Does Dutch L1 influence Occur in the Interpretation of L2 English Sentences?

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0. Abstract

The English language has several universal quantifiers, for example *any* and *all*. In ambiguous sentences such as *Every girl rides a horse* these quantifiers can be hard to interpret. For native speakers, it is not clear whether the every girl rides on her own horse or whether they all share a horse, without any context. The Dutch counterpart (*Elk meisje rijdt op een paard*) is less hard to interpret for native speakers. Many native speakers of Dutch will interpret this sentence as meaning that each girl rides a different horse. This difference most likely comes from the contrast between scope-rigid and word-order-rigid languages. What does this difference mean for second language learners? Previous research showed that ESL learners are often influenced by their native language, so does this also happen with quantifier ambiguity? The two languages seem to differ in their degree of scope rigidness. This difference is tested first. Secondly, a group of Dutch ESL learners' data is analysed to see whether they show L1 influence by comparing their data with data of native speakers of English.

Keywords: *Scope ambiguity, second language acquisition, syntactic ambiguity, quantifier scope, Dutch, ESL*

1. Introduction

When learning a second language, many people come across difficulties in understanding the language. The interpretation of certain sentences can prove to be difficult. The level of ambiguity a language allows is one of the factors that can make understanding a language difficult. The English language has three universal quantifiers, namely *all, every* and *each*. Dutch also has three universal quantifiers that roughly overlap with those in English: *alle* (all)*, elk* (every/each) and *ieder* (every/each). The universal quantifiers can cause some unclarities in English while this seems to happen less in Dutch. An ambiguous sentence in the form of:

(1) *Every girl rides a horse.*

can have two meanings in English. There is either one horse that every girl rides on or all the girls have their own horse they are riding on. These different possibilities of interpreting this sentence are called ambiguity.

Ambiguity is mainly said to originate in the syntax of English. There is a hierarchy in

English sentences, meaning that parts of a sentence belong together and have a certain place in a sentence. Some parts are higher and have more influence on the sentence. Simultaneously, English has a notion of displacement that may alter the order in which a sentence in interpreted. This can cause ambiguity in English sentences.

The high level of ambiguity does not seem to exist in Dutch. When Dutch native speakers are confronted with a similarly ambiguous sentence in Dutch, they will most likely answer that there is only one meaning to that sentence. The Dutch sentence

(2) *Ieder meisje rijdt   een paard*
     'Every girl   rides   a   horse'
      Every girl rides a horse

will mostly be interpreted as meaning that every girl rides her own horse instead of sharing one.

Previous research has looked into what may be the cause of the difficulties second language learners come across and what factors influence the acquisition and understanding of a second language. A factor that is found to influence language interpretation is scopal freedom. Dutch does not allow much freedom in scope, contrary to English. (Van der Ziel, 2012). It is assumed, that this is strongly related to the rigidness of a language. The rigidness of a language determines how much freedom a speaker has to rearrange the sentence or how free the reader is in interpreting a sentence. Dutch is a language with high scope rigidness, while English is a language with low scope rigidness. This results in Dutch ambiguous sentences usually only being interpreted with a surface structure reading while for English this could differ.

This discrepancy between the two languages may pose as a problem to second language learners. Dutch second language learners may not know about the relatively more freedom in meaning in English while English learners of Dutch may face the opposite problem. They might not be able to restrict themselves or the meaning of the sentence because of their L1 influence. The idea that Dutch is a scope rigid language, is an idea that will be tested. If this is true, it is the starting point of further research into L2 acquisition. To answer this question, data will be collected from Dutch respondents on ambiguous sentences. If the data show that Dutch only allows for a surface structure reading, and that the readings can differ in English, it leads to a new question. Do Dutch ESL learners transfer there scopal freedom to L2 English? The notion of transfer, or influence of the L1, is a factor that has been

researched numerously and this study will add to this pool of research into L2 acquisition. Following from the two posed questions, come two hypotheses.

1. Dutch is a scope rigid language and ambiguous sentences will only be interpreted with a surface structure interpretation.
2. Dutch ESL learners show L1 influence and transfer their scopal freedom to L2 English.

To test these two hypotheses, data will be collected from native speakers of Dutch and native speakers of English. The Dutch respondents are divided into a Dutch-only group and an ESL group. By looking at the data of the Dutch-only group, the first hypothesis will be tested and will show whether the claim by Van der Ziel (2012) can be confirmed. This data pool can also be used to sidestep into another claim by Van der Ziel, namely that the reading of the Dutch indefinite can cause ambiguity because it is homonymous to the numeral 'one.' A comparison of the results from the ESL group with the results from the Dutch-only group and the native speakers of English, will show whether hypothesis two about L1 influence, can also be confirmed.

This thesis will first look at the phenomenon of scope ambiguity and the factors that influence the acquisition of it by second language learners. In the third section, earlier research on syntactic ambiguity will be discussed and the results compared. After the background information, the fourth section will explain the setup of the study and the results. Lastly, these results will be discussed and some ideas for further research into this field will be proposed.

