidence of neuter in the trilingual data. Since the pattern of difficulties with neuter is similar in bi- and trilinguals, no considerable difference can be claimed.

The difference between bi- and trilingual French is considered to be the most substantial among the languages under investigation. Bilinguals acquire the gender system by the age of about 3 years and in an almost error-less fashion. The use of rules is evident from early on. In contrast, trilingual data show that feminine undergoes many errors with an accuracy mean of .13. Even though there are instances of errors in feminine in bilinguals, these are very rare and appear only for a short period, namely one month (Müller, 1990). As Müller's data in 1990 are based on one subject, this delay can be interpreted as minor. This differs considerably from trilingual acquisition where feminine is mostly incorrect. The effect of a rule is not evident in French data; there is only a general effect of the phonological rule on German and French. Furthermore, it seems that in trilingual French, a gender default is used which is not reported on for bilingual French. Therefore, the data of bi- and trilingual French are regarded as presenting a pronounced difference.

Trilingual French and German display a difference to bilingual data while the difference cannot be claimed to be great for Dutch. Even though trilingual German differs from bilingual German particularly in respect to feminine and the use of a gender default, the pattern of errors is familiar from bilingual data. Trilingual French, on the other hand, is strongly different from bilingual acquisition, because the former seems to make use of default, displays a low accuracy rate for feminine and the use of rules is not evident. These results are not known from bilingual French.

As a result and from the discussion of differences in German, Dutch and French bi- and trilinguals above, it seems that French undergoes the strongest negative effect of input reduction. It appears that the prediction that the degree of delay closely relates to the degree of input reduction is borne out.

#### *7.2.2.2. Reduced input effects the detection of assignment rules*

In what follows, the effect of input on the accessibility of assignment rules is discussed. It was argued that a great scope may provide with sufficient instances in the input so that the child may recognize similarities in forms and hence, construct a rule. As mentioned above, sufficient instances in the input are a delicate issue in multilingual children as the input for each language is reduced which may cause difficulties. Therefore, it is predicted that a rule with great scope and many instances in the input has better chances to be detected than a rule with small scope and less instances in the input. As rules with a small scope have fewer instances in the input, trilingual input reduces the amount of instances further. As a consequence, a rule with small scope would be detected later if at all.

Rules with great and small scope were tested and the results indicate that the morphological rule [-chen] for neuter in German, which has a small scope, yields significantly less correct assignments than the /r/ rule in French, which has a great(er) scope. This result seems to confirm the prediction. However, as turns out, the confirmation must be called into question. The result suggests that a small scope as in the morpheme [-chen] is difficult to detect even if there is a high amount of input, and that a rule with great scope as in /-r/ is detected even with reduced input as in French. This conclusion is, however, unwarranted for the following reasons. Firstly, it appears that there is no effect of a rule in French[37]. Therefore, there is no effect of the /-r/-rule. Hence, the test of its scope effects is not useful. Secondly, it appears that phonological rules are simply detected prior to morphological rules. The comparison of the diminutive rule in German and the phonological rule in French may not answer the question. Even though the use of the phonological rule as opposed to the morphological one may also be related to scope, the difference could certainly have independent reasons such as semantic complexity of nouns with morphological endings. Hence, a comparison of two phonological rules where one has a great scope and the other a small scope would provide better insights. This must be left to future research. Thirdly, the higher accuracy in French masculine may be caused by the use of a gender default and not by a greater scope. The latter seems to be quite likely, given the suggestions made above. Hence, the initially plausible conclusion that the prediction is borne out must in fact be called into question. The cause for the observed result may have independent reasons. It appears that the effect of scope should be tested differently in that factors such as morphology and phonology and default gender should be controlled and the use of a rule must be evident. This must be left to future research.

The discussion above suggests that there is little influence of scope on accuracy. However, there is some weak evidence of a rule with great scope which may be relevant to the discussion. There is a main effect of rule on accuracy in German. There is no effect of a morphological rule on accuracy, but of the phonological rule ($p < 0.007$). The individual analysis of genders reveals that there is no effect of rule on masculine gender ($p < 0.164$), neither on feminine with $p < 0.098$. The effect of the latter is caused by the schwa-rule. While the p value for the schwa rule is not significant, it reaches the lowest value of p for a rule available in the data. As mentioned above, the schwa-rule is the rule with the greatest scope over rules and languages with 15.000 nouns in the nouns lexicon. On the basis of this scope, the word pattern with a word-final schwa is said to constitute the dominant word pattern in German, namely, the trochaic pattern (Fikkert et al., 1998). Even though the p value indicates that the effect is not significant, it seems to approach significance. It is not possible to make concrete claims of the effect this great scope. However, the lowest p value of all tested rules suggests that there may lie a relation between scope and accuracy. The fact that there is no effect of the schwa rule was unexpected. It seems that the input reduction in a trilingual setting at the age of 3;9 strongly effects the detection of rules and that this effect has been underestimated. In sum, the effect of a small or great scope on accuracy cannot be claimed

[37] Again, note that there seems to be a very subtle effect for French, but only when grouped with German.

with certainty. However, the results of the schwa-rule in German suggest that scope may matter but that the effect of reduced input is stronger than anticipated.

The following chapter will present with a brief summary of the present discussion and its conclusion.

## 8. Conclusion

The present study investigated whether firstly, there is an effect of gender assignment rules in trilingual acquisition. The study also followed the question whether the difference in gender systems of each language is reflected in the acquisition course. Secondly, the study investigated whether there are differences between bi- and trilingual acquisition of gender and what might cause these differences. The first cause concerns a potential cross-linguistic effect and the second regards the effect of a reduced input.

Regarding the effect of assignment rules, the study revealed that this effect is significant over languages but this effect fades when French and Dutch are analyzed individually. The effect remains significant for German while it fades when genders are analyzed individually. That is, both neuter, masculine and feminine show no effect of rule in German. Only feminine approaches a significance with $p < .098$. It appears that there is a difference in acquisition between languages, but the difference was unexpected. French was predicted to be the language with the fewest errors, similarly as German. Dutch was predicted to be delayed as is known from bilinguals. However, trilingual French did not reflect the highly rule-governed gender system. The individual gender rules within each language and for each gender did not match the results. That is, it cannot be said that a highly consistent rule with great scope is detected prior to rules with less scope and consistency, as suggested by Wegener (1995) and Mills (1986). On the basis of these results, it was suggested that language specific characteristics are not sufficient to explain trilingual data. Independent reasons that are characteristic for trilingual acquisition must be considered.

