Universiteit Leiden

Learning environments, learning strategies and finding regularities in second language inflectional morphology

Master Thesis

Name:	Claire Eline Veldhuizen
Student number:	
E-mail:	
Date:	1 June 2018
University:	Leiden University
Faculty:	Humanities
Department:	Linguistics
Specialization:	English Language and Linguistics
Supervisor:	Prof. J. Grijzenhout
Second reader:	Prof. M. G. Kossmann

Abstract

This study aims to gain an insight into the similarities and differences in the acquisition of foreign language morphology in secondary school learners with different native languages. To this aim, the linguistic behavior of English and Dutch students was examined in the context of the overgeneralization phenomenon and the dual-mechanism theory. The groups were asked to conjugate both existing and non-existing nouns and verbs in one or two of their foreign languages. The results show that overgeneralization plays a major role in the foreign language acquisition of both groups, particularly in irregular conjugation. However, with more target language experience, these errors dissipated, confirming a prediction based on the dual-mechanism theory. Moreover, the results show that the language learning environment had a major influence on the students' perception of foreign language learning strategies, which in turn affected their language use and behavior. The responses of the English students, who learned Dutch in a predominantly naturalistic learning environment, demonstrated spontaneous and intuitive language use. This contrasts with the responses of the Dutch students, who learned English in an institutional environment and showed forced, rule-based language use. These results are supported by findings in German, in which the Dutch students showed similar language behavior to English, despite the close genetic relationship between German and Dutch.

Acknowledgements

First, I would like to thank my supervisor Prof. Grijzenhout for the guidance, encouragement and invaluable advice provided throughout this process. Whilst she let me undertake this project independently, she was consistently willing to evaluate my work and offer her perspective on the topic, which has truly inspired me. Additionally, I would also like to take this opportunity to thank Prof. Kossmann for taking the time to be my second reader.

Furthermore, I would like to express my gratitude to the two schools that agreed to participate in this study. Without the cooperation and enthusiasm of the students, this research could not have been conducted successfully. I would like to thank Wendy Lahy-Neary from the *International School of The Hague* and Tim den Hollander from *Gymnasium Haganum* in particular for providing me with this opportunity and for assisting me during my data collection in their classes.

Table of contents

List of tables and abbreviations

Tables

Abbreviations

L1	First language
L2	Second language
EN	English
NL	Dutch
GER	German
G1	Group 1
G2	Group 2

1. Introduction

This thesis presents a cross-sectional study investigating the similarities and differences in the acquisition of foreign language inflectional morphology between English and Dutch students. The research questions described below are discussed in the context of the overgeneralization phenomenon and the dual-mechanism theory.

Whilst numerous studies have described the relation between overgeneralization and first language (L1) acquisition, there is a relative lack of contemporary literature investigating the importance of the phenomenon in second language (L2) learners. Though L2 acquisition has increasingly been the subject of research, studies specifically investigating the acquisition of foreign language morphology have to date been less extensive. Indeed, Lowie (1998) confirms this, stating that "little or no work has yet been dedicated to the role of morphology in the bilingual mental lexicon" (p.104).

Furthermore, the dual-mechanism theory of language acquisition has been predominantly applied to L1 learners. This thesis intends to show that the dual-mechanism theory can at least in part be applied to L2 learners. Moreover, whilst the original dual-mechanism theory was based on the German language, less research has been conducted in English and Dutch.

To this aim, a group of English students and a group of Dutch students will be asked to conjugate both existing and non-existing nouns and verbs in one or more of their foreign languages. Their responses will be analyzed according to the following research questions:

RESEARCH QUESTION 1:

> What are the similarities and differences in the formation of English and Dutch inflection by secondary school students with different mother tongues?

RESEARCH QUESTION 2:

> To what extent does overgeneralization play a role in the acquisition of inflectional morphology in secondary school students?

RESEARCH QUESTION 3:

> Does the dual-mechanism theory make correct predictions regarding the acquisition of English and Dutch inflection by L2 learners?

This thesis consists of six chapters. Following the introduction (**Chapter 1**), **Chapter 2** will review the relevant literature and state the research questions and hypotheses. **Chapter 3** will discuss the methodology, including the study design and procedures followed. The qualitative and quantitative results of the data will be described in **Chapter 4**. **Chapter 5** will discuss these results in the context of the current literature. Lastly, **Chapter 6** puts forward the conclusion of the study.

2. Literature review

2.1 Overview

This section discusses the relevant literature for this study. Firstly, the phenomenon of overgeneralization will be considered, after which the dual-mechanism theory will be described in relation to this study. Subsequently, the acquisition of English, Dutch and German inflectional morphology will be discussed. Lastly, the topics interlanguage and learning environments will be reviewed.

2.2 Overgeneralization

Overgeneralization is a phenomenon that has been shown to play a major role in numerous fields of research, including psychology and linguistics. Ezeanu (2013) determines overgeneralization to be an extension of the human tendency to generalize, described by the author as "the process of extending the characteristics of a number of elements from a group or class to the entire group" (Ezeanu, 2013). Overgeneralization, then, can be described as generalization to an extent that is beyond reasonable or not appropriate. For example, in the field of mathematics, Villarreal, Esteley, & Alagia (2010) showed that some undergraduate mathematics students used linear models in contexts that were non-linear, which they described as "overgeneralization of linear models". In other words, the students used models in a context where it was inappropriate. Furthermore, in another study examining mathematical overgeneralization, Van Dooren, De Bock, Hessels, Janssens, & Verschaffel (2005) found that age does not affect the extent of the overgeneralization. Whilst occurrences of overgeneralization increased from Grade 2 until Grade 5, Grade 8 students were also still found to be subject to overgeneralization. This contrasts with studies that are reviewed in the following section, which argue that age and overgeneralization *are* related. Additionally, the next section describes linguistic overgeneralization and shows examples of overgeneralization in a linguistic context.

2.2.1 Definition of linguistic overgeneralization

Linguistic overgeneralization can be considered to occur when any person uses a grammatical rule in a linguistic context where it is not appropriate. The following is an example of linguistic overgeneralization:

(1) *We holded the baby rabbit (Pinker, 1995)

In (1), the irregular verb *to hold* is incorrectly conjugated by adding the past tense marker (-ed) to the verb, which is the standard rule for regular verb inflection. However, the past tense of the irregular verb *to hold* is an exception to this rule (*held).* The application of a grammatical rule to form the past tense of a verb where it is not applicable means the rule has been overgeneralized. Whilst this is a generally accepted explanation of this phenomenon, the univocal definition of overgeneralization within relevant literature varies, especially regarding the age group this term is used with.

Whilst overgeneralization has become a well-known concept in language development research, previous studies have focused on the domain of L1 acquisition in particular. Al-Baldawi and Saidat (2011) note that overgeneralization is "a systematic way that *children* [emphasis added] create and unconsciously use" (p. 185), emphasizing the use of linguistic overgeneralization in young L1 learners. Similarly, Kuczaj (1977) analyzed overgeneralization errors in the acquisition of the regular and irregular past tense in children.

The abundance of research on overgeneralization in L1 learners shows the origin of this association. Another example is the study by Allendorff & Wode (1981), who examined the overgeneralization errors in the L1 acquisition of interrogative pronouns in German. The study does not take into account L2 learners, as "the semantic range of the L2 learner […] is much wider than in L1" (p. 31). Felix (1976, as cited in Allendorff & Wode, 1981) names this phenomenon "semantic overextension" and it occurs when an L2 learner uses one word to give meaning to numerous different things, but which is inconsistent with native or experienced speakers' usage. However, this does not merely occur in L2 speakers, as (2) is an example which is likely to be from an L1 learner.

(2) Look at that big ball in the sky!

In (2), the moon is identified as a "big ball" because of the lack of vocabulary to call it 'moon'. This example is frequently associated with L1 learners; L2 learners understand that there is a

separate word for moon but may have inadequate vocabulary to call it ‘moon’ in English. L1 learners, however, may overgeneralize all round things to be a ball, and consequently call the moon ‘a big ball’. The following is an example of semantic overextension in L2 learners:

(3) Black raspberries are my favorite fruit

This is likely to be an example of an L2 learner identifying a blackberry as a black raspberry because they lack the vocabulary to call it a blackberry. In both (2) and (3), the speaker’s vocabulary is inadequate and consequently, they are not able to name the object by its conventional name. The examples also show that some language acquisition phenomena occur in both L1 and L2 acquisition, and that they are not always mutually exclusive.

Therefore, the linguistic definition of overgeneralization begins when a learner or speaker of a language, and not merely “a child”, as Ambridge, Pine, Rowland, Chang & Bidgood (2013) and others argue, “extends a particular word to other referents that share some visual or conceptual similarity” (p. 48). Hence, overgeneralization should not be limited to L1 acquisition. An overgeneralization error such as (1), where the speaker not only lacks the knowledge of exceptions to the grammar rules but also has an inadequate retrieval ability, is likely to come from an L1 speaker who is unaware of the fact that the verb *to hold* has an irregular past tense. However, an example such as (4) is more likely to represent an L2 learner’s overgeneralization error.

(4) *The farmer has many sheeps

In (4), the speaker adds the plural marker (-s) to the noun *sheep*, possibly because they rely on another language in which the plural of sheep is formed by adding a plural marker and they have not yet learned the exceptions to the rule that in English, an (-s) is added to form the plural of a noun. This is different to example (1) because L1 learners do not have a fully developed linguistic system to rely on, neither have they been explicitly instructed to ‘add an (-s) to a noun to form the plural’. A 2011 study by Harakchiyska is one of the few studies taking into account L2 learners and overgeneralization, as it considers both L1 and L2 learners and argues that overgeneralization “allows the [L1 and L2] learners to make a learning task more manageable [...] by extending a language rule to linguistic norms where it is not appropriate” (p. 116). The study demonstrates that it is important to understand that overgeneralization does not dissipate with age, but rather is related to the process of learning, in this case, a new language. A child takes part in this learning process, but an adolescent or adult learning a foreign language also takes part in this process. Although to a lesser extent, native speaker adults are also in a

continuous language learning process, as suggested by Marcus (2000), who claims that native speaker adults also overgeneralize linguistically. Therefore, overgeneralization is not an issue to be disregarded in the process of L2 acquisition. In fact, it shows the progress of the learner: overgeneralization shows that the learner has mastered a rule of the target language, yet still needs to learn the exceptions to that rule. Therefore, rather than relating overgeneralization to age, it should be related to the learning process. The theory behind this language learning process will be explained in the next section.

2.3 The dual-mechanism theory

The dual-mechanism theory is a language acquisition theory summarized by Pinker in his book *Words and Rules* (1999). A response to the traditional generative theory and connectionism, the dual-mechanism theory states that in morphology, regular inflection is achieved by means of a default rule, whereas irregular inflection is memorized in the mental lexicon. More specifically, the theory argues that there is one single default affix to form the regular plural in a language and one single default affix to form the regular past tense in a language. This default is applied to words where no exception applies. However, L2 learners with little language experience may not always know there is an exception to a word and may consequently apply the default in a context where it is not appropriate.

Whereas the majority of English plurals and past tense verbs are indeed formed by what appears to be a default rule, demonstrated in (5) and (6), "frequency is not a deciding factor for default selection" (Van Wijk, 2007, p. 1). Instead, the crucial criterion for a default affix is the diversity of types an affix attaches to.

(5) Regular plural inflection: add plural morpheme (-s), e.g. bird – birds
(6) Regular past tense inflection: add past tense morpheme (-ed), e.g. to walk – walked

Marcus et al. (1995, as cited in Van Wijk, 2007) selected the diversity of types an affix can attach to in order to be considered a default affix. These types include, among others, non-existing words, loanwords, acronyms and names, such as those shown in **table 1**.

Table 1: The diversity of types a default affix attaches to *(Van Wijk, 2007)*

Non-existing word	Wugs
Loanword	Cappuccinos
Acronyms	PCs
Names	The Johnsons

However, not all nouns receive an (-s) to form the plural. Some may undergo vowel change, stay unmarked or keep the plural of the original language, as shown in (7), (8) and (9). These conjugations are irregular and according to Pinker's theory, they are stored in the mental lexicon.

(7) Vowel change: tooth – teeth
(8) Unmarked: sheep – sheep
(9) Original plural: bacterium – bacteria

The same applies to the past tense inflection of verbs in English. Irregular verbs can be formed by undergoing vowel change, staying unmarked or through a more complex transformation, such as in (10), (11) and (12). These conjugations are irregular, and they are also stored in the mental lexicon. In other words, they do not employ a set of rules such as regular inflected words do.

(10) Vowel change: run – ran
(11) Unmarked: cost – cost
(12) Complex transformation: catch – caught

The dual-mechanism theory is supported by the fact that "different parts of the brain are involved to different extents when people process regular and irregular inflections" (Pinker, 1997, p. 547). This was confirmed by Ullman et al. in a 1997 study in which patients with damage to the left anterior cortex of the brain found it more difficult to inflect regular and non-existing words than irregular verbs. However, patients with damage to the left temporal lobe found it more difficult to inflect irregular verbs, showing that brain damage in either area can cause difficulties producing regular or irregular conjugations depending on which area is damaged.

Pinker and Ullman (2002) move on to defend the dual-mechanism theory with a study in which they confirm Pinker's earlier claim that "people seldom generalize irregular patterns to a new verb" (Pinker S. , 1997, p. 547). They argue that with new or non-existing irregular verbs, people do not generalize their conjugation to stay irregular, but rather overgeneralize it, so that it becomes a regular. Examples of this are shown in (13) and (14).

(13) Non-existing noun *fouse* is not generalized to become *fice,* but instead it is overgeneralized to become *fouses*

(14) Non-existing verb *bing* is not generalized to become *bang,* but instead it is overgeneralized to become *binged*

This means that when people are not able to predict the inflection of a new or non-existing word with irregular features, they will be unable to apply the 'correct rule' to a word. Therefore, they overgeneralize by applying the only 'default' rule that they know to the irregular word to regularize it. This suggests that there are no standard rules that are able to generate irregular inflection and, thus, they must be stored in the mental lexicon.

Further evidence for the dual-mechanism theory is found in a study conducted by Marcus, Pinker, Ullman, Hollander, Rosen and Xu (1992). In this study, data was collected from the CHILDES database (a collection of computerized transcripts of children's conversations (MacWhinney & Snow, 1985)), which included the past tense forms used by 83 children between the ages of 1 and 6 years. They found that children rarely overgeneralize and concluded that the errors they do make stem from a performance error rather than a qualitative grammatical reorganization. They argue that overgeneralization is a result of memory failure, with low frequency verbs being overgeneralized more often than high frequency verbs. The same is confirmed by Pinker (1999), who argued that 95% of children's irregular past tense forms are correct. However, because children have less experience with language than adults, their memory trace is weaker. Consequently, they are not always able to retrieve the irregular past tense form reliably and they will be less confident in doing so. Moreover, Marcus (2000) found that even native speaker adults overgeneralize "once in every 25,000 opportunities (Stemberger, 1989 as cited in Marcus et al., 1992)". However, the gradual decline in frequency of adult overgeneralization is "consistent with a gradually increasing memory trace for irregulars" (p. 158), confirming the irregular conjugations are stored in the mental lexicon and that with more language experience, it becomes easier to retrieve these.

Whereas many studies providing evidence for the dual-mechanism theory focus on children and L1 acquisition, this study will look at L2 learners and their ability to conjugate non-existing words with irregular features. L2 learners are similar to L1 learners with respect to having little experience with the target language and not being familiar with certain forms or conjugations of words. However, their command of an L1 allows them to make linguistic decisions based on, for example, their interlanguage. The decisions differ from those made by L1 learners because these learners have no linguistic system to rely on. **Table 2** shows a comparison between L1 and L2 acquisition (Ellis, 1994).

Table 2: A Comparison between L1 and L2 acquisition (Ellis, 1994)

Feature	L1 acquisition	L2 acquisition
Overall success	Children normally achieve perfect L1 mastery	Adult L2 learners are unlikely to achieve perfect L2 mastery
General failure	Success guaranteed	Complete success rare
Variation	Little variation in degree of success or route	L2 learners vary in overall success and route
Goals	Target language competence	L2 leaners may be content with less than target language competence or more concerned with fluency than accuracy
Fossilization	Unknown	Common, plus backsliding (i.e. return to earlier stages of development)
Intuitions	Children develop clear intuitions about correctness	L2 learners are often unable to form clear grammaticality judgements
Instruction	Not needed	Helpful or necessary
Negative evidence	Correction not found and not necessary	Correction generally helpful or necessary
Affective factors	Not involved	These play a major role in determining proficiency

Table 2 shows that the process of L2 acquisition is very variable and under the influence of multiple factors. This study will examine two predictions from the dual-mechanism theory and determine whether they also apply to L2 learners and their acquisition of one or more foreign languages. The predictions that will be tested in this study are the following:

1. L2 learners will not generalize irregular patterns of non-existing words.
2. Irregular words are stored in the mental lexicon and the retrieval ability of L2 learners will improve with increasing experience with the target language.

