Transfer across domains in Dutch heritage speakers

Evidence from a Grammaticality Judgement Task

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August 2020

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Abstract

This study reports on research which aimed to investigate whether the domain of syntax or the domain of lexicon is more prone to transfer in Dutch heritage speakers with German as their dominant language. An online Grammaticality Judgement Task was conducted, in which two syntactic phenomena (word order of three verbs in verb-final clusters and varying orders of subject-direct object in subordinate clauses) and two lexical phenomena (adjective + noun collocations and gender assignment) were taken as empirical materials. Because of differences in language background and language dominance, three different groups were created, of which the first group – the heritage speakers – was the most dominant in German. As hypothesised on the basis of previous research (e.g. Montrul, 2005, 2010b), lexical phenomena appeared to be slightly more difficult for heritage speakers. These speakers, moreover, were influenced by transfer, which also is in line with previous research (e.g. Van Greuningen, 2020; Lemhöfer, Schriefers and Hanique, 2010; Lemhöfer, Spalek & Schriefers, 2008). Cross-linguistic influence was most observed in the cases of lexical stimuli whose German translation equivalent was grammatical, whereas this was not found for syntactic constructions tested here.

Acknowledgements

I would like to thank my thesis supervisor dr. Peter Coopmans for all his time, his help and useful feedback on my master thesis. I am also grateful to the dr. Luisa Meroni for being the second reader of this thesis. Thanks to all subjects that participated in my study. A special thanks goes to Jantine, Leone and Jessica, who helped me find Dutch heritage speakers. Without their help, I would not be able to find as many heritage speakers as I did now. Thanks to the members of our digital thesis group: Marian, Marjolein, Christina and Liesje. During our daily meetings in the corona crisis, we discussed our progress, helped each other if needed and spoke about things that were unrelated to our thesis-projects. I could not have done it without them. Finally, I would like to thank my family and friends. Without their support, I would not be able to have finished this thesis.

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1. Introduction

Nowadays, many people speak more than one language. Some speak more than one first language (L1), others speak one or more second languages (L2). A subgroup of these multilingual speakers are heritage language speakers. According to Rothman (2009: 156), "a language qualifies as a heritage language if it is a language that is spoken at home or otherwise readily available to young children, but, crucially, this language is not a dominant language of the larger (national) society." Little or no formal education is available for these speakers (Rothman, 2007, 2009), who start learning their heritage language before or at the same time as the dominant language. They thus learn the heritage language as a L1 (Montrul, 2010a; Scontras, Fuchs & Polinsky, 2015). Montrul (2010a), however, argues that heritage language acquisition does not completely resemble L1 acquisition, since a heritage language is learned in a bilingual environment instead of a monolingual environment. Heritage language acquisition also shows some characteristics of adult second language acquisition, whose outcome is often described as "not uniform, not universal and unsuccessful" (Montrul, 2010a: 11). Furthermore, she argues that fossilization is very likely to occur and that motivation might play a role in the acquisition of the heritage language.

Heritage language speakers often do not show native-like mastery of their L1. Instead, their language proficiency is often lower than that of L1 speakers, who live in a country where this language is the dominant one (Scontras et al., 2015). Neither do heritage speakers resemble L2 speakers (Au, Knightly, Jun & Oh, 2002; Au, Knightly, Jun, Oh, & Romo, 2008; Montrul, 2010c). They seem to be in between L1 and L2 speakers, as indicated by Montrul (2016: 5): "Their heritage language displays many characteristics typical of adult second language acquisition in some modules of the grammar, but they maintain native-like mastery in other grammatical modules".

Several studies have examined the different grammatical modules of heritage speakers. One such study (Polinsky, 2008) investigated case and gender acquisition in Russian heritage speakers with English as their dominant language. Although both the L1 Russian and the Russian heritage speakers had some difficulties with the same gender classes, case was used less often by the heritage speakers. Some of the latter group – mostly the less proficient speakers – also tended to simplify the system, since predominantly masculine and feminine gender were used, whereas neuter gender was omitted. The heritage speakers thus did not

show native-like mastery of case and gender, which Polinsky (2008) ascribes to incomplete acquisition. Other common accounts in the literature explaining the lower language proficiency of heritage speakers point to language attrition, language transfer and language change. The predictions of each of these four accounts are spelled out in chapter 2.

This study mainly focusses on transfer, the influence of the stronger language on the weaker one (Montrul, 2010b). Transfer has been well documented in second language research, and to a lesser extent in heritage language literature (Cook, 2003; Montrul, 2010b). More specifically, the focus is on transfer in Dutch heritage speakers, whose dominant language is German. Although some research on transfer in heritage speakers has been done, this is still relevant. German and Dutch are two closely related languages and several grammatical phenomena partly overlap, but also differ in some respects. In a pilot study on gender acquisition in Dutch heritage speakers with German as their dominant language, I found evidence for the existence of language transfer (Van Greuningen, 2020). These results, however, must be taken with care, since only little data was gathered. Further exploration of transfer in Dutch heritage speakers, therefore, is needed.

As in Polinsky's (2008) study, most studies on heritage speakers focus on one phenomenon or several phenomena that belong to the same domain. To my knowledge, few studies (e.g. Montrul, 2010b) have compared linguistic ability of these speakers in different linguistic domains. The results of theses studies, as well as of studies on L2 speakers (e.g. Sorace, 2000), suggest that core syntactic phenomena are more difficult than interface phenomena. No study, I have found, however, focussed on syntax and the mental lexicon. The present study focusses on these domains, since syntax can be seen as a computational system, in which different rules need to be combined, whereas the lexical information is stored in the mental lexicon and needs to be retrieved from there.

The aim of this study is to find out whether the syntactic or lexical domain is more prone to transfer in Dutch heritage speakers, speaking German as their dominant language. To answer this question, it is investigated whether these speakers show transfer, and whether they have more difficulties with syntactic or lexical phenomena. By answering these questions, this study provides more information about the language ability of heritage speakers. It also contributes to the knowledge of Dutch heritage speakers in particular, since only very few studies have considered Dutch as a heritage language (e.g. Codina Bobia, 2017, 2019). Comparing syntax and mental lexicon, moreover, reveals what is more difficult for these

speakers. This knowledge can be useful for (extracurricular) education heritage speakers might receive. Gaining insight into the language performance of this bilingual group, furthermore, is also useful for linguistic theory in general, since it may tell us more about language mechanisms and storage.

A Grammaticality Judgment Task, in which comprehension was tested, has been carried out to answer both questions. Comprehension – and not production – is tested since it can tell one more about the ability of heritage speakers. When producing a certain structure, one cannot be sure whether the heritage speaker disallows a different (ungrammatical) construction to express something similar. In order to see whether the heritage speakers tested were able to also produce the correct constructions, they had the opportunity to improve what they considered as ungrammatical.

It is argued that Dutch heritage speakers appeared to have more difficulties with the lexical domain than with the syntactic domain. These speakers, moreover, showed transfer for Dutch stimuli, whose German translation equivalent is grammatical. Transfer affected the lexical domain more than the syntactic domain. Language dominance also influenced the results, since only the heritage speakers, who were dominant in German, showed signs of transfer.

This thesis is structured as followed. To provide more background knowledge, I will discuss four accounts in the next chapter that explain the lower proficiency of heritage speakers, as well as studies on transfer in L2 and heritage speakers. In chapter 3, I describe two syntactic and two lexical phenomena that form the empirical material of in this thesis. Chapter 4 discusses the research questions and the hypotheses of the study. Then a detailed description of the research method is given. Chapter 6 analyses the results. Chapter 7 concludes the discussion.

2. Theoretical background

2.1 Heritage speakers and their language ability

As was stated in the introduction, heritage language speakers often have a lower command of their heritage language than native speakers, who live in the country where that language is the dominant one. Gender agreement is one example of a language phenomenon heritage speakers of different languages have difficulties with (e.g. Polinsky, 2008; Montrul, Foote & Perpiñan, 2008; Martinez-Gibson, 2011). Montrul et al. (2008) for example compared Spanish gender agreement in Spanish heritage and L2 speakers. Both groups showed difficulties with gender agreement. Where L2 speakers mainly showed errors in oral production, written comprehension was affected more in heritage speakers. Martinez-Gibson (2011) also investigated gender agreement in Spanish heritage and L2 speakers. Although both groups made errors with gender agreement, the heritage speakers in this study were a little better than the L2-speakers.

Heritage speakers did not perform native-like in other grammatical domains as well. Albirini, Benmamoun and Chakrani (2013) and Valenzuela et al. (2012) both compared subject-verb agreement with adjective-noun agreement in Arabic and Spanish heritage speakers. Although the heritage speakers in both studies had difficulties with both phenomena, adjective-noun agreement turned out to be more difficult. For the syntactic domain, Potowski, Jegerski and Morgan-Short (2009) showed difficulties for the heritage speakers. They found that Spanish heritage speakers had problems with the subjunctive. Instruction helped the heritage speakers to get a better command of this construction in Spanish. Having difficulties with different grammatical structures, however, does not mean that heritage speakers are not able to acquire specific constructions. Montrul (2005), for example, showed that even low proficient Spanish heritage speakers knew the syntactic constraints on unaccusativity. These same heritage speakers, however, had some difficulties with the more subtle lexical-semantic properties of specific unaccusative verbs.

In the literature, four accounts explain this lower proficiency of heritage speakers: language attrition, incomplete acquisition, transfer, and language change. In many studies, the cause is sought in either incomplete acquisition[1] (e.g. Montrul, 2009) or language attrition

[1] The term incomplete acquisition is criticized by some researchers (Pascual y Cabo & Rothman, 2012; Scontras et al., 2015). Pascual Y Cabo & Rothman (2012) argue that “the competence [of heritage speakers] is simply different, but not incomplete”. Part of the reason for the lower proficiency of heritage speakers is the input,

(e.g. Polinsky, 2011). In the case of incomplete acquisition, heritage speakers show non-target like development. These speakers are early bilinguals, who started learning their heritage language before or at the same time as their dominant language. During this pre-schooling period, major language growth takes place in children. Monolingual children in this stage also show patterns of language in process, as for example in the omission of case morphology or mistakes in gender assignment (Montrul, 2016). When heritage speakers start socializing in the dominant language, e.g. when they start going to school, the use of the heritage language is reduced, which has consequences for the development of this language. This development is going to be delayed, since children use the heritage language less often and receive less input in this language. Because of the lack of input, Montrul (2016) argues that heritage speakers might not receive the minimum threshold of input to acquire and master different aspects of morphology and syntax. These delays, which start during childhood, are never fully caught up on, resulting in incomplete and non-native-like mastery of the heritage language. Incomplete acquisition thus may lead to divergent grammars, which are different from the target grammar, but resemble the language in progress of children (Montrul, 2016; Polinsky, 2011; Scontras, Fuchs & Polinsky, 2015)

Evidence in favour of this account is the acquisition of the subjunctive by Spanish heritage speakers. This construction is acquired late by monolingual Mexican children, who also benefit from schooling in acquiring this construction (Blake, 1983). Silva-Corválan (1994), Martinéz Mira (2009) and Montrul (2009) found in their studies that heritage speakers never fully acquire all subtle differences of the Spanish subjective with less input at a young age and without education. Other phenomena that are often sensitive to incomplete acquisition are verbal passives and conditionals, since they are late acquired as well (Alexiadou, 2017).

Other studies (e.g. Polinsky, 2011) link the cause to language attrition. According to Seliger (1996: 16) language attrition is “the temporary or permanent loss of language ability as reflected in a speaker’s performance or in his or her inability to make grammatical judgements that would be consistent with native speaker monolinguals of the same age and

which is, according to Pascual Y Cabo and Rothman (2012), not incomplete but different. The language of relatives and other people, from whom heritage speakers get their input, is already different, since they might suffer from language attrition or are influenced by the dominant language of the country, they live in. This also has consequences for the input heritage speakers receive. Incomplete acquisition, moreover, has a negative connotation, suggesting that the language of heritage speakers has some deficits. Other terms such as *divergent attainment* have therefore been suggested. In this paper, incomplete acquisition is used as a neutral term without any negative connotation.

stage of language development." A specific grammatical structure is thus first acquired, after which the ability to use this structure is lost. Bylund (2009), Flores (2010, 2012) and Pallier (2007) argue that language attrition is connected to the age of acquisition. Children tend to lose their L1 skills faster than adults, whose L1 is fully developed. Polinsky (2011) supports this account in her study, in which she compared adult and child heritage speakers regarding the acquisition of Russian relative clauses. Where monolingual and heritage children showed full acquisition of relative clauses, heritage adults performed differently. They thus suffered from language attrition.

These accounts make different claims as to development. Where a certain structure is never fully acquired in incomplete acquisition, it is acquired in case of language attrition, but this ability is lost later in life. Lohndal and Westergaard (2016), moreover, argue that both accounts make different predictions. In case of incomplete acquisition, systematic patterns are expected to be found. The outcome of language attrition would be more variable.

However, Montrul (2016: 218) states that "incomplete acquisition and attrition are not mutually exclusive: depending on the age and the developmental schedule of different grammatical properties, a child may show attrition in some areas that are acquired and mastered in the preschool age (gender agreement, case, aspect, and null subjects) and incomplete acquisition of structures that take several years to develop or are mastered during the period or later language development (verbal passives, subjunctive, and conditionals)." Furthermore, she argues that heritage speakers can also reveal incomplete acquisition of construction first and language attrition of that same construction at a later age.

A third account to explain the proficiency of heritage speakers is transfer from the dominant language to the heritage language (Montrul, 2010). One study that tested this hypothesis for Dutch heritage speakers was conducted by Codina Bobia (2017, 2019). He investigated the use of generic DPs, in particular bare singular count nouns, in heritage speakers of Dutch whose dominant language is Brazilian Portuguese. Dutch heritage speakers were in most cases more similar to the Brazilian controls than to the Dutch ones, except for indefinite singular nouns. For these DPs the heritage speakers accepted the use of determiners more often than both the native Dutch and Brazilian Portuguese controls. This is an indication that the heritage language is influenced by the dominant language Brazilian Portuguese. Since the focus of this thesis is on transfer, the next subsection will discuss some studies on transfer

more in depth where transfer was found for different grammatical phenomena in different kind of speakers.

The three accounts mentioned here mainly focus on the mistakes heritage speakers make. Instead of looking at the difficulties they have, it can also be interesting to see what these speakers can do and to determine whether there are patterns in their language use. These patterns might differ from speakers living in the country of the dominant language, which is caused by language change, i.e. "the emergence of a new language variety" (Alexiadou, 2017: 58), a fourth alternative account. Support for this account comes from the loss of the genitive by Greek heritage speakers (Alexiadou, 2017). Data from Greek heritage speakers in Argentina, gathered by Zombolou (2011), revealed the loss of the genitive case in these speakers, which she acribes to incomplete acquisition. Alexiadou (2017), however, showed that also in some dialects of Greece, e.g. in Cyprus and Samos, the genitive case is lost. Because the heritage speakers in Zombolou's study (2011) did not originate from those regions, Alexiadou (2017) concluded that the loss of the genitive cannot be a dialectal pattern. Moreover, there is no language contact, and therefore transfer is unlikely. Instead, the language of Greek heritage speakers seemed to have changed.

2.2 Transfer

Transfer is found for different grammatical phenomena and for all different kinds of speakers, e.g. heritage, L2 and third language (L3) speakers. Especially low proficient speakers are sensitive to transfer (Montrul, 2010a). Crosslinguistic influence is well documented in the L2-literature. Lemhöfer, Spalek and Schriefers (2008) and Lemhöfer, Schriefers and Hanique (2010) aimed to investigate what influence L1 German had on gender acquisition in L2 Dutch. To answer this question, they used the cognate facilitation effect (Costa, Caramazza & Sebastian-Galles, 2000). According to this effect, cognates, which share the same origin and a similar meaning, are processed faster than noncognates that only have a similar meaning (Hall, 2002). The items in Lemhöfer et al. (2008, 2010) were either cognates or noncognates, having either compatible or incompatible gender. Combining these two factors led to four different conditions: compatible cognates, incompatible cognates, compatible noncognates and incompatible noncognates. Examples of each condition can be found in (1). In both studies compatible cognates were the easiest for the participants, whereas incompatible cognates were the most difficult. The noncognate items were in between, but slightly more mistakes

were made with the incompatible ones. Since more mistakes were made when there was a difference in gender, but the word was a cognate, knowledge of the L1 seemed to be used for gender assignment in the L2.

(1) a. Compatible cognate: de hond – der Hund 'the$_{COM/MASC}$ dog'[2]
b. Incompatible cognate: de auto – das Auto 'the$_{COM/NEUT}$ car'
c. Compatible noncognate: de tuin– der Garten 'the$_{COM/MASC}$ garden'
d. Incompatible noncognate: de fiets – das Fahrrad 'the$_{COM/NEUT}$ bike'

Other evidence in favour of transfer from the L1 of the L2 comes from Chan (2004). She tested whether Chinese L2 learners of English were prone to syntactic transfer. The results showed that the Chinese used the knowledge of their L1 Cantonese when writing in English. The structures of many English sentences were quite similar to what they should be in their L1. The more difficult a certain structure was, the more likely it was that L1 knowledge was used. Moreover, less proficient speakers were more vulnerable to the influence of their native language.

Studies on heritage language acquisition also found transfer (e.g. Codina Bobia, 2017, 2019; Montrul & Ionin, 2010, 2012). In a pilot study[3] (Van Greuningen, 2020), I looked at gender assessment in Dutch heritage speakers who were dominant in German. Distinguishing the same categories as Lemhöfer et al. (2008, 2010), similar results were obtained: compatible cognates caused the least problems and most mistakes were made for incompatible cognates. Noncognates were in between. The incompatible ones were a bit more difficult than the compatible ones. This means that the heritage speakers in this study showed transfer. This study, however, had some limitations, since only little data was obtained and no control group participated.

Montrul and Ionin (2010, 2012) investigated the use of the definite plural articles with generic reference and inalienable possession in Spanish heritage and L2 speakers who speak English as their dominant language. Where Spanish uses a definite plural article to express generic reference as (2) shows, English does not. Although both (3a) and (bb) are both

[2] Common gender in Dutch is considered to be equivalent to masculine and feminine gender in German (Lemhöfer et al., 2008, 2010).
[3] I conducted this study during my internship at Humboldt Universität in Berlin (Germany) under supervision of Prof. dr. A. Alexiadou.

grammatical in English, only (3a) expresses generic reference. Inalienable possession – "the possession of body parts, articles of clothing, and sometimes kinship terms" (Montrul & Ionin, 2012: 73) – in English is most often expressed by sentences such as (4b). (4b) usually only has the interpretation that the boys raised someone else's hand, and not their own hands. Spanish, however, is ambiguous. When the definite determiner is used, as in (4a), both interpretations – the boys raised their own hands and the boys raised someone else's hand - are possible. Both the heritage and L2 speakers showed transfer for the generic use of definite articles, but not for inalienable possession.

(2) a. *Tigres comen carne.
tigers eat meat
'Tigers eat meat.'
b. Los tigros comen carne [generic reference]
the$_{PL}$ tigers eat meat
'The tigers eat meat

(3) a. Tigers eat meat [generic reference]
b. the tigers eat meat [*generic reference]

(4) a. Los chicos leventaron la mano
the$_{PL}$ boys raised the hand
'The boys raised the hand.'
b. The boys raised the hand.

Anderssen, Lundquist and Westergaard (2018) also found instances of transfer. They looked at the use of possessives and modified definite DPs in Norwegian heritage speakers with English as their dominant language. Where there is variation in these constructions in Norwegian – both phenomena allow two options, as shown in (5) – there is only one option in English (6). Some of the heritage speakers in this study were influenced by English, since they used the option in Norwegian, which is possible in English as well. A bigger group, however, showed cross-linguistic overcorrection. Instead of using the 'English variant' in Norwegian,

they tended to use the other correct variant, which is incorrect in English. This is also a form of influence of the dominant language on the weaker one.