2.1. The notion of ambiguity

Lidz and Musolino (2002) argue that the reason for ambiguity regarding scope originates somewhere in the mismatch between the surface representation and the semantic representation. Ambiguity is more than a mismatch between surface representation and semantic meaning since there are more types of ambiguity. In his paper on the acquisition of the ability to detect ambiguity, Shultz (1973) notes that there are different levels at which ambiguity can occur. This means that difficulties in interpretation can arise on different levels of the sentence. He first distinguishes a level of lexical ambiguity, also known as polysemy, where a certain lexical item has more than one semantic interpretation without depending on

the context. An example is 'bank' which can refer to a riverbank or a bank where money can be kept. The next level Shultz distinguishes is phonological ambiguity. This occurs when a phonological sequence can be interpreted in multiple ways. It can be caused by confusion over the word boundaries or because two lexical items have a similar pronunciation. An example of similar pronunciation is pear-pair. When given orally in a sentence like '*He has a pair/pear*', it is impossible to distinguish between the two words. The same can happen with a sequence such as '*There are fourteen cups on the table'* where the confusion can emerge between fourteen cups or four teacups. This type of ambiguity is acquired fairly early on (Shultz, 1973).

A third level is the syntactic level, this is what will be the main focus of this study. There are two kinds of syntactic ambiguity. The first type is ambiguity based on the surface-structure relationship. This type of ambiguity is caused by a mismatch between the surface form of the sentence and the structural form of the sentence. Usually, this ambiguity surfaces as different ways to interpret a sentence depending on what element is interpreted first. Thus, in example (1) *Every girl rides a horse* , 'a' can be interpreted as the first element making it a sentence where a specific horse is ridden. When 'every' is interpreted first, there does not have to be one specific horse that is being ridden, just that all girls ride a horse. The other type of syntactic ambiguity is based on the underlying form of a sentence. This is ambiguity occurs when two different underlying forms (UF) are mapped onto the same surface structure.

Shultz (1973) found that children develop understanding of these different levels of ambiguity at different ages. Polysemy and pronunciation ambiguity is developed at an early age but syntactic ambiguity is developed last and rather late. He concluded this is only developed around the age of twelve but not fully in place until the age of fifteen. More recent research has shown a different result. Gualmini (2004) and Hulsey (2004) (both cited in Van der Ziel, 2012) have concluded that children under the age of twelve seem to have no problem with syntactic ambiguity. They seem to even prefer a reading that is not preferred by adults (Van der Ziel, 2012). This thesis will not help contribute to this discussion, but the contrasting results show that there is still enough to discover about syntactic ambiguity.

To summarise, there are different types of ambiguity in the English language. Each seems to develop at a different age and according to Shultz (1973) syntactic ambiguity is developed last. Recent research, on the other hand, points toward children being able to understand syntactic ambiguity much earlier than Shultz(1973) claims. To understand how syntactic ambiguity works in English sentences, the next part will look at two notions about the English

syntax that are uncontroversial according to Lidz and Musolino. These two notions are the idea of hierarchy in sentences and the idea of displacement. We will look at these notions in further detail below.

2.1.1. Hierarchy

Chomsky makes two important claims in his foundational work (as cited in Lidz, 2002 p.116). He claims that the representations in the syntax are hierarchical and that the rules of syntax refer to this hierarchy. A sentence is not a simply words strung together but rather something that can be best represented as a hierarchical tree structure. In this hierarchy, words combine together into phrases, which combine into larger phrases that eventually combine into a sentence, as can be seen in example (3) below.

(3) *The cat caught three mice*
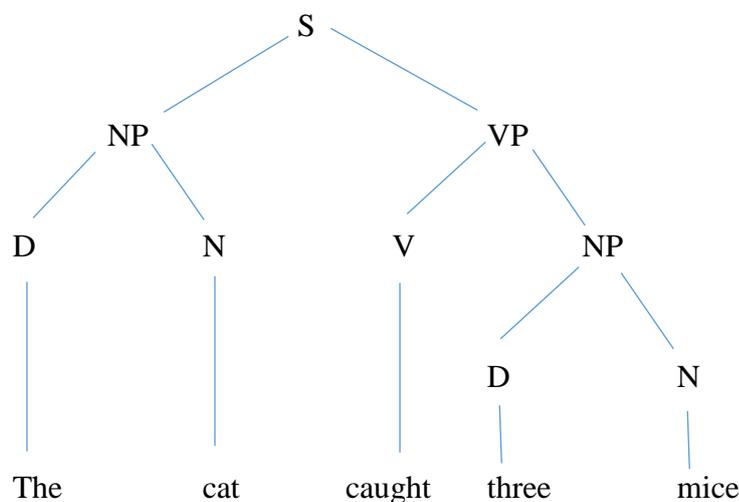
When using pronouns, syntactic rules refer to this hierarchy, making it impossible for pronouns to refer to a person later in the sentence. The pronoun has to refer to an element that directly c-commands it. A pronoun must be lower in the hierarchy than the element it refers to so it cannot fill a position high in the hierarchy and refer to a lower element as in (2)

(4) * She thinks Anna found the hotel. (where *she* refers to *Anna*)

The impossibility of example (4) stems from the broken relationship between the pronoun 'she' and the referent later in the sentence. For a pronoun to be able to refer to the element it is supposed to refer to, this element has to have some command over it. This is called c-commanding. In the sentence *Anna thinks she found the hotel,* the referent Anna c-commands the pronoun, meaning that the pronoun will refer back to Anna. The problem of example (4) lies with the no c-commanding relationship between the pronoun and the referent, not necessarily in the fact that the pronoun precedes the referent.