The lack of the effect of rule contrasts the findings for mono- and bilingual acquisition of Dutch, German and French. Dutch monolinguals use morphological rules at the age of 5 (van Ginkel, 2006) and German and French bilinguals make use of rules (Müller, 1990). Dutch bilingual data don’t show the use of rules (van Ginkel, 2006). It can be concluded that the use of assignment rules in trilingual acquisition, at least for this case study, fades in the case of French, or becomes very subtle as is the case of German. In the discussion, it was suggested that this may be due to reduced input as the critical mass for the detection of assignment rules is not reached, as mentioned above. It was also suggested that if rules are not detected, a gender default is used. In all three languages, masculine and common respectively, are highly accurate despite input reduction. It appeared from French data, that the use of a default gender is not necessarily linked to the scope of a gender in the input as feminine and masculine have a similar gender scope (cf. lexique.org). The reason might be independent from the amount of input. That is, the gender default is inherent to the gender system. While it might be inherent, it might not always be visible during acquisition. It might only become visible when the gender system does not provide with sufficient information for

non-default genders. The results of the present study suggest that this might be the case in trilingual acquisition. More evidence from trilingual acquisition of rule-governed gender systems is needed to confirm that input reduction brings about the use of a gender default.

Concerning cross-linguistic influence, no evidence was found, at least for the proposal made here. There seems to be no cross-linguistic effect of an abstract gender category. There was no consistent beneficial effect of two identical gender categories. This proposal, which accounted for transfer effects in L2 contexts, may not hold for potential cross-linguistic effects. That is not to say, that there are no cross-linguistic effects in bi- or trilingual acquisition of gender. They only seem to be unlikely to appear at an intersection of gender categories.

In sum, there is only very subtle evidence of gender assignment rules in the trilingual subject investigated here. Cross-linguistic effects cannot be claimed on the basis of the 'intersection' proposal. The most prominent result of the present data might be the almost error-less use of one gender as opposed to another, that is masculine in French and German and common in Dutch. This was unexpected, at least for French and German. Future research may shed further light on the use of gender defaults in multilingual contexts.

## 9. References


1. Alexiadou, A., Haegeman, L. and Stávrou, M. (2007): *Noun Phrase in the Generative Perspective.* Walter de Gruyter
2. Barnes, J. (2006): *Early Trilingualism. A Focus on Questions.* Second Language Acquisition. Multilingual Matters. British Library of Congress Cataloging in Publication Data.
3. Bewer, F. (2003): *Der Erwerb des Artikels als Genusanzeiger im Deutschen Erstspracherwerb.* http://www.zas.gwz-berlin.de/papers/zaspil/articles/zp33/bewer-genuserwerb.pdf
4. Blom, E., D. Polisenská and F. Weerman (2008): Articles, adjectives and age of onset: the acquisition of Dutch grammatical gender. *Second Language Research* 2008; 24; 297
5. Bol, G. & F. Kuiken (1988): *Grammaticale Analyse van Taalontwikkelingsstoornissen.* PhD Dissertation. University of Amsterdam
6. Carroll, S. (1989): Second-language acquisition and the computational paradigm. (as cited in Sisson, 2006).
7. Corbett, G. (1991): *Gender*. Cambridge Textbook in Linguistics. Cambridge University Press.
8. Cornips, L and A. Hulk (2008): Factors of success and failure in the acquisition of grammatical gender in Dutch. *Second Language Research* 2008; 24; 267
9. Cornips, L.; van der Hoek, M. & R. Verwer (2006): The acquisition of grammatical gender in bilingual child acquisition of Dutch. In: van de Weijer, J. & B. Los [red.] *Linguistics in The Netherlands 2006.* John Benjamins, Amsterdam/Philadelphia
10. De Houwer, A. (1995): Bilingual language Acquisition. In: *Handbook of Child Language*. Fletcher, P. and B. McWhinney (eds.)
11. De Houwer, A. (1990): *The acquisition of two first languages from birth. A case study.* Cambridge University Press.
12. Eisenberg, P. (2000): *Grundriss der Deutschen Grammatik. Der Satz.* Verlag J.B. Metzler.
13. Fikkert, P., Z. Penner & K. Wymann (1998): 'Das Comeback der Prosodie. Neue Wege in der Diagnose und Therapie von phonologischen Störungen'. LOGOS 2 : 84-97.
14. Haeseryn, W., Romijn, K., Geerts, G. , J. de Rooij and M.C. van en Toorn (1997): *Algemene Nederlandse Spraakkunst.* Band I. Martinus Nijhoff Uitgevers. Groningen.
15. Gathercole Mueller, V. (2002): Grammatical gender in bilingual and monolingual children: A Spanish morphosyntactic distinction. In D. Kimbrough Oller & Rebecca E. Eilers (eds.), *Language and literacy in bilingual children.* Clevedon: Multilingual Matters. 207-219.
16. Glück, H. (2000). *Metzler-Lexikon Sprache*. J.B. Metlersche Verlagsbuchhandlung und Carl Ernst Poeschel Verlag GmbH, Stuttgart