(5) a. Min venn [possessives]
my friend
'My friend'
b. Venn-en min
friend-DEF my
'My friend'
c. hus-et [modified definite DPs]
house-DEF
'The house'
d. det fine hus-et
the nice house-DEF
'The nice house'

(6) a. My friend [possessives]
b. *Friend my
c. *house the [modified definite DPs]
d. *the house the
e. the house

The studies discussed here provide evidence for transfer in different grammatical domains. It also is interesting to see whether transfer affects different domains similarly, since previous research in L2 acquisition and bilingualism has indicated that some domains are more prone to showing transfer. According to the Interface Vulnerability Hypothesis, phenomena at the interface between e.g. syntax and pragmatics, are more vulnerable for transfer (Hulk & Müller, 2000; Sorace, 2000; Serratrice, Sorace & Paoli, 2004; Tsimpli, Sorace, Heycock & Filiaci, 2004). Montrul (2010b) investigated this hypothesis for Spanish L2 and heritage language speakers. Clitics, which belong to the core of syntax elements, appeared to be less vulnerable to transfer, whereas transfer was found for clitic left dislocations and differential object marking,

processes that lie at the interface of syntax and semantics/pragmatics. Syntax as such thus seems to be less prone to show transfer.

Another study looking at transfer in different domains was conducted by Angelovska and Hahn (2012). In this experiment, transfer of German L2 to L3 English was investigated[4]. All participants who spoke different L1s had to write a text about a topic that was chosen by themselves. Mistakes which were made due to transfer were marked by the researchers. In this way, they wanted to investigate what influence the L2 had on the L3 in different grammatical domains. An example of negative syntactic transfer was fronting the object, which is allowed in German, e.g. (7), but not in English, for example (8). Instances of negative transfer in the lexical domain concerned for example the incorrect use of prepositions, e.g. (9b). Negative syntactic transfer was found more often than negative transfer in other grammatical domains, including the mental lexicon.

(7) a. Du werdest die Reinigungsmaterialen in dem Lager finden
You$_{SUBJ}$ will the cleaning_materials$_{OBJ}$ in the lager find.
'You will find the cleaning materials in the lager.'
b. Die Reinigungsmaterialen werdest du in dem Lager finden
the cleaning_materials$_{OBJ}$ will you$_{SUBJ}$ in the lager find.
'You will find the cleaning materials in the lager.'

(8) a. You$_{SUBJ}$ will find the cleaning materials in the lager.
b. *The cleaning materials$_{OBJ}$ you$_{SUBJ}$ will find the lager. (Angelovska & Hahn, 2012: 33)

(9) a. Wir sind froh, dass du mit der Arbeit bei uns anfangen kannst.
we are glad that you with the work by us start can
'We are glad that you can start working with us.'
b. *We are glad you can start with working by us. (Angelovska & Hahn, 2012: 33)

[4] In this study, L2 is defined as the "second language acquired chronologically and the first of second dominant language in everyday life" (Angelovska & Hahn, 2012: 27). L3 is the third, non-native, language, which is learned after the L1 and the L2.

Syntax in this study seemed to be more prone to transfer than in the study of Montrul (2010b). The methods of both studies, however, might have influenced this difference in results. Where Montrul (2010b) focussed on three different phenomena, which were elicited in an oral narrative task and an acceptability judgement task, Angelovska and Hahn (2012) looked at all kinds of phenomena, for which the participants showed negative transfer. Since participants in the latter study were allowed to write on a self chosen topic, it is very likely that they avoided certain structures or words they did not know. Other evidence against this study and in favour of Montrul's (2010b) conclusions might come from Montrul (2005), which was mentioned in section 2.1. In this study, she found that Spanish heritage speakers had a good command of syntax, which was quite comparable to that of Spanish native speakers, but that they had more difficulties with lexical-semantic properties. Syntax in this case caused less difficulties than the lexical-semantic domain.

To sum up, transfer has been found for several grammatical phenomena in L2, L3 and heritage speakers. Most studies have focussed only on one phenomenon or one domain. It also would be interesting to compare the role of transfer in different domains, a question that was raised and investigated for syntax and the syntax-semantic/pragmatic interface by Montrul (2010b).

3. Syntactic and lexical phenomena: an overview

In order to investigate whether the domain of syntax or the mental lexicon is more prone to transfer, four Dutch phenomena are investigated: the order of three verbs in subordinate clauses (syntax), the order of a nominal subject and prenominal direct object in subordinate sentences (syntax), A+N collocations (lexicon) and gender (lexicon). These phenomena will be explained in the next subsections.

3.1 Verb order of three verbs in subordinate clauses

The first syntactic phenomenon concerns the word order of three verbs in subordinate clauses. Both Dutch and German allow sentence-final verbal clusters with three verbs. The order of the verbs, however, differs. In this study, the combination of an auxiliary, modal verb and an infinitive, the Infinitivus pro Participio (IPP), is specifically looked at. Auxiliaries in Dutch and German, e.g. *heeft* 'has' or *hat* 'has', usually select a past participle. In IPP-constructions, an infinitive instead of the past participle is used (Haeseryn et al., 1997; Augustinus & Dirix, 2013; Augustinus & Van Eynde, 2017; Ten Cate, Lodder & Kootte, 2013). As table 1 shows, Dutch only allows the order auxiliary – modal – infinitive, which is ungrammatical in German. The grammatical verb order in German is auxiliary – infinitive – modal (Arendsen, 2013).

Table 1

Word order of three verbs in subordinate clauses

Dutch	German	English translation
dat hij het heeft kunnen zien	*dass er es hat können sehen	'that he it has$_{AUX}$ can$_{MOD}$ see$_{INF}$'
*dat hij het heeft zien kunnen	dass er es hat sehen können	'that he it has$_{AUX}$ see$_{INF}$ can$_{MOD}$'
*dat hij het kunnen heeft zien	*dass er es können hat sehen	'that he it can$_{MOD}$ has$_{AUX}$ see$_{INF}$'
*dat hij het kunnen zien heeft	*dass er es können sehen hat	'that he it can$_{MOD}$ see$_{INF}$ has$_{AUX}$'
*dat hij het zien heeft kunnen	*dass er es sehen hat können	'that he it see$_{INF}$ has$_{AUX}$ can$_{MOD}$'
*dat hij het zien kunnen heeft	*dass er es sehen können hat.	'that he it see$_{INF}$ can$_{MOD}$ hat$_{AUX}$'

3.2 Word order of nominal subjects and pronominal objects in subordinate clauses

The second syntactic phenomenon in this study concerns the relative positions of the subject and indirect object in subordinate clauses containing a nominal and a pronominal element. As

examples (2) and (3) show, German allows both the subject-direct object and direct object-subject order, whereas in Dutch the subject-direct object order is preferred. This difference can be captured with two tendencies: 1. The subject must be placed in front of the direct object; 2. A pronominal element must be placed in front of a nominal element. Where the second tendency is preferred in Dutch, German knows no preference, resulting both word orders being allowed (Speyer, 2011; Sudhoff, 2018; Van de Velde, 1972).

(10) Wie heeft het boek gelezen?
who has the book read
'Who has read the book?'

a. Ik denk, dat mijn vader het gelezen heeft.
I think that my father$_{SUBJ}$ it$_{OBJ}$ read has
'I think my father has read it.'

b. *Ik denk, dat het mijn vader gelezen heeft.
I think that it$_{OBJ}$ my father$_{SUBJ}$ read it
'I think my father has read it.' (Sudhoff, 2018)

(11) Wer hat das Buch gelesen?
who has the book read
'Who has read the book?'

a. Ich denke, dass mein Vater es gelesen hat.
I think that my father$_{SUBJ}$ it$_{OBJ}$ read has
'I think my father has read it.'

b. Ich denke, dass es mein Vater gelesen hat.
I think that it$_{OBJ}$ my father$_{SUBJ}$ read has
'I think my father has read it.' (Sudhoff, 2018)

3.3 A+N collocations

Adjective (A) + noun (N) collocations are the first lexical phenomenon that is investigated in this study. As shown in table 2, three types can be distinguished: A+N compounds, lexicalised A+N phrases and A+N phrases. Where A+N compounds and lexicalised A+N phrases are stored in the mental lexicon, A+N phrases are not since their meaning is compositional. For this

reason, the focus will be on the A+N compounds and lexicalised A+N phrases. These two types, however, differ as well. In contrast to lexicalised A+N phrases, the adjectives in A+N compounds are stressed and not inflected, e.g. *kleingeld* (D) '(loos) change' and *Kleingeld* (G) '(loos) change'. The stress in lexicalised A+N phrases is on the noun head and the adjectives are inflected, as *zure regen* (D) 'acid rain' and *saurer Regen* (G) 'acid rain' show. Orthography also helps to tease them apart. Where A+N compounds are written as one word in both languages, lexicalised A+N phrases are written as two separate words in Dutch and German, e.g. *zure regen* 'acid rain' and *saurer Regen* 'acid rain' (Hüning, 2004, 2010; Hüning & Schlücker, 2010). Sometimes, A+N collocations differ in Dutch and German. *Rode wijn* (D) *'red wine*' – *Rotwein* (G) 'red wine' is such an example. Were *red wine* is a lexicalised A+N phrase in Dutch, it is a A+N compound in German.

Table 2

Examples of A+N collocations (Hüning, 2010)

Condition	Dutch	German	English translation
A+N compounds	kleingeld	Kleingeld	'(loos) change'
Lexicalised A+N phrases	zure regen	saurer Regen	'acid rain'
A+N phrases	dunne streep	dünner Strich	'thin line'

3.4 Gender

The second lexical phenomenon which is considered in this study is gender assignment. Both Dutch and German have gender systems which partly overlap but are different from each other as well. German distinguishes three different genders: masculine, feminine and neuter. Masculine gender is most frequent (50%), followed by feminine (30%) and neuter gender (20%) (Bauch, 1971 in Müller, 1990). Gender is shown on articles, and on all other determiners, relative pronouns, question pronouns, personal pronouns in the third person and on attributive adjectives (Kupisch, Akpinar & Stöhr, 2013; Szagun, Stumper, Sondag & Frankik, 2007). Since the focus in this study is on articles, this subsection also focusses on articles. Gender is shown on the singular forms of both definite and indefinite articles, which are inflected for case as well. The German gender system contains many instances of syncretism, as shown in table 3. Several inflections cannot be distinguished because their forms are similar (Lüdeling, 2013; Weiß, 2012). *Der* 'the$_{\text{SG, MASC, NOM / SG, FEM, GEN \& DAT / PL GEN}}$', for example, is used

for both masculine and feminine words, as well as for plural nouns. Because of syncretism, gender identification might become more difficult. Another difficulty is that some nouns can have two or even three different genders, e.g. *der/die/das Yoghurt* 'the$_{MASC/FEM/NEUT}$ yoghurt' (Carstensen, 1980; Ten Cate et al., 2013).

Table 3

Declension of the German definite (left) and indefinite (right) articles.

	Singular			Plural
	Masculine	Feminine	Neuter	
Nominative	der / ein	die / eine	das / ein	die / keine[5]
Genitive	des / eines	der / einer	des / eines	der / keiner
Dative	dem / einem	der / einer	dem / einem	den / keinen
Accusative	den / einen	die / eine	das / ein	die / keine

As for gender assignment, German is more transparent than Dutch, whose gender system is explained later this subsection. In German, various semantic, morphological, and phonological rules are at play. Nouns denoting males and females are usually masculine and feminine, respectively. Sometimes, natural gender is overridden by grammatical gender, as for example in *das Mädchen* 'the$_{NEUT}$ girl'. This is due to the diminutive ending *-chen*, which always triggers neuter gender. Another example of a morphological rule is that words with the ending *-heit* are feminine. Phonological rules concern vowel length. Nouns with a long vowel in medial position often have masculine or neuter gender (Köpcke, 1982, Müller, 1990)[6].

Dutch used to have the same gender distinction as German. This three-gender-system is, however, partly lost. In nominal gender, as e.g. shown on articles and adjectives, masculine and feminine fall together now and form common gender, whereas pronominal gender still distinguishes masculine, feminine, and neuter gender. This process is not unique for Dutch but is also shown in other Germanic languages such as Norwegian and Swedish (Audring, 2006, 2010; Vogelaer, 2006).

[5] *Ein* 'a' cannot be used for plural nouns. To show that similar determiners as *ein* 'a' are still inflected for case in plural, *kein* 'no' is used in table 3.

[6] See Müller (1990) for an extended overview of gender rules in German.

Since the focus of this thesis is on articles, Dutch is considered as having a two-gender-system, with common and neuter gender. As shown in table 4, common gender nouns have the article *de* 'the$_{COM}$', whereas neuter nouns go with *het* 'the$_{NEUT}$'. The indefinite article does not make a gender distinction, nor does the plural article. Adjectives and third person personal pronouns are inflected for gender in Dutch as well.

Table 4

Declension of Dutch definite (left) and indefinite (right) articles.

	Singular	Plural
Common	de / een	de / -
Neutral	het / een	de / -

Common gender nouns are much more frequent than neuter nouns. According to Van Berkum (1996), there is a 3:1 to 2:1 relation between common and neuter nouns. According to the Algemene Nederlandse Spraakkunst (Haeseryn et al., 1997) 75% of the Dutch words has common gender, 25% is neuter. Contrary to German, Dutch is non-transparent regarding gender assignment. Deutsch and Wijnen (1985) nonetheless found some 'rules'. Diminutives, nominalized verbs, and nouns ending in *-ment* and *-sel* are always neuter, whereas nouns ending in *-heid* and *-ing* are common gender.

There are two views regarding default gender in Dutch. Some researchers (e.g. Brouwer, Cornips & Hulk, 2008; Cornips, Van der Hoek & Verwer, 2006; Deutsch & Wijnen, 1994; Loerts, 2012; Loerts, Stowe & Schmid, 2013; Sabourin, Stowe & De Haan, 2006; Van der Velde, 2004) have argued that *de* 'the$_{COM}$' is the default, since this article is acquired earlier and is overused for neuter nouns by Dutch L1 learners (Blom, Polišenská & Weerman, 2008; Cornips & Hulk, 2008, Orgassa & Weerman, 2008; Van der Velde, 2004). Tsimpli and Hulk (2014) and Roodenburg and Hulk (2010), however, have argued that *het* 'the$_{NEUT}$' is the linguistic default, since this article is used to introduce nominalized verbs, predicative superlatives, and de-adjectival nouns.

4. The current study

As discussed in the theoretical background chapter, heritage speakers are often less proficient in their heritage language than native speakers living in a country where that language is the dominant one. Differences between these groups have been found for several grammatical domains. Only very few studies (e.g. Montrul, 2010b) have compared the language abilities of heritage speakers in different domains. This study aims to further explore this question by comparing the syntactic and lexical domain. As stated in the introduction, lexical knowledge, which is stored in the mental lexicon, needs to be retrieved, whereas syntactic information needs to come about by application of a combinatory rule.

More specifically, this study focusses on transfer from German, the dominant language, to the heritage language Dutch. Transfer is one of the accounts which explains the lower language proficiency of heritage speakers. Since Dutch and German are closely related languages and many studies in L2 acquisition, as well as a pilot study on gender acquisition in Dutch heritage speakers (Van Greuningen, 2020) have found evidence of crosslinguistic influence, transfer is expected to be very likely. Therefore, this study hopes to find evidence for transfer in Dutch heritage speakers. Both factors, possible differences between domains and as well transfer, are combined in this thesis. The research question this study aims to answer is therefore: *Is the syntactic or lexical domain in heritage speakers more prone to transfer?* To answer this question, evidence needs to be found for transfer in these speakers.

Although I hypothesize that there is transfer in these speakers, one cannot automatically assume that there is crosslinguistic influence. The first sub-question therefore is: *Do Dutch heritage speakers with German as their dominant language show transfer?* To answer this sub-question, four phenomena that have some similarities, but differences as well, are investigated. If there is transfer, heritage speakers are expected to allow the incorrect Dutch verb order auxiliary – infinitive – modal, which is correct in German, and to score the grammatical Dutch order auxiliary – modal – infinitive, which is ungrammatical in German, lower than the native controls. The word order modal – auxiliary – infinitive is hypothesised to be rejected, since it is ungrammatical in both languages. For the second condition, the order of subject and direct object in subordinate clauses, the participants are expected to allow both the subject – direct object and direct object – subject order, since both are possible in German. Transfer is expected for A+N collocations as well. It is hypothesised that Dutch heritage

speakers will incorrectly accept items as *roodwijn* 'red wine', because of the influence of the German equivalent *Rotwein* 'red wine'. Since some A+N-collocations are compounds in both languages, no difference is expected there. It is expected that heritage speakers accept items as *kleingeld* '(loos) change' and reject items as **kleine geld* '(loos) change'. The last phenomenon is gender assessment. Following Lemhöfer et al. (2008, 2010) and my pilot study (Van Greuningen, 2020), compatible cognates are expected to cause less problems, since gender information is helpful for this category. Incompatible cognates on the other hand are expected to be most difficult because knowledge of the German equivalent does not help the heritage speaker to determine the gender of the Dutch word. Noncognates are expected to be in between, but some more mistakes are expected for the incompatible ones than for the compatible ones.

The second sub-question that needs to be answered then is *Does the syntactic or lexical domain cause more difficulties for the Dutch heritage speakers?* I have found no previous study that addresses this question. Since core syntactic phenomena caused little problems in previous studies (e.g. Montrul, 2010b), only few problems are expected for the syntax conditions in this study as well. Lexical phenomena are hypothesised to be more difficult for the heritage speakers. Evidence for this question is lower acceptability rates for the grammatical lexical items than for syntactic ones, and higher rejecting rates for the ungrammatical ones in the lexical domain than in the syntactic domain.

Combining the hypotheses for these sub-questions, leads to the hypothesis of the main question. Since transfer is expected to be found and lexical phenomena are expected to be more difficult than syntax, it is hypothesised that the lexicon is more prone to transfer than syntax.

5. Method

5.1 Participants

13 heritage speakers between 16;2 and 72;4 (*M*= 38;11, *SD*= 20;2) participated in this study. 6 of them were men, the other 7 women. All speakers were quite proficient in Dutch, which was measured with a picture naming task (*M*= 29,5; *SD*= 2,6). This task is explained in sections 5.2 and 5.3. Their answers to the personal questions revealed some variation in age and language background. Therefore, three groups were created, based on their language dominance.

The first group consisted of six heritages speakers, who were born in the Netherlands, Germany, Switzerland or Norway, and now live in Germany. They all learned both Dutch and German from birth onwards. Only one participant started learning German at the age of 4. Three of the six participants have lived in the Netherlands, but they moved away before the age of seven. This means that these speakers either did not go to a regular school in the Netherlands or for a maximum of two years. Two heritage speakers of this group received extracurricular Dutch education at a school in Germany, which differs from regular education in the Netherlands. Most of the subjects speak both Dutch and German with their parents and siblings, but German with their friends, at school and at work. They, moreover, all indicated that they speak German better. Based on this information, the participants in this group are considered Dutch heritage speakers, whose dominant language is German.

Three participants belong to the second group (*M*= 59;6, SD= 7;2). These three speakers were all born in the Netherlands and now live in Germany. Like the speakers in the first group, they started learning both Dutch (0-1 years) and German (0-3 years) from early on. The difference with the first group is, however, that lived longer in the Netherlands and they therefore received regular Dutch education (either 6 or 12 years). Another difference is their language use. With parents and siblings, they mostly speak Dutch. With friends, at school or at work, they use either German or both languages. This group, thus, is not as dominant in German as the first group, a fact that is also noted by the subjects themselves. It thus is doubtful whether they can be considered heritage speakers. Therefore, they are indicated as non-native speakers.