This constraint can be formalized under the following notions set up by Chomsky and Reinhart (as cited in Lidz and Musolino, 2002 p. 118)

> (5) X c-commands Y if
>> a. The first branching node dominating X also dominates Y
>> b. X does not dominate Y
>> c. X is not Y

> (6) X binds Y if
>> a. X c-commands Y
>> b. X and Y are coreferential

2.1.2 Displacement

Displacement is the notion that certain expressions are not interpreted in the same place as they appear in. Take for example a sentence like (7) (example (13) from Lidz, 2002 p. 120)

> (7) *Everyone didn't smile.*

This sentence can be interpreted in two ways, depending on whether *everyone* c-commands the negation or whether the negation c-commands the universal quantifier *everyone*. This is also known as taking scope over the universal quantifier. These interpretations can be formulated as follows in logical form (LF) (as cited in Lidz, 2002):

(8) a. Everyone didn't smile

b. Δx [¬ [x smiled]]

c ¬ [Δx [x smiled]]

(8) Shows the sentence in LF which is the mental representation of a sentence. When *everyone* (Δ) c-commands the negator (¬), it means that it can be interpreted as meaning that everyone had the property of not smiling, so no-one smiled. When the negation takes scope over the quantifier everyone, it means that not everyone has the property of not smiling, or formulated differently it means that some had the property of not smiling while others did not and were smiling. This can be made visible in the following tree structures (as cited in Lidz, 2002) where it becomes clear how the different interpretations can be represented.

(9) a.   b.

Δx   ¬

¬   Δx

x   smiled   x   smiled
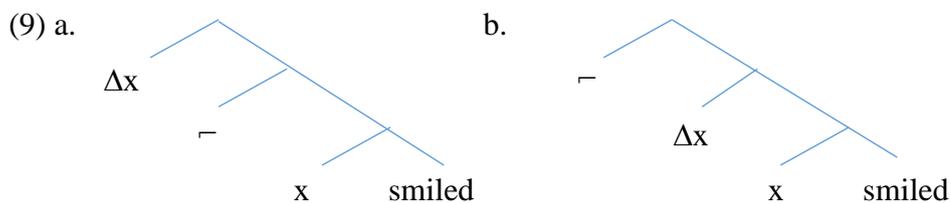
The way an element takes scope over another element in the sentence does not alter the surface structure of the sentence. This means that the surface structure and the semantic structure are not necessarily isomorphic (Lidz, 2002 p.121). When the scope relation between the universal quantifier and the negation coincides with the surface structure, a sentence is isomorphic. Going back to example (8), (8a) shows a situation where the interpretation is isomorphic. The first element, the quantifier is interpreted first and takes scope over the rest of the sentence. (8b) shows a non-isomorphic reading, also called an inverse reading by Van der Ziel (2012). The relation in (8b) does not coincide with the surface structure of the sentence, making the reading non-isomorphic. There has been no consensus yet as to where this mismatch originates. For the purpose of this thesis, it is sufficient enough to know that the surface structure and the semantic structure are not necessarily isomorphic.

Lidz and Musolino (2002) and many other scholars believe that quantifier ambiguity happens when there is a mismatch in the surface-semantic relationship. This means that the surface structure does not reflect the semantic meaning. According to Lidz and Musolino, a sentence is ambiguous when scope can be taken in multiple ways.

Scope refers to the domain a certain element has in a sentence. So, when the first

element has wide scope, it influences the reading of the rest of the sentence. When an element later in the sentence holds scope over the first element in the sentence, it means that the later element influences the reading of the first element. The way the quantifiers take scope over each other is directly linked to what are called the collective reading and the distributive reading. Consider the ambiguous sentence *Every cat chased a mouse* to illustrate the readings. When the universal quantifier has wide scope over the rest of the sentence, the sentence can be interpreted as meaning that every cat chased a mouse but not necessarily the same mouse (Brooks, 1996). This is the distributive reading. Every cat can be assigned a different mouse individually, different mice are distributed over the cats. When the indefinite takes wide scope over the rest of the sentence, the reader can interpret the sentence as meaning that there is a specific mouse that all the cats chase after. This is the collective reading, since all the cats are collectively chasing the same mouse.[1]

 This is also called the isomorphic and non-isomorphic readings respectively discussed above.

        Croft (1983), on the other hand, suggests a different cause for the ambiguity in some English sentences. He finds it linguistically "amazing" that the ambiguity only exists in the logical form and not in the linguistic form of a sentence (Croft, 1983 p.25). With this is meant that the ambiguity cannot be found in a difference in sentence structure but only in the mental representation of the sentence. Not satisfied with this explanation, he turns to look for another

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[1] Brooks (1996) even distinguishes two distinctive collective interpretations. She illustrates this with two sentences (10) and (11).

        (10) All the women saw a movie
        (11) All of the men built a boat

If (10) gets the collective reading, it means that every woman saw one particular movie individually, although maybe not all together. So if Mary is one of the women and the film is *Titanic,* it can be said that Mary saw *Titanic.* Example (11) is different from this example in that when it get a collective reading where in all the men worked together to build a boat. If Henry is one of the men and the boat is the Titanic, it cannot be said that Henry built the Titanic since he only helped build the boat.

explanation for scope ambiguity. He says there are two other logical explanations. Ambiguity either surfaces because of ambiguity in the surface structure or polysemy in a specific lexical item. He quickly disregards the first explanation but does see some logic in polysemy. He says that in English, the quantifiers 'some' and 'a' have two readings. These items, according to Croft, can be interpreted as being specific or having a nonspecific meaning. The reader can interpret 'a' referring to a specific being or interpreted as referring to 'any being.' The same goes for the quantifier 'some.'