2.4 The acquisition of inflectional morphology

Early research on the acquisition of inflectional morphology was carried out Berko (1958), who introduced the WUG-test as an instrument to test L1 children's knowledge of morphological rules. Furthermore, Cazden (1968) provided the first inflectional analysis in L1 learners, a study that was completed by Brown (1973). The results of his analysis, which examined the order of morpheme acquisition in children, proved vital for future research in this domain, with his "stages of syntactic and morphological development" significantly influencing subsequent studies on morphology acquisition. Furthermore, early research on the acquisition of morphology predominantly focused on L1 learners, whereas recent decades have brought forward additional research on L2 language and morphology acquisition, especially inflectional morphology (Hopp (2012), Bliss (2006), Salaberry & Shirai (2002), Salaberry (1998)).

The principles of transparency, contrast and conventionality are essential in both L1 and L2 morphology acquisition (Lowie, 1998). However, in L2 acquisition, the learner's native language, and therefore their interlanguage, also has a major influence on the development of morphology. Other variables including language exposure, teaching hours and the learning environment (discussed in section 2.6) are additional influences in L2 acquisition. Taking these variables into account, Lowie (1998) argues that the acquisition of morphology in L2 learners shows similar patterns as the process of development in L1 learners. Tasseva-Kurktchieva (2008) supports this, stating that "adult L2 acquisition is more similar than distant from child L1 acquisition" (p. 249).

2.4.1 WUG-test

The WUG-test is an instrument used to test children's linguistic knowledge. It was developed by Berko (1958) in the study *The Child's Learning of English Morphology*. It consists of a series of existing and non-existing words to test children's "use of morphological rules of different types of and under varying phonological conditions" (Berko, 1958, p. 153). An

example is shown in **figure 1**, where children are asked to complete the sentence by conjugating the noun.

Figure 1: Example of the WUG-test (Berko, 1958)

The WUG-test helps elicit productions of several grammatical categories (plural, past tense, possessive) from the learners in order to understand the linguistic knowledge held by children. In the current study, however, the WUG-test is used as an inspiration for the creation of word lists containing non-existing words in three languages as well as to interpret the linguistic understanding of L2 adolescents. Berko's argument that if learners are able to correctly conjugate the word *witch* (plural: witches), they will produce a similar conjugation to a non-existing word with a comparable ending, such as *gutch* (potential plural: gutches) will be examined in the present study. A description of the plural and past tense formations in English, Dutch and German is given in the next section.

2.4.2 English inflection

Regular plural formation in English consists of adding the suffix (-s) to a noun. This plural morpheme has three different phonological realizations (Bauer, 1983):

1. /-ɪz/ after sibilant consonants (i.e. /s z ʃ ʒ tʃ dʒ/), e.g. case – cases, witch – witches
2. /-s/ after any other voiceless obstruent, e.g. roof – roofs, kick – kicks
3. /z/ everywhere else, e.g. mug – mugs, table – tables

Irregular plural formation in English does not employ a set of rules as regular plural formation does. Instead, it is argued in Pinker's dual-mechanism theory that all irregular plurals are memorized in the mental lexicon. Therefore, English irregular plural nouns can merely be classified into categories that show similar patterns in the formation of the plural:

1. Mass nouns do not have a plural, e.g. hair, milk
2. Unmarked nouns have the same plural form as singular form, e.g. fish, sheep
3. Nouns that change vowels to produce a plural, e.g. mouse – mice, man – men
4. Loanwords that use the original plural, e.g. bacterium – bacteria, crisis – crises

Research that has been conducted on this topic include a study by Natalicio & Natalicio (1971), who also recognized that "[English noun plurals] have been extensively examined by earlier researchers […] among native English-speaking samples" (p. 1303). The study compares the acquisition of the English plural by native English speakers to native Spanish speakers. Similar research was conducted by Jia (2003) who examined the acquisition of the English plural morpheme by native Mandarin Chinese-speaking children. The study aimed to describe the similarities and differences between L1 and L2 English plural morpheme acquisition, finding that L2 learners "more frequently marked the same noun inconsistently in the same testing session, and were more likely to overgeneralize the plural morpheme in singular or mass noun contexts" (p. 1). Finally, Song (2015) investigated "whether late second language […] learners can attain native-like knowledge of English plural inflection" (p. 1), finding that learners of English, although sensitive to plural errors, are able to eventually achieve "target-like L2 inflection knowledge" (p. 1).

Whilst examining regular-irregular dissociations in L2 acquisition of English morphology, Birdsong & Flege (2001) acknowledge the dual-mechanism theory, stating that "under the dual-mechanism model […], computation of regular verb past tense is a matter of rule-based, or symbolic, processing, and knowledge of irregular pasts involves access to individual lexical items that are stored in associative memory, and whose representation is sensitive to the frequency of the item" (p. 123). This demonstrates that the formation of the regular past tense in English is similar to regular plural formation and is formed by adding the suffix (-ed) to a verb. This past tense morpheme has three different phonological realizations:

1. /-t/ after all voiceless sounds except /t/, e.g. bake – baked
2. /-d/ after all voiced sounds except /d/, e.g. pray – prayed
3. /-ɪd/ after voiced or voiceless alveolar plosives /d t/, e.g. melt – melted, nod – nodded

Similarly, the irregular past tense does not employ a set of rules but is instead part of the mental lexicon. Therefore, the past tense verbs can merely be classified into categories that show similar patterns in the conjugation of these verbs. These categories include:

1. Unmarked verbs have the same present tense form as past tense form, e.g. put – put
2. Verbs that undergo a vowel change to produce the past tense, e.g. run – ran
3. Verbs that undergo a more complex transformation, e.g. catch – caught

Birdsong & Flege (2001) compared the acquisition of the English plural and past tense by native English speakers to L2 learners of English with Korean and Spanish mother tongues.

2.4.3 Dutch inflection

Regular plural formation in Dutch consists of adding the suffixes (-s) or (-en) to a noun. Dutch plural forms have the following general distribution (De Haas & Trommelen, 1993):

1. /-ən/ after stems ending in
    - /p t k f s g/, e.g. boot – boten, vis – vissen;
    - /ɛi œy ʌu aːi oːi ui eːu iu yu/, e.g. leeuw – leeuwen, trui – truien;
    - /œɬ ɪːɬ aɬ ɔːɬ oːn aːn aːm oːm ɪːɪ aːɪ yɪ ɛɪn ɛɪm/, e.g. raam–ramen, kuil – kuilen
2. /-ən/ after monosyllabic nouns ending in /ɑɬ ɪɬ ɛm ɔm ɛn ɪn ɑɪ ɑŋ ɪŋ/, e.g. rang – rangen

3. /-s/ after stems ending in
    - /eː ø y i aː oː u/, e.g. toffee – toffees, ruzie – ruzies;
    - /əɬ əm ən əɪ/, e.g. lepel – lepels, haven – havens;
    - /ʌɬ ɑɬ ɪm ɔm ɔn ɑn ɔn ɔŋ ɑŋ ɑɪ/, e.g. marathon – marathons, nectar – nectars

Whilst the plural markers (-s) and (-en) are productive, the alternative plural marker (-eren) is "unproductive and restricted to some 15 nouns only" (Baayen, Dijkstra, & Schreuder, 1997, p. 99). Therefore, this ending was not considered in the current study.

Irregular plural formation in Dutch does not follow a set of rules as regular plural formation does. As with English irregular plural formation, Dutch irregular plurals can be classified into categories that show similar patterns in the formation of the plural:

1. Nouns with a short vowel that change to a long vowel, e.g. gat – gaten
2. Nouns with an /ɪ/ that changes to an /eː/, e.g. schip – schepen
3. Loanwords that use the original plural, e.g. museum – musea

According to Ernestus & Baayen (2001), there is one standard description for the regular past tense in Dutch: To form the regular Dutch past tense, either the suffix (-te) or the suffix (-de) + person ending is attached to an unmarked verb stem. The distribution is as follows (Ernestus & Baayen, 2001):

1. /-tə / after all verbs with a stem ending in an underlying voiceless obstruent, e.g. koken – kookten
2. /-də/ everywhere else, e.g. halen – haalden

As with the formation of the irregular past tense in English, the irregular past tense in Dutch does not follow a set of rules. Therefore, the irregular verbs can only be classified into categories that show similar patterns in the formation of the past tense. Such categories include:

1. Verbs that undergo a root change to produce the plural, e.g. eten – aten
2. Verbs that undergo a vowel change to produce the plural, e.g. varen – voeren
3. Verbs that undergo a more complex transformation, e.g. brengen – brachten

2.4.4 German inflection

The German plural system is more complex than the English and Dutch plural systems. Consequently, a plural distribution similar to the English and Dutch distribution shown earlier is not possible, mainly because German plurals have a distribution based on grammatical rules rather than orthographic or phonological distributions.

Schaner-Wolles (1988) and Veit (1986) (as cited in Tessier, 2015) highlight the complexity of the German plural system by claiming that German children will only have acquired the German plural system when they reach the age of five, an age older than what would be expected in other languages. One explanation is that most German plurals are lexical exceptions – stored in the mental lexicon – rather than regular plurals (Köpcke, 1988), reinforcing the need to gain sufficient language experience to be able to retrieve them reliably. Clahsen, Rothweiler and Woest (1992) confirm this in their study by arguing that "most [German] nouns have irregular plurals [...] and the regular [...] plural [occurs] less frequent[ly] than several of the irregular

plurals" (p. 225). Unlike English and Dutch, German regular plural formation does not include one plural suffix with several allomorphs, but instead, the plural suffixes considered to be regular are rare. However, Clahsen (1999) has claimed that the "[German] plural system has been shown to provide a default process that applies when irregular forms are not accessible" (p. 995), strengthening the case for a dual-mechanism model. The plural suffix (-s) is applied only to a minimal percentage of German nouns. Nevertheless, it fulfills the criteria to be a default as it can be attached to a diversity of word types and situations, such as "unusual nouns, exocentric nouns and in childhood" (Pinker & Ullman, 2002, p. 458).These minority defaults take the regular plural suffix (-s) when there is no irregular available.

In comparison to German plural formation, German past tense formation is less complex. Regular verb conjugation consists of adding the suffix (-te) + person ending to the unmarked verb stem:

1. /-ətə/ after verbs with an unmarked stem ending in a plosive or fricative + /n m/, e.g. atmen – atmeten, trocknen – trockneten
2. /-tə/ in all other cases, e.g. machen – machten

As with English and Dutch, the irregular past tense in German does not follow a set of rules, but instead is part of the mental lexicon. Therefore, the irregular verbs can only be classified into categories that show similar patterns in the formation of the past tense. These categories include:

1. Verbs that undergo a vowel change to produce the past tense, e.g. fahren – fuhren
2. Verbs that undergo a more complex transformation, e.g. sein – waren

Contrary to English, "the simple past [in German] is not very common, at least [not] in the spoken language" (Wenzlaff & Clahsen, 2004, p. 60). Except for the verb *sein* 'to be' and the modal verbs, the past participle is used more frequently. An example is shown in (15), which is less commonly used than (16).

(15) *Das machte ich gestern schon* 'I did that yesterday already'
(16) *Das habe ich gestern schon gemacht* 'I have already done that yesterday'

The distinction between the use of the above described tenses may be challenging for L2 learners of German. One reason is that a learner's L1 influences the linguistic decisions that they make in their L2. This illustrates the omnipresence of interlanguage in L2 acquisition, discussed below.

2.5 Interlanguage

The term interlanguage was introduced by Selinker in 1972 as an underlying linguistic system, which develops throughout the process of learning a foreign language. It is an autonomous system between the native language and the target language of the learner, and it takes influences from both languages in all language domains. This was shown by Sato (1984), who investigated syllable structure in the interlanguage of two Vietnamese learners of English, as well as by Kaspar & Schmidt (1996), who examined developmental issues in interlanguage pragmatics in relation to L2 acquisition.

Interlanguage highlights the different cognitive abilities of L1 and L2 learners: Learners of L1 are still in the process of learning their first language, whereas learners of L2 already have a fully developed linguistic system to rely on. Therefore, it is unlikely for L1 learners to develop any degree of interlanguage. The L2 learners' reliance on their L1 and interlanguage can cause errors such as overgeneralization. For example, L2 learners "suppl[y] certain morphemes more than others," (Hawkins & Lozano, 2006, p. 69) depending on their mother tongue(s). This results in an irregular pattern with respect to the general acquisition of morphology in L2 learners. However, although L1 learners do not have an interlanguage situation comparable to that of an L2 learner, overgeneralization remains a key aspect in the learning processes of both groups.

Another key characteristic of interlanguage is fossilization. This has been subject to research since interlanguage was first introduced (Selinker & Lamendella, 1978), and has been reviewed throughout the past two decades (Long, 2003; Fidler, 2006; Tarone & Han, 2014). Fossilization occurs when an L2 learner retains their interlanguage system and therefore never fully develops the target language to achieve a native-like fluency. Subsequently, the errors that the learners make as a result of their interlanguage become permanent features of their speech. These errors are unlikely to affect comprehension or cause misunderstandings and therefore, the speaker is not corrected and may not be aware of their persisting errors. Fossilization is dependent on the

learning context, setting and experience; an adult in a naturalistic learning environment will be more likely to experience fossilization than an adolescent in an educational environment. The following section describes these learning environments and their influence on language learners.

2.6 Naturalistic vs. institutional language learning environments

Muñoz (2008) distinguishes between a naturalistic and an institutional learning environment, analyzing the symmetries and asymmetries that exist between the two environments. The study claims that a naturalistic environment allows "learning through immersion in the second language environment" (p. 578), whereas an institutional environment "may be characterized as formal learning in the classroom" (p. 578). According to Mitchell, Kiely & Hüttner (2015), one principal difference is the comparatively lower exposure to the target language in classroom learning than in a naturalistic context. However, teachers in a classroom are able to plan, sequence and organize their lessons effectively, balancing the acquisition of accuracy in the grammar systems and the ability to communicate freely (Mitchell, Kiely, & Hüttner, 2015). Ellis concluded in a 1989 study that "the classroom learners […] did appear to be more successful than the naturalistic leaners in that they reached higher levels of acquisition in a shorter period of time" (p. 305). However, according to Mitchell, Kiely & Hüttner (2015), age is a deciding factor in whether classroom learning is effective. Older learners are cognitively more mature and therefore have enhanced memories and longer attention spans than younger learners. They also "have […] acquired knowledge before, so they can plan and organize their own learning" (Mitchell, Kiely & Hüttner, 2015, 1:48). Marsh & Langé (2000) argue that one reason children are able to learn languages more efficiently than adults is because of the "naturalness" (p. 3) of the environment they are in. Classroom based learning, which adults are more likely to be involved in when learning a new language, can rarely recreate such naturalness. Whilst classroom learning is vital for understanding the structures and rules of the language, there may not be enough time to incorporate practice with these structures in such a time-limited environment (Marsh & Langé, 2000). Consequently, the learners will know the theory of the language, but may struggle with spontaneous conversation. As the participants in the present study had experience with both learning environments, it is essential to consider the influence of these environments when interpreting the results.

2.7 Research questions and hypotheses

Based on the literature review, hypotheses for the research questions were formulated. The research questions and their respective hypotheses are as follows:

RESEARCH QUESTION 1:

> What are the similarities and differences in the formation of English and Dutch inflectional morphology by secondary school students with different mother tongues?

Hypothesis I: There are no differences because the rules concerning inflection in the respective languages are transparent.

Hypothesis II: The close relationship between the Germanic languages has a positive influence on the ability of the students to inflect words in another Germanic language.

RESEARCH QUESTION 2:

> To what extent does overgeneralization play a role in the acquisition of foreign language morphology in secondary school students?

Hypothesis: The students use grammar rules in all contexts, even where they should not be applied.

RESEARCH QUESTION 3:

> Does the dual-mechanism theory make correct predictions regarding the acquisition of English and Dutch inflection by L2 learners?

Hypothesis: The students will not generalize irregular patterns of non-existing words and they are able to conjugate irregulars properly depending on their familiarity with the words.

3. Research Design & Methodology

3.1 Overview

The aim of the present study was to investigate the similarities and differences in the acquisition of foreign language morphology in learners with different native languages. A study was carried out to test the hypotheses, taking into account overgeneralization and the dual-mechanism theory. The study population was recruited from students of two schools based in the Netherlands.

The Dutch school *Gymnasium Haganum* in The Hague offers VWO level to students, which is the highest level of secondary education in the Netherlands. Obtaining a diploma at such a level is the only way to directly ensure higher education at a university. The participants at this school were attending their tenth year in the educational system (see **table 3**) and had an average age of 14.1 years when they took part in the study.