The last group is formed by four speakers (*M*= 51;8, *SD*= 15;3). Like most speakers in the other groups, they were born in the Netherlands and moved to Germany, when they were

21. Unlike Dutch, which these speakers learned from birth, German was learned from the age of 11 or even later (*M*= 14, *SD*= 4;8). They felt comfortable speaking in German at a later age than speaking in Dutch. These subjects received regular Dutch education in the Netherlands, and some of them also got German education in the Netherlands. With family, they mostly speak Dutch. With friends, at work and at school either German or both languages are used. Based on this information and as indicated by the subjects, they either mastered both languages equally well or had a better command in Dutch. Following the definition of Rothman (2009), they are not heritage speakers, since German was not available from a very young age and German is not the dominant language of all speakers in this group. This group will therefore be indicated as non-native speakers*.

Since this study aimed to investigate the language abilities of heritage speakers, the focus will be on these speakers in the next chapters. The non-native and non-native* speakers will be discussed as well, to show what influence language dominance has.

21 Dutch native speakers served as a control group. Seventeen women and four men between 19;9 and 26;1 (*M*= 23;3, *SD*= 1;6) participated in the study. Except for one participant that was born in the United Kingdom, they were all born in the Netherlands. All participants now live in the Netherlands.

5.2 Procedure

The study consisted of two different tasks: a version of the Grammaticality Judgement Task and a Picture Naming Task. In the first task, two home-made pictures per stimulus were shown to the participants. Both pictures were described with a sentence. The participants had to judge the grammaticality of every second sentence on a five-point-Likert scale. If they found the sentence ungrammatical, they moreover had the opportunity to improve the sentence. In this way, it becomes clear whether they mark the sentence as ungrammatical, because of the intended mistake or for some other reason. It, moreover, shows whether the participants were able to correct the mistakes and to produce a specific structure.

In some experimental conditions, a context was needed. Therefore, the participants saw two pictures and sentences per item. An example of such a condition is the word order of subject and object subordinate clauses, as shown in (12) The direct object of the second sentence (S2) which was a personal pronoun, was introduced in the first sentence (S1).

(12) a. Tijdens het voeren van de dolfijnen gooit de trainster een vis in het water. [S1]
while the feeding of the dolphins throws the trainer a fish in the water
'While feeding the dolphins, the trainer throws a fish into the water.'

b. Hier zie je dat **de dolfijn** **hem** gelijk opgegeten heeft. [S2]
here see you that the dolphin$_{SUBJ}$ him$_{OBJ}$ immediately ate has
'Here you see that the dolphin ate it immediately.'

Some A+N collocations were clarified in the first sentence as well, as for example in (5). Since *grote vader* 'big dad' is a possible phrase in Dutch, the synonym *opa* 'grandfather' is used in the first sentence, to only allow the grandfather interpretation in the second sentence.

(13) a. Vandaag gaat de jongen met zijn opa naar het dolfijnenpark. [S1]
Today goes the boy with his grandfather to the dolphin_park
'Today the boy goes to the dolphin park with his grandfather.'

b. *Op dit plaatje bekijkt de jongen met zijn **grote** **vader** de pinguïns. [S2]
on this picture looks_at the boy with his grand$_{E}$ father the penguins.
'On this picture the boy and his grandfather looks at the penguins.'

The use of Grammaticality Judgement Tasks is sometimes criticised in the literature (Montrul, 2016; Polinsky; 2015; Sherkina-Lieber, 2011), because much metalinguistic awareness is required, which is usually gained during education. Heritage speakers often get little or no formal education in the heritage language, and as a consequence they often have little metalinguistic awareness (Montrul, 2016; Polinsky; 2015; Sherkina-Lieber, 2011). Another reported problem is that heritage speakers tend to accept too much, displaying a kind of yes-bias, resulting in quite accurate scores for accepting stimuli, but not for rejecting ungrammatical ones (Sherkina-Lieber, 2011). Low literacy of heritage speakers might influence the results of Grammaticality Judgement Tasks as well (Montrul, 2016; Polinsky, 2015). Nonetheless, Grammaticality Judgement Tasks have shown to be useful in several studies (e.g. Cuza & Frank, 2011; Montrul, 2010; Sherkina-Lieber, 2011), but the results need to be taken with care. Despite these problems, I have opted for this task since comprehension is tested with a non-binary choice task. Moreover, when the subjects reject incorrect sentences, it means that they find these structures ungrammatical. Furthermore, only literate

participants are were recruited for this study. In this way, the disadvantages of this study hopefully have little effect on the final results.

The experiment also included a Picture Naming Task in order to measure language proficiency. The participants saw pictures, which they then had to name. The pictures in this task were taken from Snodgrass and Vanderwart (1980). Finally, some personal questions were asked to determine the language background of the heritage speakers, as well as to be sure that German was the dominant language and Dutch the heritage one.

The study was conducted with the online programme Limesurvey (LimeSurvey Project Team & Schmitz, 2015). Ethical approval was obtained by the *Faculty Ethics Assessment Committee – Humanities* of Utrecht university (Reference number: 5712173-01-02-2020). The participants were instructed in Dutch. Only the ethical approval form, the welcome-word and the personal questions were also available in German for the heritage speakers, to be sure that these participants would understand the form and the personal questions. The participants were allowed to answer these questions in either German or Dutch. This study was conducted during the corona pandemic. As a consequence of that, only online studies were possible.

5.3 Stimuli

In order to test both syntactic and lexical phenomena, the experimental items in the Grammaticality Judgement Task were divided into four conditions: word order of three verbs (3V), word order of subject and object subordinate clauses (SDO), A+N phrases (A+N) and gender (Gend). Every stimulus consisted of two newly made pictures, which were described by two sentences. As was stated in 5.2, the main function of the first sentence was to create a suitable context for the second sentence. *Hem* 'him', the direct object in (14b), the second sentence of a stimulus, was introduced in the first sentence. The first sentences were made as comparable in their syntax to each other as possible.

(14) a. Na een lange zonnige dag op het strand is het gezin de groene koelbox kwijt. [S1]
after a long sunny day at the beach is the family the green cooler lost
'After a long sunny day at the beach, the family has lost the green cooler.'

b. Hier zie je dat **het gezin** **hem** op het strand vergeten is. [S2]
here see you that the familiy$_{SUBJ}$ him$_{OBJ}$ at the beach forgotten is
'Here you see that the family forgot it at the beach.'

The second sentences had to fulfil more requirements. Since both syntactic conditions (3V and SDO) required a subordinated clause, as explained in 3.1 and 3.2, all sentences in the syntax conditions began with *hier zie je dat*… 'here you can see that…', followed by a subordinate clause. (15) is an example of such a sentence. For both lexical conditions (A+N and gender), a subordinate clause was not required. Therefore, only half of the lexical conditions started with *hier zie je dat*... 'Here you can see that...'. The other half began with *op dit plaatje* 'on this picture', which was followed by a main clause, e.g. (16b). I opted to start some sentences with this phrase, since it was more suitable to the pictures. The other specifics differed per condition.

(15) a. Door de huilende baby was de man de hele nacht wakker. [S1]
because_of the crying baby was the man the whole night awake
'Because of the crying baby, the man was awake whole night.'
b. *Hier zie je dat de man overdag nog een aantal uur in de hangmat
here see you that the man during_the_day still a number hours in the hammock
heeft slapen kunnen. [S2]
has$_{AUX}$ sleap$_{INF}$ can$_{MOD}$
'Here you see that the man was able to sleep for a number of hours during the day.'

(16) a. De man met de winkelwagen moet boodschappen in de supermarkt doen. [S1]
the man with the trolley must groceries in the supermarket do
'The man with the trolley has to do groceries in the supermarket.'
b. Op dit plaatje pakt hij **het** **groente** voor het avondeten als eerste. [S2]
on this picture takes he the$_{NEUT}$ vegetable$_{COM}$ for the dinner as first
'On this picture, he takes the vegetable for dinner first.'

Each second sentence in the 3V-condition consisted of a verbal endcluster with the auxiliary *heeft* 'has', the modal verb *kunnen* 'can' or *moeten* 'must' and an infinitive, which takes

hebben ‘to have’ as auxiliary. For each modal verb, 6 items were included. 2 out of these 6 items had the correct Dutch word order auxiliary – modal – infinitive as in (17b), which is incorrect in German. The other four items were incorrect in Dutch. Two of these incorrect Dutch items were grammatical in German (auxiliary – infinitive – modal, e.g. (18b)), the other two were ungrammatical in German as well, e.g. (19b). These items followed the pattern modal – auxiliary – infinitive.

(17) a. 

De politieagent achtervolgt de dief vanwege een inbraak. [S1]

The policeman chases the thief because_of a burglary

‘The policeman chases the thief because of a burglary

b. 

Hier zie je dat de agent de boef snel **heeft kunnen boeien**. [S2]

Here see you that the policeman the thief fast has_{AUX} can_{MOD} $chain_{INF}$

‘Here you can see that the policeman could chain the thief fast.’

(18) a. 

Na uren spelen op het strand heeft het meisje zin in wat lekkers. [S1]

After hours playing at the beach has the girl fancy in something sweet

'After hours playing on the beach, the girl fancies something sweet.'

b. 

*Hier zie je dat het meisje een ijsje bij de ijskraam **heeft halen**

Here see you that the girl an icecream at the ice_cream_stall has$_{AUX}$ take$_{INF}$

kunnen. [S2]

can$_{MOD}$

'Here you can see that the girl could have eaten an ice cream at the ice cream stall.'

(19) a. 

Bij de groentewinkel koopt de vrouw bananen en ananas. [S1]

at the greengrocer's buys the woman bananas and pineapple

'The woman buys bananas and pineapple at the greengrocer's.'

b. 

*Hier zie je dat ze bij deze winkel met contant geld **kunnen heeft betalen**. [S2]
here see you that she at this store with cash can$_{MOD}$ has$_{AUX}$ pay$_{INF}$
'Here you can see that she could have paid with cash at this store.

As the 3V condition, the SDO-condition were represented by 12 items, of which half were intended to be grammatical (e.g. 20) and the other half ungrammatical (e.g. 21). As explained before, the object of the second sentence, e.g. *hem* 'him' in (20b), was introduced in the first sentence. The subject of the second sentence, *de dief* 'the thief' could be introduced in the second sentence, but that was not the case in all sentences.

(20) a. 

's Nachts is de dief het museum binnengeslopen om de kroon te pikken [S1]
at_night is the thief the museum sneaked_into to the crown to steal.
'At night, the thief sneaked into the museum to steal the crown.'

b. 

Hier zie je dat **de dief hem** uit het museum gestolen heeft. [S2]

here see you that the thief$_{SUBJ}$ him$_{OBJ}$ out the museum stolen has

'Here you see that the thief stole him out of the museum.'

(21) a. 

Een nieuwe dolfijn is vandaag per auto in het dolfijnenpark aangekomen. [S1]

a new dolphin is today by car in the dolphin_park arrived

'A new dolphin arrived in the dolphin park by car today.'

b. 

Hier zie je dat **hem de verzorgers** met de kraan in het water getild hebben.[S2]

here see you that him$_{OBJ}$ the caretakers$_{SUBJ}$ with the crane in the water lifted have

'Here you see that the caretakers lifted it in the water with the crane.'

The third condition concerned A+N collocations. Half of the items (*n* = 6) in this condition were lexicalised A+N phrases, e.g. *rode wijn* 'red wine', the other half A+N compounds (*n* = 5)[7], e.g. *grootvader* 'grandfather'. The items were balanced for correctness. As explained in the theoretical background section, the adjectives in Dutch lexicalised A+N phrases are inflected and written as two words, e.g. *rode wijn* 'red wine'. The German equivalent is, however, an A+N compound, e.g. *Rotwein* 'red wine'. An example of this condition can be found in (22). The other items for this phenomenon were A+N compounds in both Dutch and German. In both languages the adjective is not inflected, as *grootvader* 'grandfather' – *Großvater* 'grandfather' shows. (23) is an example of an item in this condition.

(22) a. 

De kinderen zoeken een donker plekje om de sterren goed te kunnen bekijken. [S1]
The children look_for a dark place to the starts good to can look_at.
'The children are looking for a dark place to be able the look at the stars.'

b. 

*Op dit plaatje kunnen de kinderen de sterren en de **volmaan** vanaf het
On this picture can the children the stars and the full∅_moon from the
donkere strand goed zien. [S2]

[7] Due to another mistake in an item, one stimulus needed to be removed for further analysis.

dark beach good see

'On this picture, the children can see the stars and the full moon from the dark beach.'

(23) a. 

Het meisje maakt een lange tocht met haar paard over het strand. [S1]

the girl makes a long ride with her horse on the beach

'The girl makes a long ride with her horse on the beach.'

b. 

*Hier zie je dat het meisje daarna haar paard samen met haar **halve broer**

here see you that the girl then her horse together with her half$_{ø}$ brother

borstelt. [S2]

brushes

'Here you see that the girl then brushes her horse together with her half-brother.'

The items in the gender condition were divided into four categories that were based on the factors cognatehood (cognate or noncognate) and gender compatibility (compatible or incompatible gender), as in the studies of Lemhöfer et al. (2008, 2010). As explained in the theoretical background section, the Dutch and German gender systems are not the same. Since Dutch used to distinguish masculine and feminine in articles and still distinguishes these

two genders in pronominal gender, common gender in Dutch is considered to be equivalent to masculine and feminine gender in German. Moreover, when referring back to a noun in Dutch with a pronoun, a difference is made between e.g. *hij* 'he' and *zij* 'she'. Neutral Dutch gender is of course equivalent to neutral gender in German. In this analysis, I follow Lemhöfer et al. (2008, 2010).

Examples of all four categories and their German equivalents are shown in table 5. Each category was represented by 4 items, which made a total of 16 stimuli. The items were balanced for gender in Dutch. Two of the items took the article *de* 'the$_{COM}$', the other two *het* 'the$_{NEUT}$'. The stimuli were balanced for correctness as well. Half of the items were correct, the other half incorrect. In order to exclude possible frequency effects, all items had a lemma frequency between 0 and 62 in a million (M = 20, SD= 21.98), according to the Celex database (Max Planck Institute for Psycholinguistics, 2001). Examples of stimuli are found in (24) – (27)

Table 5

Examples of the experimental stimuli per condition

Condition	Dutch	German	English translation
Compatible cognate	de vaas	die Vase	the$_{COM/FEM}$ vase
Incompatible cognate	het zand	der Sand	the$_{NEUT/MASC}$ sand
Compatible noncognate	het schilderij	das Gemälde	the$_{NEUT/NEUT}$ painting
Incompatible noncognate	de knuffel	das Kuscheltier	the$_{COM/MASC}$ cuddly toy

(24) a. 

De man heeft de vrouw bloemen voor haar verjaardag gegeven. [S1]

the man has the woman flowers for her birthday given

'The man gave the woman flowers for her birthday.'

b. 

Op dit plaatje heeft de vrouw de bloemen in de vaas gezet. [S2]

on this picture has the woman the flowers in the$_{COM}$ vase$_{COM}$ put

'On this picture, the woman put the flowers in the vase.'

(25) a. 

Drie maanden geleden heeft de jongen een schattige puppy gekregen. [S1]

three months ago has the boy a cute puppy got

'Three months ago, the boy got a cute puppy.'

b. 

*Hier zie je dat **het** **halsband** voor de gegroeide hond te klein geworden is. [S2]

here see you that the$_{NEUT}$ collar$_{COM}$ for the grown dog too small became is

'Here you see that the collar for the grown dog has become too small.'

(26) a. 

Het meisje moet van haar moeder de tafel dekken voor het avondeten. [S1]

the girl must of her mother the table set for the dinner

'Her mother tells the girl to set the table for dinner.'

b. 

*Hier zie je dat ze **de** **mes** aan de verkeerde kant van het bord gelegd

here see you that she the$_{COM}$ knife$_{NEUT}$ on the wrong side of the plate put

heeft. [S2]

has

'Here you see that she put the knife on the wrong side of the plate.'

(27) a. 

De moeder maakt met haar zoontje een wandeling over de camping. [S1]

the mother makes with her son a walk around the campsite

'The mother takes her son for a walk around the campsite.'

b. 

Op dit plaatje is **de** **knuffel** van het kind op de grond gevallen. [S2]

on this picture is the$_{COM}$ cuddly_toy$_{COM}$ of the child to the ground fell

'On this picture, the child's cuddly toy fell to the ground.'

The task did not only include experimental items, but 12 fillers as well, which made it a total of 64 items. These items concerned correct (e.g. 28) and incorrect uses of the plural, e.g. (29). I have opted to only include 12 fillers, since the experiment would be too long otherwise.

(28) a. 

Tijdens de pauze spelen de kinderen op het schoolplein. [S1]

during the break play the children on the schoolyard

'During the break the children play at the schoolyard.'

b. 

Hier zie je dat de **leraren** dan samen een kop koffiedrinken. [S2]

here see you that the teacher-en$_{PL}$ then together a cup coffee_drink

'Here you see that the teachers then having a cup of coffee together.'

(29) a. 

De vrouw en de man zijn hun bagage aan het inpakken voor de vliegreis. [S1]

the woman and the man are their luggage on the pack for the flight.

'The woman and man are packing their luggage for the flight'.

b. 

*Hier zie je dat ze twee **kofferen** per persoon meenemen op vakantie. [S2]

here see you that they two suitcases$_{PL_EN}$ per person take_with on holiday

'Here you see that they take two suitcases per person on holiday.'

All stimuli in including the self-made pictures can be found in Appendix B. Table 6 is an overview of all conditions per domain.

Table 6

Overview conditions in the Grammaticality Judgement Task

Domain	Syntax		Mental lexicon	
Condition	3V (*n* = 12)	SDO (*n* = 12)	A+N (*n* = 11)	Gender (*n* = 16)
Subconditions	Aux – Modal – inf	Subj – Obj	A+N	Com-Cog
	Aux – Inf - Modal	Obj – Subj	collocations	Incom-Cog
			A+N	Com-Noncog
			compounds	Incom-Noncog

The picture name task consisted of 16 items, which were not used in the Grammaticality Judgement Task. Half of the items were cognates in German and Dutch, the other half were noncognates. All items were divided over 4 frequency categories: 0-20 in a million; 21-50 in a million; 51-100 in a million and >100 in a million. Frequency was taken from the Celex database (Max Planck Institute of Psycholinguistics, 2001). For every item, the participant could get a maximum of 2 points: 1 for the correct recognition of the word and 1 for the correct writing of the word (Baur, Goggin & Wrede-Jackes, 2013; Baur & Spettman, 2009). A participant thus could get a maximum of 32 points.

6. Results

In this chapter I will discuss the results of the Grammaticality Judgement Task. As discussed in 5.1, the participants were divided over three different groups, which were created based on their language background and language dominance. The heritage speakers learned both Dutch and German from early on. German was their dominant language. Although the non-native speakers also learned Dutch and German from birth, they have had more exposure to Dutch. As a consequence of this, this group was less dominant in German than the heritage speakers. The last group, the non-natives*, is least dominant in German. Some speakers in this group were dominant in Dutch or spoke both languages equally well. Since this study aims to investigate what role transfer plays in syntactic and lexical domains in heritage speakers, the focus of this chapter will lie on the heritage speakers. Both other groups – the non-natives and non-natives* – are also included in this analysis, since their answers to the Grammaticality Judgement Task can help understanding the role of language dominance better.