So far, the basics of English syntax has offered an explanation for the origin of ambiguity. Displacement can cause elements to be interpreted in a different place than where it is the LF. Another cause of ambiguous sentences may be polysemy, where a lexical item can get different readings. The way a sentence is interpreted and mentally represented, might differ the sentence itself, this is a non-isomorphic reading. When the two representations overlap, it is called an isomorphic reading. Scope determines the influence an element has over the rest of a sentence. When an element has wide scope over another item, it influences the meaning of said item. In ambiguous sentences the scopes taking can change. This is where the ambiguity originates. Not all languages seem to allow for the same level of ambiguity. Scope does not seem to be as an important factor in Dutch as it is in English. Some researchers turned to the rigidness of languages to explain the differences.

2.2 Rigidness and scope ambiguity

Languages are not all the same and have different syntactic rules and structures. The idea of hierarchy and displacement are rather universal but how languages deal with these phenomena differs. According to Bobaljik (2008) and other scholars, the differences between languages and their level of ambiguity, has to do with the rigidness of the word order of a language. It seems logical that when word order is rigid, fewer combinations of words are allowed to convey the same message. English is a language that can even be considered to be the upper-limit of rigidness according to Givon (2001, p. 235). It is a language that does not allow for many different structures. English does display some structures other than SVO, but these are mostly marked constructions (Givon, 2001). When word order is not as rigid, small changes can be made to the sentence to get different messages across to the reader. It would seem logical to assume that this is what causes the ambiguity in word rigid languages such as

English, but makes languages such as German, Japanese and Dutch, that are freer in their word order, more reluctant to allow for ambiguity and are thus more scope rigid languages (Bobaljik, 2008).

One of the strategies scope-rigid languages such as German and Dutch employ is scrambling. Scrambling is a syntactic movement phenomenon English does not allow but that language such as German, Japanese and Dutch employ to disambiguate a sentence (Unsworth in Slabakova, 2008). According to Van der Ziel (2012), depending on where the scrambled element moves, it can also cause ambiguity. In work by Unsworth (in Slabakova, 2008), the acquisition of scrambling in Dutch across different groups was examined. Scrambling is a phenomenon where an NP or PP can move to other positions in a sentence. Scrambling can be used to make an ambiguous sentence unambiguous as can be seen in example (38) from Unsworth, here as (12).

> (12) a. *De jongen heeft twee keer een bal gegooid*
>   The boy   has twice   a   ball thrown
>   'The boy threw a ball twice'
>   b. *De jongen heeft een bal twee keer gegooid*
>   The boy   has   a ball twice   thrown
>   'The boy threw a (particular) ball twice'

In Dutch, the element 'een bal' (a ball) can be put in multiple positions in the sentence. The sentence can be interpreted as meaning that the boy threw the same ball twice, or that he threw a ball twice and each time this was a different ball. The second sentence is scrambled in Dutch and this repositioning makes the sentence unambiguous. Here it is impossible to get the reading of the boy throwing two different balls. Its English counterpart can only convey the same meaning by making it unambiguous with an added element, in this case 'particular,' otherwise the English sentence would still be ambiguous where the Dutch one is not anymore. The fact that English does not seem to allow for any other syntactic structure to convey this meaning, shows that English has a more rigid word order that causes ambiguity. On the contrary, Dutch allows scrambling and this give it the option to disambiguate the sentence in a way that English does not have.

In these scope rigid languages it seems that the surface order determines the interpretation of the sentence as Van der Ziel (2002) notes. On the other hand, coming back to Croft (1983), who claimed that ambiguity does not originate in the syntax but in polysemy, all

this does not seem to make sense. The argument he makes for English, also works for Dutch. The indefinite 'a' in English and 'een' ('a') in Dutch, both can be interpreted in a specific and non-specific way. The indefinite and the numeral one, are both often written as 'een,' making it possible for the reader to interpret an ambiguous sentence only with a collective reading when it is interpreted as the numeral (Croft, 1983). The opposite can also occur where a numeral is interpreted as an indefinite. When sentences are interpreted with the indefinite, it shows the same results as when inverse reading is blocked for Dutch. When the results show that there are readers who mostly interpret the sentences in a collective manner, Croft's idea might be an explanation and simultaneously throw off the claims made by Van der Ziel.

Where this difference in scope taking between languages exactly comes from is hard to say. Two ideas could be argued according to Van der Ziel (2012). First of all, it could be said that inverse scope taking is parameterised and that some languages allow it often, while others allow it only scarcely. Secondly, it could be argued that there are language-specific restraints on inverse scope. This second idea is hard to believe according to Van der Ziel (2012), especially since the degree of inverse scope taking is also dependent on the context of the quantifier. English, which generally allows for a high degree of scope ambiguity, cannot take inverse scope in sentences with a double object for example. This rules out the idea of language specific restraints. This leaves the first claim to explain where ambiguity originates.