Table 3: Country conversions

Country conversions	
United Kingdom	Year 10
United States	Grade 9
The Netherlands	Klas 3
Germany	3. Klasse

The *International School of The Hague (ISH)* is an international school based in the Netherlands offering the International Baccalaureate Middle Years Program (IB MYP) and Diploma Program (IB DP), two international programs that are globally recognized. The participants at this school also attended year 10 and had an average age of 15.5 years when they participated in the study.

3.2 Participants

The study included 30 participants (43% male and 57% female) from the two schools mentioned above. The participants had an average age of 14.8 years and attended year 10 at the time of data collection.

The Dutch students all considered Dutch to be their mother tongue. They all lived in the Netherlands and attended Dutch education for the majority, if not all of their lives. However, the English students had a variety of backgrounds (including Israeli, Hungarian, English, Dutch). Only the responses of the students who considered English to be their mother tongue were analyzed in this study to avoid bias. Most of the English students lived in different places throughout their lives and attended international schools with English as the primary teaching language.

Table 4 shows the participants and their first language. Additionally, the table shows the relevant foreign languages that the students were learning, as well as the teaching hours per week (TH p/w) that the students had at their current school.

Table 4: Details of the participants

Study groups	Mother tongue	Foreign language A (TH p/w)	Foreign language B[1] (TH p/w)	Number of participants		
				Male	Female	Total
Group 1	English	Dutch (3)	German (3)	7	5	12
Group 2	Dutch	English (2)	German (3)	6	12	18
				Total 13	17	30

3.3 Study design

This cross-sectional study consisted of both qualitative as well as quantitative data in the form of a questionnaire and written responses. Berko's WUG-test (1958) was used as an inspiration to test students' morphological knowledge of the foreign language(s) that they were learning.

[1] When applicable, as not every student has studied German as a foreign language

At both schools, students were asked to complete a questionnaire in their native language. Additionally, they were asked to complete a number of word lists that are described immediately below.

(17) Two word lists in their foreign language A (see **table 4**) in which they were asked to produce the plural of approximately 20 nouns and the past tense of approximately 20 verbs.

(18) When applicable: Two word lists in their foreign language B (see **table 4**) in which they were asked to produce the plural of approximately 20 nouns and the past tense of approximately 20 verbs.

The word lists consisted of both existing and non-existing words. The non-existing words were constructed based on Berko's (1958) WUG-test words. Therefore, some words are similar to words of the WUG-test; these were converted to Dutch and German equivalents, such as shown below.

(19) EN: A WUG NL: EEN WUK GER: EIN WÜCK

The non-existing words that were not based on the WUG-test words were constructed to have endings representing the endings of existing words, such as in (20), (21) and (22).

(20) EN: The ending of HEAF corresponds to the ending of *leaf*

(21) NL: The ending of BUTS corresponds to the ending of *muts* 'hat'

(22) GER: The ending of ZOTEN corresponds to the ending of *beten* 'to pray'

The existing words in the word lists were divided into groups of regular and irregular words. These words were chosen according to the categorizations described in section 2.4. **Table 5** shows examples of words in those particular categories in English. For example, the conjugations of the regular plural words that were chosen for the English word lists all either end in /-ɪz/, /-s/ or /-z/. The example words in **table 5** are examples from the word lists that were used in this study.

Table 5: Categories of the English word lists

		Plural words				Past tense words			
Regular		(-s)				(-ed)			
	/-ɪz/	Case	–	Cases	/-t/	Bake	–	Baked
	/-s/	Roof	–	Roofs	/-d/	Pray	–	Prayed
	/-z/	Mug	–	Mugs	/-ɪd/	Melt	–	Melted
Irregular		Vowel change Unmarked Latinate				Vowel change Unmarked Complex transformation		
	VC	Mouse	–	Mice	VC	Run	–	Ran
	UM	Sheep	–	Sheep	UM	Cost	–	Cost
	L	Bacterium	–	Bacteria	CT	Catch	–	Caught

Table 6 shows examples of the categories in Dutch. For example, the conjugations of the past tense regular words that were chosen for the Dutch word lists all either end in /-tə/ or /-də/ + person ending. The example words in **table 6** are examples from the word lists that were used in this study.

Table 6: Categories of the Dutch word lists

		Plural words		Past tense words
Regular		(-en), (-n), (-s)		(-te), (-de)
	/-ən/	Hand – Handen	/-tə/	Pakken – Pakten
	/-n/	Weide – Weiden	/-də/	Halen – Haalden
	/-s/	Tafel – Tafels		
Irregular		Short vowel ⇨ Long vowel Root change		Root change
	SV ⇨ LV	Gat - Gaten	RC	Komen – Kwamen
	RC	Schip – Schepen		

The participants completed the word lists in their classrooms whilst not being allowed to speak to one another during the exercise. Each class was given as much time as was needed to fill in the lists.

3.4 Procedures

The goal of the questionnaire (see **Appendix A**) was to provide additional information to the quantitative results. The results of the questionnaire were analyzed and used to understand the general students' perception of foreign language acquisition and the manner in which they best acquire the grammar of a foreign language. It was also used to gain an insight into variables such as age, language exposure and the number of other acquired languages.

The word list exercise aimed to trigger the students to think about the way in which they conjugate nouns and verbs in a foreign language. To conjugate the nouns and verbs, the students were able to use grammar rules they learned in a language class, conjugate the words based on their intuition, conjugate the words at random or a combination of these. Their written responses were assessed based on whether they were grammatically correctly written. This means that features that are not heard when spoken, such as the double /p/ in <stopped> / [stɑpt], were also taken into account. The written native-like conjugations of the words can be found in **Appendices B**, **C** and **D**.

The quantitative results will be broken down into three parts. Part one (section 4.2.1) examines the similarities and differences in the acquisition of English and Dutch inflectional morphology by secondary school students with different mother tongues. The similarities and differences were examined in two ways.

Firstly, the correctness of the responses was examined, and each student was given a correctness score. This score was calculated based on the comparison of a student's written responses to the list of native-like conjugations. These individual scores were used to calculate an overall correctness score for each group (G1 and G2, see **table 4**). Additionally, the responses to the non-existing words of each language were examined. As one cannot calculate a correctness score for non-existing words, a separate score was calculated for each group. These scores were assessed based on the native-like conjugation list. The non-existing words in this list were conjugated based on the conjugation of existing words with similar endings (23) or by applying the conjugation rules discussed in the literature review (24).

(23) Non-existing RICK based on *click*, conjugation RICKED

(24) Non-existing KIRPEN, conjugation KIRPTEN because of the rule '/-tə / after all verbs with a stem ending in an underlying voiceless obstruent'

Secondly, the written responses of the learners were compared to the written responses of the native speakers by examining each individual word. A Pearson's Chi-Squared statistical test with the significance level set at $P<0.05$ determined whether there were any significant differences between the responses of the L2 learners and the native speakers of the language. The independent variable was the mother tongue of the participants, either English or Dutch. The dependent variable was the response of the participants, which was categorized to be either correct or incorrect based on the native-like conjugation lists.

Part two of the quantitative results (section 4.2.2) examines the extent to which overgeneralization played a role in the acquisition of foreign language inflectional morphology by L2 speakers. The overgeneralization errors of each learner were counted and an individual score for each student was calculated. The average amount of errors made by G1 was compared to the average of G2 to find out the extent of overgeneralization errors.

The third part of the quantitative results (section 4.2.3) examines whether the dual-mechanism theory makes correct predictions (see section 2.3) regarding the acquisition of foreign language morphology in L2 learners with different mother tongues.

The first prediction was tested by examining the conjugations of the non-existing words by G1 and G2. The results show which plural and past tense suffixes the L2 learners used to conjugate the words. Moreover, any instances of generalization were highlighted as well.

The second prediction was tested by reviewing the language experience of the L2 learners and their conjugation performance. A distinction between L2 learners with more language experience and L2 learners with less language experience was made by taking the mean of the months of exposure the students reported to have in the questionnaire. Subsequently, the students of each group were divided into two further subgroups:

1. Students with >*mean* months experience
2. Students with <*mean* months experience

This was done for both G1 and G2. The general correctness scores of these groups was calculated as well as the correctness scores for the irregular words.

4. Results

4.1 Qualitative results

Table 7 shows the data that was collected from the above described questionnaire. The exposure measured in the questionnaire refers to any type of exposure, such as teaching, (social) media, entertainment and time spent in the country of the target language. Therefore, it is not equal to the teaching hours per week (TH p/w) as shown in **table 4**.

Table 7: Averages of questionnaire responses

	English students	Dutch students
Age	15.5 years old	14.1 years old
Male : female ratio	7 : 5	1 : 2
Months of exposure to FLA	125.0 months	63.2 months
Languages learned before age 10	1.3 languages	0.7 languages
Languages learned after age 10	1.3 languages	3.9 languages

Table 7 shows that the English students were on average 1.4 years older than the Dutch students. Moreover, the male to female ratio was higher in the class with English students, with seven males to five females, whereas the Dutch class consisted of six males and twelve females. The English students had an average of 125.0 months of exposure to Dutch whereas the Dutch students had an average of 63.2 months of exposure to English. This will be discussed in more detail in **chapter 5**.

Table 8 shows that 77.8% of the Dutch students believed that the grammar of a foreign language is best learned by memorizing the grammar rules "off by heart". 50.0% of the students believed that reading in the foreign language helps to understand the grammar. Finally, 16.7% of students selected a reason that was not listed, answering:

- "Films kijken met of zonder ondertiteling" (*To watch movies with or without subtitles*)
- "Veel oefenen" (*Practice a lot*)
- "Ermee oefenen en opdrachten maken" (*Practice and complete exercises*)

Table 8: Responses to a question about learning strategies

		English students		Dutch students	
How grammar of a foreign language is learned best (more than one option possible) a) By memorizing the grammar rules off by heart b) By interacting with native speakers c) By reading in the language d) Other	Average	a)	33.3%	a)	77.8%
		b)	41.7%	b)	5.6%
		c)	50.0%	c)	50.0%
		d)	0.0%	d)	16.7%
	Male average	a)	42.9%	a)	83.3%
		b)	42.9%	b)	0.0%
		c)	14.3%	c)	50.0%
		d)	0.0%	d)	0.0%
	Female average	a)	20.0%	a)	75.0%
		b)	40.0%	b)	8.3%
		c)	100.0%	c)	50.0%
		d)	0.0%	d)	25.0%

Table 8 also shows that 50.0% of the English students believed that reading in the foreign language helps to learn the grammar of a foreign language. The female participants felt stronger (100.0%) about this than the male participants (14.3%). One third of the English students believed that memorizing the rules "off by heart" helps to learn the grammar of a foreign language, in contrast to the Dutch students, who strongly held this view. Almost half of the English students (41.7%) believed that interacting with native speakers helps to learn the grammar of a foreign language best. Again, in contrast to the opinion of the Dutch students, of which only 5.6% favored this option.

Furthermore, all Dutch students claimed to have learned English predominantly by exposure to (social) media and entertainment such as books and films rather than language classes at school. 16.7% of English students reported learning Dutch solely through the language classes at school, whereas another 16.7% reported learning Dutch solely through (social) media and entertainment. The remaining students (66.7%) claimed to have learned Dutch through a combination of the two options mentioned above.

4.2 Quantitative results

4.2.1 Part 1: Similarities and differences

4.2.1.1 Correctness scores

Figure 2 shows the overall correctness scores of G1 and G2 for plural and past tense conjugations of the existing words. G1 showed only a small difference between plural and past tense conjugations (difference: 3.6 percentage points (*p.p.*)), whereas a larger difference of 21.3 *p.p.* was noted for G2 correctness scores. Comparing between groups, G2 scored higher in plural conjugation exercises (difference: 7.8 *p.p.*) but lower in past tense conjugation (difference: 17.1 *p.p.*).

Figure 2: Correctness scores of the existing words

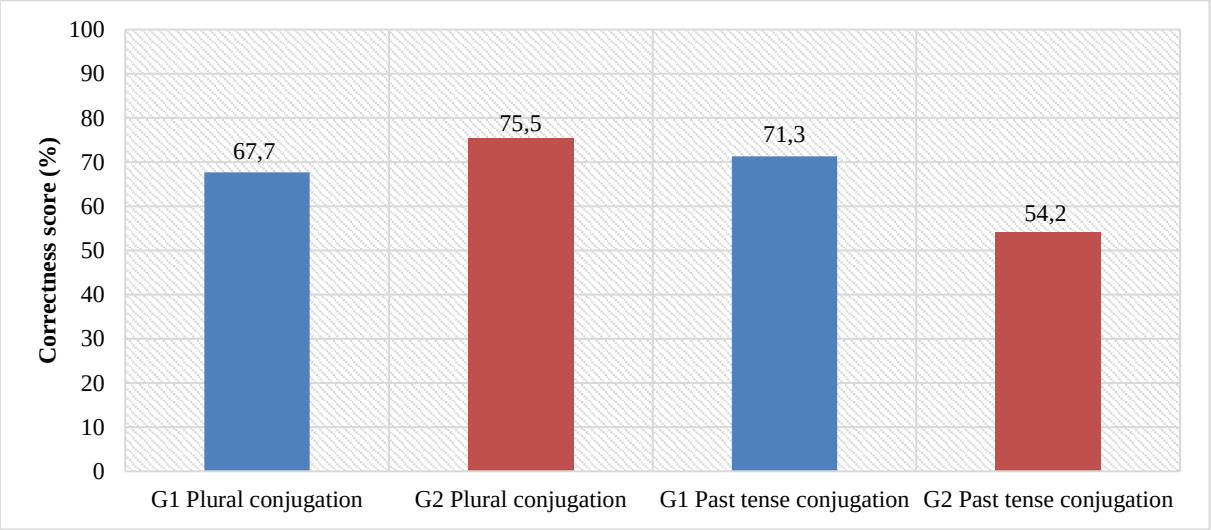
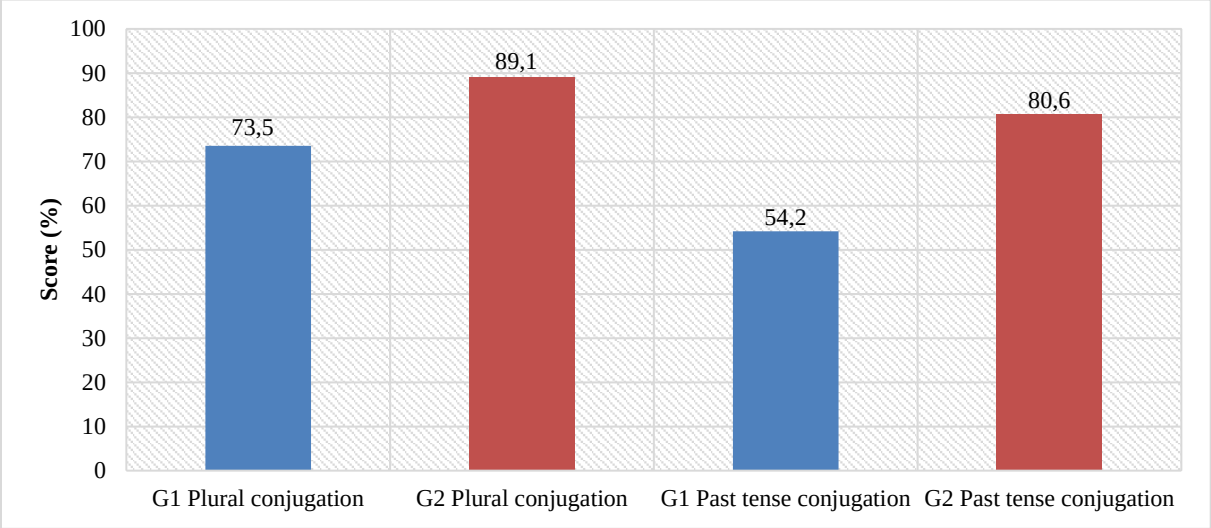


Figure 3 shows that the scores of the non-existing words vary more than the correctness scores of the existing words. G2 had a higher score than G1 for the non-existing words, for both plural and past tense conjugations (differences: 15.6 *p.p.* and 26,4 *p.p.* respectively). Moreover, G2 had a higher score for the non-existing words than for the existing words, with a difference of 13.6 *p.p.* in the plural and 26.4 *p.p.* in the past tense conjugations.

For the plural conjugations however, G1 had similar scores on the existing words and the non-existing words (difference: 5.8 *p.p.*). However, for the past tense conjugations of the non-existing words, G1 received a lower score (difference: 17.1 *p.p.*).