This chapter first focusses on the question whether there is a difference in language performance in the syntactic and lexical phenomena, after which possible transfer from German to Dutch is discussed. Finally, I will turn to the question of whether transfer affects syntax more than the lexicon. All statistical analyses reported in this chapter were done with R (R core team, 2017). The package lme4 (Bates, Mächler, Bolker & Walker, 2015) was used to perform linear mixed effects analyses. After creating a baseline model, which consisted of random intercepts for participants and items, a step-up approach was taken to investigate which model fitted the data best. Likelihood ratio tests were used to explore whether the added variables improved the model. Only the models that fitted the data best are discussed. All models can be found in appendix C. Using the package lmerTest (Kuznetsova, Brockhoff & Christensen, 2017) the models were further explored and p-values were obtained.

6.1 Correctness

Before answering the questions that were mentioned in the previous paragraph, it is important to know whether overall the grammatical stimuli received a higher score higher than the ungrammatical ones. The mean scores and standard deviation for correct and incorrect answers of each group are shown in table 7. As the mean scores in this table indicate, the scorings of all groups were different. The heritage speakers tend to give the correct answers lower scores and the incorrect answers higher scores than the native controls. A

similar pattern was found for the non-natives. The correct stimuli also received a lower score from the non-native* speakers than from the controls, but the incorrect items did not receive higher or lower scores from this non-native* group, compared with the native speakers. This means that they found these stimuli as unacceptable as the control group.

Table 7

Mean scores and (standard deviations) of each group for correct and incorrect stimuli.

	Heritage speakers	Non-native speakers	Non-native* speakers	Control group
Correct	3.58 (1.42)	4.04 (1.35)	3.42 (1.70)	4.49 (0.96)
Incorrect	2.69 (1.58)	2.63 (1.53)	1.57 (1.23)	1.79 (1.17)

Despite these differences between the groups, the best fitting model, to which an interaction effect of 'correctness' and 'group' was added [$\chi^2(3)=164.88$, $p<.001$], revealed that all participants were able to distinguish the correct from the incorrect answers, as shown in table 8. Although all participants were able to do this, they differ as well. The difference in scores between correct and incorrect answers is bigger for the control group than for the heritage, non-native and non-native* speakers. This indicates that it was easier for the Dutch natives to distinguish the correct from the incorrect items than for the other groups. Beta values, standard error, t-value and p-values of this interaction effect between 'group' and 'correctness' are shown in table 9.

Table 8

Beta values, standard error, t-value and p-values for distinguishing correct and incorrect answers in each participant group

	Distinguishing correct and incorrect stimuli
Heritage speakers	β=-0.82, SE=0.16, $t(304.16)=-5.08$, $p<.001$
Non-native speakers	β=-1.32, SE=0.21, $t(684.23)=-6.42$, $p<.001$
Non-native* speakers	β=-1.76, SE=0.19, $t(492.65)=-9.50$, $p<.001$
Control group	β=-2.61, SE=0.12, $t(90.28)=-22.45$, $p<.001$

Table 9

Beta values, standard error, t-value and p-values for the interaction between correctness and group

	Interaction between correctness and group
Heritage speakers	β=1.80, SE=0.15, *t*(1649.06)=12.16, *p*<.001
Non-native speakers	β=1.29, SE=0.20, *t*(1649.06)=6.52, *p*<.001
Non-native* speakers	β=0.86, SE=0.17, *t*(1649.06)=4.92, *p*<.001

This best fitting model also revealed that correct items yielded higher scores from the control group than from the heritage speakers [β=-0.90, SE=0.19, *t*(49.26)=-4.77, *p*<.001] and the non-native* speakers [β=-1.07, SE=0.22, *t*(49.26)=-4.80, *p*<.001]. However, there was no significant difference between the control group and non-native speakers, meaning that this group of non-native speakers gave higher or lower scores to correct items than the control group [β=-0.44, SE=0.25, *t*(49.26)=-1.77, *p*=.084]. The heritage speakers [β=0.90, SE=0.19, *t*(45.79)=4.83, *p*<.001] and non-native speakers [β=0.84, SE=0.25, *t*(45.79)=3.40, *p*=.001] found incorrect items more acceptable than the control group. The non-native* speakers found the incorrect items as ungrammatical as the control group [β=-0.21, SE=0.22, *t*(45.79)=-0.97, *p*=.34].

(30a) is an example of an incorrect stimulus. A heritage speaker correctly judged this sentence as ungrammatical since this sentence received the score 1 on a five-point-Likert-scale. His correction, shown in (30b), showed that he also recognised the intended mistake. This correction, moreover, shows that he does this by simplifying the sentence. Instead of a sentence-final verbal cluster with three verbs a verbal cluster with two verbs is used. This simplification, however, does not capture the full meaning of (30a).

(30) a. *Hier zie je dat het meisje een ijsje bij de ijskraam **heeft halen**
here see you that the girl an icecream at the ice_cream_stall has$_{AUX}$ take$_{INF}$
kunnen
can$_{MOD}$
'Here you see that the girl had an ice cream at the ice cream stall.'

b. Hier zie je dat het meisje een ijsje bij de ijskraam **heeft gehaald**
here see you that the girl an icecream at the ice_cream_stall has$_{AUX}$ taken$_{PART}$
'Here you see that the girl had an ice cream at the ice cream stall.'

To sum up, all participants in this study were able to distinguish the correct from the incorrect items. The heritage and non-native participants, however, differed in how native-like their judgements were. The heritage speakers judged found the correct items less acceptable and the incorrect items more acceptable than the control group, meaning that they found the correct stimuli less grammatical and the incorrect ones less ungrammatical. The subjects in the other groups either gave lower scores to the correct items (non-natives*) or higher scores to incorrect items (non-natives) than the native speakers. Although these speakers had quite some exposure to Dutch, which moreover is the dominant language of some of the non-native* speakers, they differed from the Dutch control group in their grammaticality judgements.

6.2 Influence of domain

A three-way interaction between correctness, group and domain was added to the model in order to see whether the heritage speakers had more difficulties with the syntactic or lexical domain. A chi-square-test showed that this model was significantly better than the model without the three-way interaction [$\chi^2(3)=13.77$, $p=.003$]. The mean scores and standard deviation of correct and incorrect stimuli per domain for each group are shown in tables 10 and 11. All groups gave lower scores to incorrect syntactic stimuli than to the incorrect lexical stimuli. The heritage and non-native* speakers also gave lower scores to grammatical items in the syntax condition than in the lexical condition.

Table 10

Mean scores and (standard deviation) of each group for correct and incorrect stimuli in the lexical conditions.

	Heritage speakers	Non-native speakers	non-native* speakers	Control group
Correct	4.07 (1.27)	3.98 (1.42)	3.75 (1.64)	4.46 (1.02)
Incorrect	3.50 (1.58)	2.77 (1.65)	1.63 (1.28)	2.06 (1.29)

Table 11

Mean scores of each group for correct and incorrect stimuli in the syntactic conditions.

	Heritage speakers	Non-native speakers	non-native* speakers	Control group
Correct	2.90 (1.34)	4.13 (1.25)	2.95 (1.68)	4.53 (0.86)
Incorrect	1.93 (1.15)	2.50 (1.42)	1.52 (1.19)	1.53 (0.98)

Although all participants, including the control group, gave syntactic items lower scores than the lexical items, the heritage speakers judged the stimuli in the correct syntactic condition as less acceptable than the Dutch controls [β=-1.63, SE=0.23, *t*(99.40)=-7.21, *p*<.001]. This means that the heritage speakers found these items less grammatical than the control group. No difference was found for the incorrect syntactic items [β=0.39, SE=0.21, *t*(72.46)=1.89, *p*=.06]. The heritage speakers thus appeared to be more native-like in their judgements of the incorrect syntactic stimuli than in their judgments of correct syntactic stimuli. This differed for the lexical stimuli. Where the scores of heritage speakers to correct lexical items did not differ from those of the controls [β=-0.39, SE=0.21, *t*(72.46)=-1.86, *p*=.007], they did so for the incorrect lexical items [β1.44, SE=0.21, *t*(77.34)=6.80, *p*<.001]. The incorrect stimuli received higher scores from the heritage speakers than from the control group. The heritage speakers thus found these items less ungrammatical.

Different patterns were found for the non-native and non-native* speakers. The non-native speakers showed to have more difficulties with the incorrect stimuli of both the syntactic domain [β=0.97, SE=0.28, *t*(72.46)=3.48, *p*<.001] and lexical domain [β=-0.71, SE=0.28, *t*(77.34)=2.52, *p*=.01]. These non-native speakers gave these incorrect items higher scores than the control group, meaning that they found these stimuli less ungrammatical. No difference between the non-native speakers and control group was found for the correct stimuli in the syntactic [β=-0.40, SE=0.30, *t*(99.40)=-1.31, *p*=.19] and lexical domain [β=-0.48, SE=0.28, *t*(72.46)=-1.74, *p*=.009]. This means that the non-native speakers found these items as grammatical as the control group.

The non-native* speakers, however, showed to have more difficulties with the correct stimuli in the syntactic domain [β=-1.58, SE=0.27, *t*(99.40)=-5.93, *p*<.001] and the lexical domain [β=-0.71, SE=0.25, *t*(72.46)=-2.89, *p*=.005]. The items in these conditions received lower scores from this group than from the control group. The non-native* speakers showed

native-like judgements to the incorrect items in both domains, since no difference between the non-native* and the native speakers was found for both the syntactic domain [β=-0.07, SE=0.25, *t*(72.46)=-0.07, *p*=.95] and the lexical domain [β=-0.42, SE=0.25, *t*(77.34)=-1.70, *p*=.09].

So far the two syntactic phenomena and the two lexical phenomena have been taken together assuming that both the word order of three verbs in verb-final clusters and varying orders of subject-direct object in subordinate clauses belong to core syntax, and that information on A+N-collocations and gender assignment is stored in the lexicon. In order to see whether this assumption is correct, the scores to the word order of three verbs in verb-final clusters will be compared with the scores to the varying orders of subject-direct object in subordinate clauses. The scores to both lexical phenomena will also be compared to each other. To investigate this, all data is split per domain.

A model with a three-way interaction between correctness, group and condition, as well as random effects for participants and items fitted the data of the syntactic domain best [$\chi^2(3)=12.58$, *p*=.006]. Mean scores and standard deviations for correct and incorrect answers of both syntactic phenomena for each group is shown in table 12. The model revealed that the scores to both syntactic phenomena of the heritage, the non-native and the native speakers did not differ significantly (see table 13). This means that none of these participant groups perceived either the word order of three verbs in verb-final clusters or the word order of the subject and direct object more difficult. As the means show, the non-native* speakers do show a difference in the scoring on both syntactic conditions. The correct stimuli in the word order of the subject and direct object condition received a lower score than the items concerning the word order of three verbs.

Table 12

Means scores and (standard deviations) of correct and incorrect answers in both syntactic conditions of each group.

	Word order of three verbs in verb-final clusters		Word order of the subject and direct object	
	Correct	Incorrect	Correct	Incorrect
Heritage speakers	2.63 (1.56)	1.63 (1.02)	3.08 (1.16)	2.33 (1.20)
Non-native speakers	3.83 (1.34)	2.63 (1.35)	2.33 (1.19)	2.33 (1.53)
Non-native* speakers	3.75 (1.75)	1.63 (1.36)	2.42 (0.92)	1.38 (0.92)
Control group	4.58 (0.84)	1.73 (1.17)	4.49 (0.87)	1.26 (0.56)

Table 13

Beta values, standard error, t-value and p-values for the interaction between correctness, group and condition

	Interaction between correctness and group
Heritage speakers	β=0.55, SE=0.31, *t*(758.29)=1.81, *p*=.07
Non-native speakers	β=0.59, SE=0.41, *t*(758.29)=-1.46, *p*=.14
Non-native* speakers	β=-1.24, SE=0.36, *t*(758.29)=-3.47, *p*<.001
Control group	β=-0.09, SE=0.16, *t*(48.37)=-0.57, *p*=.57

Table 14 contains the mean scores, as well as the standard deviations of responses to correct and incorrect stimuli in both lexical conditions of each participant group. These scores do not give a clear indication of different responses to A+N collocations and stimuli that concerned gender assignment. When adding the factor condition – either as a main effect or as an interaction with correctness and group – to a model containing only the responses to the lexical phenomena, no significant improvements of the models were found. This means that condition appeared not to have influenced the participants in their judgements of lexical items.

Table 14

Mean scores and (standard deviations) of correct and incorrect answers in both lexical conditions of each group.

	A+N collocations		Gender assignment	
	Correct	Incorrect	Correct	Incorrect
Heritage speakers	4.20 (1.14)	3.57(1.59)	3.98 (1.36)	3.46 (1.60)
Non-native speakers	4.11 (1.13)	2.80 (1.70)	3.88 (1.62)	2.75 (1.65)
Non-native* speakers	4.00 (1.38)	2.35 (1.73)	3.56 (1.81)	1.19 (0.59)
Control group	4.54 (0.86)	2.16 (1.32)	4.39 (1.12)	1.99 (1.26)

To sum up, the responses of the heritage speakers revealed some interesting insights. Where this group showed to have more difficulties accepting correct syntactic stimuli than rejecting the incorrect ones, this pattern is reversed for the lexical phenomena: the heritage speakers were native-like in their judgements of grammatical lexical stimuli, but not in their judgements of incorrect lexical stimuli. The participants in the two other groups either had more difficulties with the grammatical (non-native* speakers) or the ungrammatical stimuli (non-native speakers). Except for the non-native* speakers in the syntactic domain, the two tested phenomena in both the syntactic and the lexical domain did not appear to be different.

6.3 Influence of transfer

This study also tried to find out whether the heritage speakers were influenced by transfer. To investigate this, the participants' responses to Dutch stimuli whose German translation equivalent is grammatical, and to Dutch stimuli whose equivalent in German is ungrammatical are analysed. 'German' is used here to indicate the grammatical German translation equivalents of the Dutch stimuli, 'non-German' is used for ungrammatical German translation equivalents. Both 'German' and 'non-German' thus have nothing to do with the language of the stimuli. All stimuli for all participants – both the experimental ones and the controls – were in Dutch.

In addition to random intercepts for participants and items, a three-way interaction between 'correctness', group and German was added to the best model of fit [$\chi^2(8)=30.25$, $p<.001$].The mean scores and standard deviations for correct and incorrect stimuli for both German and non-German ones are shown in tables 15 and 16.

Table 15

Mean scores and (standard deviation) of each group for correct and incorrect stimuli in Dutch, whose German translation equivalent is grammatical.

	Heritage speakers	Non-native speakers	Non-native* speakers	Control group
Correct	3.34 (1.45)	3.91 (1.36)	3.08 (1.71)	4.51 (0.90)
Incorrect	2.94 (1.60)	2.62 (1.56)	1.63 (1.31)	1.76 (1.83)

Table 16

Mean scores of each group for correct and incorrect stimuli in Dutch, whose German translation equivalent is ungrammatical.

	Heritage speakers	Non-native speakers	Non-native* speakers	Control group
Correct	3.98 (1.27)	4.26 (1.32)	3.97 (1.54)	4.46 (1.04)
Incorrect	2.36 (1.51)	2.64 (1.51)	1.50 (1.13)	1.82 (1.20)

Like the control group, the non-native and non-native* speakers were able to distinguish the correct and incorrect answers for both the German and non-German stimuli (see table 17). However, the heritage speakers were not able to distinguish the correct answers from the incorrect ones, when the stimulus was correct in German. They were able to do this for the items that were ungrammatical in German. This result is also visible in the mean scores for grammatical and ungrammatical stimuli for both German and non-German stimuli. The difference between correct (*M*=3.34) and incorrect (*M*=2.94) items for German stimuli is smaller than the difference between correct (*M*=3.98) and incorrect (*M*=2.36) for non-German stimuli. This group is thus influenced by their dominant language German, if the stimuli are correct in this language.

Table 17

Beta values, standard error, t-value and p-values for transfer

	Correct in German	Incorrect in German
Heritage speakers	β=0.40, SE=0.21, *t*(191.33)=-1.70, *p*=.06	[β=1.41, SE=0.24, *t*(498.00)=-5.82, *p*<.001].
Non-native speakers	β=1.29, SE=0.27, *t*(453.50)=4.74, *p*<.001	β=1.41, SE=0.31, *t*(1004.00)=4.45, *p*<.001
Non-native* speakers	β=1.45, SE=0.24, *t*(315.21)=5.93, *p*<.001	β=2.26, SE=0.28, *t*(770.19)=8.03, *p*<.001
Control group	β=2.75, SE=0.16, *t*(60.14)=17.35, *p*<.001	β=2.42, SE=0.17, *t*(139.65)=14.25, *p*<.001

Other evidence in favour of transfer in this group can be found in the corrections by the heritage speakers. One participant gave the incorrect sentence in (31a) a 3 on a five-point Likert scale. Instead of the intended mistake, which concerned the word order of the subject *de jongen* 'the boy' and direct object *ze* 'them', this heritage speaker changed the word order in the sentence-final verbal cluster, as (31b) shows. This participant showed cross-linguistic influence, since she incorrectly accepted the direct object-subject order, which is correct in German. Moreover, she showed cross-linguistic overcorrection. Contrary to Dutch, which allows both *gedaan heeft* 'done has' and *heeft gedaan* 'has done', only the order past participle – auxiliary is allowed in German (Arfs, 2007; Pauwels, 1953). This participant thus deliberately chose to use a correct verb order in Dutch which is incorrect in German. In instances of cross-linguistic overcorrection, the dominant language German influences the weaker language Dutch as well. Several other instances of corrected word orders for this participant as well as for other subjects were found as well, for example (32) and (33). (32b) and (33b) were produced in response to the stimuli in (32a) and (33a) respectively.

(31) a. *Hier zie je dat ze de jongen in de emmer gedaan heeft.
here see you that them the boy in the bucket done has
'You see here that the boy put them in a bucket.'

b. *Hier zie je dat ze de jongen in de emmer heeft gedaan.
Here see you that them the boy in the bucket has done
'You see here that the boy put them in a bucket.'

(32) a. Hier zie je dat de dief hem uit het museum gestolen heeft.
here see you that the thief$_{SUBJ}$ him$_{OBJ}$ out the museum stolen has
'Here you see that the thief stole him out of the museum.'
b. Hier zie je dat de dief hem uit het museum heeft gestolen.
here see you that the thief him from the museum has stolen.
'Here you see that the thief stole it from the museum.'

(33) a. Hier zie je dat de postbode hem bij het huis bezorgd heeft.
here see you that the postman him at the house delivered has
'Here you see that the postman delivered it at the house.'
b. Hier zie je dat de postbode hem bij het huis heeft bezorgd .
here see you that the postman him at the house has delivered
'Here you see that the postman delivered it at the house.'

Cross-linguistic overcorrection is also found in the response that is shown in (34b). Instead of using the correct Dutch verb order past participle – auxiliary as in (34a), the heritage speakers deliberately chose to change this into a form that would be ungrammatical in the German translation equivalent. This response also shows transfer in the lexical domain, since *het halsband* 'the$_{NEUT}$ collar$_{COM}$' instead of *de halsband* 'the$_{COM}$ collar$_{COM}$' is used.

(34) a. *Hier zie je dat het halsband voor de gegroeide hond te klein geworden is.
here see you that the$_{NEUT}$ collar$_{COM}$ for the grown dog too small became is
'Here you see that the collar for the grown dog has become too small.'
b. *Hier zie je dat het halsband voor de gegroeide hond te klein is geworden.
here see you that the$_{NEUT}$ collar$_{COM}$ for the grown dog too small is became
'Here you see that the collar for the grown dog has become too small.'