Dutch is a scope rigid language but allows for more word-order combinations than English. The rigidness of Dutch, blocks the inverse scope reading. English has more scopal freedom than Dutch and does allow for inverse readings. The multiple possible scope readings in English are a cause of ambiguity. The scope rigidness of Dutch, seems to block a high level of ambiguity. The difference in the level of ambiguity allowed between Dutch and English gives rise to the question whether this influences L2 readers. Does the fact that Dutch only rarely allows for inverse scope reading influence the reading of ambiguous sentences in English for second language learners? There has been some research into the acquisition of second language learner of the ability to interpret ambiguous sentences. The next chapter will look into some of the conclusions based on research into second language acquisition.

3. SLA and ambiguity

As noted before, Dutch and English have a different level of ambiguity due to the rigidness of the English word order versus the freer word order of Dutch. This type of syntactic or lexical ambiguity, depending on which theory one adheres to, has not been researched much in the

field of second language acquisition.

White (2011) notes that previous research has shown that L2 learners can become native-like but only when they reach a high level of proficiency. Findings have not been conclusive but this is contributed to the difference in method. Dekydtspotter et al (as cited in White, 2011), have shown in numerous studies that there also seems to be L1 influence in the syntax-semantics relationship. Once learners get past L1 transfer and reach a high level of proficiency, they can also attain the subtle interpretive distinctions that are associated with the L2 word order which is often not found in the L1. These findings make the syntax-semantics relationship seem unproblematic for learners, but other studies have shown that there are difficulties for second language learners. Examples given in white (2011) show that English has different wh- expressions than for example Chinese. This turned out to be problematic for many English natives.

A study by Hopp (as cited in White, 2011) tested three groups of L2 German speakers (with their L1 being Dutch, Russian or English) on scrambling. Dutch and Russian allow for scrambling but English does not. It would be expected that the groups with a Russian or Dutch background would show more native-like responses than the English L1 group. The results show that some subjects showed native-like responses in some of the cases when looking at the syntax-morphology relationship. The results show a completely different picture when focus is put on the syntax-semantics relationship. Now all three groups, did not show much native-like performances. Hopp attributes this to the complexity of the task. Scrambling is a phenomenon that is hard to process and this causes computional burden which can result in non-native performances. Sometimes this seems to interact with L1 influences. Hopp's study shows, that a complex syntactic phenomenon like scrambling can cause non-native responses, even if the phenomenon in question may already be acquired. L1 seems to affect the responses. If scrambling can already cause a computional burden, it might not be hard to imagine that ambiguity falls under the same category. A sentence with different ways of interpreting might also be too complex for L2 learners to process, causing them to give non native-like responses.

In a thesis by Rah (2009) that has similar goal to the one in this thesis, Rah looked at two different types of ambiguous syntactic structures and how German second language learners of English processed these in comparison to native speakers of English. The initial theory was that looking at the way people interpret the sentences gives insight in the processing systems in learners. When the ESL group shows different processing patterns, it might indicate that proficiency in the L2 cannot alter the innate system a learner has built up

in their L1. This would mean that there is always a discrepancy between native speakers and non-native speakers. A similar result would also point toward L1 influence in the interpretation of L2 sentences. Rah looked at sentences where the PP is ambiguous. She gives the example of (13)

(13) *The man saw the boy with the binoculars*

This sentence is ambiguous in that the PP *with the binoculars*, can either be interpreted as meaning that the boy had binoculars in his hand or to the man who looked through the binoculars saw the boy. She explains that the PP can either be attached to the NP *the boy*, or the VP *saw*. Furthermore, Rah looked at ambiguous relative clauses (RC).

(14) *Someone shot the servant of the actress who was on the balcony*

The ambiguity occurs because it is not clear whether the RC belongs to *the servant*, giving the interpretation that the servant stood on the balcony when he was shot, or *the actress*, giving the interpretation that she was standing on the balcony when her servant was shot. With this type of ambiguity, just like with quantifier ambiguity, the surface structure is not altered by the reader to make it unambiguous.

The results of research into this phenomenon are especially interesting since they differ cross-linguistically (Rah, 2009 p. 23), meaning that languages seem have different levels of ambiguity tolerance and different rules about how to deal with this. The results from earlier research showed that the differences between interpretations of ambiguities, depends on what languages are looked at. This indicates L1 influence in L2 context. It is expected that L2 learners transfer the cues from their L1 onto their L2 (Rah, 2009 p. 24). Cues are the elements in a language that point a reader towards the meaning of a sentence (Gass, 2013). This can be word order, grammaticality or syntactic elements. As the learner experiences more of their L2, the cue strengths change and will become more target-like. This would mean that when a learner is first introduced to a new language, he will process this language the same way as he looks at his own L1. He depends on the cues from his L1 to interpret a sentence, but not all languages share the same cues and the strength of these cues also differs. It is expected that the learner becomes less and less dependent on the L1 cues as he gets more L2 input and the proficiency level increases. If this is correct, learners with different levels of

proficiency will show different results in interpreting the L2 sentences. The group with a lower proficiency level is expected to have answers more similar to the answers presumably given in the L1 while those more proficient will answer more and more like natives of the L2. Transfer from L1 to L2 is supported by evidence from different studies (Rah, 2009 p. 24). Earlier studies showed that there is indeed L1 influence when second language learners process and interpret L2 sentences.