Figure 3: Scores of the non-existing words



4.2.1.2 Comparison of learners' responses to native speakers' responses

When examining the plural conjugations, a significant difference between the responses of the English students learning Dutch and the Dutch native speakers was found in the following words, where the bold words are non-existing words:

SLOT (*P*< .001)	SMID (*P*= .007)	SPELER (*P*= .025)
LOT (*P*= .002)	LID (*P*= .010)	**JUUN** (*P*= .026)
SCHIP (*P*= .003)	WEIDE (*P*= .019)	

The responses to the irregular nouns SLOT, LOT and SCHIP show the most significant differences. The percentage of correct learner responses compared to the native speaker responses is shown in **figures 4**, **5** and **6**. The most frequent incorrect learner responses for each noun are given below.

(25) Incorrect response to SLOT: *Slotten
(26) Incorrect response to LOT: *Lotten
(27) Incorrect response to SCHIP: *Schips

Figure 4: Scores for SLOT, *P*< .001

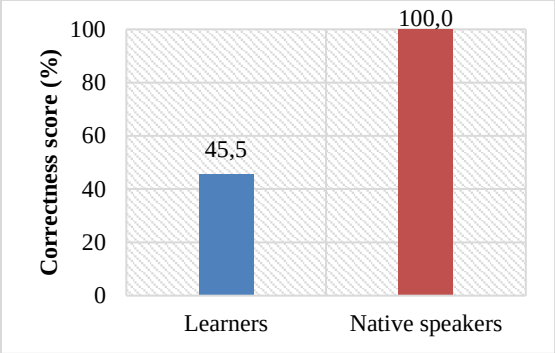


Figure 5: Scores for LOT, *P*= .002

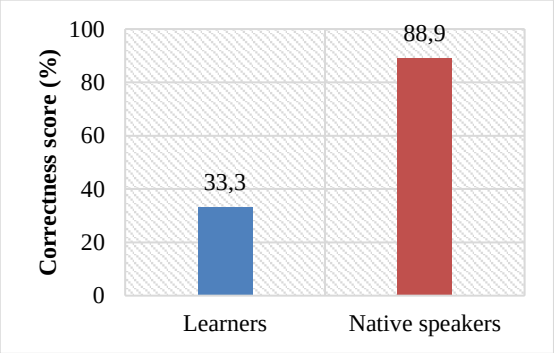
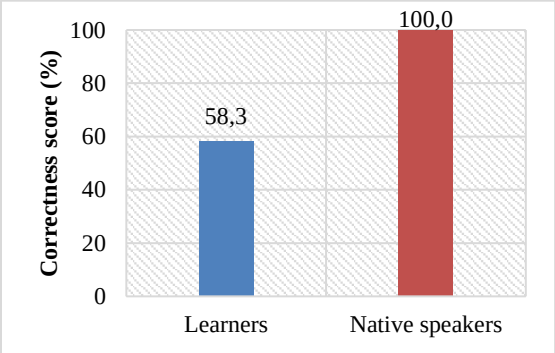


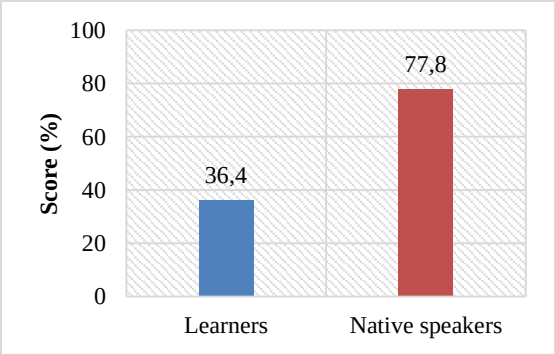
Figure 6: Scores for SCHIP, *P*= .003



Furthermore, the responses to the non-existing noun JUUN are shown in **figure 7**. An example of a response to JUUN can be found below.

(28) Response to JUUN: "Juuns"

Figure 7: Scores for JUUN, *P*= .026



Finally, the L2 learners did not outperform the native speakers on any occasion during plural conjugation exercises.

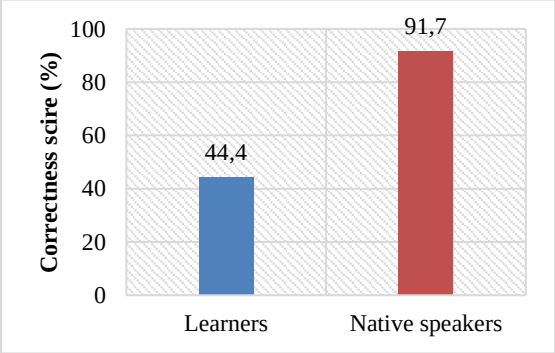
When comparing the plural conjugations of the Dutch students learning English to the English native speakers, a significant difference was found in the following words:

MOUSE (*P*= .009) STIMULUS (*P*= .012) FISH (*P*= .015)

The responses to the irregular noun MOUSE show the most significant difference. The percentage of correct learner responses compared to the native speaker responses is shown in **figure 8**. A common incorrect learner response to MOUSE is shown in (29).

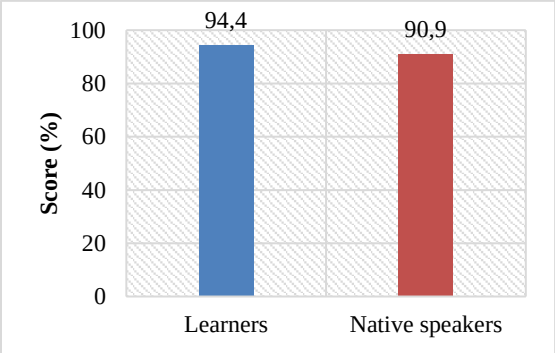
(29) Incorrect response to MOUSE: *Mouses

Figure 8: Scores for MOUSE, *P*= .009



When comparing the plural conjugations of the Dutch students to the English native speakers, no significant difference for any of the non-existing words was found. However, there were a number of instances in which the Dutch learners of English obtained a higher score than the English native speakers. In 75.0% of these instances, both the learners as well as the native speakers obtained scores of 90.0% or higher. Therefore, differences between the two groups were relatively small in these instances, such as in the word KRA (difference: 3.5 *p.p.*), shown in **figure 9**.

Figure 9: Scores for KRA



However, for the other 25.0% of instances, the learners scored considerably higher than the native speakers. These results are shown in **figures 10** and **11**. Moreover, 62.5% of the words in which the Dutch learners scored higher than the English native speakers were non-existing words, and there were no significant differences in any of the non-existing words.

Figure 10: Scores for HEAF

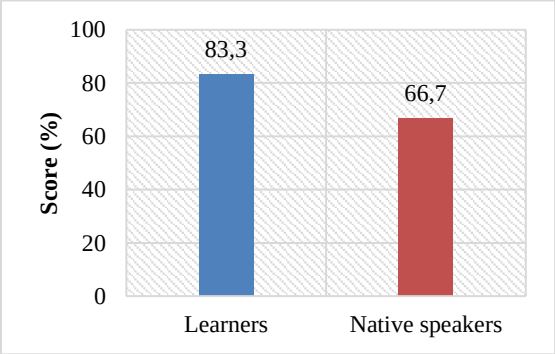
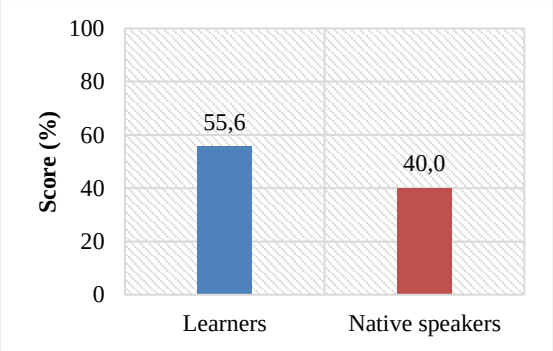


Figure 11: Scores for KAZH



When examining the past tense conjugations, a significant difference between the responses of the English students learning Dutch and the Dutch native speakers was found in the following words, where the bold words are non-existing words:

LERTEN ($P < .001$)	MISSEN ($P = .001$)	HALEN ($P = .003$)
POLDEN ($P = .001$)	**KIRPEN** ($P = .003$)	BRENGEN ($P = .043$)

The responses to the existing verb MISSEN and the non-existing verbs LERTEN and POLDEN show the most significant differences. The learner scores compared to the native speaker scores are shown in **figures 12**, **13** and **14**. The most frequent incorrect learner responses for each verb are given below.

(30) Incorrect response to LERTEN: “Lerden”

(31) Incorrect response to MISSEN: *Misden

(32) Incorrect response to POLDEN: “Pold”

Figure 12: Scores for LERTEN, *P*< .001

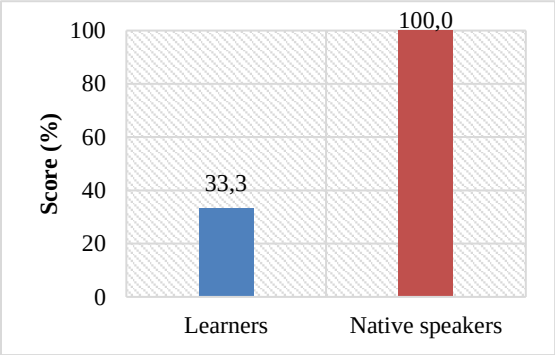


Figure 13: Scores for MISSEN, *P*= .001

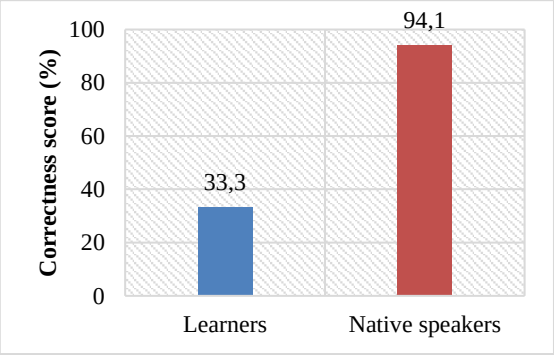
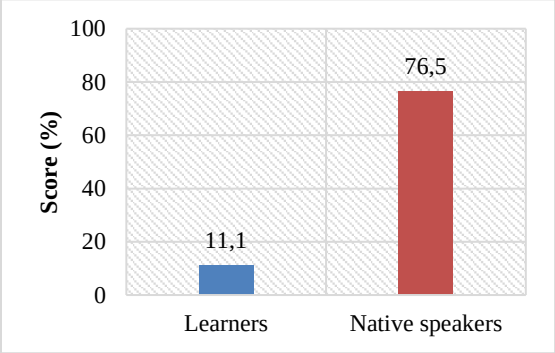
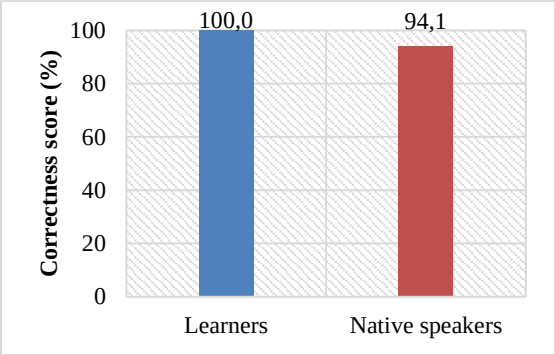


Figure 14: Scores for POLDEN, *P*= .001



Lastly, **figure 15** shows that the English learners of Dutch obtained a higher score on the past tense conjugation of the irregular verb WETEN than the Dutch native speakers.

Figure 15: Scores for WETEN



When comparing the past tense conjugations of the Dutch students learning English to the English native speakers, a significant difference was found in the following words:

CATCH (*P*= .001)	CRY (*P*= .002)	HURT (*P*= .011)
THROW (*P*= .002)	RUN (*P*= .007)	PUT (*P*= .046)

The responses to the irregular verbs CATCH and THROW as well as the regular verb CRY show the most significant differences. The percentage of correct learner responses compared to the native speaker responses is shown in **figures 16**, **17** and **18**. Examples of the incorrect learner responses to CATCH, THROW and CRY are shown below.

(33) Incorrect response to CATCH: *Catched
(34) Incorrect response to THROW: *Threwed
(35) Incorrect response to CRY: *Cryd

Figure 16: Scores for CATCH, *P*= .001

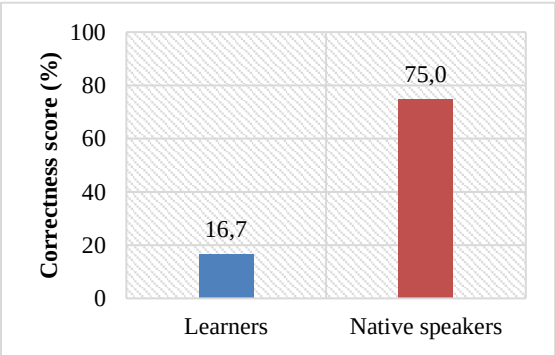


Figure 17: Scores for THROW, *P*= .002

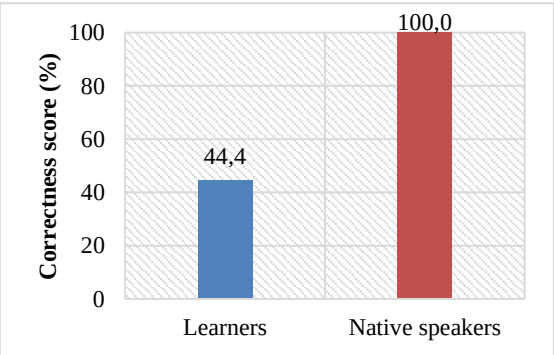
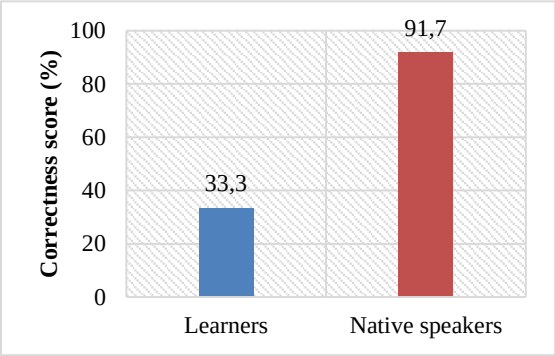
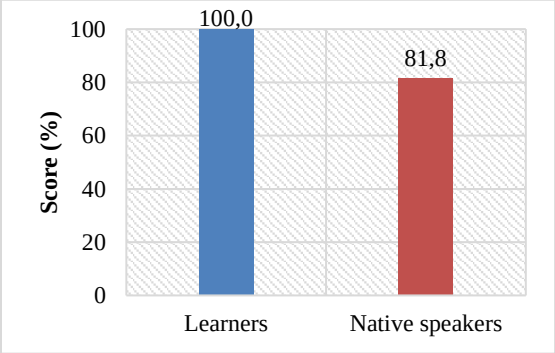


Figure 18: Scores for CRY, *P*= .002



Lastly, **figure 19** shows that the Dutch learners of English obtained a higher score on the past tense conjugation of the non-existing verb BING than the English native speakers. Whilst there were a number of similar instances, the difference in BING was considerably bigger (18.2 *p.p.*) than in other words.

Figure 19: Scores for BING



4.2.2 Part 2: Overgeneralization

Tables 9 and **10** show that both groups made on average 3.2 overgeneralization errors in plural conjugation. G2 made on average 3.6 more errors in past tense conjugation. In G1, males and females obtained similar results in past tense conjugation. However, females did worse in plural conjugation than males. The same is true for G2, in which females also made more errors in plural conjugation, though the difference was considerably smaller (0.2 errors). For the past

tense conjugation, however, G2 males scored worse than females, making 1.4 more errors. G1 males were also outperformed by females in this respect, though the difference was smaller (0.3 errors). Overall, it can be concluded that G2 overgeneralized more than G1, particularly in past tense conjugation.

Table 9: G1 overgeneralization errors

	Plural	Past tense
Average males	2.6	1.1
Average females	4.0	1.4
Average G1	3.2	0.8

Table 10: G2 overgeneralization errors

	Plural	Past tense
Average males	3.0	5.3
Average females	3.2	3.9
Average G2	3.2	4.4

Figure 20 and **21** show the Dutch words that were overgeneralized most frequently by G1. The group overgeneralized verbs less frequently than nouns, which supports the data shown in **table 9**. The word VAREN was the most frequently overgeneralized verb by the L2 learners. However, it is worth mentioning that 61.1% of the native Dutch speakers also overgeneralized the same verb. **Table 11** shows that the most frequently overgeneralized nouns were irregular, whereas the past tense words that were overgeneralized were both regular and irregular. Examples of the learner responses are also shown in the table.