17. Granfeldt, J. (2000): The acquisition of the determiner phrase in bilingual and second language French. *Bilingualism: Language and Cognition*, 3, 263 – 280. Cambridge University Press
18. Hoffmann, C. (2001): Towards a description of trilingual competence. In: *International Journal of Bilingualism*. 2001, 5.1.
19. Hulk, A. (2004): The Acquisition of the French DP in a Bilingual Context. In: *The Acquisition of French in Different Contexts. Focus on Functional Categories.* Prevost, P. & J. Paradis. John Benjamins, Amsterdam
20. Hulk, A. & L. Cornips (2006a): 'Between 2L1- and child L2 acquisition: an experimental study of bilingual Dutch.' In: Conxita Lleó [red.] *Interfaces in multilingualism*. John Benjamins, Amsterdam/Philadelphia
21. Hulk, A. & L. Cornips (2006b): 'Neuter gender and interface vulnerability in child L2/2L1 Dutch. In: Sharon, U. et. al. (eds.), Paths of Development in L1 and L2 acquisition: In honor of Bonnie D. Schwartz. 2006. John Benjamins, Amsterdam
22. Hulk, A. and N. Müller (2000): Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition*. 3, 227 – 244. Cambridge University Press
23. Karmilloff-Smith, A. (1979): *A functional approach to Child Language. A Study of Determiners and Reference.* Cambrigde University Press.
24. Kempe, V., Brooks, P, Miranova, N., & Fedorova, O. (2003): Diminutivization supports gender acquisition in Russian children. *Journal of Child Language*. 30. 471-485.
25. Koehn, C. (1994): The Acquisition of Gender and Number Morphology within NP. In: *Bilingual First Language Acquisition*. *French and German Grammatical Development.* Meisel, J. (ed.). Benjamin Publishing Company.
26. Köpcke, K. & D. Zubin (1984): Sechs Prinzipien für die Genuszuweisung im Deutschen: Ein Beitrag zur natürlichen Klassifikation. *Linguistische Berichte 93.* p. 26 -50. Westdeutscher Verlag.
27. Kupisch, T. (2003): The DP, a vulnerable domain? Evidence from the acquisition of French. In: Müller, N. (ed.) *(In)vulnerable Domains in Bilingualism.* Amsterdam: Benjamins
28. Maratsos, M. (1982): The child's construction of grammatical categories. In: Wanner & Gleitmann: *Language Acquisition: The state of the art*. Cambridge University Press.
29. Mc Laughlin, B. (1978): Second-Language Acquisition in Childhood. Hillsdale. L. Erlbaum Associates. In: Quay, S. (2001). See reference 33.
30. Meisel, J. (1989): Early differentiation of languages in bilingual children. In: Bilingualism across the lifespan: Aspects of acquisition, maturity and loss. Hyltenstam, K. and L. Obler (eds.). Cambridge University Press (as cited in Quay, S. , reference 34)
31. Mills, A. (1986): *The Acquisition of Gender. A study of English and German*. Springer Series in Language and Communication. Springer Verlag
32. Müller, N. (2000): Gender and number in acquisition, pp.351-399 in B. Unterbeck et al. (eds.) Gender in Grammar and Cognition.

33. Müller, N. (1994): Gender and Number Agreement within DP. In: *Bilingual First Language Acquisition*. *French and German Grammatical Development.* Meisel, J. (ed.). Benjamin Publishing Company.
34. Müller, N. (1990): Developing two Gender Assignment Systems simultaneously. In: Meisel, J. (ed.) *Two first languages. Early grammatical development in Bilingual Children.* Dordrecht. Foris.
35. Pinker, S. (1999): Words and Rules: The Ingredients of Language. Harper Collins Publishers. New York.
36. Platzack, C. (2001): The vulnerable C-domain. *Brain and Language* 77, 364–377
37. Platzack, C. (1999): The vulnerable C-domain. Paper presented at the workshop on Language Acquisition and Language Breakdown, UIL-OTS Utrecht University (cited in Hulk & Müller, 2000, reference 15)
38. Quay, S. (2001): Managing linguistic boundaries in early trilingual development. In: *Trends in Bilingual Acquisition*. Cenoz, J. and F. Genesee. John Benjamins Publishing. Amsterdam/Philadelphia
39. Rietveld, T. And R. Van Hout (2005): Statistics in Language Research: Analysis of Variance. Mouton de Gruyter. Textbook. Berlin
40. Sabourin, Laura Sabourin, Laurie A. Stowe and Ger J. de Haan (2006): Transfer effects in learning a second language grammatical gender system. *Second Language Research* 2006; 22; 1.
41. Sisson, C. (2006): *Adult L2 Acquisition of French Grammatical Gender: Investigating Sensitivity to Phonological and Morphological Gender Cues.* Honours Thesis. MCGill University.
42. Szagun, G., Stumper, B., Sondag, N. & Franik, M. (2007): The acquisition of gender marking by young German-speaking children: Evidence for learning guided by phonological regularities. *Journal of Child Language, 34*, 445-471.
43. Tucker, G.R., Lambert, W.E. and A.A. Rigault (1977): *The French Speaker's Skill with Grammatical Gender: An Example of Rule-Governed Behavior*. Mouton The Hague, Paris.
44. Unsworth, S. (2008): Age and input in the acquisition of grammatical gender in Dutch. *Second Language Research (*special issue on The acquisition of grammatical gender in Dutch) 24, 3 365-396.
45. Unsworth, S. (2003): Testing Hulk & Müller (2000) on crosslinguistic influence: Root Infinitives in a bilingual German/English child. *Bilingualism: Language and Cognition* 6,2 143-158
46. Van Berkum, J. (1996). *The Psycholinguistics of Grammatical Gender. Studies in Language Comprehension and Production*. Nijmegen University Press.
47. Van Ginkel, B. (2006): *De verwerving van lexicaal en morfologisch bepaald geslacht [The acquisition of lexical and morphological gender]*. Unpublished Masters thesis, Meertens Institute, University of Utrecht
48. Van der Velde, M. (2004): L'acquisition des determinants en L1: une etude comparative entre le francais et le neerlandais. AILE, 21, 9 – 46 (as cited in Hulk & Cornips, 2006a).

49. Van der Velde, M. (2003): *Déterminants et pronoms en néerlandais et en français : syntaxe et acquisition*. Thesis available here: http://umr7023.free.fr/Downloads/MvdVeldeTh_somm.html (March, 2009)
50. Wegener, H. (2000). German Gender in Children's Second Language Acquisition. In: Gender in Grammar and Cognition. B. Unterbeck (eds.). Mouton de Gruyter
51. Wegener, Heide (1995): *Die Nominalflexion des Deutschen – verstanden als Lerngegenstand.* Reihe germanistische Linguistik. Niemeyer
52. www.lexique.org Lexique - Une Base de Données Lexicales Libre
53. Zonneveld, R. Van (1992): Het jonge Hoofd – De Righthand Head Rule bij kinderen von 4 tot 7 jaar. De Nieuwe Taalgids, 85, 37 – 49 (as cited in reference 16. Hulk & Cornips, 2006a)

## **Appendix A**– List of Tested Nouns with Coding and Results

### *1. Dutch*

*Session I – Total of tested nouns: 30*

a. Common ‘De’

i. no rule:

Table 1

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | kicker | √ | Common | yes |
| 2. | paddelstoel | √ | Common | yes |
| 3. | fles | √ | Common | yes |
| 4. | glijbaan | √ | Common | yes |
| 5. | tafel | √ | Common | yes |
| 6. | stoel | √ | Common | yes |
| 7. | olifant | √ | Common | yes |
| 8. | bloem | √ | Common | yes |
| 9. | boter | √ | Common | yes |
| 10. | appel | √ | Common | yes |

b. Neuter ‘Het’

i. no rule:

Table 2

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | been | × | Common | yes |
| 2. | kussen | × | Common | yes |
| 3. | spel | -- | -- | no |
| 4. | hout | × | Common | yes |
| 5. | vel | × | Common | yes |
| 6. | zout | × | Common | yes |
| 7. | blad | × | Common | yes |
| 8. | haar | -- | -- | no |
| 9. | vlees | × | Common | yes |
| 10. | hemd | × | Common | yes |

ii. diminutive rule [-je]:

Table 3

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | hondje | × | Common | yes |
| 2. | eisje | × | Common | yes |
| 3. | treintje | × | Common | yes |
| 4. | broekje | × | Common | yes |
| 5. | maandje | × | Common | yes |
| 6. | hartje | × | Common | yes |
| 7. | hoofdje | × | Common | yes |
| 8. | koekje | × | Common | yes |
| 9. | eendje | × | Common | yes |
| 10. | meisje | × | Common | yes |

*Session II – Total of tested nouns: 30*

a. Common ‘De’

i. no rule:

Table 4

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | kicker | √ | Common | yes |
| 2. | paddelstoel | √ | Common | yes |
| 3. | fles | √ | Common | yes |
| 4. | glijbaan | √ | Common | yes |
| 5. | bril | √ | Common | yes |
| 6. | deur | √ | Common | yes |
| 7. | kaas | √ | Common | yes |
| 8. | hand | √ | Common | yes |
| 9. | boek | √ | Common | yes |
| 10. | auto | √ | Common | yes |

b. Neuter ‘Het’

i. no rule:

Table 5

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | been | × | Common | yes |
| 2. | kussen | × | Common | yes |
| 3. | spel | × | Common | yes |
| 4. | hout | × | Common | yes |
| 5. | oor | × | Common | yes |
| 6. | paard | × | Common | yes |
| 7. | mes | × | Common | yes |
| 8. | eij | × | Common | yes |
| 9. | vuur | × | Common | yes |
| 10. | sap | × | Common | yes |

ii. diminutive rule [-je]:

Table 6

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | paardje | × | Common | yes |
| 2. | huisje | × | Common | yes |
| 3. | eendje | × | Common | yes |
| 4. | broekje | × | Common | yes |
| 5. | koekje | -- | -- | no |
| 6. | bootje | -- | -- | no |
| 7. | emmertje | × | Common | yes |
| 8. | boekje | × | Common | yes |
| 9. | eisje | -- | -- | no |
| 10. | snoepje | × | Common | yes |

*Session III – Total of tested nouns: 30*

1. Common ‘De’

i. no rule:

Table 7

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | kicker | √ | Common | yes |
| 2. | paddelstoel | √ | Common | yes |
| 3. | fles | √ | Common | yes |
| 4. | glijbaan | √ | Common | yes |
| 5. | koek | √ | Common | yes |
| 6. | leeuw | √ | Common | yes |
| 7. | vogel | √ | Common | yes |
| 8. | wolk | √ | Common | yes |
| 9. | mond | √ | Common | yes |
| 10. | lamp | √ | Common | yes |

2. Neuter ‘Het’

i. no rule:

Table 8

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | been | × | Common | yes |
| 2. | kussen | × | Common | yes |
| 3. | spel | × | Common | yes |
| 4. | hout | × | Common | yes |
| 5. | geld | × | Common | yes |
| 6. | huis | × | Common | yes |
| 7. | water | × | Common | yes |
| 8. | raam | × | Common | yes |
| 9. | paard | × | Common | yes |
| 10. | brood | × | Common | yes |

ii. diminutive rule [-je]:

Table 9

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | paardje | × | Common | yes |
| 2. | huisje | × | Common | yes |
| 3. | eendje | × | Common | yes |
| 4. | broekje | × | Common | yes |
| 5. | glasje | × | Common | yes |
| 6. | mondje | -- | -- | no |
| 7. | muisje | -- | -- | no |
| 8. | hartje | × | Common | yes |
| 9. | mannetje | × | Common | yes |
| 10. | cadeautje | × | Common | yes |

***2. French***

*Session I – Total of tested nouns: 65*

1. Masculine ‘Le’

i. no rule:

Table 10

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | sable | √ | Masculine | yes |
| 2. | train | √ | Masculine | yes |
| 3. | jardin | √ | Masculine | yes |
| 4. | telephone | √ | Masculine | yes |
| 5. | magasin | -- | -- | no |
| 6. | coque | -- | -- | no |
| 7. | teddy | √ | Masculine | yes |
| 8. | crocodile | √ | Masculine | yes |
| 9. | crue | √ | Masculine | yes |
| 10. | chien | √ | Masculine | yes |

ii. phonological rule /-r/:

Table 11

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | beurre | √ | Masculine | yes |
| 2. | coeur | √ | Masculine | yes |
| 3. | tonnerre | √ | Masculine | yes |
| 4. | verre | √ | Masculine | yes |
| 5. | tigre | √ | Masculine | yes |
| 6. | concombre | √ | Masculine | yes |
| 7. | zebre | √ | Masculine | yes |
| 8. | cigarre | √ | Masculine | yes |
| 9. | metre | √ | Masculine | yes |
| 10. | renard | √ | Masculine | yes |

Exceptions:

Table 12

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | fleur | -- | -- | no |
| 2. | chambre | × | Masculine | yes |
| 3. | voiture | × | Masculine | yes |
| 4. | cuilliere | -- | -- | no |
| 5. | chevre | -- | -- | no |

iii. morphological rule [-ier]:

Table 13

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | calendrier | -- | -- | no |
| 2. | pompier | √ | Masculine | yes |
| 3. | cuisinier | -- | -- | no |
| 4. | meunier | √ | Masculine | yes |
| 5. | chevalier | √ | Masculine | yes |
| 6. | jardinier | -- | -- | no |
| 7. | fermier | √ | Masculine | yes |
| 8. | cordonnier | -- | -- | no |
| 9. | voilier | -- | -- | no |
| 10. | tablier | √ | Masculine | yes |

2. Feminine ‘La’

i. no rule:

Table 14

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | douche | -- | -- | no |
| 2. | fille | × | Masculine | yes |
| 3. | vache | × | Masculine | yes |
| 4. | maison | √ | Masculine | yes |
| 5. | balle | × | Masculine | yes |
| 6. | lune | × | Masculine | yes |
| 7. | table | × | Feminine | yes |
| 8. | souris | × | Masculine | yes |
| 9. | banane | -- | -- | no |
| 10. | bouche | -- | -- | no |

ii. phonological rule [-z]:

Table 15

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | chaise | √ | Feminine | yes |
| 2. | prise | -- | -- | no |
| 3. | chemise | -- | -- | no |
| 4. | valise | × | Masculine | yes |
| 5. | cerise | × | Masculine | yes |
| 6. | framboise | -- | -- | no |
| 7. | rose | × | Masculine | yes |
| 8. | punaise | -- | -- | no |
| 9. | blouse | -- | -- | no |
| 10. | fallaise | -- | -- | no |

iii. morphological rule:

Table 16

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | baguette | -- | -- | no |
| 2. | trotinette | × | Masculine | no |
| 3. | bicyclette | × | Masculine | yes |
| 4. | fourchette | -- | -- | no |
| 5. | chouette | -- | -- | no |
| 6. | chaussette | √ | Feminine | yes |
| 7. | trompette | -- | -- | no |
| 8. | cotelette | -- | -- | no |
| 9. | poussette | -- | -- | no |
| 10. | mouette | -- | -- | no |

*Session II – Total of tested nouns: 65*

1. Masculine ‘Le’

i. no rule:

Table 17

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | sable | √ | Masculine | yes |
| 2. | train | √ | Masculine | yes |
| 3. | coque | √ | Masculine | yes |
| 4. | telephone | -- | -- | no |
| 5. | cou | -- | -- | no |
| 6. | toit | √ | Masculine | yes |
| 7. | feu | √ | Masculine | yes |
| 8. | bateau | √ | Masculine | yes |
| 9. | nez | √ | Masculine | yes |
| 10. | bebe | × | Feminine | yes |

ii. phonological rule /-r/:

Table 18

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | beurre | √ | Masculine | yes |
| 2. | coeur | √ | Masculine | yes |
| 3. | tonnerre | √ | Masculine | yes |
| 4. | verre | √ | Masculine | yes |
| 5. | cadre | √ | Masculine | yes |
| 6. | pierre | √ | Masculine | yes |
| 7. | zebre | √ | Masculine | yes |
| 8. | mouchoir | √ | Masculine | yes |
| 9. | mur | √ | Masculine | yes |
| 10. | radiateur | √ | Masculine | yes |

Exceptions:

Table 19

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | fleur | -- | -- | no |
| 2. | chambre | × | Masculine | yes |
| 3. | voiture | × | Masculine | yes |
| 4. | cuilliere | -- | -- | no |
| 5. | chevre | × | Masculine | yes |

iii. morphological rule [-ier]:

Table 20

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | cordonnier | √ | Masculine | yes |
| 2. | pompier | √ | Masculine | yes |
| 3. | sablier | √ | Masculine | yes |
| 4. | tablier | √ | Masculine | yes |
| 5. | chandelier | × | Feminine | yes |
| 6. | papier | √ | Masculine | yes |
| 7. | collier | × | Feminine | yes |
| 8. | chemisier | √ | Masculine | yes |
| 9. | sanglier | √ | Masculine | yes |
| 10. | postier | √ | Masculine | yes |

2. Feminine ‘La’:

i. no rule:

Table 21

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | douche | × | Masculine | yes |
| 2. | fille | × | Masculine | yes |
| 3. | vache | × | Masculine | yes |
| 4. | maison | × | Masculine | yes |
| 5. | tete | × | Masculine | yes |
| 6. | tomate | × | Masculine | yes |
| 7. | lanterne | -- | -- | no |
| 8. | neige | -- | -- | no |
| 9. | rue | -- | -- | no |
| 10. | giraffe | √ | Feminine | yes |

ii. phonological rule:

Table 22

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | chaise | √ | Feminine | yes |
| 2. | prise | × | Masculine | yes |
| 3. | valise | √ | Feminine | yes |
| 4. | chemise | × | Masculine | yes |
| 5. | betoneuse | √ | Feminine | yes |
| 6. | depanneuse | × | Masculine | yes |
| 7. | pare-brise | × | Masculine | yes |
| 8. | chargeuse | × | Masculine | yes |
| 9. | coiffeuse | -- | -- | no |
| 10. | friteuse | -- | -- | no |

iii. morphological rule:

Table 23

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | baguette | √ | Feminine | yes |
| 2. | trotinette | × | Masculine | yes |
| 3. | bicyclette | √ | Feminine | yes |
| 4. | chouette | × | Masculine | yes |
| 5. | clarinette | -- | -- | no |
| 6. | omelette | × | Masculine | yes |
| 7. | cassette | × | Masculine | yes |
| 8. | boulette | √ | Feminine | yes |
| 9. | cigarette | × | Masculine | yes |
| 10. | pincette | -- | -- | no |

*Session III – Total of tested nouns: 65*

1. Masculine ‘Le’:

i. no rule:

Table 24

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | sable | √ | Masculine | yes |
| 2. | train | √ | Masculine | yes |
| 3. | coque | √ | Masculine | yes |
| 4. | telephone | √ | Masculine | yes |
| 5. | bateau | √ | Masculine | yes |
| 6. | chocolat | √ | Masculine | yes |
| 7. | lait | √ | Masculine | yes |
| 8. | lit | √ | Masculine | yes |
| 9. | tapis | √ | Masculine | yes |
| 10. | cheval | √ | Masculine | yes |

ii. phonological rule:

Table 25

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | beurre | √ | Masculine | yes |
| 2. | coeur | √ | Masculine | yes |
| 3. | tonnerre | √ | Masculine | yes |
| 4. | verre | √ | Masculine | yes |
| 5. | dessert | √ | Masculine | yes |
| 6. | foulard | | -- | no |
| 7. | ventre | | -- | no |
| 8. | bagger | √ | Masculine | yes |
| 9. | radiateur | √ | Masculine | yes |
| 10. | coffre | √ | Masculine | yes |

Exceptions:

Table 26

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | fleur | × | Masculine | yes |
| 2. | chambre | × | Masculine | yes |
| 3. | voiture | × | Masculine | yes |
| 4. | cuilliere | × | Masculine | yes |
| 5. | chevre | × | Masculine | yes |

iii. morphological rule:

Table 27

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | cordonnier | √ | Masculine | yes |
| 2. | pompier | √ | Masculine | yes |
| 3. | fermier | √ | Masculine | yes |
| 4. | tablier | √ | Masculine | yes |
| 5. | sanglier | √ | Masculine | yes |
| 6. | postier | √ | Masculine | yes |
| 7. | policier | √ | Masculine | yes |
| 8. | patissier | √ | Masculine | yes |
| 9. | cahier | √ | Masculine | yes |
| 10. | coquetier | √ | Masculine | yes |