For her research, Rah used groups of EFL learners that were taught by instruction and a control group of native speakers of English. She gave both groups a series of task both online and offline. The native speakers of English show a difference in preference in the online and offline tasks, the English learners on the other hand did not show any preference in the offline task which can be attributed to many things; recency preference, shallow structuring processing but also influence of the L1. The results of the online task show that learners do not process the same way as natives do. This means that they are probably influenced by their L1 or an L2-specific recency strategy. Proficiency also plays a large role in the acquiring of a native-like processing. The more proficient the learner was, the more their processing was similar to that of the natives. This shows that there is a high possibility that, as expected, L1 plays a role in the interpretation of syntactic ambiguity.

Another scholar who looked into the ambiguity of RC is Dussias (2003). Just like Rah, she is interested in the way learners of English process these ambiguities and whether this differs from natives. She looked at learners of English whose L1 is Spanish. Earlier findings discussed by Dussias (2003) show that some learners show native-like syntactic processing that are not found in their L1 but immediately after, findings are discussed that show that learners do have a different syntactic processing system from adult native speakers.

So far, previous research has shown that there seem to be differences between the interpretation of sentences by native speakers and L2 speakers. Rah's study (2009) showed that it is highly possible that L2 speakers with a low proficiency rely on cues of their L1. Dussias (2003), found similar results, confirming the high possibility of L1 influence on L2 interpreting. Most of the previous studies have focussed on RC's and this leaves room for more research into other syntactic ambiguity. Van der Ziel (2012) found that interpretation of ambiguous sentences is not influenced by indefinites but by universal quantifiers. If this is true, and L2 learners are influenced by their L1, it would be expected that ambiguous sentences with universal quantifiers will be interpreted differently by L2 learners and native speakers of English. Before this hypothesis can be tested, an earlier claim about Dutch has to be confirmed first. If Dutch is a scope rigid language and English is not, there should be

different analyses of Dutch and English sentences by native speakers of both languages. If a difference can be found, as is expected, ESL learners' data can be analysed to see whether they are influenced by their L1.

4. The study

To test the claims that Dutch only allows for a surface reading and that ESL learners are influenced, the following test was set up.

4.1 Method

Participants:

For this study, sixty volunteers participated. Fifty of them were Dutch natives. In the questionnaire these respondents were directly divided into two categories: 25 of the respondents were learners of English and 25 were native speakers of Dutch. Ten respondents are used as a control group. This group exist of native English speakers. There was no selection on age or sex. There was only a selection on "Education" for the respondents to get a Dutch version of the questionnaire or the English version. The criterion was having a higher education (HBO[2] or university) or being around high level or native English on a daily basis. This allocation is done so the people who were getting an English version, were for sure to understand the questionnaire and should have a good understanding of English.

As a result of no selection criteria more females were participating than males in the research group, but contrary in the control group. (table 1.) Figure 2 shows the division in age. Most of the respondents in the research group (64%) were in the age category: 19-30 years old while 50% in the control group were younger than 18 years old. The 25 Dutch respondents who were asked to fill in the English version of the AQ were all have or had a higher education and all said to have a high proficiency level of English (see appendix A).

Table 1: division of sex

	Research group	Control group
Male	11	8
Female	39	2
Total	50	10

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[2] Higher Professional Education

Figure 1: Age of the respondents in the research group.

Age of the respondents

■ 18 or younger ■ 19-30 ■ 31-50 ■ > 50

4; 8%
9; 18%
5; 10%
32; 64%
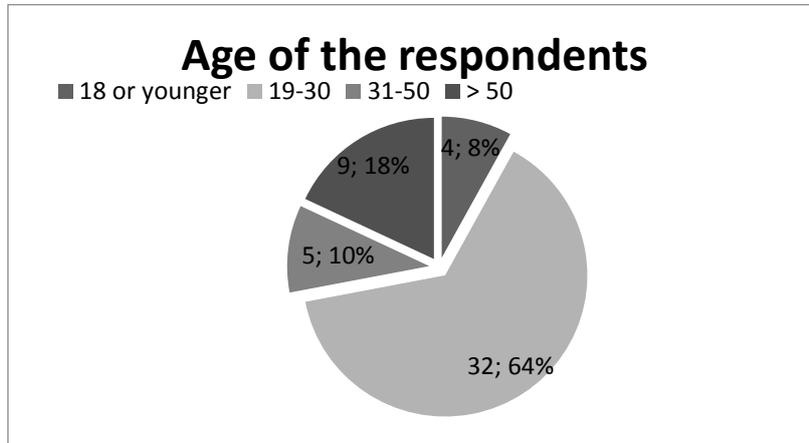
Figure 2: Age of the respondents in the control group.

Age of the respondents

■ 18 or younger   ■ 19-30   ■ 31-50   ■ > 50

2; 20%   0; 0%
5; 50%
3; 30%
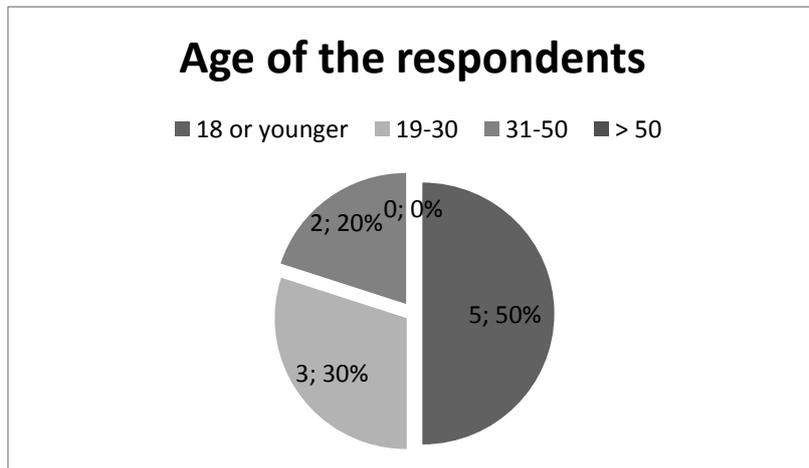
Materials:

       To test the hypotheses, a questionnaire was made for now named the Ambiguity Questionnaire (AQ). The Ambiguity Questionnaire is made up of 24 sentences that each had four answer options.