Figure 20: G1 nouns with an overgeneralization error percentage of ≥ 50.0%

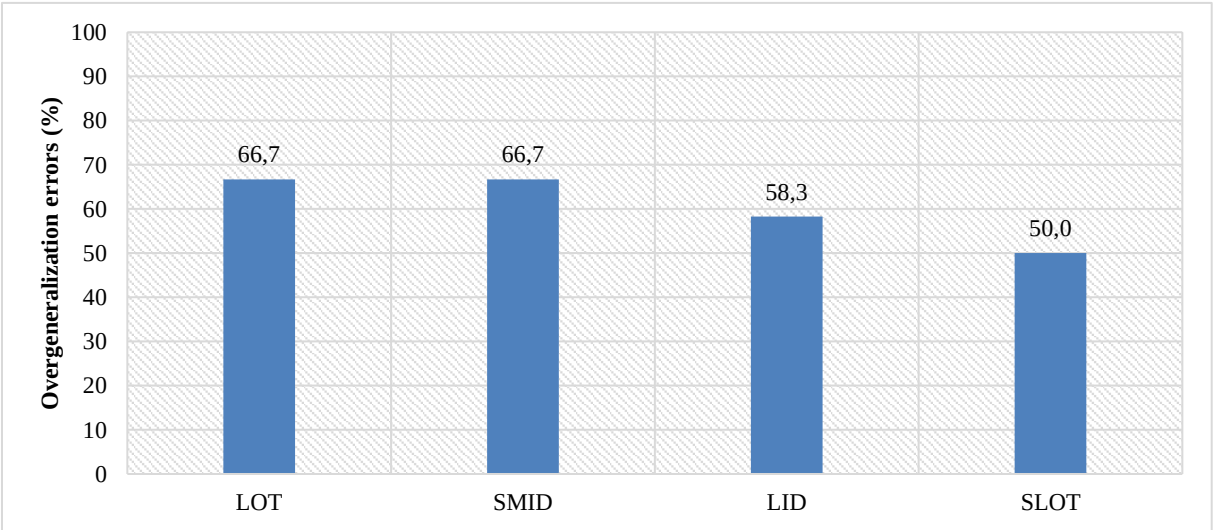


Figure 21: G1 verbs with an overgeneralization error percentage of ≥ 25.0%

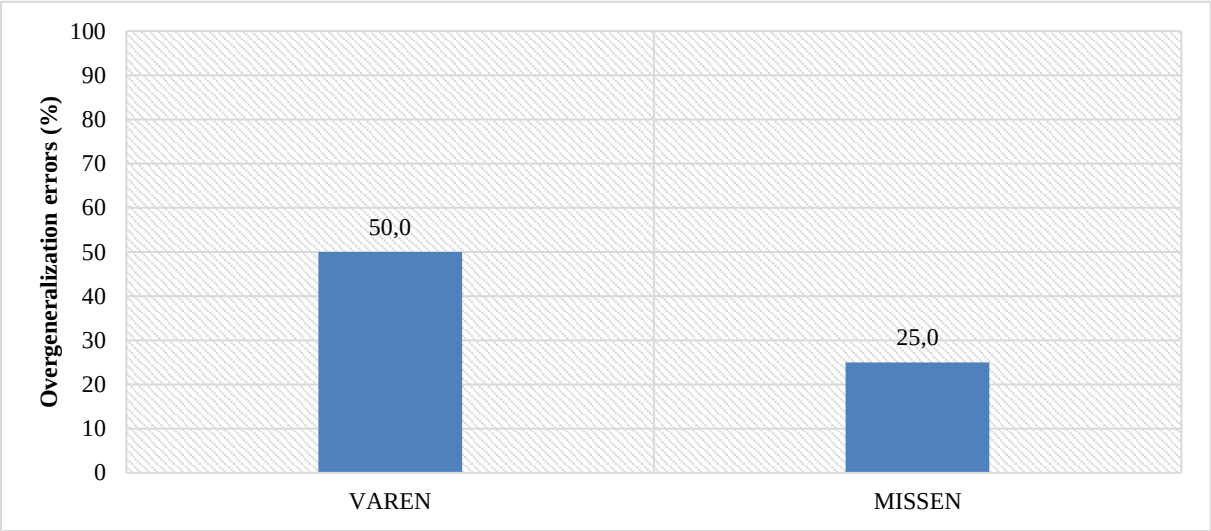


Table 11: Most frequently overgeneralized words by G1

	Word	Regular or irregular	Correct conjugation	Overgeneralization error
Nouns	LOT	Irregular (SV ⇨ LV)	Loten	*Lotten
	SLOT	Irregular (SV ⇨ LV)	Sloten	*Slotten
	SMID	Irregular (root change)	Smeden	*Smidden
	LID	Irregular (root change)	Leden	*Lidden
Verbs	MISSEN	Regular (/tə/)	Misten	*Misden
	VAREN	Irregular (root change)	Voeren	*Vaarden

Figure 22 and **23** show the English words that were overgeneralized most frequently by G2. The group overgeneralized the nouns less frequently than the verbs, which supports the data shown in **table 10**. The noun FISH was most frequently overgeneralized. However, SHEEP – which, like FISH, also stays unmarked when conjugated to a plural – was 22.2 *p.p.* less frequently overgeneralized. Similarly, the word HURT was the one of the most frequently overgeneralized verbs, whereas PUT – which, like HURT, also stays unmarked when conjugated to the past tense – was overgeneralized 33.3 *p.p.* less frequently. **Table 12** shows that all the overgeneralized words were irregular, except for the verb CRY. Examples of the learner responses are also shown.

Figure 22: G2 plural words with an overgeneralization error percentage of ≥ 50.0%

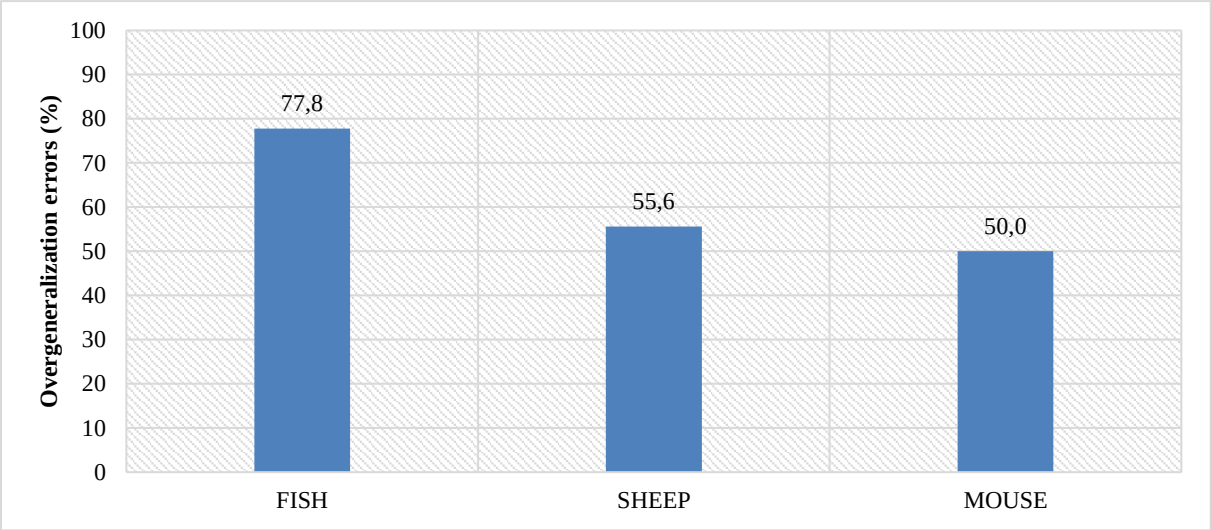


Figure 23: G2 plural words with an overgeneralization error percentage of ≥ 50.0%

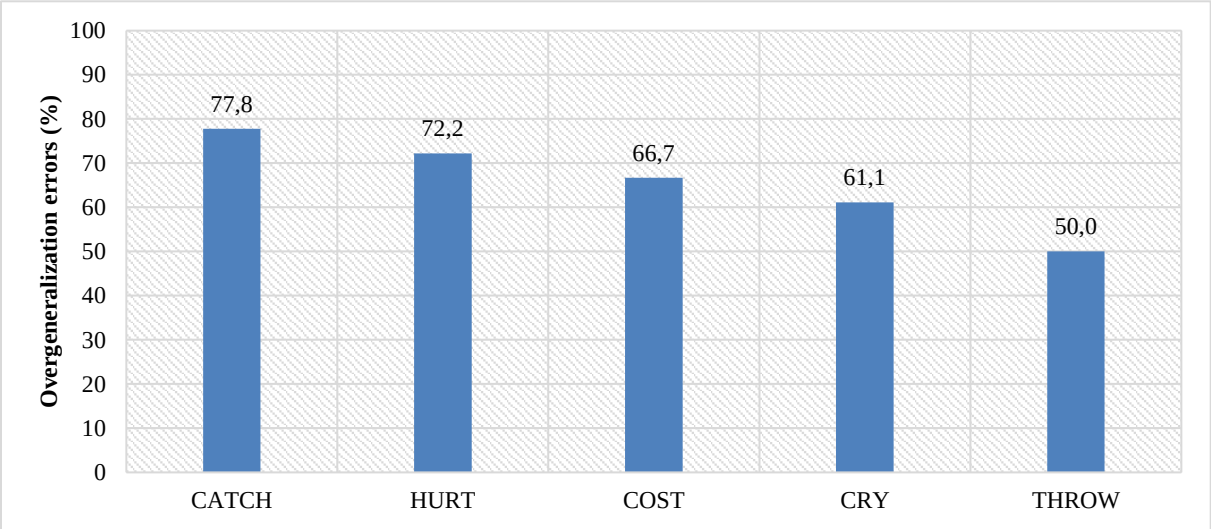


Table 12: Most frequently overgeneralized words by G2

	Word	Regular or irregular	Correct conjugation	Overgeneralization error
Nouns	FISH	Irregular (unmarked)	Fish	*Fishes
	SHEEP	Irregular (unmarked)	Sheep	*Sheeps
	MOUSE	Irregular (changing vowel)	Mice	*Mouses
Verbs	THROW	Irregular (complex)	Threw	*Throwed
	CATCH	Irregular (complex)	Caught	*Catched
	COST	Irregular (unmarked)	Cost	*Costed
	HURT	Irregular (unmarked)	Hurt	*Hurted
	CRY	Regular (/d/)	Cried	*Cryed

4.2.3 Part 3: The dual-mechanism theory

4.2.3.1 Prediction 1

Figure 24 shows which suffixes G1 used to conjugate the non-existing nouns. The majority of students added (-en) to the first five words shown in the graph, whilst for the last two words, the majority of students added (-s) to the nouns. Apart from the words WUK and NAG, the students were divided on which plural suffix to use, showing that the students did not share the same opinion on how to conjugate the non-existing words.

Figure 24: G1 plural conjugation of Dutch non-existing nouns

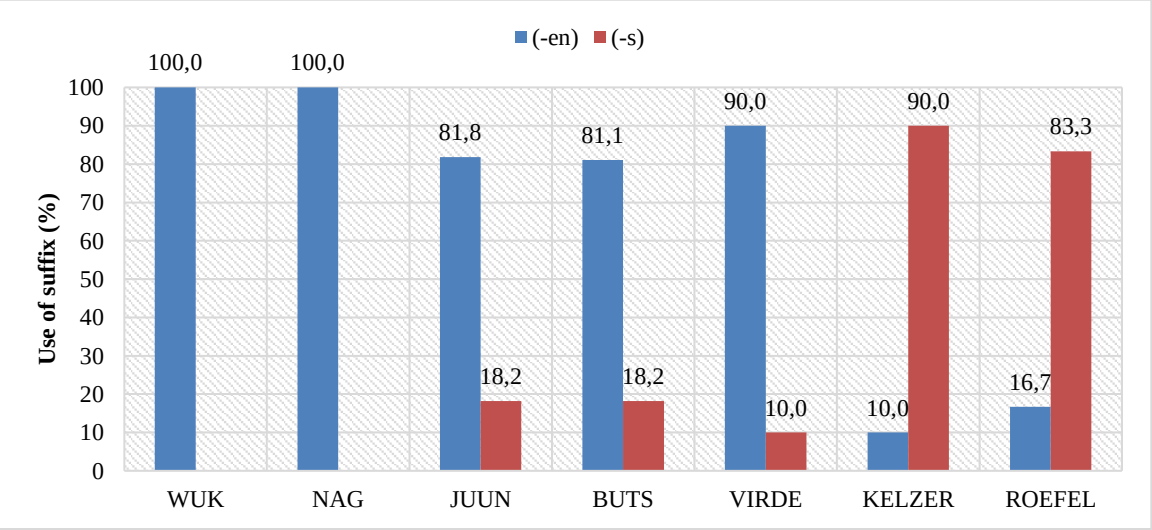


Figure 25 shows which suffixes G1 used to conjugate the Dutch non-existing verbs. G1 used two different suffixes to form the past tense: (-te) and (-de). Moreover, some students also generalized verbs, i.e. they did not add a suffix to form the past tense but rather they created an irregular form of the verb. Examples of this are shown in (36) and (37).

(36) Generalized past tense form of FLENGEN: "Fliengen"

(37) Generalized past tense form of LINGEN: "Langen"

For the words ZORKEN, KIRPEN and LERTEN, the majority of the students used (-te) to form the past tense of the verbs. For the words POLDEN, FLENGEN and LINGEN, the majority of G1 used the suffix (-de) to form the past tense. However, except for the verb POLDEN, the students were divided on which suffix to use to form the past tense. Especially for the word KIRPEN, there is a relatively small difference (42.8 *p.p.*) between the students who used the (-te) suffix and the students who used the (-de) suffix.

Figure 25: G1 past tense conjugation of Dutch non-existing verbs

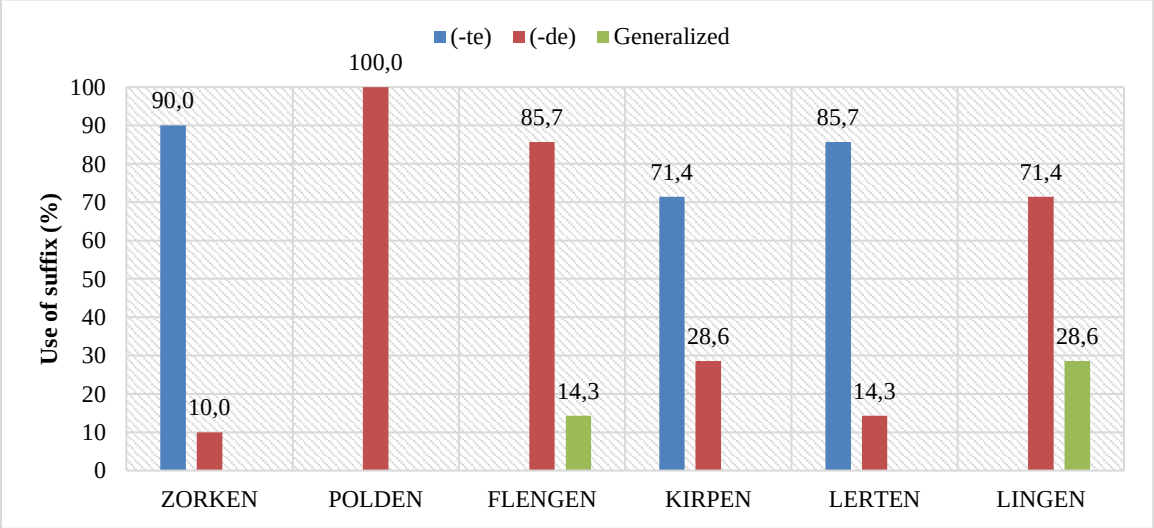


Figure 26 shows that G2 only used one suffix to conjugate the English non-existing singular nouns into plural nouns. All students used the suffix (-s) in all words. The exceptions for the words GUTCH and FOUSE are shown in (38) and (39).