Although this study did not focus on the conjugation of the past participle, (16) is another example of transfer. To form past participles of weak verbs in German, the prefix *ge-* and the suffix *-t* are added, except for verbs ending in *-ieren,* e.g. *operieren* 'to operate. These verbs do not get the prefix *ge-*. *Operiert* 'operated' therefore is the correct form of the past participle. In (35) the heritage speakers incorrectly omitted this suffix, probably due to cross-linguistic influence of German.

(35) *Hier zie je dat hij bij de dierenverzorgster aan zijn zere poot opereert wordt.
here see you that he at the animal_caretaker on his sore paw operated become
'Here you see that he is operated at his sore paw at the animal caretaker.'

To summarize, Dutch heritage speakers showed signs of cross-linguistic influence, whereas the other subjects that were less dominant in German, as well as the controls did not.

6.4 Influence of transfer across domains

In the last part of this chapter I will focus the discussion on the question whether the domain of syntax or the domain of mental lexicon is more prone to transfer. Since the three-way interaction between correctness, HSgroup and domain turned out to improve the model significantly, as explained above, this model was considered as the baseline-model to answer this question. A chi-square test showed that a four-way interaction between correctness, HSgroup, domain and German improved the model significantly [$\chi^2(8)=17.49$, $p=.03$]. The means for the correct and incorrect items for both German and non-German stimuli for the syntactic and lexical domain are shown in table 18 and 19. As the means in the tables already indicate, the non-native, non-native* and the Dutch native speakers are able to distinguish correct and incorrect items in all conditions. This means that they were not influenced by transfer. Beta values, standard error, t-value and p-values for all groups are shown in table 20. These results are not surprising, since these groups also did not show transfer when both domains were taken together.

Table 18

Mean scores and (standard deviations) of each group for correct and incorrect, German and non-German stimuli in the lexical conditions.

	Heritage speakers		Non-native speakers		Non-native* speakers		Control group	
	German	Non-German	German	Non-German	German	Non-German	German	Non-German
Correct	3.90 (1.44)	4.24 (1.05)	3.81 (1.44)	4.14 (1.42)	3.68 (1.68)	3.82 (1.63)	4.46 (0.99)	4.46 (1.05)
Incorrect	3.74 (1.62)	3.22 (1.51)	2.76 (1.73)	2.78 (1.59)	1.64 (1.42)	1.63 (1.13)	2.16 (1.32)	1.94 (1.25)

Table 19

Mean scores and (standard deviations) of each group for correct and incorrect, German and non-German stimuli in the syntactic conditions.

	Heritage speakers		Non-native speakers		Non-native* speakers		Control group	
	German	Non-German	German	Non-German	German	Non-German	German	Non-German
Correct	2.85 (1.29)	3.08 (1.57)	4.00 (1.32)	4.67 (0.81)	2.56 (1.58)	4.50 (1.07)	4.55 (0.82)	4.45 (1.02)
Incorrect	2.25 (1.21)	1.50 (0.91)	2.50 (1.41)	2.50 (1.47)	1.63 (1.24)	1.38 (1.13)	1.40 (0.81)	1.71 (1.15)

Table 20

Beta values, standard error, t-values and p-values for transfer in all participant groups

	Lexicon-German	Lexicon-non-German	Syntax-German	Syntax-non-German
Heritage speakers	β=-0.17, SE=0.28, *t*(318.10)=-0.5, *p*=.55	[β=-0.87, SE=0.28, *t*(774.50)=-3.17, *p*=.002]	β=-0.60, SE=0.26, *t*(318.11)=-2.34, *p*=.02	β=-1.58, SE=0.42, *t*(318.11)=-3.75, *p*<.001]
Non-native speakers	β=-1.05, SE=0.36, *t*(761.62)=-2.86, *p*<.001	β=-1.22, SE=0.37, *t*(1339.00)=-3.28, *p*=.001	β=-1.50 SE=0.34, *t*(761.62)=-4.38, *p*<.001	β=-2.17, SE=0.56, t(761.62)=-3.87, p<.00
Non-native* speakers	β=-2.04, SE=0.32, *t*(541.17)=-6.28, *p*<.001	β=-2.05, SE=0.33, *t*(1117.25)=-3.28, *p*<.001	β=-0.94, SE=0.30, *t*(541.17)=-3.09, *p*=.002	β=-3.13, SE=0.50, t(541.17)=-6.31, p<.001
Control group	β=-2.31, SE=0.19, *t*(72.20)=-12.33, *p*<.001	β=-2.31, SE=0.19, *t*(72.20)=-12.33, *p*<.001	β=-3.14, SE=0.18, *t*(72.20)=-17.96, *p*<.001	β=-2.75 SE=0.29, t(72.20)=-9.61, p<.001

As discussed earlier in section 6.3, the heritage speakers did show transfer, when the stimuli of both domains were taken together. Therefore, it is interesting to see whether these speakers show signs of cross-linguistic influence in one or both domains. The speakers in this group were not able to distinguish correct German lexical items from incorrect ones. For the syntactic domain, they were able to distinguish the correct German items from the incorrect ones. For the non-German stimuli, they did not have any difficulties distinguishing the correct items from the incorrect items for both the lexical and syntactic phenomena. This means that transfer appears to have some effect on these speakers' mental lexicon behaviour, not so on their performance in the syntactic domain.

7. Discussion

This study aimed to examine whether transfer has more of an effect on the syntactic or lexical domain in Dutch heritage speakers with German as their dominant language. Previous research (e.g. Polinsky, 2008; Potowski et al., 2009; Montrul et al., 2008) has shown that the language abilities of heritage speakers are different from those of native speakers in various grammatical domains. Only a few studies (Montrul, 2005, 2010b) have compared the language abilities of heritage speakers across domains. None of them have focussed on a comparison of the syntactic and lexical domain. Very few studies (e.g. Codina Bobia, 2017, 2019) have looked at Dutch heritage speakers or specifically at the combination Dutch (heritage language) – German (dominant language). This study was set up to further explore language ability across domains in Dutch-German speakers, which were hypothesised to be influenced by transfer. To investigate which domain is more prone to transfer, the following sub-questions were answered: *Does the syntactic or lexical domain cause more difficulties for the Dutch heritage speakers?* and *Do Dutch heritage speakers with German as their dominant language show transfer?*

Like the heritage speakers in previous studies (e.g. Polinsky, 2008; Potowski et al., 2009; Montrul et al., 2008), the heritage speakers tested in this study were less proficient in Dutch than the control group of Dutch native speakers since the Dutch heritage speakers overall gave lower scores to grammatical stimuli and higher scores to ungrammatical ones. This difference itself, however, does not mean that they did not master the grammatical construction tested because they were able to distinguish the correct stimuli from the incorrect ones. Earlier research (Polinsky, 2008) also discovered that heritage speakers sometimes simplify their heritage language. Instances of simplification were also found in this experiment. For both correct and incorrect stimuli, some participants simplified sentence-final verbal clusters with three verbs. Instead they opted for a verbal cluster with two verbs, which is easier to use. These simplifications, however, did not capture the intended meaning. The characteristics of the language ability of heritage speakers in this study are thus in line with previous research.

In order to answer the first sub-question, two syntactic and two lexical phenomena formed the empirical materials of this study. The syntactic phenomena concerned the sentence-final order of three verbs in subordinate clauses and the word order of the subject

and direct object in subordinate clauses. A+N collocations and gender assignment were taken here as the lexical phenomena. Except for the non-native* speakers in the syntactic domain, the scores to the two tested phenomena in both the syntactic and the lexical domain did not appear to be different. The different phenomena in each domain thus did not influence the results. An exception to this were the non-native* speakers. They showed to have more difficulties with order of the subject and object than with the word order of three verbs in sentence-final cluster. Earlier studies (e.g. Hulk & Müller, 2000, Montrul, 2005, 2010b; Sorace, 2000; Serratrice, et al., 2004; Tsimpli, et al., 2004) that focussed on differences in language ability in core syntax and the interface of syntax and semantics/pragmatics have found that core syntactic phenomena do not appear to really be problematic for heritage or L2 speakers. It therefore was hypothesised that syntax would cause less difficulties than lexical phenomena for the participants in this study.

The lexical conditions yielded overall higher scores in the heritage, non-native, non-native* and Dutch native speakers. This suggests that even among native speakers syntax errors are more severe, whereas lexical errors are more subtle. This might be due to the task, since both the syntax constructions and lexical phenomena were presented in sentences. Since the mistakes in lexical items concerned a small part of the sentence – often only one word – these mistakes might be overlooked faster. Nonetheless, I argue that this is not the explanation for the difference found between syntax and lexicon, since the intended mistakes in both the syntactic and lexical stimuli were noticed by the control group, as one would expect. If this group had overseen the intended mistakes, the incorrect lexical stimuli would have been judged more acceptable. Where incorrect syntax items for example received the score 1 on a five-point-Likert-scale by the control group, incorrect lexical items often got a 3, suggesting that this mistake was somehow felt less severe. It, moreover, suggests that we maybe able to compare lexicon and syntax on the same Likert scale, since the scale seems to differ for the domains.

Although all groups were stricter with syntactic stimuli, the heritage speakers performed significantly differently from the native controls. The heritage speakers found the correct syntactic items less acceptable than the control group, which means that they were judged less acceptable. For the lexical items, this pattern was reversed: incorrect items received significantly higher scores (i.e. were judged more acceptable) from this group than from the control group, whereas this group was native-like in their judgements to correct

lexical stimuli. Although this group thus is more conservative with accepting correct syntactic stimuli and rejecting incorrect lexical stimuli, they were nevertheless able to distinguish the correct syntactic stimuli from the incorrect ones for both domains. This means that they had mastered the phenomena to some extent.

The results for the incorrect lexical stimuli suggest that these items felt less acceptable to the heritage speakers, but that they did not always know exactly what was wrong, resulting in higher scores. Lexical stimuli therefore appeared to be more difficult for this group than syntactic items, which was in line with the hypothesis. The participants in the other heritage groups either gave the grammatical (non-native* speakers) or the ungrammatical stimuli (non-native speakers) higher scores. Except for the non-native* speakers in the syntactic domain, the scores for the two tested phenomena in both the syntactic and the lexical domain did not appear to be different.

Transfer is one of the accounts that may be invoked to explain the lower language proficiency of heritage speakers. Since Dutch and German are closely related languages and since many studies on L2 acquisition (e.g. Lemhöfer et al., 2008, 2010), as well as my pilot study on Dutch heritage speakers with German as the dominant language (Van Greuningen, 2020), found cross-linguistic influence, transfer was hypothesised to be very likely for Dutch heritage speakers. As expected, the Dutch native controls were not influenced by German, neither were the non-native and the non-native* speakers, who were less dominant in German than the heritage speakers. Some of them were dominant in Dutch. Language dominance seemed to play a role, since the heritage speakers, who were dominant in German, did show transfer from their dominant language German to their weaker language Dutch. Transfer was only found for Dutch stimuli where the German translation equivalent was grammatical. Many of the corrections by heritage speakers also showed some signs of transfer. Instead of correcting the intended mistake, they changed something else in the sentence. Not only cross-linguistic influence was found, but also some instances of cross-linguistic overcorrection. In these examples, the heritage speakers deliberately chose to use a correct Dutch form, which is incorrect in German, although the German translation equivalent is grammatical in Dutch as well. This also can be considered as a form of influence by the dominant language, since a heritage speaker chose to use a form that is incorrect in his dominant language.

It thus can be concluded on the basis of the evidence uncovered here that these heritage speakers appear to be influenced by their dominant language. Since only the participants who were dominant in German showed signs of cross-linguistic influence, language dominance appears to play a role in transfer.

The answers to these sub-questions lead me back to the main question, which concerned the role of transfer in the syntactic and lexical domain. As hypothesised, transfer affected the lexicon more than the core syntax in heritage speakers. Where the heritage speakers were able to distinguish the correct syntactic items from the incorrect ones in Dutch, whose German translation equivalents were grammatical, they were often less able to do this for the lexical German items. This is probably due to the fact that lexical knowledge of every word needs to be stored in the mental lexicon, whereas syntactic information normally comes about by application of a combinatory rule. If one knows a syntactic rule, this knowledge could be used for other similar constructions, resulting in quite native-like judgements. Since the language performance of heritage speakers was not native-like, they probably know the general rule, but not all subtle differences resulting in some mistakes. Since there are no or just very few, highly specific, rules – take, for example, the case gender assignment in Dutch – lexical information needs to be stored and retrieved from the mental lexicon for every word. One thus must know for example the gender of a word, if one wants to use it in the proper form and environments. If not, one could resort to using the knowledge of his or her dominant language. This strategy seems to have been adopted in various cases by the heritage speakers in this study.

However, it needs to be stressed here that not all participants showed transfer for lexical phenomena, only the heritage speakers who were most dominant in German. Non-native and non-native* did not show transfer. Dominanc also appears to play a role here. Only if the participants are dominant in German, does knowledge of this language appear to influence the weaker language Dutch.

Although the participants had the option of correcting sentences they marked as ungrammatical (i.e. producing the proper form), the main focus of this study was on comprehension. To fully understand the language ability of heritage speakers, Polinksy (2018) argues that it is important to look at both comprehension and production. Especially so since several studies (e.g. Polinksy, 2015, 2018) have found that production is more difficult, and heritage speakers are sometimes more native-like in comprehension. Although differences

between heritage speakers and Dutch native speakers were found in this study, production data might show even bigger differences. It, therefore, is interesting to also test production. Including more tasks that test comprehension might give more reliable results as well. As discussed in chapter 4, grammaticality judgment tasks have some limitations, since much metalinguistics awareness is required and participants need to be literate.

Further research can also include speakers of Dutch as an L2. Their language performance can then be compared to the language abilities of heritage speakers. Previous research (e.g. Montrul, 2010c, 2011; Montrul, et al., 2008; Van Osch, Hulk, Aalberse & Sleeman, 2018) already has compared both groups of speakers in different grammatical domains. None of the studies I have found, however, compared transfer across domains in both bilingual groups.

Finally, the factor of language similarity or typological distance should be considered in further research. This study investigated heritage speakers whose dominant language was typologically very similar to their heritage language. As hypothesised, instances of transfer were found in these speakers. Heritage speakers, whose dominant language is less similar, might show transfer as well, but it might also be the case that they suffer from incomplete acquisition, language attrition or language change.

In conclusion, the language proficiency of heritage speakers tested in this study differed from that of native speakers. Although the heritage speakers were able to distinguish correct and incorrect items in a Grammaticality Judgement Task, they did not perform native-like, since they found correct stimuli less acceptable and incorrect stimuli more acceptable on an acceptability scale. The heritage speakers who were most dominant in German seemed to have more difficulties with lexical phenomena. Evidence for transfer was found as well. Heritage speakers who were dominant in German showed influence of their German knowledge on Dutch grammatical and ungrammatical stimuli whose German translation equivalent was correct. The present study, moreover, found that transfer affected the lexicon more than the syntax in Dutch heritage speakers. This was only found for the heritage speakers who were dominant in Dutch, and not for the other non-native and non-native* speakers, who were less or not dominant in German. Further research should thus take differences across domains, as well as the role of language dominance into account.

References

Albirini, A., Benmamoun, E., & Chakrani, B. (2013). Gender and number agreement in the oral production of Arabic Heritage speakers. *Bilingualism: Language and Cognition, 16*(1), 1-18.

Alexiadou, A. (2017). Language variation and change. *Belgian Journal of Linguistics, 31*(1), 56-75.

Anderssen, M., Lundquist, B., & Westergaard, M. (2018). Crosslinguistic similarities and differences in bilingual acquisition and attrition: Possessives and double definiteness in Norwegian heritage language. *Bilingualism: Language and Cognition, 21*(4), 748-764.

Arendsen, T. (2013). *Verbclustervariation im Nebensatz. Ein Vergleich zwischen den Wortfolgepräferenzen niederländischer, deutscher und österreicher Sprecher.* Bachelorthesis.

Arfs, M. (2007). Rood of groen? De interne woordvolgorde in tweeledige werkwoordelijke eindgroepen in Nederlandse bijzinnen. In: Fenoulhet, J., Gelderblom, A. J., Kristel, M., Lalleman, J., Missine, L., & Pekelder, J. (ed.). *Neerlandistiek in contrast. Handelingen Zestiende Colloquium Neerlandicum*, Amsterdam: Rozenberg Publishers, 223-245.

Au, T., Knightly, L., Jun, S., & Oh, J. (2002). Overhearing a language during childhood. *Psychological Science, 13*(3), 238–243.

Au, T., Knightly, L., Jun, S., Oh, J., & Romo, L. (2008). Salvaging a childhood language. *Journal of Memory and Language*, *58*(4), 998-1011.

Audring, J. (2006). Genusverlies en de betekenis van voornaamwoorden. In: Hüning, M., Verhagen, M., Vogl., U., & Wouden, T. van de (ed.). *Nederlands tussen Duits en Engels*. Leiden: Stichting Neerlandistiek Leiden, 71-88.

Audring, J. (2010). Deflexion und pronominales Genus. In: Nübling, D., Dammel, A., Kürschner, S., (ed.) *Kontrastive germanistische Linguistik*, no. II. Hildesheim: Georg Olms Verlag, 692-717.

Augustinus, L., & Dirix, P. (2013). The IPP effect in Afrikaans: a corpus analysis. In: *Proceedings oft he 19th Nordic Conference of Computational Linguistics (NoDaLiDa)*. Linköping: Linköping University Electronic Press, 213-225.

Augustinus, L., & Eynde, F. van (2017). A usage-based typology of Dutch and German IPP verbs. *Leuvense Bijdragen: Tijdschrift voor Germaanse Filologie*, *101*, 101-122.

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software, 67*(1), 1-48.

Baur, R. S., Goggin, M., & Wrede-Jackes (2013). *Der C-Test: Einsatzmöglichkeiten im Bereich DaZ*. Online: https://www.uni-due.de/imperia/md/content/prodaz/c_test_einsatzmoeglichkeiten_daz.pdf.

Baur, R., & Spettman, M. (2009). Der C-Test als Instrument der Sprachdiagnose und Sprachförderung. In: Lengyel, D., Reich, H. H., Roth, H. J., & Döll, M. (eds.). *Von der Sprachdiagnose zur Sprachförderung*. Münster, New York, München, Berlin: Waxmann, 115-127.

Berkum, J. A. van (1996). *The psycholinguistics of grammatical gender: Studies in language comprehension and production*. Nijmegen: Max Planck Instituut voor Psycholinguïstiek.

Blake, R. (1983). Mood selection among Spanish-speaking children, ages 4 to 12. *Bilingual Review/La Revista Bilingüe, 10*(1), 21-32.

Blom, E., Polišenská, D., & Weerman, D. (2008). Articles, adjectives and age of onset: the acquisition of Dutch grammatical gender. *Second language Research, 24*(3), 297-331.

Brouwer, S., Cornips, L., & Hulk, A. (2008). Misrepresentation of Dutch neuter gender in older bilingual children? In: Haznedar, B., & Gavruseva, E. (eds.). *Current trends in child second language acquisition: A generative perspective*, 83-96.

Bylund, E. (2009). Maturational constraints and first language attrition. *Language learning, 59*(3), 687-715.

Carstensen, B. (1980). Das Genus englischer Fremd- und Lehnwörter im Deutschen. In: Viereck, W. (ed.). *Studien zum Einfluß der englischen Sprache auf das Deutsche/Studies on the Infleunce of the English Language on German*. Tübingen: Narr, 37-76.

Cate, A. P. ten, Lodder, H. G., & Kootte, A. (2013). *Deutsche Grammatik: Eine Deutsch-Niederländische Beschreibung für den Fremdsprachenerwerb*. Bussum: Coutinho.