       Fourteen sentences were English ambiguous sentences taken from earlier research (Van der Ziel, 2012; Croft, 1983; and Kurtzman, 1993 among others). Besides these 14 English ambiguous sentences, the test had also two sentences taken from Van der Ziel (2012) that she found to be ambiguous in Dutch. The sentences were translated into their counterpart in either English or Dutch, trying to keep as close to the original sentence a possible. The questionnaire is available in an English version (Appendix B-II) and in a Dutch version (Appendix B-I). Most of the sentences have the quantifier before the indefinite, but some of

the test sentences have the indefinite before the quantifier. These sixteen sentences (see Appendix B) make up the core of the test. For example (15) where the quantifier precedes the indefinite:

> *(15) Every man loves a woman*
>> All men love the same woman
>>
>> There is a different woman for each man
>>
>> Both statements are true
>>
>> None of the above statements are true

Another example shows a sentence where the universal quantifier follows the indefinite

> *(16) A tourist visited every city*
>> One tourist every city
>>
>> Multiple tourist together visited all the cities
>>
>> Both statements are true
>>
>> None of the above statements are true

This is to see whether it is only the surface structure that influences the reading, or that the quantifier plays a role in the interpretation of sentences. This was especially important for the Dutch-only respondents answering the questionnaire in Dutch. To keep the participants from blindly filling in the questions and distracting them. Another eight sentences were added that are not ambiguous, such as (17)

> (17) *The girl picked up every stone*
>> All stones were picked up by the same girl
>>
>> Multiple girls picked up the stones
>>
>> Both statements are true
>>
>> None of the above statements are true

 The answer options were kept the same, but grammatically only one answer was right on these questions.

Procedure:

All respondents were acquaintances or recruited online, and were asked to fill in an online-questionnaire. At the beginning of the test, the respondent was given a small explanation about the set-up of the test, the number of sentences and what was expected of them. It was explained to try to answer without thinking too much. The first question the respondent had to answer was his level of education and level of English learning. This was necessary to divide people into the Dutch-only group with Dutch questions and the ESL group with English questions

Before the participants got the sentences, some basic information was asked such as age, gender and for the second language learners also their level of English.

Analyse expectation:

All participants are asked which statement reflects the given sentence best. There are four possible options to choose from, the first two options reflect the two possible scope readings. The statements either reflect an inverse scope reading or reflect a surface scope reading. The third option is a statement that says both previous statements are correct. This option reflects an ambiguous reading where the participant finds both the surface scope interpretation and the inverse scope meaning. The last option is a statement that says none of the answers above are correct to see which sentences cause a problem or where formulated wrongly. It is expected that the Dutch-only group, who get their questions in Dutch, will almost always only allow for the surface scope interpretation because this is a feature of Dutch. The second language learners should show a similar picture, especially when the participant has a lower proficiency of English. This is because research has shown that the higher one's proficiency, the more native-like the thought processes become. It would be reasonable to assume then that the participants with a lower proficiency still process English the same way they would process Dutch. This would make their answers similar to their counterparts who answered the questions in Dutch. A higher proficiency would mean more native-like processing so these participants should come up with more ambiguous answers than the less proficient language learners.

In the questionnaire will be looked at variables like groups (Dutch only, ESL (English learners), English native) , three kinds of strategy in reading ambiguous sentences (Surface structure reading, inverse reading, ambiguity). Also there will be looked at the importance of

the place of the quantifier and scope. This will be analysed at group level but also at sentence level.

4.2 Results

Group analyses:

To get the results for surface structure reading, a Chi-squared test is used to compare the English (control) group and both Dutch groups. At first a comparison is made between the groups to see if there is a difference in reading preference.

Table 2: *Overall scores of ambiguous sentences. With the accumulative number first and the percentage between brackets.*

	Dutch only	*English native*	*ESL*
Surface reading	262 (65.5)	97 (60.6)	278 (70)
Inverse reading	28 (7)	28 (17.5)	40 (10)
Ambiguous	69 (17.3)	28 (17.5)	71 (17.9)
Neither reading	41 (10.2)	7 (4.4)	8 (2.1)

As seen in table 4, in all groups surface reading has a preference, while inverse reading has the least. Although all three groups show a preference for surface reading, a Chi-squared test will be used to see if there is a difference between the groups and to test the hypothesis:

1. Dutch is a scope rigid language and ambiguous sentences will mostly be interpreted with a surface structure interpretation