(38) Response student X for conjugation of GUTCH: "Gutchen"

(39) Response student Y for conjugation of FOUSE: "Fouse"

Figure 26: G2 plural conjugation of English non-existing nouns

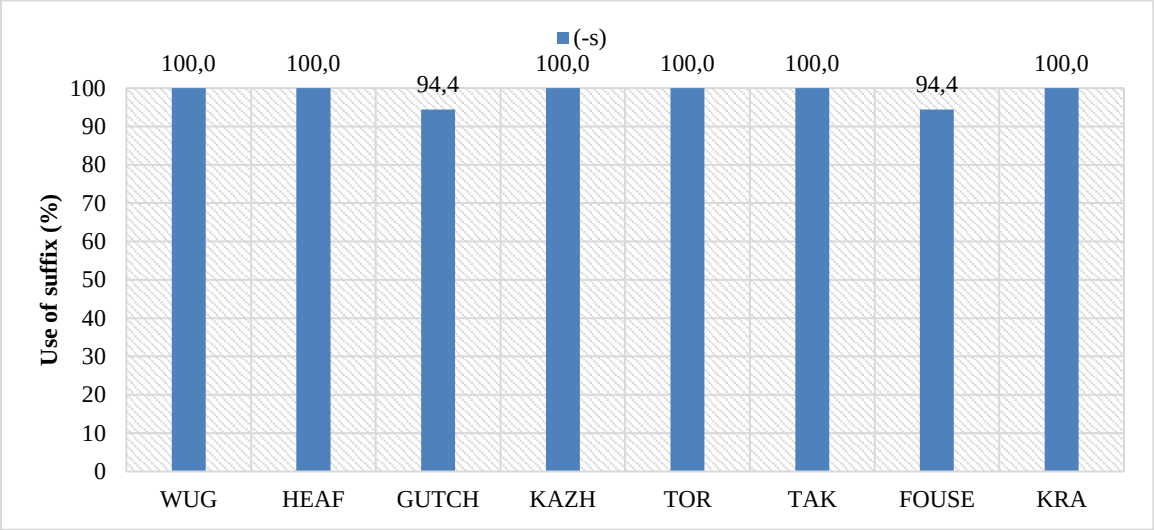


Figure 27 shows that G2 mostly used the suffix (-ed) to conjugate the English non-existing verbs. The exceptions for the words MOT, BING and BOD can be found in (40), (41) and (42)

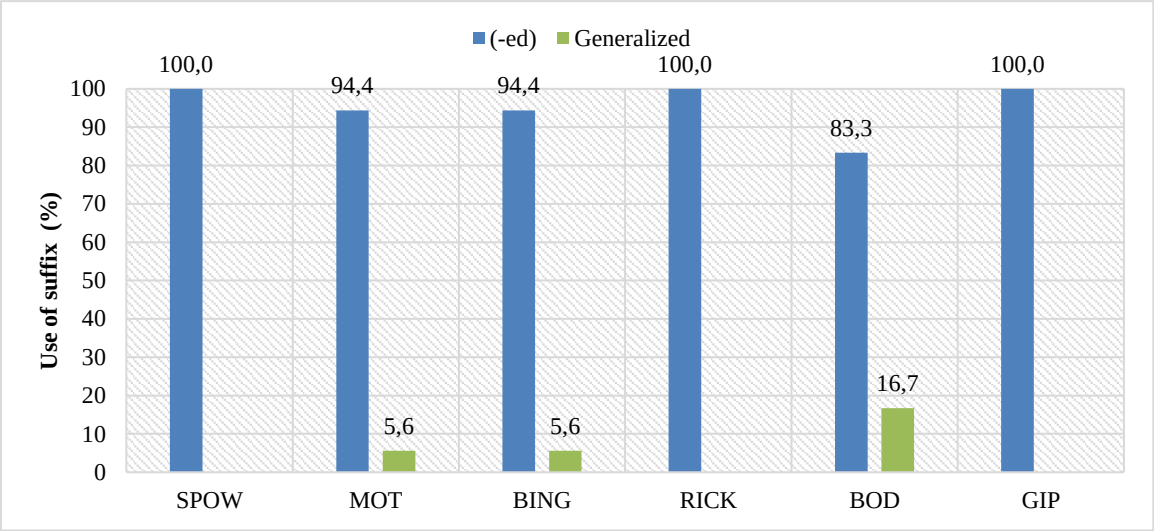
(40) Generalized past tense form of MOT: "Mot"

(41) Generalized past tense form of BING: "Bang"

(42) Generalized past tense form of BOD: "Bod", "Bed"

The student who generalized the non-existing verb BING to be "bang" in the past tense was the only student with a 100.0% score on the conjugation of the irregular existing verbs. The students who generalized the non-existing verbs MOT and BOD to be "mot" and "bod" in the past tense, all conjugated the words PUT and RUN correctly, but not COST and HURT.

Figure 27: G2 past tense conjugation of English non-existing verbs



4.2.3.2 Prediction 2

Figure 28 shows the plural conjugation scores of G1 students with more than 124.0 months of Dutch language experience and of students with less than 124.0 months of Dutch language experience. It shows that the students with more language experience outperformed the students with less language experience, especially for irregular plural conjugations (difference: 46.7 *p.p.*) but also for the general plural conjugations (difference: 10.0 *p.p.*).

Figure 28: G1 plural scores based on language experience

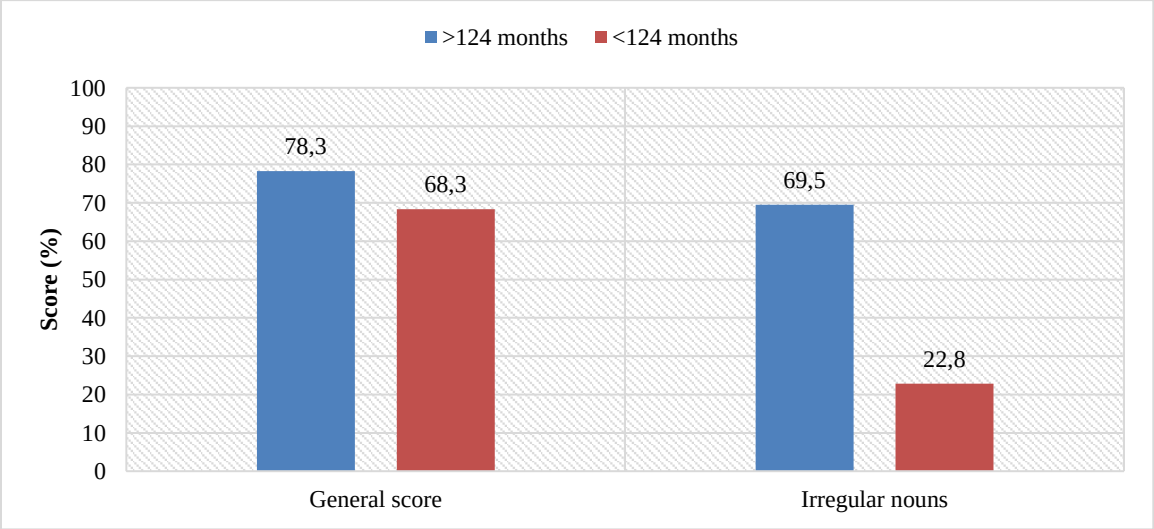


Figure 29 shows that the G1 students with more language experience obtained a higher score than the students with less language experience in both the general past tense conjugations as well as the irregular past tense conjugations. Although the difference of 1.4 *p.p.* is significantly smaller than the difference in the plural irregular conjugation, the difference in the general past tense score (28.7 *p.p.*) is considerably larger.

Figure 29: G1 past tense scores based on language experience

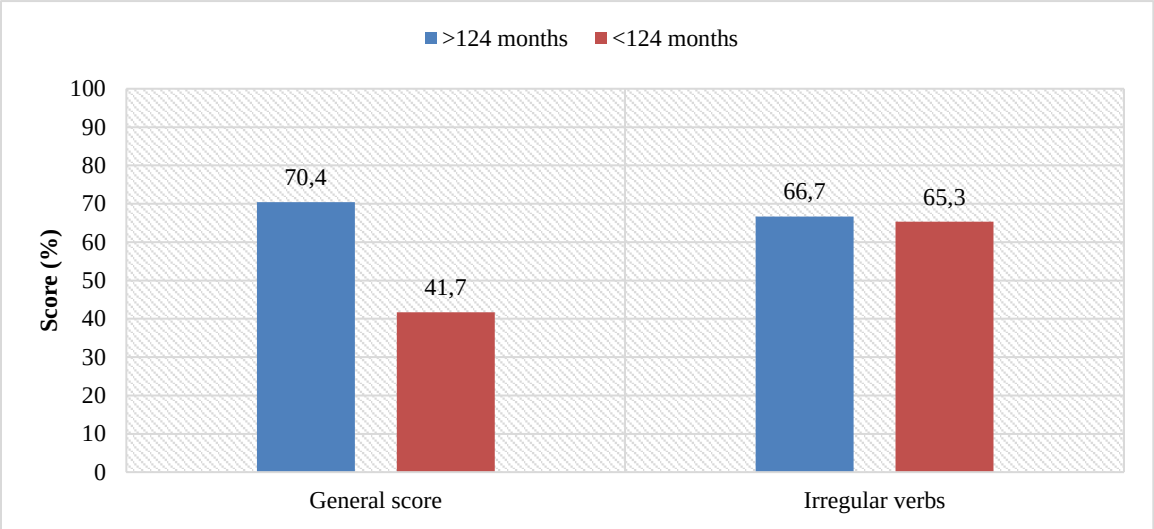
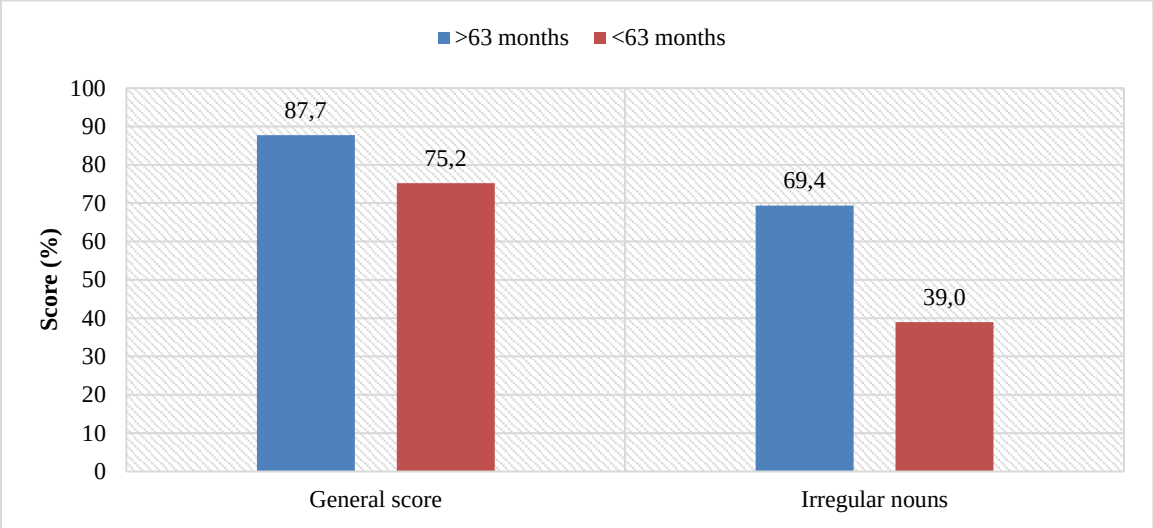


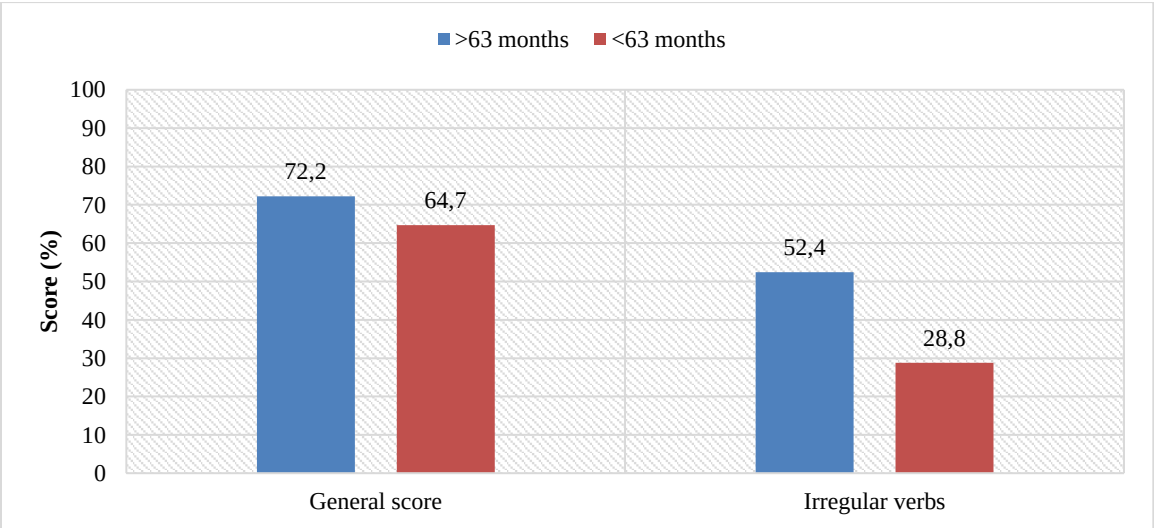
Figure 30 shows the scores of G2 students with more than 63.0 months of English language experience and students with less than 63.0 months of English language experience. The G2 students with more language experience outperformed the students with less language experience in both the general plural conjugations (difference: 12.5 *p.p.*) as well as in the irregular plural conjugations (difference: 30.4 *p.p.*). This is similar to the results in G1, where difference in irregular plural conjugation was larger than in general plural conjugation.

Figure 30: G2 plural scores based on language experience



Lastly, **figure 31** shows that in general, the G2 students with more language experience outperformed those with less language experience. This is true for the general past tense conjugation (difference: 7.5 *p.p.*), but also for irregular past tense conjugation (difference: 23.6 *p.p.*).

Figure 31: G2 past tense scores based on language experience



5. Discussion

5.1 Qualitative findings

At the time of this study, the English students had been exposed to Dutch more than the Dutch students had been exposed to English. In the questionnaire, exposure was not equal to the teaching hours (TH) such as shown in **table 4**, as it included any type of exposure, such as teaching, (social) media, entertainment and time spent in the country of the target language. The difference in exposure can be explained by the fact that some of the English students have a Dutch parent or have lived in the Netherlands for an extended period of time. Moreover, the English students had more opportunities to be in contact with the Dutch language on a daily basis at the time of this study, considering public life in the Netherlands is in Dutch. The Dutch students however, had not been in contact with the English language on a daily basis.

Furthermore, the English students had learned approximately the same amount of languages before and after the age of ten. However, the Dutch students had learned 3.2 more languages after than before the age of ten. This is because most primary schools (ages 4-12) in the Netherlands only teach Dutch and English, whereas Dutch high schools teach many more languages. Especially a VWO Gymnasium (ages 12-18) frequently teaches up to six languages in the first few years (Ministerie Onderwijs Cultuur en Wetenschap, n.d.).

Additionally, international students such as the ones in this study are more likely to have moved to and from multiple countries. Therefore, a number of students may have experienced the languages of the countries that they have lived in. Furthermore, they will have continuously been in contact with various languages, not least because their school environment allows them to engage with students of various nationalities, mother tongues, cultural backgrounds and language experiences. The Dutch students in this study had less first-hand experience with the learning of foreign languages, as well as less active, practical foreign language knowledge. The students' vision on foreign language acquisition reflects this difference in foreign language exposure and experience.

The English students strongly believed that the most effective strategy to learn the grammar of a foreign language is by interacting with native speakers. By interacting with native speakers of a language, L2 learners are able to learn subconsciously and in a natural, spontaneous manner without explicit instructions. Because the English students are frequently surrounded by native

speakers of different languages, the barriers to use of their L2 with these native speakers are fewer than for students who are continuously surrounded by L1 speakers. This is reinforced by the low percentage (4.2%) of Dutch students who believed interaction with native speakers to be an effective learning strategy. Instead, 79.2% of Dutch students believed that the best strategy to learn the grammar of a foreign language is to memorize the grammar rules "off by heart". These findings are essential for the understanding and interpretation of the quantitative results.

The findings are a result of the learning environments in which the students learn their foreign language. The English students learn Dutch in an institutional environment in the form of three hours of language teaching per week. Additionally, they are also able to learn Dutch in a naturalistic environment by interacting with native speakers in and around the school and because they are immersed in the Dutch language and culture on a daily basis. The Dutch students however, mostly learn English in an institutional environment (two hours of language teaching per week). They do report to engage in English (social) media and entertainment. Whilst this is not comparable to a comprehensive naturalistic language learning environment, Birulés-Muntané & Soto-Faraco (2016) have shown that watching English media with English subtitles can significantly improve the speech perception and listening comprehension of L2 learners. The discussion of the quantitative data – which follows below – demonstrates the extent to which the learning environments influence the performance of the students.

5.2 Quantitative findings

The data presented in section 4.2 shows that there are more differences than similarities in the L2 learning processes of the two groups. The students' perception of what the most effective foreign language learning strategy is – which will likely have been influenced by the learning environment – causes different linguistic behavior regarding the conjugation of foreign language nouns and verbs. The fact that both groups have a similar overall correctness score shows that, generally, all the students have reached a similar level when it comes to the conjugation of nouns and verbs in their L2. However, the learning strategy that the students implement to reach the final, conjugated word form differs significantly.

These differences are highlighted by the different error patterns that were found in both groups. The errors of the Dutch students systematically consisted of overgeneralizations of the

inflectional endings. Most errors were made in the irregular English words by applying a default rule to an irregular word. However, the error patterns of the English students varied. They overgeneralized the Dutch rule that when conjugating a singular noun into a plural, the final consonant is doubled if it follows a short vowel. There are many exceptions to this rule, which the English students had not yet acquired. **Table 13** shows an example and an exception to the rule. The English students were mostly correct in their use of the inflectional ending.