2. Feminine ‘La’

i. no rule:

Table 28

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | douche | × | Masculine | yes |
| 2. | fille | × | Masculine | yes |
| 3. | vache | × | Masculine | yes |
| 4. | maison | × | Masculine | yes |
| 5. | balle | × | Masculine | yes |
| 6. | lune | × | Masculine | yes |
| 7. | table | √ | Feminine | yes |
| 8. | souris | × | Masculine | yes |
| 9. | banane | × | Masculine | yes |
| 10. | bouche | × | Masculine | yes |

ii. phonological rule /-z/:

Table 29

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | chaise | × | Masculine | yes |
| 2. | prise | × | Masculine | yes |
| 3. | chemise | × | Masculine | yes |
| 4. | valise | × | Masculine | yes |
| 5. | cerise | × | Masculine | yes |
| 6. | framboise | × | Masculine | yes |
| 7. | rose | × | Masculine | yes |
| 8. | punaise | -- | -- | no |
| 9. | blouse | × | Masculine | yes |
| 10. | fallaise | × | Masculine | yes |

iii. morphological rule [-ette]:

Table 30

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | baguette | × | Masculine | yes |
| 2. | trotinette | × | Masculine | yes |
| 3. | bicyclette | × | Masculine | yes |
| 4. | fourchette | × | Masculine | yes |
| 5. | chouette | × | Masculine | yes |
| 6. | chaussette | √ | Feminine | yes |
| 7. | trompette | × | Masculine | yes |
| 8. | cotelette | × | Masculine | yes |
| 9. | poussette | × | Masculine | yes |
| 10. | mouette | × | Masculine | yes |

**3. German**

*Session I – Total of tested nouns: 95*

1. Masculine ‘Der’

i. no rule:

Table 31

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Sand | √ | Masculine | yes |
| 2. | Baum | √ | Masculine | yes |
| 3. | Mond | √ | Masculine | yes |
| 4. | Hut | √ | Masculine | yes |
| 5. | Pinsel | √ | Masculine | yes |
| 6. | Fuss | √ | Masculine | yes |
| 7. | Schneemann | √ | Masculine | yes |
| 8. | Schmetterling | √ | Masculine | yes |
| 9. | Besen | √ | Masculine | yes |
| 10. | Esel | √ | Masculine | yes |

ii. phonological rule:

Table 32

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Fels | √ | Masculine | yes |
| 2. | Hals | √ | Masculine | yes |
| 3. | Krebs | √ | Masculine | yes |
| 4. | Spatz | √ | Masculine | yes |
| 5. | Pilz | √ | Masculine | yes |
| 6. | Schwanz | √ | Masculine | yes |
| 7. | Keks | √ | Masculine | yes |
| 8. | Mops | √ | Masculine | yes |
| 9. | Sitz | -- | -- | no |
| 10. | Blitz | √ | Masculine | yes |

Exceptions:

Table 33

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Holz | × | Masculine | yes |
| 2. | Herz | × | Masculine | yes |
| 3. | Gans | × | Masculine | yes |
| 4. | Box | × | Masculine | yes |
| 5. | Netz | × | Masculine | yes |

iii. morphological rule:

Table 34

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Räuber | √ | Masculine | yes |
| 2. | Hörer | √ | Masculine | yes |
| 3. | Spitzer | √ | Masculine | yes |
| 4. | Helikopter | √ | Masculine | yes |
| 5. | Hocker | √ | Masculine | yes |
| 6. | Anhänger | √ | Masculine | yes |
| 7. | Fernseher | √ | Masculine | yes |
| 8. | Bäcker | √ | Masculine | yes |
| 9. | Taucher | √ | Masculine | yes |
| 10. | Reiter | √ | Masculine | yes |

Exceptions:

Table 35

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Feder | √ | Feminine | yes |
| 2. | Leiter | × | Masculine | yes |
| 3. | Butter | × | Masculine | yes |
| 4. | Messer | × | Masculine | yes |
| 5. | Feuer | -- | -- | -- |

2. Feminine ‘Die’

i. no rule:

Table 36

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Klingel | -- | -- | no |
| 2. | Klammer | -- | -- | no |
| 3. | Mauer | × | Masculine | yes |
| 4. | Hand | √ | Feminine | yes |
| 5. | Feder | -- | -- | no |
| 6. | Bank | × | Masculine | yes |
| 7. | Heizung | × | Masculine | yes |
| 8. | Nacht | -- | -- | no |
| 9. | Kuh | √ | Feminine | yes |
| 10. | Feuerwehr | × | Masculine | yes |

ii. phonological rule:

Table 37

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Fliege | √ | Feminine | yes |
| 2. | Wolke | √ | Feminine | yes |
| 3. | Schere | √ | Feminine | yes |
| 4. | Vase | -- | -- | no |
| 5. | Blume | √ | Feminine | yes |
| 6. | Nase | √ | Feminine | yes |
| 7. | Kasse | -- | -- | no |
| 8. | Katze | √ | Feminine | yes |
| 9. | Hexe | √ | Feminine | yes |
| 10. | Biene | √ | Feminine | yes |

Exceptions:

Table 38

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Affe | √ | Masculine | yes |
| 2. | Löwe | √ | Masculine | yes |
| 3. | Hase | √ | Masculine | yes |
| 4. | Käse | -- | -- | no |
| 5. | Auge | × | Masculine | yes |

iii. morphological rule:

Table 39

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Bäckerin | √ | Feminine | yes |
| 2. | Verkäuferin | √ | Feminine | yes |
| 3. | Königin | × | Masculine | yes |
| 4. | Prinzessin | √ | Feminine | yes |
| 5. | Freundin | √ | Feminine | yes |
| 6. | Schwimmerin | × | Masculine | yes |
| 7. | Lehrerin | × | Masculine | yes |
| 8. | Musikerin | -- | -- | no |
| 9. | Bäuerin | √ | Feminine | yes |
| 10. | Fahrerin | √ | Feminine | yes |

3. Neuter ‘Das’

i. no rule:

Table 40

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Geld | × | Masculine | yes |
| 2. | Paket | × | Masculine | yes |
| 3. | Baby | × | Masculine | yes |
| 4. | Boot | × | Masculine | yes |
| 5. | Telefon | √ | Neuter | yes |
| 6. | Sofa | -- | -- | no |
| 7. | Fenster | × | Masculine | yes |
| 8. | Klavier | -- | -- | no |
| 9. | Pflaster | × | Masculine | yes |
| 10. | Dreirad | × | Masculine | yes |

ii. morphological rule [-chen]:

Table 41

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Häschen | × | Masculine | yes |
| 2. | Würstchen | -- | -- | no |
| 3. | Bienchen | × | Masculine | yes |
| 4. | Pferdchen | × | Masculine | yes |
| 5. | Brötchen | √ | Neuter | yes |
| 6. | Mäuschen | √ | Neuter | yes |
| 7. | Köpfchen | × | Masculine | yes |
| 8. | Blümchen | × | Masculine | yes |
| 9. | Bettchen | × | Masculine | yes |
| 10. | Entchen | × | Masculine | yes |

*Session II – Total of tested nouns: 95*

1. Masculine ‘Der’

i. no rule:

Table 42

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Sand | √ | Masculine | yes |
| 2. | Baum | √ | Masculine | yes |
| 3. | Mond | √ | Masculine | yes |
| 4. | Hut | √ | Masculine | yes |
| 5. | Apfel | √ | Masculine | yes |
| 6. | Pinguin | √ | Masculine | yes |
| 7. | Bär | √ | Masculine | yes |
| 8. | Schüssel | √ | Masculine | yes |
| 9. | Fisch | √ | Masculine | yes |
| 10. | Bus | √ | Masculine | yes |

ii. phonological rule:

Table 43

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Hals | √ | Masculine | yes |
| 2. | Fels | √ | Masculine | yes |
| 3. | Pils | √ | Masculine | yes |
| 4. | Spatz | √ | Masculine | yes |
| 5. | Prinz | √ | Masculine | yes |
| 6. | Fuchs | √ | Masculine | yes |
| 7. | Dachs | √ | Masculine | yes |
| 8. | Pelz | √ | Masculine | yes |
| 9. | Schlips | √ | Masculine | yes |
| 10. | Klecks | √ | Masculine | yes |

Exceptions:

Table 44

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Holz | × | Masculine | yes |
| 2. | Herz | × | Masculine | yes |
| 3. | Gans | √ | Feminine | yes |
| 4. | Box | × | Masculine | yes |
| 5. | Netz | × | Masculine | yes |

iii. morphological rule:

Table 45

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Räuber | √ | Masculine | yes |
| 2. | Hörer | √ | Masculine | yes |
| 3. | Spitzer | √ | Masculine | yes |
| 4. | Fernseher | √ | Masculine | yes |
| 5. | Blinker | -- | -- | no |
| 6. | Roller | √ | Masculine | yes |
| 7. | Donner | √ | Masculine | yes |
| 8. | Schläger | √ | Masculine | yes |
| 9. | Stecker | √ | Masculine | yes |
| 10. | Bauer | √ | Masculine | yes |

Exceptions:

Table 46

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Feder | √ | Feminine | yes |
| 2. | Leiter | × | Masculine | yes |
| 3. | Butter | × | Masculine | yes |
| 4. | Messer | × | Masculine | yes |
| 5. | Feuer | × | Masculine | yes |

2. Feminine ‘Die’

i. no rule:

Table 47

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Klingel | √ | Feminine | yes |
| 2. | Kuh | √ | Feminine | yes |
| 3. | Bank | × | Masculine | yes |
| 4. | Tafel | × | Masculine | yes |
| 5. | Tür | × | Masculine | yes |
| 6. | Axt | × | Masculine | yes |
| 7. | Brezel | -- | -- | no |
| 8. | Schüssel | × | Masculine | yes |
| 9. | Heizung | × | Masculine | yes |
| 10. | Insel | × | Masculine | yes |

ii. phonological rule:

Table 48

| No. | Target | Gender Correct (√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Fliege | √ | Feminine | yes |
| 2. | Wolke | √ | Feminine | yes |
| 3. | Glocke | × | Masculine | yes |
| 4. | Schere | √ | Feminine | yes |
| 5. | Flasche | √ | Feminine | yes |
| 6. | Lampe | √ | Feminine | yes |
| 7. | Eule | × | Masculine | yes |
| 8. | Dusche | √ | Feminine | yes |
| 9. | Karotte | × | Masculine | yes |
| 10. | Kette | × | Masculine | yes |

Exceptions:

Table 49

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Affe | √ | Masculine | yes |
| 2. | Löwe | √ | Masculine | yes |
| 3. | Hase | × | Neuter | yes |
| 4. | Käse | √ | Masculine | yes |
| 5. | Auge | × | Masculine | yes |

iii. morphological rule:

Table 50

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Bäckerin | √ | Feminine | yes |
| 2. | Bäuerin | × | Masculine | yes |
| 3. | Königin | × | Masculine | yes |
| 4. | Freundin | √ | Feminine | yes |
| 5. | Zwergin | × | Masculine | yes |
| 6. | Prinzessin | √ | Feminine | yes |
| 7. | Hündin | × | Masculine | yes |
| 8. | Köchin | × | Masculine | yes |
| 9. | Löwin | × | Masculine | yes |
| 10. | Sängerin | √ | Feminine | yes |

3. Neuter ‘Das’

i. no rule:

Table 51

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Geld | √ | Neuter | yes |
| 2. | Paket | × | Masculine | yes |
| 3. | Sofa | × | Masculine | yes |
| 4. | Küken | × | Feminine | yes |
| 5. | Boot | × | Masculine | yes |
| 6. | Schloss | × | Masculine | yes |
| 7. | Gras | × | Masculine | yes |
| 8. | Hemd | × | Masculine | yes |
| 9. | Auto | × | Masculine | yes |
| 10. | Buch | × | Masculine | yes |

ii. morphological rule [-chen]:

Table 52

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Häschen | × | Masculine | yes |
| 2. | Schiffchen | × | Masculine | yes |
| 3. | Blümchen | × | Masculine | yes |
| 4. | Entchen | × | Masculine | yes |
| 5. | Schirmchen | × | Masculine | yes |
| 6. | Mädchen | × | Masculine | yes |
| 7. | Würstchen | × | Masculine | yes |
| 8. | Häuschen | × | Masculine | yes |
| 9. | Eimerchen | × | Masculine | yes |
| 10. | Gläschen | × | Masculine | yes |

*Session III – Total of tested nouns: 95*

1. Masculine ‘Der’

i. no rule:

Table 53

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Sand | √ | Masculine | yes |
| 2. | Baum | √ | Masculine | yes |
| 3. | Mond | √ | Masculine | yes |
| 4. | Hut | √ | Masculine | yes |
| 5. | Kopf | √ | Masculine | yes |
| 6. | Elefant | √ | Masculine | yes |
| 7. | Kuchen | √ | Masculine | yes |
| 8. | Stuhl | √ | Masculine | yes |
| 9. | Schirm | √ | Masculine | yes |
| 10. | König | √ | Masculine | yes |

ii. phonological rule:

Table 54

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Spatz | √ | Masculine | yes |
| 2. | Hals | √ | Masculine | yes |
| 3. | Fels | √ | Masculine | yes |
| 4. | Pilz | √ | Masculine | yes |
| 5. | Filz | √ | Masculine | yes |
| 6. | Kranz | -- | -- | no |
| 7. | Schatz | √ | Masculine | yes |
| 8. | Gips | √ | Masculine | yes |
| 9. | Klotz | √ | Masculine | yes |
| 10. | Kleks | -- | -- | no |

Exceptions:

Table 55

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Holz | -- | -- | no |
| 2. | Herz | × | Masculine | yes |
| 3. | Gans | × | Masculine | yes |
| 4. | Box | × | Masculine | yes |
| 5. | Netz | × | Masculine | yes |

iii. morphological rule:

Table 56

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Räuber | √ | Masculine | yes |
| 2. | Hörer | √ | Masculine | yes |
| 3. | Spitzer | √ | Masculine | yes |
| 4. | Fernseher | √ | Masculine | yes |
| 5. | Fahrer | √ | Masculine | yes |
| 6. | Jäger | √ | Masculine | yes |
| 7. | Roboter | √ | Masculine | yes |
| 8. | Locher | √ | Masculine | yes |
| 9. | Lutscher | √ | Masculine | yes |
| 10. | Wecker | √ | Masculine | yes |

Exceptions:

Table 57

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Feder | × | Masculine | yes |
| 2. | Leiter | × | Masculine | yes |
| 3. | Butter | × | Masculine | yes |
| 4. | Messer | × | Masculine | yes |
| 5. | Feuer | × | Masculine | yes |

2. Feminine ‘Die’

i. no rule:

Table 58

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Klingel | √ | Feminine | yes |
| 2. | Kuh | √ | Feminine | yes |
| 3. | Bank | × | Masculine | yes |
| 4. | Heizung | × | Masculine | yes |
| 5. | Gabel | √ | Feminine | yes |
| 6. | Wurst | × | Masculine | yes |
| 7. | Waffel | × | Masculine | yes |
| 8. | Zahl | × | Masculine | yes |
| 9. | Ampel | √ | Feminine | yes |
| 10. | Luft | × | Masculine | yes |

ii. phonological rule:

Table 59

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Wolke | × | Masculine | yes |
| 2. | Fliege | √ | Feminine | yes |
| 3. | Glocke | × | Masculine | yes |
| 4. | Schere | √ | Feminine | yes |
| 5. | Säge | × | Masculine | yes |
| 6. | Tasche | × | Masculine | yes |
| 7. | Hose | × | Masculine | yes |
| 8. | Kerze | × | Masculine | yes |
| 9. | Rutsche | √ | Feminine | yes |
| 10. | Ente | √ | Feminine | yes |

Exceptions:

Table 60

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Affe | √ | Masculine | yes |
| 2. | Löwe | √ | Masculine | yes |
| 3. | Hase | √ | Masculine | yes |
| 4. | Käse | √ | Masculine | yes |
| 5. | Auge | × | Masculine | yes |

iii. morphological rule:

Table 61

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Bäckerin | × | Masculine | yes |
| 2. | Bäuerin | × | Masculine | yes |
| 3. | Königin | × | Masculine | yes |
| 4. | Freundin | × | Masculine | yes |
| 5. | Chinesin | × | Masculine | yes |
| 6. | Gärtnerin | × | Masculine | yes |
| 7. | Reiterin | × | Masculine | yes |
| 8. | Schneiderin | × | Masculine | yes |
| 9. | Jägerin | × | Masculine | yes |
| 10. | Enkelin | × | Masculine | yes |

*3. Neuter 'Das'*

i. no rule:

Table 62

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Geld | × | Masculine | yes |
| 2. | Paket | × | Masculine | yes |
| 3. | Sofa | × | Masculine | yes |
| 4. | Boot | × | Masculine | yes |
| 5. | Schwein | × | Masculine | yes |
| 6. | Fleisch | × | Masculine | yes |
| 7. | Fahrrad | × | Masculine | yes |
| 8. | Blatt | × | Masculine | yes |
| 9. | Krokodil | × | Masculine | yes |
| 10. | Glas | × | Masculine | yes |

ii. morphological rule [-chen]:

Table 63

| No. | Target | Gender Correct(√)/ Incorrect (×) | Gender used | Determiner used |
|---|---|---|---|---|
| 1. | Häschen | × | Masculine | yes |
| 2. | Entchen | × | Masculine | yes |
| 3. | Blümchen | × | Masculine | yes |
| 4. | Würstchen | × | Masculine | yes |
| 5. | Säckchen | × | Masculine | yes |
| 6. | Vögelchen | × | Masculine | yes |
| 7. | Bäumchen | × | Masculine | yes |
| 8. | Tässchen | × | Masculine | yes |
| 9. | Stühlchen | × | Masculine | yes |
| 10. | Bällchen | × | Masculine | yes |

# Appendix B – Test Dates

| *Language* | *Date* | *Time/Duration* |
|---|---|---|
| *1. Dutch (each session = one test date)* | | |
| Session I | 17.06. | ca. 30 min (no breaks) |
| Session II | 09.07. | ca. 30 min (no breaks) |
| Session III | 29.07. | ca. 30 min (no breaks) |
| *2. German (each session = three subsequent test dates)* | | |
| Session I | 11./12./13.06. | each ca. 40 min (with small breaks of 3-5 minutes) |
| Session II | 02./03./04.07. | each ca. 40 min (with small breaks of 3-5 minutes) |
| Session III | 23./24./25.07. | each ca. 40 min (with small breaks of 3-5 minutes) |
| *3. French (each session = two subsequent test dates)* | | |
| Session I | 15.06./16.06. | each ca. 40 min (with small breaks of 3-5 minutes) |
| Session II | 05.07./06.07. | each ca. 40 min (with small breaks of 3-5 minutes) |
| Session III | 26.07./27.07. | each ca. 40 min (with small breaks of 3-5 minutes) |