Chan, A. Y. W. (2004). Syntactic transfer: Evidence from the interlanguage of Hong Kong Chinese ESL learners. *The modern language Journal, 88*(1), 56-74.

Codina Bobia, A. J. M. (2017). *Article omission in Dutch as a heritage language in Brazil*. Dissertation, State University of Campinas.

Codina Bobia, A. J. M. (2019). Bare Singular Count Nouns in Dutch as a Heritage Language in Brazil/Nomes singulares nus em neerlandês como língua de herança. *Revista de Estudos da Linguagem, 27*(2), 631-668.

Cook, V. (2003). *Effects on the second language on the first.* Clevedon: Mulitlingual Matters LTD.

Cornips, L., Hoek, M. van der, & Verwer, R. (2006). The acquisition of grammatical gender in bilingual child acquisition of Dutch (by older Moroccan and Turkish children): The definite determiner, attributive adjective and relative pronoun. *Linguistics in the Netherlands, 23*(1), 40-51.

Cornips, L., & Hulk, A. (2008). Factors of success and failure in the acquisition of grammatical gender in Dutch. *Second Language Research, 24*(3), 267-295.

Costa, A., Caramazza, A., & Sebastian-Galles, N. (2000). The cognate facilitation effect: Implications for models of lexical access. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *26*(5), 1283-1296.

Deutsch, W., & Wijnen, F. (1985). The article's noun and the noun's article: explorations into the representation and access of linguistic gender in Dutch. *Linguistics*, *23*(5), 793-810.

Cuza, A. &, Frank, J. (2011). Transfer Effects at the Syntax-Semantics Interface: The Case of Double-*que* Questions in Heritage Spanish. *Heritage Language Journal, 8*(1), 66-89.

Flores, C. (2010). The effect of age on language attrition: Evidence from bilingual returnees. *Bilingualism: Language and Cognition, 13*(4), 533-546.

Flores, C. (2012). Differential effects of language attrition in the domains of verb placement and object expression. *Bilingualism: Language and Cognition, 15*(3), 550-567.

Greuningen, E. H. W. van (2020). Gender acquisition in Dutch heritage speakers. A pilot study. Manuscript, Humboldt University, Berlin, Utrecht University, Utrecht

Hall, C. J. (2002) The automatic cognate form assumption: Evidence for the parasitic model of vocabulary development. *IRAL - International Review of Applied Linguistics in Language Teaching, 40*(2), 69–87.

Haeseryn, W., Romijn, K., Geerts, G., Rooij, J. de, & Toorn, M. C. van den (1997). *Algemene Nederlandse Spraakkunst. Tweede, geheel herziene druk*. Groningen/Deurne: Martinus Nijhoff uitgevers/Wolters Plantyn. Online: http://ans.ruhosting.nl/e- ans/index.html.

Hulk, A., & Müller, N. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition, 3*(3), 227-244.

Hüning, M. (2004). Over woorden en woordgroepen: A+N-verbindingen in het Nederlands en in het Duits. In: Kiedroń, S., & Kowalksa-Szubert, A. (eds.). *Thesaurus polyglottus et flores quadrilingues. Festschrift für Stanislaw Predota zum 60. Geburtstag*, 159-171.

Hüning, M. (2010). Adjective + Noun constructions between syntax and word formation in Dutch and German. In: Onysko, A., & Michel, S. (eds). *Cognitive perspectives on Word Formation.* Berlin, New York: de Gruyter, 195-216.

Hüning, M., & Schlücker, B. (2010). Konvergenz und Divergenz in der Wortbildung. Komposition im Niederländischen und im Deutschen. In: Dammel, A., Kürschner, S., & Nübling, D. (eds.). *Kontrastive Germanistische Linguistik. Teilband 2*, Hildesheim, Zürich, New York: Olms, 783-825.

Köpcke, K. M. (1982). *Untersuchung zum Genussystem der deutschen Gegenwartssprache.* Tubingen: Niemeyer.

Kupisch, T., Akpinar, D., & Stöhr, A. (2013). Gender assignment and gender agreement in adult bilinguals and second language learners of French. *Linguistic approaches to Bilingualism, 3*(2), 150-179.

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). LmerTest package: Tests in linear mixed effects models. *Journal of Statistical Software, 82*(13), 1-26.

Lemhöfer, K., Spalek, K., & Schriebers, H. (2008). Cross-language effects of grammatical gender in bilingual word recognition and production. *Journal of Memory and Language, 59*(3), 312-330.

Lemhöfer, K., Schriefers, H., & Hanique, I. (2010). Native language effects in learning second-language grammatical gender: A training study. *Acta Psychologica 135*(2), 150-158.

LimeSurvey Project Team & Schmitz, C. (2015). *LimeSurvey: An open source survey tool (Version 2.06+)*. Online: http://limesurvey.org.

Loerts, H. (2012). Uncommon gender: eyes and brains, native and second language learners, & grammatical gender. Groningen: s.n.

Loerts, H., Stowe, L. A., & Schmid, M. S. (2013). Predictability speeds up the re-analysis process: An ERP investigation of gender agreement and cloze probability. *Journal of Neurolinguistics, 26*(5), 561-580.

Lohndal, T., & Westergaard, M. (2016). Grammatical gender in American Norwegian heritage language: Stability or attrition? *Frontiers in psychology, 7*, 344, 1-15.

Lüdeling, A. (2013). *Grundkurs Sprachwissenschaft*. Stuttgart: Klett.

Max Planck Institute for Psycholinguistics (2001). *Webcelex* [database].

Martinez-Gibson, E. A. (2011). A comparative study on gender agreement errors in the spoken Spanish of heritage speakers and second language learners. *Porta Linguarum, 15*, 177-193.

Martínez-Mira, M. I. (2009). Spanish heritage speakers in the southwest: Factors contributing to the maintenance of the subjunctive in concessive clauses. *Spanish in context, 6*(1), 105-126.

Montrul, S. (2005) Second language acquisition and first language loss in adult early bilinguals: exploring some differences and similarities. *Second Language Research*, *21*(3), 199-249.

Montrul, S. (2009). Knowledge of tense-aspect and mood in Spanish heritage speakers. *International Journal of Bilingualism, 13*(2), 239-269.

Montrul, S. (2010a). Current issues in heritage language acquisition. *Annual Review of Applied Linguistics*, *30*, 3-23.

Montrul, S. (2010b). Dominant language transfer in adult second language learners and heritage speakers. *Second Language Research, 26*(3), 293-327.

Montrul, S. (2010c). How similar are adult second language learners and Spanish heritage speakers? Spanish clitics and word orders. *Applied psycholinguistics, 31*(1), 167-207.

Montrul, S. (2011). Morphological errors in Spanish second language learners and heritage speakers. *Studies in Second Language Acquisition, 33*(2), 163-192.

Montrul, S. (2016). *The acquisition of heritage languages*. Cambridge University Press.

Montrul, S., Foote, R., & Perpiñán, S. (2008). Gender agreement in adult second language learners and Spanish heritage speakers: The effects of age and context of acquisition. *Language Learning, 58*(3), 503–553.

Montrul, S., & Ionin, T. (2010). Transfer effects in the interpretation of definite articles by Spanish heritage speakers. *Bilingualism: Language and Cognation, 13*(4), 449-473.

Montrul, S., & Ionin, T. (2012). Dominant language transfer in Spanish heritage speakers and second language learners in the interpretation of definite articles. *The Modern Language Journal, 96*(1), 70-94.

Müller, N. (1990). Developing two gender assignment systems simultaneously. In: Meisel, J. M. (ed.): *Two first languages: Early grammatical development in bilingual children*, Dordrecht: Foris publications, 193-234.

Orgassa, A., & Weerman, F. (2008). Dutch gender in specific language impairment and second language acquisition. *Second Language Research, 24*(3), 333-364.

Osch, B. van, Hulk, A., Aalberse, S., & Sleeman, P. (2018). Implicit and explicit knowledge of a multiple interface phenomenon: Differential task effects in heritage speakers and L2 speakers of Spanish in the Netherlands. *Languages*, *3*(3), 25.

Pallier, C. (2007). Critical periods in language acquisition and language attrition. In: Köpke, B., Schmid, M., Keijzer, M., & Dosterst, S. (eds.). *Language Attrition. Theoretical Perspectives*. Amsterdam: John Benjamins, 99–120.

Pascual y Cabo, D., & Rothman, J. (2012). The (Ill)logical problem of heritage speaker bilingualsm and incomplete acquisition. *Applied Linguistics, 33*(4), 450-455.

Pauwels, A. (1953a). *De plaats van het hulpwerkwoord verleden deelwoord en infinitief in de Nederlandse bijzin. Deel I. - Tekst*. Leuven: Drukkerij M. & L. Symons

Polinsky, M. (2008). Gender under incomplete acquisition: Heritage speakers' knowledge of noun categorization. *Heritage Language Journal, 6*(1), 40-71.

Polinsky, M. (2011). Reanalysis in adult heritage language: New evidence in support of attrition. *Studies in second language acquisition, 33*(2), 305-328.

Polinsky, M. (2015). Heritage languages and their speakers: State of the field, challenges, perspectives for future work, and methodologies. *Zeitschrift für Fremdsprachwissenschaft 26*, 7-27.

Potowski, K., Jegerski, J., & Morgan-Short, K. (2009). The effects of instruction on linguistic development in Spanish heritage language speakers. *Language Learning, 59*(3), 537–579.

R Core Team (2017). *R: A language and environment for statistical computing*. R foundation for Statistical Computing, Vienna, Austria.

Roodenburg, J., & Hulk, A. (2010). "Gender" puzzles. *Taal en Tongval, 22*, 143-164.

Rothman, J. (2007). Heritage speaker competence difference, language change, and input type: Inflected infinitives in Heritage Brazilian Portuguese. *International Journal of Bilingualism, 11*(4), 359-389.

Rothman, J. (2009). Understanding the nature and outcomes of early bilingualism: Romance languages as heritage languages. *International Journal of Bilingualism, 13*(2), 155-163.

Sabourin, L., Stowe, L. A., & Haan, G. J. de (2006). Transfer effects in learning a second language grammatical gender system. *Second Language Research*, *22*(1), 1-29.

Scontras, G., Fuchs, S., & Polinsky, M. (2015). Heritage language and linguistic theory. *Frontiers in Psychology, 6*, 1545, 1-20.

Seliger, H. W. (1996). Primary language attrition in the context of bilingualism. *Handbook of second language acquisition*, 605-625.

Serratrice, L., Sorace, A., & Paoli, S. (2004). Crosslinguistic influence at the syntax–pragmatics interface, subjects and objects in English–Italian bilingual and monolingual acquisition. *Bilingualism: Language and Cognition, 7*(3), 183-206.

Sherkina-Lieber, M. (2011). *Comprehension of Labrador Inuttitut functional morphology by receptive bilinguals*. Toronto: Canada: University of Toronto.

Silva-Corvalán, C. (1994). *Language Contact and Change: Spanish in Los Angeles*. Oxford: Oxford University Press.

Snodgrass, J. G., & Vanderwart, M. (1980). A standardized set of 260 pictures: Norms for name agreement, image agreement, familiarity and visual complexity. *Journal of Experimental Psychology: Human Learning and Memory, 6*(2), 174-215.

Sorace, A. (2000). Differential effects of attrition in the L1 syntax of near-native L2 speakers. *Proceedings of the 24th Boston University Conference on Language Development*. Somerville, MA: Cascadilla Press, 719-725.

Speyer, A. (2011). Die Freiheit der Mittelfeldabfolge im Deutschen – ein modernes Phänomen. *Beiträge zur Geschichte der deutschen Sprache und Literatur, 133*(1), 14-33.

Sudhoff, S. (2018). *Kontrastive Syntax*. [PowerPoint].

Szagun, G., Stumper, B., Sondag, N., & Franik, M. (2007). The acquisition of gender marking by young German-speaking children: Evidence for learning guided by phonological regularities. *Journal of Child language*, *34*(3), 445-471.

Tsimpli, I. M., & Hulk, A. (2013). Grammatical gender and the notion of default: Insights from language acquisition. *Lingua, 137*, 128-144.

Tsimpli, I. M., Sorace, A., Heycock, C., & Filiaci, F. (2004). First language attrition and syntactic subjects: A study of Greek and Italian near-native speakers of English. *International Journal of Bilingualism, 8*(3), 157-177.

Velde, M. van de (1972). Zur Wortstellung im niederländischen und im deutschen Satz. *Sprache der Gegenwart 19: Linguistische Studien 1*. Düsseldorf: Schwann, 76-126.

Velde, M. van der (2004). L'acquisition des articles définis en L1: Étude comparative entre le français et le néerlandais. *Acquisition et Interaction en Langue etrangère*, *21*, 9-46.

Vogelaer, G. de (2006). Pronominaal genus bij 'Zuid-Nederlandse' taalverwervers: grammaticaal of semantisch systeem? In: Hüning, M., Verhagen, M., Vogl., U., & Wouden, T. van de (eds.). *Nederlands tussen Duits en Engels*. Leiden: Stichting Neerlandanistiek Leiden, 89-102.

Valenzuela, E., Faure, A., Ramírez-Trujillo, A. P., Barski, E., Pangtay, Y., & Diez, A. (2012). Gender and heritage Spanish bilingual grammars: A study of code-mixed determiner phrases and copula constructions. *Hispania, 95*(3), 481-494.

Weiß, H. (2012). 4. Sprachgeschichte. In: Drügh, H., Komfort-Hein, S., Kraß, A., Meier, C., Rohowski, G., Seidel, R., & Weiß, H. (eds.): *Germanistik: Sprachwissenschaft – Literaturwissenschaft – Schlüsselkompetenzen*. Stuttgart, Weimar: Verlag J. B. Metzler, 121-154.

Zombolou, K. (2011). Attrition in Greek Diaspora: Grammars in Contact or Incomplete Acquisition? In: I. Ihemere (ed.): *Language Contact and Language Shift: Grammatical and Sociolinguistic Perspectives*, Munich: Lincom Europa.

Appendix A. Used abbreviations

3V	Verb order in a verb cluster of three verbs
AN	Adjective (A) – noun (N) collocation
AN_Comp	A+N compounds
AN_LexP	Lexicalised A+N phrase
AUX	Auxiliary
COM	Common (gender)
ComCog	Compatible cognate
ComNoncog	Compatible noncognate
DAT	Dative
DEF	Definite
FEM	Feminine (gender)
GEN	Genitive
Gend	Gender
IncomCog	Incompatible cognate
IncomNoncog	Incompatible Noncognate
INF	Infinitive
L1	First language
L2	Second language
L3	Third language
MASC	Masculine (gender)
MOD	Modal
NEUT	Neuter (gender)
NOM	Nominative
OBJ	Direct object
PL	Plural
S1	First sentence of a stimulus in the experiment
S2	Second sentence of a stimulus in the experiment
SDO	Word order of subject and direct object in subordinate clauses
SG	Singular
SUBJ	Subject

Appendix B: Stimuli of the study

Stimuli Grammaticality Judgement Task

Word order 3 verbs in subordinate clauses

3V_kunnen_1

Sentence 1

De politieagent achtervolgt de dief vanwege een inbraak.

the policeman chases the thief because_of a burglary

'The policeman chases the thief because of a burglary'

Sentence 2

Hier zie je dat de agent de boef snel **heeft kunnen boeien.**

here see you that the policeman the thief quickly has$_{AUX}$ can$_{MOD}$ chain$_{INF}$

'Here you see that the policeman was able to chain the thief quickly.

3V_kunnen_2

Sentence 1

Vandaag gaan vader en zoon een lange fietstocht maken door de Limburgse

today go father and son a long bicycle_ride make through the Limburg

heuvels.

hills

'Today father and son go for a bicycle ride through the hills of Limburg.

Sentence 2

Hier zie je dat de vader de fietsen op het dak van de auto **heeft kunnen zetten**.

here see you that the father the bikes on the roof of the car has$_{AUX}$ can$_{MOD}$ put$_{INF}$

'Here you see that the father was able to put the bikes on roof of the car.'

3V_kunnen_3

Sentence 1

Na uren spelen op het strand heeft het meisje zin in wat lekkers.

after hours playing at the beach has the girl fancy something sweet

'After hours playing on the beach, the girl fancies something sweet.'

Sentence 2

*Hier zie je dat het meisje een ijsje bij de ijskraam **heeft halen kunnen**

here see you that the girl an icecream at the ice_cream_stall has$_{AUX}$ take$_{INF}$ can$_{MOD}$

'Here you see that the girl had an ice cream at the ice cream stall.'

3V_kunnen_4

Sentence 1

Door de huilende baby was de man de hele nacht wakker.

because_of the crying baby was the man the whole night awake

'Because of the crying baby, the man was awake whole night.'

Sentence 2

*Hier zie je dat de man overdag nog een aantal uur in de hangmat **heeft**

here see you that the man during_the_day still a number hours in the hammock has$_{AUX}$

slapen kunnen.

sleep$_{INF}$ can$_{MOD}$

'Here you see that the man was able to sleep for a number of hours during the day.'

3V_kunnen_5

Sentence 1

Bij de groentewinkel koopt de vrouw bananen en ananas.

at the greengrocer's buys the woman bananas and pineapple

'At the greengrocer's the woman buys bananas and pineapple.'

Sentence 2

*Hier zie je dat ze bij deze winkel met contant geld **kunnen heeft betalen**.

here see you that she at this store with cash can$_{MOD}$ has$_{AUX}$ pay$_{INF}$

'Here you see that she was able to pay with cash at this store.'

3V_kunnen_6

Sentence 1

Door de sterke stroming is het jonge meisje ver de zee in gesleurd.

because_of the strong flow is the young girl far the sea into dragged

‘Because of the strong flow the girl has been dragged far into the see.’

Sentence 2

*Hier zie je dat de strandwacht het meisje uit zee **kunnen heeft redden.**

here see you that the lifeguard the girl from sea can_{MOD} has_{AUX} $rescue_{INF}$

‘Here you see the lifeguard was able to rescue the girl from the see.’

3V_moeten_1

Sentence 1

De politieagent heeft vandaag een winkeldief in de cel op het politiebureau gezet.

the police_officer has today a shoplifter in the jail at the police_station put

'The police officer put a shoplifter in jail at the police station today.'

Sentence 2

Hier zie je dat de agent het proces-verbaal achter zijn bureau **heeft moeten**

here see you that the officer the charge behind his desk has_{AUX} $must_{MOD}$

schrijven.

$write_{INF}$

'Here you see that the officer had to write the charge behind his desk.'

3V_moeten_2

Sentence 1

Het voorwiel van de fiets is door de val helemaal kapotgegaan.

the front_wheel of the bike is due_to the fall completely broke

'The front wheel of the bike broke completely due to the fall.

Sentence 2

Hier zie je dat de vrouw een nieuwe band bij de winkel **heeft moeten kopen**.

here see you that the woman a new wheel at the store has$_{AUX}$ must$_{MOD}$ buy$_{INF}$

'Here you see that the woman had to buy a new wheel at the store.'

3V_moeten_3

Sentence 1

Vanwege de hoeveelheid suiker mogen apen maar weinig bananen eten op

because_of the amount sugar are_allowed_to monkeys only little bananas eat on

een dag.

a day

'Because of the amount of sugar monkeys are not allowed to eat a lot of bananas on a day.'

Sentence 2

*Hier zie je dat de verzorgster de bananen daarom **heeft wegen moeten.**

here see you that the caretaker the bananas therefore has$_{AUX}$ weigh$_{INF}$ must$_{MOD}$

'Here you see that the caretaker therefore had to weigh the bananas.'