Table 13: Example of G2 overgeneralization Dutch grammar rule

	Singular	Plural	G2 response
Regular	*Pan* /pɑn/ 'pan'	*Pannen* /pɑnən/ 'pans'	N/A
Irregular	*Gat* /χɑt/ 'hole'	*Gaten* /χaːtən/ 'holes'	**Gatten* /χɑtən/

The errors of the English students also included transfer, such as the examples in (43) show.

(43) Examples of English students' transfer in Dutch: *Schips, *Smids

In these responses, the inflectional ending is incorrect. This is most likely not because the students applied a default rule for conjugating singular nouns into plural nouns, but rather that the students recognized the words from their L1 and applied the English plural suffix (-s) to the Dutch words. In this case, it is a coincidence that the suffix (-s) is also a Dutch plural marker and the students did not apply it because they believed the Dutch (-s) to be the appropriate ending to these words.

These findings are supported by the results of the German conjugations. Although most English students (83.3%) did not fill in the German word lists, some of the responses show transfer, such as shown below.

(44) Examples of English students' transfer in German: *Die Charakters, *Die Students

The students whose responses included transfer did not complete the German word list, but only conjugated a number of words. Therefore, no patterns could be found in their responses. All the Dutch students filled in the German word lists. Surprisingly, considering the amount of similar words in the German word lists (see **table 14**), none of the Dutch students' responses showed transfer. The German irregular verbs in particular were frequently conjugated incorrectly by the Dutch students. These verbs were mostly overgeneralized; a result similar to

the results for the English irregular words. In addition to examples of these overgeneralizations, **table 14** also shows the percentage of students who overgeneralized the words.

Table 14: Examples of similar German and Dutch irregular verbs

German irregular verb in word list	Dutch equivalent	Correct German conjugation	Correct Dutch conjugation	Examples and percentage of Dutch students' conjugation
KOMMEN	Komen	Kamen	Kwamen	*Kommten (80.0%)
FLIEGEN	Vliegen	Flogen	Vlogen	*Fliegten (75.0%)
ESSEN	Eten	Aßen	Aten	*Essten (100.0%)
BRINGEN	Brengen	Brachten	Brachten	*Bringten (92.9%)

The responses of the Dutch students to the German word lists verify the results of the English word lists, namely that the Dutch students are able to memorize the grammar rules for regular conjugation but have difficulty remembering the exceptions to these rules. The results in section 4.2 show this, and the German results verify it, as the students performed well for the conjugation of German regular verbs. The Dutch students performed less well on German plural conjugation (average correctness score: 45.5%). This illustrates the difficulty Dutch students have to retrieve irregulars, as the German plural conjugation consists mostly of exceptions. The Dutch students' responses were highly inconsistent, sometimes adding (-en) and sometimes adding (-e) or (-s) to the nouns.

Whilst the Dutch students mostly added the German past tense marker (-te) + person ending to conjugate the verbs, they also managed to apply schwa epenthesis. This is a mechanism whereby verbs ending in (-te) or (-de) receive an additional (-e) in the past tense, such as shown in **table 15**. This is an additional rule for regular conjugation which is used frequently enough for it not to be an exception. **Table 15** shows that the Dutch students were familiar with the rule and even applied it to non-existing words.

Table 15: Examples of correct German past tense conjugations

	German verb ending in (-te) or (-de) + person ending	(Correct) German conjugation	Percentage of Dutch students' (correct) conjugation
Existing	ARBEITEN	Arbeiteten	75.0%
	KOSTEN	Kosteten	81.3%
	ENDEN	Endeten	87.5%
Non-existing	ZOTEN	Zoteten	56.3%
	LIDEN	Lideten	75.0%

The nature of the errors that were made by both groups of students reflects the learning strategy that the groups believed to be most effective to learn the grammar of a foreign language. Whereas the English students' responses were derived from their intuition and interlanguage, the Dutch students' responses were derived from their reasoning, by applying the rules they had learned in their language classes.

This study was conducted in the light of the dual-mechanism predictions stated in section 2.3. The results of these predictions show that a small number of students in both groups generalized non-existing words, which contrasts the prediction that learners would *not* generalize irregular patterns of non-existing words. In both groups, the generalizations were made only for past tense conjugations and not for plural conjugations. The students who generalized words had more experience with the target language than the average student. The fact that these generalizations were not seen in any of the native speaker responses indicates that the experienced L2 learners may have believed that these words were an exception to regular words and therefore did not want to apply a default rule. However, they were not able to retrieve a correct irregular conjugation and consequently responded with an improvised version.

In both groups, the correctness scores of the irregular words increased significantly with language experience. This confirms the prediction that irregular words are stored in the mental lexicon and that, depending on the learner's experience with language, their retrieval ability improves. Although some L2 learners in the study were more advanced than others, L2 learners should not be considered identical to L1 learners. Instead, they should be recognized as independent, competent language users. The linguistic decisions and behavior of L2 learners stem from a different source, since their foreign language knowledge, intuition and experience is unique. Moreover, adolescent L2 learners such as the participants in the study have access to

a fully developed linguistic system, promoting an interlanguage and potential susceptibility to errors that L1 learners are not at risk of. This reinforces the importance of L2 acquisition studies and implementation of L2 learner needs into the classroom. Cook (1999) argues that L2 learners should be taught from an L2 learner perspective, rather than focusing on the pursuit of a perfect native speaker example, as this generates the perception of L2 learners being "failed native speakers" (p. 185).

5.3 Analysis of research questions and hypotheses

The research questions posed in section 2.7 are discussed below based on the findings of this study.

RESEARCH QUESTION 1:

> What are the similarities and differences in the formation of English and Dutch inflectional morphology by secondary school students with different mother tongues?

Hypothesis I: There are no differences because the rules concerning inflection in the respective languages are transparent.

Hypothesis II: The close relationship between the Germanic languages has a positive influence on the ability of the students to inflect words in another Germanic language.

The results brought forward more differences than similarities regarding the formation of foreign language inflectional morphology. Whereas the students of both groups reached a similar level in the acquisition of foreign language inflectional morphology, the learning strategies they implement differed. Consequently, neither of the hypotheses can be confirmed: Hypothesis I is disproved because the rules of the two languages that were examined were not sufficiently transparent to the L2 learners, causing them to make errors based on their learning strategy. Hypothesis II is disproved because in this study, the close relationship Dutch has to German did not result in an outcome that showed a better performance in German conjugation than in English conjugation from the Dutch students.

The language learning environment proved to have a major influence on the students' perception of foreign language acquisition. Whereas G1 believed that interaction with native

speakers was the most effective foreign language learning strategy, G2 believed it was more effective to memorize the grammar rules “off by heart”. These students have performed according to this perception, which has overruled their natural linguistic intuition.

RESEARCH QUESTION 2:

> To what extent does overgeneralization play a role in the acquisition of foreign language inflectional morphology in secondary school students?
>
> Hypothesis: The students use grammar rules in all contexts, even where they should not be applied.

The results showed that overgeneralization played a major role in the acquisition of foreign language morphology in secondary school adolescents. Both groups used grammar rules in contexts where they were not appropriate. However, whereas G1 overgeneralized various grammar rules and was also subject to other types of errors, such as transfer, G2 systematically overgeneralized the same rule, namely the application of a regular suffix to an irregular word. Therefore, the hypothesis can be confirmed, with an emphasis on the correlation between overgeneralization and language learning in an institutional environment.

RESEARCH QUESTION 3:

> Does the dual-mechanism theory make correct predictions regarding the acquisition of English and Dutch inflection by L2 learners?
>
> Hypothesis: The students will not generalize irregular patterns of non-existing words and they are able to conjugate irregulars properly depending on their familiarity with the words.

The results showed that some students in both groups generalized irregular patterns of non-existing words, but most students did not. Additionally, G1 also overgeneralized irregular existing words to a large degree. However, the retrieval ability of irregular words of both groups improved with language experience. Therefore, the hypothesis can be confirmed.

5.4 Limitations and further research

Limitations in the research methodology should be considered. Firstly, the average age of the two student groups differed, potentially leading to differences in handling of the language acquisition process (Gringmuth-Dallmer, 2015). Nevertheless, given that both groups had likely reached their critical period of language acquisition, one can consider that the age difference will not have significantly introduced bias in the study design. Furthermore, the English students did not all complete the exercises asked of them, therefore making the study population smaller. This may also have artificially altered the study group's average characteristics, introducing bias in the results. Lastly, some factors such as student engagement and quality of teaching could not be accounted for in the present study. With improved time resources and a larger sample size, one could be more confident about excluding these factors as a source of bias. This may be a direction for future research in the field.

5.5 Summary of discussion

In conclusion, the findings show that overgeneralization plays a major role in L2 acquisition, as both the English and the Dutch students were prone to making overgeneralization errors in their L2. Therefore, linguistic overgeneralization is a phenomenon that should be considered to play a role in any person's language learning process, rather than relating it L1 learners.

Furthermore, the results show that the language learning environment has the ability to influence an L2 learner's perception of foreign language acquisition. This study focused on L2 learners with a predominantly naturalistic learning background and L2 learners with an institutional learning background. The distinct views of foreign language acquisition held by both groups of students were underlined by their questionnaire responses and performances in the word list exercises. The English students believed that interaction with native speakers is the most effective strategy to acquire the grammar of a foreign language. They showed spontaneous language use and improvisation in their responses. The Dutch students believed that memorizing grammar rules "off by heart" is the most effective learning strategy, and showed forced, rule-based language use in their responses.

Moreover, the dual-mechanism predictions that were examined in this study show to be applicable to L2 learners to some extent. Although this is the case, the apparent difference

between L1 and L2 users should not be disregarded and both of these groups should be considered independent and competent language users.

6. Conclusion

This study examined the similarities and differences in the acquisition of foreign language morphology in secondary school learners with different native languages. In the light of the dual-mechanism theory and the overgeneralization phenomenon, the results of two groups of secondary school students show that the learning environment has a major influence on an adolescent L2 learner's perception of foreign language acquisition. This perception, in turn, strongly affects the manner in which the L2 learners approach familiar and unfamiliar linguistic situations. This causes differences in the learning strategies implemented by both groups.

Bibliography

Al-Baldawi, W. N., & Saidat, A. M. (2011). Linguistic overgeneralization: A case study. *International Journal of Academic Research in Business and Social Sciences*(1), 184-193.

Allendorff, S., & Wode, H. (1981). Some overgeneralizations in the L1 acquisition of interrogative pronouns. *International Review of Applied Linguistics in Language Teaching*, 31-44.

Al-Saidat, E. M. (2012). Acquisition of the Inflectional Morphology of English as a Foreign Language: An Error Analysis Approach. *The Buckingham Journal of Language and Linguistics, 5*, 19-37.

Ambridge, B., Pine, J. M., Rowland, C. F., Chang, F., & Bidgood, A. (2013). The retreat from overgeneralization in child language acquisition: Word learning, morphology and verb argument structure. *Wiley Interdisciplinary Reviews: Cognitive Science, 4*(1), 47-62.

Baayen, R. H., Dijkstra, T., & Schreuder, R. (1997). Singulars and Plurals in Dutch: Evidence for a Parallel Dual-Route Model. *Journal of Memory and Language, 37*, 94-117.

Bailey, N., Madden, C., & Krashen, S. (1974). Is there a "natural sequence" in adult second language learning? *Language Learning, 24*, 235-243.

Bauer, L. (1983). *English Word-Formation.* Cambridge: Cambridge University Press.

Berent, I., Pinker, S., & Shimron, J. (2002). The nature of regularity and irregularity: evidence from Hebrew nominal inflection. *Journal of psycholinguistic research, 31*, 459-502.

Berko, J. (1958). The Child's Learning of English Morphology. *Word, 14*(2-3), 150-177.

Berko, J. (2011, January). The Wug Test and Major Developments Since Then: The Jean Berko Gleason Interview. (R. S. Murphy, Interviewer)

Birdsong, D., & Flege, J. (2001). Regular-irregular dissociations in L2 acquisition of English morphology. *BUCLD 25: Proceedings of the 25th Annual Boston University Conference on Language Development* (pp. 123-132). Boston, MA: Cascadilla Press.

Birulés-Muntané, J., & Soto-Faraco, S. (2016). Watching Subtitled Films Can Help Learning Foreign Languages. *PloS ONE, 11*(16). doi:https://doi.org/10.1371/journal.pone.0158409

Bliss, H. (2006). L2 Acquisition of Inflectional Morphology: Phonological and Morphological Transfer Effects. *Proceedings of the 8th Generative Approaches to Second Language Acquisition: The Banff Conference* (pp. 1-8). Banff: Cascadilla Proceedings Project.

Boudelaa, S., & Gaskell, M. G. (2002). A re-examination of the default system for Arabic plurals. *Language and Cognitive Processes, 17*, 321-343.

Brown, R. (1973). The Study of Adam, Eve and Sarah. In R. Brown, *A First Language: The Early Stages* (pp. 51-59). Cambridge: Harvard University Press.

Cabrera, M., & Zubizarreta, M. L. (2005). Overgeneralization of Causatives and Transfer in L2 Spanish and L2 English. *Selected Proceedings of the 6th Conference on the Acquisition of*

Spanish and Portugese as First and Second Languages (pp. 15-30). Albuquerque: Cascadilla Proceedings Project.

Cai, L., & Wang, Y. (2013). Interlanguage Pragmatics in SLA. *Theory and Practice in Language Studies, 3*(1), 142-147.

Cazden, C. B. (1968). The Acquisition of Noun and Verb Inflections. *Child Development, 39*(2), 433-448.

Clahsen, H. (1999). Lexical entries and rules of language: A multidisciplinary study of German inflection. *Behavioral and Brain Sciences*, 991-1060.

Clahsen, H., Rothweiler, M., & Woest, A. (1992). Regular and irregular inflection in the acquisition of German noun plurals. *Cognition*, 225-255.

Cook, V. (1999). Using SLA research in language teaching. *International Journal of Applied Linguistics, 9*(2), 267-284.

Dabrowska, E. (2001). Learning a morphological system without a default: the Polish genitive. *Journal of Child Language, 28*(3), 545-574.

De Haas, W., & Trommelen, M. (1993). *Morfologisch Handboek van het Nederlands.* 's-Gravenhage: SDU Uitgeverij.

Domínguez, J. A. (1991). The Role of Morphology in the Process of Language Acquisition and Learning. *Revista Alicantina de Estudios Ingleses, 4*, 37-47.

Dulay, H., & Burt, M. (1974). Natural sequences in child second language acquisition. *Language Learning, 24*, 37-53.

Ellis, N. C. (2008). The psycholinguistics of the interaction hypothesis. *Multiple Perspectives on Interaction in SLA: Second Language Research in Honor of Susan M. Gass*, 11-40.

Ellis, R. (1989). Are Classroom and Naturalistic Acquisition the Same?: A Study of the Classroom Acquisition of German Word Order Rules. *Studies in Second Language Acquisition, 11*(3), 305-328.

Ellis, R. (1994). *The Study of Second Language Acquisition.* Oxford: Oxford University Press.

Ellis, R. (1997). *SLA Research and Language Teaching.* New York: Oxford University Press.

Ernestus, M., & Baayen, H. (2001). Choosing between the Dutch past-tense suffixes -te and -de. In T. Van Der Wouden, & H. Broekhuis, *Linguistics in the Netherlands 2001* (pp. 77-88). Amsterdam: John Benjamins Publishing Company.

Ezeanu, E. (2013). *Overgeneralization: What It Is, Why It's Dangerous and How to Avoid It*. Retrieved from Eduard Ezeanu: Coaching for Peak Performance: http://iameduard.com/overgeneralization/

Fidler, A. (2006). Reconceptualizing fossilization in second language acquisition: a review. *Second Language Research, 22*(3), 398-411.

Flege, J. E., Yeni-Komshian, G. H., & Liu, S. (1999). Age Constraints on Second-Language Acquisition. *Journal of Memory and Language, 41*(1), 78-104.

Gollan, T. H., & Frost, R. (2002). Two routes to grammatical gender: evidence from Hebrew. *Journal of psycholinguistic research, 30*, 627-651.

Gringmuth-Dallmer, F. T. (2015). Puberty as a Critical Period in Teach English as a Foreign Language. Berlin : Freie Universität Berlin.

Hahn, U., & Nakisa, R. C. (2000). German Inflection: Single Route or Dual Route? *Cognitive Psychology, 41*, 313-360.

Harakchiyska, T. (2011). Overgeneralization as a Strategy for the Acquisition of L1 and L2 Noun Morphology: the Category of Number. *Conference: University of Ruse and Union of Scientists, 50.* Ruse.

Hawkins, R., & Lozano, C. (2006). Second Language Acquisition of Phonology, Morphology and Syntax. In K. Brown, *The Encyclopedia of English Language and Linguistics* (pp. 67-74). London: Elsevier.