3V_moeten_4

Sentence 1

Het laken kwam helemaal verkreukeld uit de wasmachine.

the sheet came all crumpled_out of the washing_machine

'The sheet came all crumpled out of the washing machine.'

Sentence 2

*Hier zie je dat de vrouw het zwarte laken **heeft strijken moeten**

here see you that the woman the black sheet has$_{AUX}$ iron$_{INF}$ must$_{MOD}$

'Here you see that the woman had to iron the black sheet.'

3V_moeten_5

Sentence 1

Alle stoelen bij de dolfijnenshow waren bezet.

all seats at the dolphin_show were occupied

'All the seats at the dolphin show were taken.'

Sentence 2

*Hier zie je dat het meisje daarom bij de show **moeten heeft staan**.

here see you that the girl therefore at the show must$_{MOD}$ has$_{AUX}$ stand$_{INF}$

'Here you see that the girl therefore had to stand at the show.'

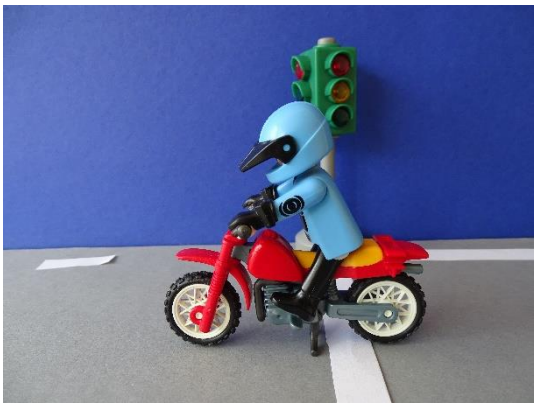
3V_moeten_6

Sentence 1

Na de motorrijder springt het stoplicht op rood.

after the motorcyclist jumps the traffic_light on red

‘After the motorcyclist the traffic light turns red.’



Sentence 2

*Hier zie je dat de bestuurder van de auto voor het rode licht **moeten heeft**

here see you that the driver of the car in_front_of the red light must$_{MOD}$ has$_{AUX}$

stoppen.

stop$_{INF}$

‘Here you see that the car driver had to stop in front of the read light.’

Word order of the subject and direct object in subordinate sentences

SDO_SUBJ_OBJ_1

Sentence 1

‘s Nachts is de dief het museum binnengeslopen om de kroon te pikken

At_night is the thief the museum sneaked_into to the crown to steal.

‘At night, the thief sneaked into the museum to steal the crown.’

Sentence 2

Hier zie je dat **de dief** **hem** uit het museum gestolen heeft.

here see you that the thief$_{SUBJ}$ him$_{OBJ}$ out the museum stolen has

‘Here you see that the thief stole him out of the museum.’

SDO_SUBJ_OBJ_2

Sentence 1

Na een lange zonnige dag op het strand is het gezin de groene koelbox kwijt.

after a long sunny day at the beach is the family the green cooler lost

‘After a long sunny day at the beach, the family has lost the green cooler.’

Sentence 2

Hier zie je dat **het gezin** **hem** op het strand vergeten is.

here see you that the familiy$_{SUBJ}$ him$_{OBJ}$ at the beach forgotten is

‘Here you see that the family forgot it at the beach.’

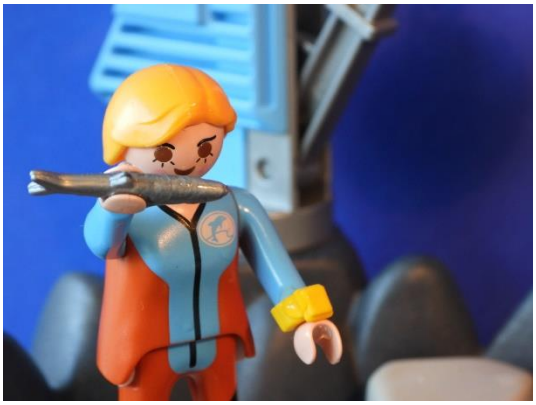
SDO_SUBJ_OBJ_3

Sentence 1

Tijdens het voeren van de dolfijnen gooit de trainster een vis in het water.

while the feeding of the dolphins throws the trainer a fish in the water

'While feeding the dolphins, the trainer throws a fish in the water.'

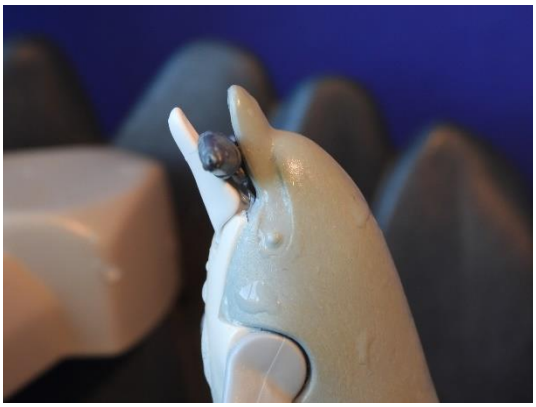


Sentence 2

Hier zie je dat **de dolfijn** **hem** gelijk opgegeten heeft.

here see you that the dolphin$_{SUBJ}$ him$_{OBJ}$ immediately ate has

'Here you see that the dolphin ate it immediately.'



SDO_SUBJ_OBJ_4

Sentence 1

Het konijn is stiekem uit het openstaande hok ontsnapt.

the rabbit is secretly from the open hutch escaped

'The rabbit has secretly escaped from the open hutch.'

Sentence 2

Hier zie je dat **het meisje het** met haar handen gevangen heeft.

here see you that the $girl_{SUBJ}$ it_{OBJ} with her hands caught has

'Here you see that the girl caught it with her hands.'

SDO_SUBJ_OBJ_5

Sentence 1

Het meisje heeft een brief voor haar vriendin in de brievenbus gedaan.

the girl has a letter for her fried in the mailbox done

'The girl put a letter in the mailbox for her friend.'

Sentence 2

Hier zie je dat **de postbode hem** bij het huis bezorgd heeft.

here see you that the postman_{SUBJ} him_{OBJ} at the house delivered has

'Here you see that the postman delivered it at the house.'

SDO_SUBJ_OBJ_6

Sentence 1

Sinds kort hangt de hockeystick van de beste hockeyer ter wereld in het nieuwe

recently hangs the hockey stick of the best hockey player in the world in the new

sportmuseum.

sports_museum

'Recently, the hockey stick of the best hockey player in the world is hanging in the new sports museum.'

Sentence 2

Hier zie je dat **de man hem** aandachtig bekeken heeft.

here see you that the man_{SUBJ} him_{OBJ} closely watched has

'Here you see that the man has been watching it closely.'

SDO_OBJ_SUBJ_1

Sentence 1

De pinguïn met de zere poot wordt met het verdovingspistool verdoofd.

the penguin with the sore paw is with the stun_gun stunned

'The penguin with the sore paw is stunned with the stun gun.'

Sentence 2

*Hier zie je dat **hem de dierenverzorgster** daarna aan zijn zere poot opereert.

here see you that him$_{OBJ}$ the animal_carer$_{SUBJ}$ then on his sore paw operates

'Here you see that the animal carer then operates its sore paw.'

SDO_OBJ_SUBJ_2

Sentence 1

Tijdens het avondeten is het glas op de grond gevallen.

during the dinner is the glass on the ground fell

‘During dinner, the glass fell on the ground.’

Sentence 2

*Hier zie je dat **het de vrouw** van de grond gepakt heeft.

here see you that it the woman off the ground took has

‘Here you see that the woman took it off the ground.’

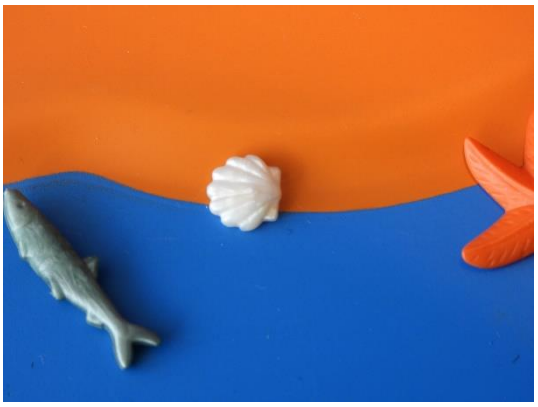
SDO_OBJ_SUBJ_3

Sentence 1

Op het strand is een heel mooie schelp aangespoeld.

on the beach is a very nice shell washed_ashore

‘On the beach, a very nice shell washed ashore.’



Sentence 2

*Hier zie je dat **hem het meisje** tijdens haar schelpenjacht gevonden heeft.

here see you that it_{OBJ} the $girl_{SUBJ}$ during her shell_hunt found has

'Here you see that the girl found it during her shell hunt.'

SDO_OBJ_SUBJ_4

Sentence 1

In de nieuwe sportwinkel in het dorp is een heel goed tennisracket te koop.

in the new sports_shop in the village is a very good tennis_racket for sale

'In the new sports shop, a very good tennis racket is for sale.'

Sentence 2

*Hier zie je dat **het de jongen** gelijk gekocht heeft.

here see you that it$_{OBJ}$ the boy$_{SUBJ}$ immediately bought has

'Here you see that the boy immediately bought it.'

SDO_OBJ_SUBJ_5

Sentence 1

Een nieuwe dolfijn is vandaag per auto in het dolfijnenpark aangekomen.

a new dolphin is today by car in the dolphin_park arrived

'A new dolphin arrived in the dolphin park by car today.'

Sentence 2

Hier zie je dat **hem de verzorgers** met de kraan in het water getild hebben.

here see you that him$_{OBJ}$ the caretakers$_{SUBJ}$ with the crane in the water lifted have

'Here you see that the caretakers lifted it in the water with the crane.'

SDO_OBJ_SUBJ_6

Sentence 1

Vandaag heeft de jongen de hele dag vissen gevangen met zijn schepnet

today has the boy the whole day fishes caught with his fishing_net

'Today the boy has been fishing all day with his fishing net.'

Sentence 2

*Hier zie je dat **ze** **de jongen** in de emmer gedaan heeft.

here see you that them$_{OBJ}$ the boy$_{SUBJ}$ in the bucket done has

'You see here that the boy put them in a bucket.'

A+N-collocations

A+N_LexP_1

Sentence 1

Tijdens de spannende wedstrijd heeft de Duitse voetballer een overtreding op

during the exicting match has the German footballer a foul against

de Nederlander gemaakt.

the Dutchman made

'During the exciting match, the German footballer made a foul against the Dutchman.'

Sentence 2

Op dit plaatje mag de Nederlandse voetballer daarom een **vrije schop** nemen.

on this picture is_allowed_to the Dutch footballer therefore a free$_E$ kick take

'On this picture, the Dutch footballer therefore is allowed to take a free kick

A+N_LexP_2

Sentence 1

De man moet kiezen of hij sinaasappelsap of wijn bij het eten wil drinken

the man must choose if he orange juice or wine at the dinner want drink

‘The man has to choose if he wants to drink orange juice or wine with dinner.’

Sentence 2

Hier zie je dat de man een glas **rode wijn** bij het eten gedronken heeft.

here see you that the man a glass **red$_E$ wine** at the dinner drunk has

‘Here you see the the man had a glass of red wine with dinner.’

A+N_ LexP _3

Sentence 1

Vandaag maakt de man het huis grondig schoon.

today makes the man the house thoroughly clean

‘Today the man is cleaning the house thoroughly.’

Sentence 2

Hier zie je dat hij ook het **oud papier** naar de papierbak wegbrengt.

here see you that he also the wast$_{\emptyset}$ paper to the paper_bin brings

'Here you see that he also takes the waste paper to the paper bin.'

A+N_ LexP_4

Sentence 1

De kinderen zoeken een donker plekje om de sterren goed te kunnen bekijken.

The children look_for a dark place to the starts good to can look_at.

'The children are looking for a dark place to be able the look at the stars.'

Sentence 2

*Op dit plaatje kunnen de kinderen de sterren en de **volmaan** vanaf het donkere
on this picture can the children the stars and the full$_{\emptyset}$_moon from the dark
strand goed zien.
beach good see

'On this picture, the children can see the stars and the full moon from the dark beach.'

A+N_LexP_5

Sentence 1

De dokter in het ziekenhuis onderzoekt de zere buik van de jongen.
the doctor in the hospital examines the sore belly of the boy
'The doctor at the hospital examines the boy's sore belly.'

Sentence 2

*Op dit plaatje geeft de dokter de jongen pijnstilling voor zijn zere **dikdarm.**
on this picture gives the doctor the boy pain_relief for his sore large$_{\emptyset}$_intestine
'On this picture the doctor gives the boy pain relief for his sore large intestine.'

A+N_LexP_6

Sentence 1

Overdag werkt de vrouw als agent op het politiebureau.

during_the_day works the woman as policeman at the police_station

‘Duting the day, the woman works as policeman at the police station.’

Sentence 2

*Hier zie je dat ze in haar **vrijtijd** graag door de natuur fietst.

here see you that she in her spareø_time gladly through the nature cycles

‘Here you see that she likes to cycle through nature in her spare time.’

A+N_comp_1

Sentence 1

Het meisje leest het bordje bij het dierenverblijf aandachtig.

the girl reads the sign at the animal_shelter carefully

'The girl reads the sign at the animal shelter carefully.'

Sentence 2

Op dit plaatje vraagt het meisje aan de moeder of het dier op het bordje een

on this picture asks the girl to the mother whether the animal on the sign a

dolfijn of een **bruinvis** is.

dolphin or a porpoise$_{ø}$ is

'On this picture, the girl asks her mother whether the animal on the sign is a dolphin or a porpoise.'

A+N_comp_2

Sentence 1

De man zoekt een plekje om zijn rode motorboot aan te leggen.

the man lookes_for a place to his red motorboat to moor

‘The man is looking for a place to moor his red motorboat.’

Sentence 2

Op dit plaatje heeft de man een plekje aan de steiger van **hardhout** gevonden.

on this picture has the man a spot on the jetty of hard$_{\emptyset}$_wood found

‘On this picture, the man has found on the hardwood jetty.’

A+N_comp_3

Sentence 1

De bakker zet de bestellingen van de klanten in zijn bedrijfsauto.

the baker puts the orders of the customers in his company_car

‘The baker puts the customers’ orders in his company car.’

Sentence 2

Hier zie je dat een klant **witbrood** bij de bakker besteld heeft.

here see you that a customer white$_{ø}$_bread at the baker ordered has

‘Here you see that a customor ordered white bread from the baker.’

A+N_comp_4

Sentence 1

Het meisje maakt een lange tocht met haar paard over het strand. [S1]

the girl makes a long ride with her horse on the beach

‘The girl makes a long ride with her horse on the beach.’

Sentence 2

*Hier zie je dat het meisje daarna haar paard samen met haar **halve broer** borstelt.

here see you that the girl then her horse together with her half$_{\emptyset}$ brother brushes

'Here you see that the girl then brushes her horse together with her half-brother.'

A+N_comp_5_incorrect

Sentence 1

Vandaag gaat de jongen met zijn opa naar het dolfijnenpark.

today goes the boy with his grandfather to the dolphin_park

'Today the boy goes with his grandfather to the dolphin park.'

Sentence 2

*Op dit plaatje bekijkt de jongen met zijn **grote vader** de pinguïns.

on this picture looks_at the boy with his grand$_{E}$_dad the penguins

'On this pictures the boys is looking at the penguins with his grandfather.'

A+N_comp_6[8]

Sentence 1

Na een zwangerschap van 32 weken is de vrouw in het ziekenhuis bevallen.

after a pregnancy of 32 weeks is the woman in the hospital given_birth

'After a pregnancy of 32 weeks, the woman gave birth in the hospital.'

Sentence 2

*Hier zie je dat het gezin ondanks de **vroege geboorte** van de baby al snel naar

here see you that the family despite the early$_E$ birth of the baby already soon to

huis mochten gaan.

home allowed go

'Here you see that the family was allowed to go home fast despite the premature birth of the baby.'

[8] Due to another mistake in the experiment, this item was removed for further analysis.

Gender

Gend_Com_Cog_1[9]

Sentence 1

De man heeft de vrouw bloemen voor haar verjaardag gegeven.

the man has the woman flowers for her birthday given

'The man gave the woman flowers for her birthday.'

Sentence 2

Op dit plaatje heeft de vrouw de bloemen in de vaas gezet.

on this picture has the woman the flowers in the$_{COM}$ vase$_{COM}$ put

'On this picture, the woman put the flowers in the vase.'

[9] Com_Cog = compatible cognate

Gend_Com_Cog_2

Sentence 1

Door de storm ligt het apenverblijf vol met allerlei bloemblaadjes van de bomen.

due_to the storm lies the monkey_cage full with all_kinds_of petals of the trees.

'Due to the storm, the monkey cage is full of all kind of petals from the threes.'

Sentence 2

*Hier zie je dat de verzorger het verblijf met **het** **hark** schoongemaakt heeft.

here see you that the careaker the cage with the$_{NEUT}$ rake$_{COM}$ cleaned has

'Here you see that the caretaker cleaned the cage with the rake.'

Gend_Com_Cog_3

Sentence 1

De vrouw met de rode trui geeft het bruine konijn sla en wortels.

the woman with the red sweater gives the brown rabbit lettuce and carrots

'The woman with the read sweater gives the brown rabbit lettuce and carrots.'

Sentence 2

Hier zie je dat het konijn **het** **gras** in zijn hok lekkerder vindt.

here see you that the rabbit the$_{NEUT}$ grass$_{NEUT}$ in his hutch nicer finds

'Here you see that the rabbit likes the grass in his cage better.'

Gend_Com_Cog_4

Sentence 1

In de winkel heeft het meisje een snorkel en flippers gekocht.

in the shop has the girl a snorkel and flippers bought

'In the shop, the girl bought a snorkel and flippers.'

Sentence 2

*Op dit plaatje speelt ze gelijk met haar nieuwe spullen in **de zwembad**.

on this picture plays she immediately with her new stuff in the$_{COM}$ pool$_{NEUT+}$

'On this picture, she immediately plays with her new stuff in the pool.'

Gend_Incom_Cog_1[10]

Sentence 1

Elke dag drinkt de oude man om elf uur een kop koffie in de stoel voor het raam.

every day drinks the old man at eleven o'clock a cup coffee in the chair in_front_of the window

'Every day, the old an drinks a cup of coffee at eleven o'clock in the chair in front of the window.'

[10] Incom_Cog = incompatible cognate

Sentence 2

Hier zie je dat hij dan ook van de muziek op **de** **radio** geniet.

here see you that he then also of the music on the$_{COM}$ radio$_{COM}$ enjoys

'Here you see that he then enjoys the music on the radio.'

Gend_Incom_Cog_2

Sentence 1

Drie maanden geleden heeft de jongen een schattige puppy gekregen.

three months ago has the boy a cute puppy got

'Three months ago, the boy got a cute puppy.'

Sentence 2

*Hier zie je dat **het** **halsband** voor de gegroeide hond te klein geworden is.

here see you that the$_{NEUT}$ collar$_{COM}$ for the grown dog too small became is

'Here you see that the collar for the grown dog has become too small.'

Gend_Incom_Cog_3

Sentence 1

De man maakt het vlees voor het avondeten klaar op de barbecue.

the man makes the meat for the dinner ready on the barbecue

'The man prepares the meat for dinner on the barbecue.'

Sentence 2

Op dit plaatje worden zijn kleren tijdens het koken niet vies door het

on this picture become his clothes during the cooking not dirty because_of the$_{NEUT}$

schort.

apron$_{NEUT}$

'On this picture his clothes do not get dirty because of the apron during cooking.'

Gend_Incom_Cog_4

Sentence 1

De jongen en het meisje willen op het strand een zandkasteel maken.

the boy and the girl want at the beach a sandcastle make

'The boy and the girl want to make a sandcastle at the beach.'

Sentence 2

Op dit plaatje doet het meisje **de** **zand** daarom in de oranje emmer.

on this picture puts the girl the$_{NEUT}$ sand$_{COM}$ therefore in the orange bucket

'On this picture, the girl therefore puts the sand in the orange bucket.'

Gend_Com_Noncog_1[11]

Sentence 1

Voor vertrek naar zee zet vader de laatste koffer in de auto.

before leaving to sea puts father the last suitcase in the car

'Before leaving for the sea, father puts the last suitcase in the car.'

Sentence 2

Hier zie je dat ze door **de file** op de snelweg heel lang over hun

here see you that they because of the$_{COM}$ traffic_jam$_{COM}$ on the highways very long on their

reis doen.

journey do

[11] Com_Noncog = compatible noncognate

Gend_Com_Noncog_2

Sentence 1

Door zijn rode haren en bleke huid moet de jongen op deze warme dag oppassen

because_of his read hair and pale skin must the boy on this hot day be_careful

om niet te verbranden.

to not to sunburn

'Because of his red hair and pale skin, they boy have to be careful not to get sunburned on this hot day.'

Sentence 2

*Op dit plaatje heeft hij daarom **het** **pet** op zijn hoofd gezet.

on this picture has he therefore the$_{NEUT}$ cap$_{COM}$ on his head put.

'On this picture, he therefor put his cap on his head.'

Gend_Com_Noncog_3

Sentence 1

De man heeft bij de winkel meubels en decoratie voor de nieuwe woning gekocht.

the man has at the store furniture and decoration for the new house bought

‘The man has bought furniture and decoration for the new house at the store.’

Sentence 2

Op dit plaatje heeft hij **het** **schilderij** gelijk op de muur van de woning

on this picture has he the$_{NEUT}$ painting$_{NEUT}$ immediately on the wall of the house

gehangen.

hanged

‘On this picture, he immediately hanged the painting on the wall of the house.’

Gend_Com_Noncog_4

Sentence 1

Het meisje moet van haar moeder de tafel dekken voor het avondeten.

the girl must of her mother the table set for the dinner

‘Her mother tells the girl to set the table for dinner.’

Sentence 2

*Hier zie je dat ze **de** **mes** aan de verkeerde kant van het bord gelegd heeft.

here see you that she the$_{COM}$ knife$_{NEUT}$ on the wrong side of the plate put has

'Here you see that she put the knife on the wrong side of the plate.'

Gend_Incom_Noncog_1[12]

Sentence 1

De moeder maakt met haar zoontje een wandeling over de camping.

the mother makes with her son a walk around the campsite

'The mother takes her son for a walk around the campsite.'

[12] Incom_Noncog = incompatible noncognate

Sentence 2

Op dit plaatje is **de** **knuffel** van het kind op de grond gevallen.

on this picture is the$_{COM}$ cuddly_toy$_{COM}$ of the child to the ground fell

'On this picture, the child's cuddly toy fell to the ground.'

Gend_Incom_Noncog_2

Sentence 1

De man met de winkelwagen moet boodschappen in de supermarkt doen.

the man with the trolley must groceries in the supermarket do

'The man with the trolley has to do groceries in the supermarket.'

Sentence 2

Op dit plaatje pakt hij **het** **groente** voor het avondeten als eerste.

on this picture takes he the$_{NEUT}$ vegetable$_{COM}$ for the dinner as first

‘On this picture, he takes the vegetable for dinner first.’

Gend_Incom_noncog_3

Sentence 1

Het gezin doet alle benodigde spullen voor het strand in de kar.

the family puts all necessary stuff for the beach in the cart

‘The family puts all the necessary stuff for the beach in the cart.’

Sentence 2

Hier zie je dat ze ook **het** **krat** frisdrank en de koelbox meenemen.

here see you that they also the$_{NEUT}$ crate$_{NEUT}$ soda and the cooler bring_with

‘Here you can see they also bring the crate of soda and the cooler.’

Gend_Incom_Noncog_4

Sentence 1

Elke dag gaat de dierenverzorgster op haar fiets naar het werk.

every day goes the animal_caretaker on her bike to the work

‘Every day the animal caretaker goes to work on her bike.’

Sentence 2

*Hier zie je dat ze haar fiets in **de** **fietsenrek** gezet heeft.

here see you that she her bike in the$_{COM}$ bike_rack$_{NEUT}$ put has

‘Here you see that she put her bike in the bike rack.’

Fillers

Fillers_1

Sentence 1

De vrouw ligt op haar handdoek te zonnen op het strand.

the woman lies on her towel to sunbath on the beach

'The woman is sunbathing on her towel on the beach.'

Sentence 2

Op dit plaatje gaat ze haar zonnebril ter bescherming van haar **ogen** opzetten.

on this picture goes she her sunglasses to protect of her eye-en$_{PL}$ put_on

'On this picture she is going to put on her sunglasses to protect her eyes.'

Fillers_2

Sentence 1

De leverancier heeft een nieuwe voorraad voor de supermarkt gebracht.

the supplier has a new stock for the supermarket brought

'The supplier brought a new stock for the supermarket.'

Sentence 2

Op dit plaatje zet de winkelmedewerkster de **flessen** frisdrank gelijk in de winkel.

on this picture puts the shop_assistent the bottle-en$_{PL}$ soda right in the shop

'On this picture, the shop assistant puts the bottles of soda right in the shop.'

Fillers_3

Sentence 1

De vrouw heeft het oude brood op het grasveld voor het huis gegooid.

the woman has the old bread on the lawn in_front_of the house thrown

'The woman threw the old bread on the lawn in front of the house.'

Sentence 2

*Hier zie je dat er daarom zoveel **meeuws** voor het huis zitten.

here see you that there therefore so_many seagull-s_{PL} in_front_of the house sit

'This is way there are so many seagulls in front of the house.'

Fillers_4

Sentence 1

Tijdens de pauze spelen de kinderen op het schoolplein.

during the break play the children on the schoolyard

'During the break the children play at the schoolyard.'

Sentence 2

Hier zie je dat de **leraren** dan samen een kop koffiedrinken.

here see you that the teacher-en_{PL} then together a cup coffee_drink

'Here you see that the teachers then having a cup of coffee together.'

Fillers_5

Sentence 1

De honden bedelen bij de jongen om eten.

the dogs beg at the boy for food

'The doys are begging the boy for food.'

Sentence 2

Hier zie je dat de jongen de **voerbaks** van de honden gevuld heeft.

here see you that the boy the bowl-s_{PL} of the dogs filled has

'Here you see that the boy has filled the dog's bowls.'

Fillers_6

Sentence 1

Door hun goede voorbereiding kraken de dieven snel de codes.

because_of their good preparation crack the thieves quickly the codes

'Because of their good preparation, the thieves quickly crack the codes.'

Sentence 2

*Op dit plaatje ligt er veel geld en goud in de blauwe **kluizes**.

on this picture lies there a_lot_of money and gold in the blue safe-s_{PL}

'On this picture, there is a lot of money and gold in the blue safes.'

Fillers_7

Sentence 1

De man heeft de tafel op zijn zijkant gezet om ook eronder te kunnen stofzuigen.

the man has the table on his side put to also underneath to can vacuum

'The man put the table on its side to be able to vacuum underneath.'

Sentence 2

Hier zie je dat het mandje met **knijpers** daarbij op de grond gevallen is.

here see you that the basket with peg-s_{PL} with_that on the ground fallen is

'Here you see that the basket with pegs then fell on the ground.'

Fillers_8

Sentence 1

De blonde meiden lopen met een bal het water in.

the blond girls walk with a ball the water into

'The blond girls walk into the water with a ball.'

Sentence 2

Op dit plaatje gooien de **blondines** met de bal over in het water.

on this picture throw the blonde-S_{PL} with the ball over in the water

'On this picture the blondes throw the ball over in the water.'

Fillers_9

Sentence 1

De vader loopt samen met zijn zonen naar het veldje.

the father walks together with his sons to the field

'The father walks with his sons to the field.'

Sentence 2

Op dit plaatje proberen de **jongenen** bij hun vader een doelpunt te maken.

on this picture try the boy-en$_{PL}$ at their father a goal to make

'On this picture the boys are trying to score a goal with their father.'

Fillers_10

Sentence 1

Na het avondeten wast de man het bestek en alle borden af.

after the dinner washing the man the curtlery and all plates AF_{verb}

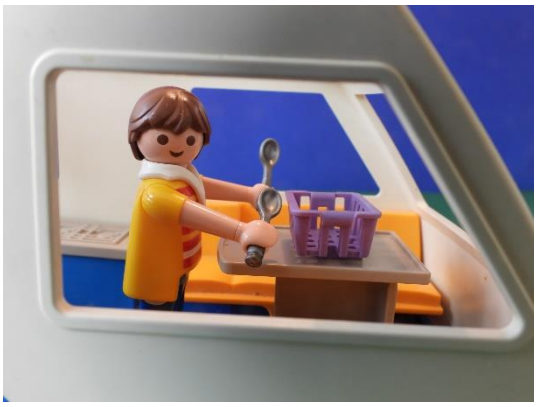
‘After dinner the man is washing the curtlery and all plates.’

Sentence 2

Op dit plaatje legt hij de **lepels** weer terug in het bestekbakje.

on this picture puts he the spoon-S_{PL} again back in the curtlery_tray.

‘On this picture, he puts the spoons back in the curtlery tray.



Fillers_11

Sentence 1

De voetballers komen het veld op voor de wedstrijd om het kampioenschap.

the soccer_players enter the field on for the game about the championship

'The soccer players enter the field for the championship game.'

Sentence 2

*Hier zie je dat er veel **toeschouweren** bij deze belangrijke wedstrijd gekomen

here see you that there a_lot_of spectator-en$_{PL}$ to this important game come

zijn.

are

'Here you can see that a lot of spectators have come to this important game.'

Fillers_12

Sentence 1

De vrouw en de man zijn hun bagage aan het inpakken voor de vliegreis.

the woman and the man are their luggage on the pack for the flight.

'The woman and man are packing their luggage for the flight'.

Sentence 2

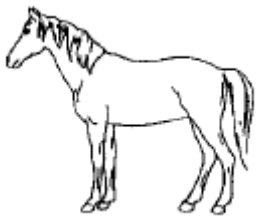
*Hier zie je dat ze twee **kofferen** per persoon meenemen op vakantie.

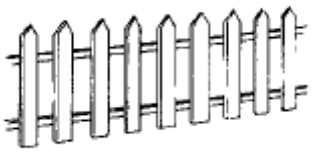
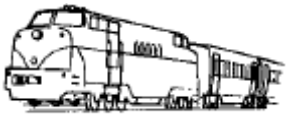
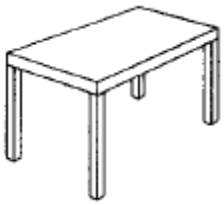
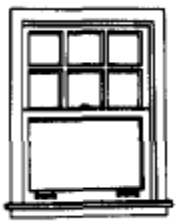
here see you that they two suitcase-en$_{PL}$ per person take_with on holiday

'Here you see that they take two suitcases per person on holiday.'

Stimuli Picture Naming Task

Dutch stimulus	English translation	Pictures (Snodgrass & Vanderwart, 1980)	Cognate or noncognate	Frequency category
gitaar	'guitar'		Cognate	0-20 in a million
sok	'sock'		Cognate	0-20 in a million

Dutch stimulus	English translation	Pictures (Snodgrass & Vanderwart, 1980)	Cognate or noncognate	Frequency category
pan	‘pan’		Cognate	21-50 in a million
appel	‘apple’		Cognate	21-50 in a million
ster	‘star’		Cognate	51-100 in a million
berg	‘mountain’		Cognate	51-100 in a million
paard	‘horse’		Cognate	>100 in a million
stoel	‘chair’		Cognate	>100 in a million
strik	‘bow’		Noncognate	0-20 in a million
vlinder	‘butterfly’		Noncognate	0-20 in a million

Dutch stimulus	English translation	Pictures (Snodgrass & Vanderwart, 1980)	Cognate or noncognate	Frequency category
kip	‘chicken’		Noncognate	21-50 in a million
hek	‘fence’		Noncognate	21-50 in a million
trein	‘train’		Noncognate	51-100 in a million
broek	‘trousers’		Noncognate	51-100 in a million
tafel	‘table’		Noncognate	>100 in a million
raam	‘window’		Noncognate	>100 in a million

Appendix C. Statistical models

Models that test whether the participants were able to distinguish correct from incorrect stimuli

Model	Anova with the previous best-fitting model	Conclusion
mi_0 <- lmer(Likert.scale ~ (1|Ppid) + (1|ItemId), data=ad, REML = FALSE) [baseline]	-	-
mi_1 <- lmer(Likert.scale ~ Correctness + (1|Ppid) + (1|ItemId) , data=ad, REML = FALSE)	[$\chi2(1)=124.32$, $p<.001$]	mi_1 is better than mi_0
mi_2 <- lmer(Likert.scale ~ Correctness + Group + (1|Ppid) + (1|ItemId) , data=ad, REML = FALSE)	[$\chi2(3)=10.12$, $p<.017$]	mi_2 is better than mi_1
mi_3 <- lmer(Likert.scale ~ Correctness * Group + (1|Ppid) + (1|ItemId) , data=ad, REML = FALSE)	[$\chi2(3)=164.88$, $p<.001$]	mi_3 is better than mi_2

Models that test the effect of domain

Model	Anova with the previous best-fitting model	Conclusion
md_0 <- lmer(Likert.scale ~ Correctness * Group + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	-	
md_1 <- lmer(Likert.scale ~ Correctness * Group + Domain + (1|Ppid) + (1|ItemId) , data=ad, REML = FALSE)	[$\chi^2(1)=20.20$, $p<.001$]	md_1 is better than md_2
md_2 <- lmer(Likert.scale ~ Correctness * Group + Correctness *	[$\chi^2(1)=6.17$, $p=.013$]	md_2 is better than md_1

Model	Anova with the previous best-fitting model	Conclusion
Domain + (1|Ppid) + (1|ItemId) , data=ad, REML = FALSE)		
md_3 <- lmer(Likert.scale ~ Correctness * Group + Correctness * Domain + Group * Domain + (1|Ppid) + (1|ItemId) , data=ad, REML = FALSE)	[$\chi^2(3)=64.38$, $p<.001$]	md_3 is better than md_2
md_4 <- lmer(Likert.scale ~ Correctness * Group * Domain + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(3)=13.77$, $p=.003$]	md_4 is better than md_3

Models that investigated possible differences between the syntactic stimuli

Model	Anova with the previous best-fitting model	Conclusion
ms_0 <- lmer(Likert.scale ~ Correctness * Group + (1|Ppid) + (1|ItemId), data=ads, REML=FALSE)	-	-
ms_1 <- lmer(Likert.scale ~ Correctness * Group + Condition + (1|Ppid) + (1|ItemId), data=ads, REML=FALSE)	[$\chi^2(1)=3.26$, $p=.07$]	ms_0 is better than ms_1
ms_2 <- lmer(Likert.scale ~ Correctness * Group + Condition * Correctness + (1|Ppid) + (1|ItemId), data=ads, REML=FALSE)	[$\chi^2(2)=3.78$, $p=.15$]	ms_0 is better than ms_2
ms_3 <- lmer(Likert.scale ~ Correctness*Group +	[$\chi^2(5)=32.32$, $p<.001$]	ms_3 is better than ms_0

Model	Anova with the previous best-fitting model	Conclusion
Correctness*Condition + Group*Condition + (1|Ppid) + (1|ItemId), data=ads, REML=FALSE)		
ms_4 <- lmer(Likert.scale ~ Correctness * Group * Condition + (1|Ppid) + (1|ItemId), data=ads, REML=FALSE)	[$\chi^2(3)=12.58$, $p=.005$]	ms_4 is better than ms_3

Models that investigated possible differences between the lexical stimuli

Model	Anova with the previous best-fitting model	Conclusion
ml_0 <- lmer(Likert.scale ~ Correctness * Group + (1|Ppid) + (1|ItemId), data=adl, REML=FALSE)	-	-
ml_1 <- lmer(Likert.scale ~ Correctness * Group + Condition + (1|Ppid) + (1|ItemId), data=adl, REML=FALSE)	[$\chi^2(1)=1.85$, $p=.17$]	ml_0 is better than ml_1
ml_2 <- lmer(Likert.scale ~ Correctness * Group + Condition * Correctness + (1|Ppid) + (1|ItemId), data=adl, REML=FALSE)	[$\chi^2(2)=1.89$, $p=.39$]	ml_0 is better than ml_2
ml_3 <- lmer(Likert.scale ~ Correctness*Group + Correctness*Condition + Group*Condition + (1|Ppid) + (1|ItemId), data=adl, REML=FALSE)	[$\chi^2(5)=8.66$, $p=.12$]	ml_0 is better than ml_3

Model	Anova with the previous best-fitting model	Conclusion
ml_4 <- lmer(Likert.scale ~ Correctness * Group * Condition + (1|Ppid) + (1|ItemId), data=adl, REML=FALSE)	[$\chi^2(8)=11.29$, $p=.19$]	ml_0 is better than ml_4

Models that investigated possible influence of transfer

Model	Anova with the previous best-fitting model	Conclusion
mt_0 <- lmer(Likert.scale ~ Correctness * Group + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	-	-
mt_1 <- lmer(Likert.scale ~ Correctness * Group + German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(1)=0.29$, $p=.59$]	mt_0 is better than mt_1
mt_2 <- lmer(Likert.scale ~ Correctness * Group + Group * German+ (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(4)=4.31$, $p=.37$]	mt_0 is better than mt_2
mt_3 <- lmer(Likert.scale ~ Correctness * Group + Correctness * German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(2)=0.43.66$, $p=.81$]	mt_0 is better than mt_3
mt_4 <- lmer(Likert.scale ~ Correctness * Group * German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(8)=30.25$, $p<.001$]	mt_4 is better than mt_0

Models that investigated possible influence of transfer across domains

Model	Anova with the previous best-fitting model	Conclusion
mdt_0 <- lmer(Likert.scale ~ Correctness * Group * Domain + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	-	-
mdt_1 <- lmer(Likert.scale ~ Correctness * Group * Domain + German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(1)=0.11$, $p=.74$]	mdt_0 is better than mdt_1
mdt_2 <- lmer(Likert.scale ~ Correctness * Group * Domain + Correctness * German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(2)=0.98$, $p=.61$]	mdt_0 is better than mdt_2
mdt_3 <- mer(Likert.scale ~ Correctness * Group * Domain + Group * German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(4)=6.17$, $p=.19$]	mdt_0 is better than mdt_3
mdt_4 <- lmer(Likert.scale ~ Correctness * Group * Domain + Domain * German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(2)=0.53$, $p=.77$]	mdt_0 is better than mdt_4
mdt_5 <- lmer(Likert.scale ~ Correctness * Group * Domain + Correctness * Group * German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(8)=22.81$, $p=.004$]	mdt_5 is better than mdt_0

mdt_6 <- lmer(Likert.scale ~ Correctness * Group * Domain + Correctness * Group * German + Correctness * Domain * German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(2)=0.78$, $p=.68$]	mdt_5 is better than mdt_6
mdt_7 <- lmer(Likert.scale ~ Correctness * Group * Domain + Correctness * Group * German + Group * Domain * German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(4)=4.27$, $p=.37$]	mdt_5 is better than mdt_7
mdt_8 <- lmer(Likert.scale ~ Correctness * Group * Domain * German + (1|Ppid) + (1|ItemId), data=ad, REML=FALSE)	[$\chi^2(8)=17.49$, $p=.03$]	mdt_8 is better than mdt_5