Hopp, H. (2012). The development of L2 morphology. *Second Language Research, 29*(1), 3-6.

Jia, G. (2003). The acquisition of the English plural morpheme by native Mandarin Chinese-speaking children. *Journal of Speech, Language and Hearing Research, 46*(6), 1297-1311.

Kaspar, G., & Schmidt, R. (1996). Developmental Issues in Interlanguage Pragmatics. *Studies in Second Language Acquisition, 18*(2), 149-169.

Keuleers, E., Sandra, D., Daelemans, W., Gillis, S., Durieux, G., & Martens, E. (2007). Dutch plural inflection: The exception that proves the analogy. *Cognitive Psychology, 54*(4), 283-318.

Köpcke, K.-M. (1988). Schemas in German Plural Formation. *Lingua, 74*, 305-335.

Köpcke, K.-M. (1998). The acquisition of plural marking in English and German revisited: schemata versus rules. *Journal of Child Language, 25*(2), 293-319.

Kouider, S., Halberda, J., Wood, J., & Carey, S. (2006). Acquisition of English Number Marking: The Singular-Plural Distinction. *Language Learning and Development, 2*(1), 1-25.

Kuczaj, S. A. (1977). The acquisition of regular and irregular past tense forms. *Journal of Verbal Learning and Verbal Behavior, 16*(5), 589-600.

Long, M. H. (2003). Stabilization and Fossilization in Interlanguage Development. In C. J. Doughty, & M. H. Long, *The Handbook of Second Language Acquisition* (pp. 488-529). Oxford: Blackwell Publishing Ltd.

Lowie, W. M. (1998). *The acquisition of interlanguage morphology: a study into the role of morphology in the L2 learner's mental lexicon.* Groningen.

MacWhinney, B., & Snow, C. (1985). The child langugae data exchange system. *Journal of Child Language, 12*(2), 271-295.

Marcus, G. F. (2000). Children's overregularization and its implications for cognition. In P. Broeder, & J. Murre, *Models of Language Acquisition: Inductive and Deductive Approaches* (pp. 154-176). Oxford: Oxford University Press.

Marcus, G. F., Brinkmann, U., Clahsen, H., Wiese, R., & Pinker, S. (1995). German Inflection: The Exception That Proves the Rule. *Cognitive Psychology, 29*(3), 189-256.

Marcus, G., Pinker, S., Ullman, M., Hollander, M., Rosen, T., & Xu, F. (1992). Overregularization in language acquisition. *Monographs of the Society for Research in Child Development, 57*(4), 1-182.

Marsh, D., & Langé, G. (2000). *Using Languages to Learn and Learning to Use Languages.* Jyväskylä & Milan: TIE-CLIL.

Mazurkewich, I., & White, L. (1984). The acquisition of the dative alternation: Unlearning overgeneralizations. *Cognition, 16*, 261-283.

Ministerie Onderwijs Cultuur en Wetenschap. (n.d.). *Welke vreemde talen krijg ik in de onderbouw van het voortgezet onderwijs?* Retrieved from www.rijksoverheid.nl: https://www.rijksoverheid.nl/onderwerpen/voortgezet-onderwijs/vraag-en-antwoord/welke-vreemde-talen-krijg-ik-in-de-onderbouw-van-het-voortgezet-onderwijs

Mitchell, R., Kiely, R., & Hüttner, J. (2015). Naturalistic vs. classroom learning. Southampton, England: University of Southampton & British Council. Retrieved from https://www.futurelearn.com/courses/understanding-language/0/steps/4157

Muñoz, C. (2008). Symmetries and Asymmetries of Age Effects in Naturalistic and Instructed L2 Learning. *Applied Linguistics, 29*(4), 578-596.

Nakisa, R., Plunkett, K., & Hahn, U. (2000). Single and dual-route models of inflectional morphology. In P. Broeder, & J. Murre, *Models of Language Acquisition: Inductive and Deductive Approaches* (pp. 201-222). Oxford: Oxford University Press.

Natalicio, D., & Natalicio, L. (1971). A comparative study of English pluralization by native and non-native English speakers. *Child Development, 42*, 1302-1306.

Pinker, S. (1995). Why the Child Holded the Baby Rabbit: a Case Study in Language Acquisition. In L. Gleitman, & M. Liberman, *An Invitation to Cognitive Science: Language* (pp. 107-133). Cambridge, MA: MIT Press.

Pinker, S. (1997). Words and rules in the human brain. *Nature, 387*, 547-548.

Pinker, S. (1998). Words and rules. *Lingua*, 219-242.

Pinker, S. (1999). *Words and rules* (Vol. 106). London: Weidenfeld and Nicholson.

Pinker, S. (2003). *The Language Instinct: How the Mind Creates Language.* London: Penguin.

Pinker, S., & Ullman, M. T. (2002). The past and the future of the past tense. *Trends in Cognitive Sciences, 6*(11), 456-463.

Plunkett, K., & Juola, P. (2010). A Connectionist Model of English Past Tense and Plural Morphology. *Cognitive Science, 23*(4), 463-490.

Salaberry, M. R. (1998). The development of inflectional morphology in L2 acquisition: a cross-linguistic analysis. *Ilha do Desterro, 35*, 87-127.

Salaberry, M. R., & Shirai, Y. (2002). *The L2 Acquisition of Tense-Aspect Morphology.* Amsterdam: John Benjamins.

Sato, C. J. (1984). Phonological Processes in Second Language Acquisition: Another Look at Interlanguage Syllable Structure. *Language Learning, 34*(4), 43-58.

Selinker, L. (1972). Interlanguage. *International Review of Applied Linguistics in Language Teaching, 10*(1-4), 209-231.

Selinker, L., & Lamendella, J. T. (1978). Two Perspectives on Fossilization in Interlanguage Learning. *Interlanguage Studies Bulletin, 3*(2), 143-191.

Selinker, L., Swain, M., & Dumas, G. (1972). The Interlanguage Hypothesis Extended to Children. *Language Learning, 25*(1), 139-152.

Slabakova, R. (2009). What Is Easy and What Is Hard to Acquire in a Second Language? *Proceedings of the 10th Generative Approaches to Second Language Acquisition Conference* (pp. 280-294). Illinois: Cascadilla Proceedings Project.

Slabakova, R., & Gajdos, J. (2008). The Combinatorial Variability Hypothesis in Second Language. *Selected Proceedings of the 2007 Second Language Research Forum* (pp. 35-43). Illinois: Cascadilla Proceedings Project.

Song, Y. (2015). L2 processing of Plural Inflection in English. *Language Learning, 65*(2), 233-267.

Takashima, H. (1992). Transfer, overgeneralization and simplification in second language acquisition: A case study in Japan. *IRAL, 30*, 97-111.

Tarone, E. (1994). Interlanguage. *Elsevier, 4*, 1715-1719.

Tarone, E., & Han, Z. (2014). *Interlanguage: Forty Years Later.* Amsterdan: John Benjamins.

Tasseva-Kurktchieva, M. (2008). What About Grammar? Comprehension and Production at the Initial Stage of L2 Acquisition. In Roumyana Slabakova et al. (Ed.), *Proceedings of the 9th Generative Approaches to Second Language Acquisition Conference (GASLA 2007)* (pp. 242-250). Somerville, MA: Cascadilla Proceedings Project.

Tessier, A.-M. (2015). *Phonological Acquisition: Child Language and Constraint-Based Grammar*. London: Macmillan Education.

Tomasello, M. (2009). The usage-based theory of language acquisition. In E. L. Bavin, *The Cambridge Handbook of Child Language* (pp. 69-88). New York: Cambridge University Press.

Tyler, A., & Nagy, W. (1989). The Acquisition of English Derivational Morphology. *Journal of Memory and Language, 28*, 649-667.

Ullman, M., Corkin, S., Coppola, M., Hickok, G., Growdon, J., Koroshetz, W., & Pinker, S. (1997). A Neural Dissociation within Language: Evidence that the mental dictionary is part of

declarative memory, and that grammatical rules are processed by the procedural system. *Journal of Cognitive Neuroscience, 9*, 266-276.

Van Dooren, W., De Bock, D., Hessels, A., Janssens, D., & Verschaffel, L. (2005). Not everything is proportional: Effects of age and problem type on prospensities for overgeneralization. *Cognition and Instruction, 23*(1), 57-86.

Van Wijk, J. (2007). *The Acquisition of the Dutch Plural*. Utrecht: LOT.

Villarreal, M., Esteley, C., & Alagia, H. (2010). Overgeneralization of Linear Models: Presence and Characteristics among University Students. *Mathematical Thinking and Learning, 12*(1), 86-108.

Weerman, F., Punt, L., & Bisschop, J. (2006). L1 and L2 Acquisition of Dutch Adjectival Inflection. *ACLC Working Papers, 1*(1), 5-36.

Wenzlaff, M., & Clahsen, H. (2004). Tense and agreement in German agrammatism. *Brain and Language, 89*, 57-68.

Wiese, R. (2009). The grammar and typology of plural noun inflection in varieties in German. *The Journal of Comparative Germanic Linguistics, 12*(2), 137-173.

Wood, J. N., Kouider, S., & Carey, S. (2009). Acquisition of Singular-plural Morphology. *Developmental Psychology, 41*(1), 202-206.

Yu, L., & Odlin, T. (2015). *New Perspectives on Transfer in Second Language Learning.* Bristol: Multilingual Matters.

Appendix A: English Questionnaire

1. In which year were you born? _____
2. What is your gender? Male / Female
3. What is your mother tongue(s)? _____
4. How long have you been learning Dutch? _____
5. What is your favorite word in Dutch? _____
6. How long have you been learning German? _____
7. What is your favorite word in German? _____
8. Which languages have you learned before the age of 10? _____
9. Which languages have you learned after the age of 10? _____
10. Have you learned the languages mostly through teaching or through exposure (television, living abroad, etc.)?

    Dutch: _____

    German: _____

11. How do you learn the grammar of a foreign language best?
    a. By memorizing the grammar rules off by heart
    b. By interacting with native speakers
    c. By reading in the language
    d. Other: _____
12. Which language(s) do you speak fluently today? _____

Appendix B: English words and their native-like conjugation

		Word	Conjugation	
			Orthography	Phonology
Nouns and their plural conjugation	Regular	Mug	Mugs	/mʌgz/
		Door	Doors	/dɔɹz/
		Album	Albums	/ælbəms/
		Roof	Roofs	/ɹuːfs/
		Kick	Kicks	/kɪks/
		Case	Cases	/keɪsɪz/
		Witch	Witches	/wɪtʃɪz/
	Irregular	Mouse	Mice	/maɪs/
		Tooth	Teeth	/tiːθ/
		Man	Men	/mɛn/
		Fish	Fish	/fɪʃ/
		Sheep	Sheep	/ʃip/
		Bacterium	Bacteria	/bæktɪɹiə/
		Stimulus	Stimuli	/stɪmjəlaɪ/
	Non-existing	Wug	Wugs	/wʌgz/
		Gutch	Gutches	/gʌtʃɪz/
		Kazh	Kahzes	/kæzɪz/
		Tor	Tors	/tɔɹz/
		Kra	Kras	/kɹɑs/
		Tak	Taks	/tæks/
		Heaf	Heafs	/hiːfs/
		Fouse	Fouses / Fice	/faʊsɪz/; /faɪs/
Verbs and their past tense conjugation	Regular	Bake	Baked	/beɪkt/
		Stop	Stopped	/stɑpt/
		Melt	Melted	/mɛltɪd/
		Shout	Shouted	/ʃaʊtɪd/
		Pray	Prayed	/pɹeɪd/
		Cry	Cried	/kɹaɪd/
	Irregular	Run	Ran	/ɹæn/
		Catch	Caught	/kɑt/
		Throw	Threw	/θɹuː/
		Cost	Cost	/kɔst/
		Hurt	Hurt	/hɝt/
		Put	Put	/pʊt/
	Non-existing	Spow	Spowed / Spew	/spoʊd/; /spju/
		Rick	Ricked	/rɪkt/
		Mot	Motted	/mɑtɪd/
		Bod	Bodded	/bɑdɪd/
		Bing	Binged / Bang	/bɪŋd/; /bæŋ/
		Gip	Gipped	/gɪpt/

Appendix C: Dutch words and their native-like conjugation

		Word	Conjugation	
			Orthography	Phonology
Nouns and their plural conjugation	Regular	Hand	Handen	/ɦɑndən/
		Stoel	Stoelen	/stuł/
		Boek	Boeken	/buk/
		Tafel	Tafels	/tafəłs/
		Speler	Spelers	/speːłəɹs/
		Keuze	Keuzes	/køzəs/
		Weide	Weiden / Weides	/ʋɛidən/; /ʋɛidəs/
	Irregular	Gat	Gaten	/χaːtən/
		Slot	Sloten	/sloːtən/
		Lot	Loten	/loːtən/
		Lid	Leden	/leːdən/
		Schip	Schepen	/sχeːpən/
		Smid	Smeden	/smeːdən/
	Non-existing	Wuk	Wukken	/ʋʏkən/
		Buts	Butsen	/bʏtsən/
		Nag	Naggen	/nɑχən/
		Virde	Virden	/vɪɹdən/
		Juun	Junen	/jynən/
		Kelzer	Kelzers	/kɛłzəɹs/
		Roefel	Roefels	/ʁufəłs/
Verbs and their past tense conjugation	Regular	Pakken	Pakten	/pɑktən/
		Boffen	Boften	/bɔftən/
		Missen	Misten	/mɪstən/
		Leggen	Legden	/lɛχdən/
		Roeren	Roerden	/ʁuɹdən/
		Halen	Haalden	/ɦaldən/
	Irregular	Eten	Aten	/atən/
		Varen	Voeren	/vuʁən/
		Brengen	Brachten	/brɑχtən/
		Komen	Kwamen	/kʋɑmən/
		Weten	Wisten	/ʋɪstə(n)/
		Vliegen	Vlogen	/vloχən/
	Non-existing	Zorken	Zorkten	/zɔɹktən/
		Kirpen	Kirpten	/kɪɹptən/
		Polden	Poldden	/pɔldən/
		Lerten	Lertten	/lɛɹtən/
		Flengen	Flengden / Flachten	/fłɛŋdən/; /fłɑχtən/
		Lingen	Lingden / Longen	/lɪŋdən/; /lɔŋən/

Appendix D: German words and their native-like conjugation

		Word	Conjugation	
			Orthography	Phonology
Nouns and their plural conjugation	Regular	Die Banane	Die Bananen	/ɓanaːnən/
		Die Frage	Die Fragen	/fʁaːgŋ/
		Der Student	Die Studenten	/stʉːdɛntən/
		Der Tisch	Die Tische	/tɪʃə/
		Das Tier	Die Tiere	/tiːɐ̯/
		Der Opa	Die Opas	/opaːs/
		Das Foto	Die Fotos	/foːtos/
	Irregular	Der Charakter	Die Charaktere	/kaʁaktɐ/
		Das Klima	Die Klimate	/kliːma/
		Das Deck	Die Decks	/dɛks/
		Der Park	Die Parks	/paʁks/
		Der Onkel	Die Onkel	/ɔŋkl/
		Der Daumen	Die Daumen	/daʊ̯mən/
		Die Firma	Die Firmen	/fɪʁmən/
		Die Praxis	Die Praxen	/pʁaksn/
	Non-existing	Der Wück	Die Wücken	/vʏkən/
		Das Kahza	Die Kahzas	/kaːtsas/
		Der Lör	Die Löre	/løːʁə/
		Das Bunn	Die Bunnen	/bʊnən/
		Die Nito	Die Nitos	/nitos/
		Die Krohe	Die Kröhen	/kʁœn/
		Der Haf	Die Häfe	/hɛːfə/
		Der Rass	Die Rassen	/ʁɑsn/
Verbs and their past tense conjugation	Regular	Leben	Lebten	/leːptn̩/
		Machen	Machten	/maχtn/
		Sagen	Sagten	/zaːktn
		Arbeiten	Arbeiteten	/aʁbaɪ̯tətn/
		Kosten	Kosteten	/kɔstətn/
		Enden	Endeten	/ɛndətn/
	Irregular	Essen	Aßen	/aːsn/
		Fahren	Fuhren	/fuːʁən/
		Bringen	Brachten	/bʁaχtn/
		Kommen	Kamen	/kaːmən/
		Wissen	Wussten	/vʊstn/
		Fliegen	Flogen	/floːgŋ/
	Non-existing	Spünnen	Spünnten	/ʃpʏntn/
		Micken	Mickten	/mɪktn/
		Zoten	Zoteten	/tsɔtətn/
		Liden	Lideten	/liːdətn/
		Fringen	Fringten / Flachten	/fʁɪŋtn/; /fʁaχtn/
		Bingen	Bingten / Bangen	/bɪŋtn/; /bɑŋn/