Table 3: *Results of the Chi-squared test overall*

Results						
	surface structure	reverse reading	ambiguous	incorrect		Row Totals
Dutch Only	262 (266.25) [0.07]	28 (40.13) [3.66]	69 (70.22) [0.02]	41 (23.41) [13.22]		400
English natives	97 (106.50) [0.85]	28 (16.05) [8.90]	28 (28.09) [0.00]	7 (9.36) [0.60]		160
ESL	278 (264.25) [0.72]	40 (39.82) [0.00]	71 (69.69) [0.02]	8 (23.23) [9.99]		397
Column Totals	637	96	168	56		957 (Grand Total)

In table 5 the results are shown of the Chi-squared test between the groups and the kind of reading. The number of times the option is chosen is depicted first. Between brackets the expected outcome is shown and between the square brackets the chi-square value is shown. There was a significant relationship between the group people were participating in and the likelihood of giving the surface structure answer, $X2$ (7, n=957) = 38.0446, p<.05.

To see if the significance differs between the Dutch-, ESL- and English native group, Chi-squares were used separately.

No difference was found between the Dutch group and ESL-group, $X2$ (5, n=748) = 1.4194, p<.05. Between the Dutch group and the English native group a significant difference was found, $X2$ (5, n=512) = 12.2688, p<.05. A comparison between the English native group and the ESL gave also a significance difference, $X2$ (5, n=542) = 6.6595, p<.05.

To see if the three groups differs on kind of used strategy (especially surface structure reading), Zscores were used to measure significance between these groups on all of the three variables of reading separately (see table 6).

Table 4: Zscores of the different groups compared in three variables.

		ESL	ENG natives	Dutch only
Dutch only	Surface	Z= -1.37 p=0.17		
	Inverse	Z= -1.55 p=0.12		
	Ambiguous	Z=-0.24 p=0.81		
ESL	Surface		*Z=2.14 p=0.03*	
	Inverse		*Z=2.42 p=0.02*	
	Ambiguous		Z=0.11 p=0.91	
ENG natives	Surface			Z=1.087 p=0.28
	Inverse			*Z=3.74 p=0.00*
	Ambiguous			Z= -0.07 p=0.94

Pointedly, people in the Dutch group used less inverse strategy than the English group. The ESL group also used the inverse strategy less, but uses the surface structure reading more than the English native group.

Another Chi-squared test was performed to see whether there is a relationship between the place of the quantifier and the answers given (table 7). This was done for each of the test groups.

Table 5: *Results of the Chi-squared test between quantifier-indefinite sentences and indefinite-quantifier sentences respectively*

	Dutch-only		English native		ESL	
Surface Reading	168	94	59	38	165	113
	(163,75)	(98,25)	(60.62)	(36.38)	(173.66)	(104.34)
	[0.11]	[0.18]	[0.04]	[0.07]	[0.43]	[0.72]
Inverse Reading	13	15	16	12	27	13
	(17,50	(10,50)	(17.50)	(10.50)	(24.99)	(15.01)
	[1.16]	[1.93]	[0.13]	[0.21]	[0.16]	[0.27]
Ambiguous	54	15	21	7	51	20
	(43,12)	(25,88)	(17.50)	(10.50)	(44.35)	(26.65)
	[2.74]	[4.57]	[0.70]	[1.17]	[1.00]	[1.66]
Neither reading	15	26	4	3	5	3
	(25,62)	(15,38)	(4.38)	(2.62)	(5)	(3)
	[4.41]	[7.34]	[0.03]	[0.05]	[0.00]	[0.00]

For the Dutch-only group, the test gives a chi-square statistic of 22.4409. The *p*-value is 0.000053 with a significant result when $p < .05$. This makes the variable dependent on each other, showing a relationship between the surface structure and the given answers for the Dutch-only group

For the English natives, the test gives a chi-square statistic of 2.4114. The *p*-value is 0.491518 which means this is not significant with $p < .05$. This shows that for the English natives, there is no real relationship between the surface structure of the sentence and the interpretation of it.

Interestingly, the ESL group also showed a non-significant result. The test gives a square

statistic of 4.2377. The *p*-value is 0.236915 which means this is not significant with $p < .05$. The variables are thus independent.

Item analysis

An Item analysis is done to get an answer for the hypothesis:

> 2. Dutch ESL learners show L1 influence and transfer their scopal freedom to L2 English.

When we take a look at the sentences separately, we find the following data. All numbers are given in percentages. It seems that a few times not all answers were filled in by every participant. This is why there is a slight difference between the questions. Below eight sentences are given, the other data can be found in appendices B-I and B-II.

Tables 6 till 11 show which reading strategy was chosen at different kind of sentences. All the numbers are percentages within groups.

Table 6: *Results of the sentence 'Each student attended a seminar' in percentages*

	Dutch-only	*English native*	*ESL*
Surface reading	56	50	54.2
Inverse reading	-	30	4.2
Ambiguous	36	20	37.5
Neither reading	8	-	4.2

As expected the Dutch only group, who answered the questions in Dutch, has the highest amount of surface form answers. This means that the answers they filled in to be the right answer, or in other terms the answer that best reflected the given sentence, was the option given in the surface form. In this case the given sentence and options were:

> (18) 1. Each student attended a seminar
>
>> a. All students went to the same seminar
>> b. The students went each to a different seminar

c. both statements are true

d. none of the statements are true

Answer 'b' overlaps with the surface structure.

The English native group also used surface structure reading more but used the other strategies also. The ESL group shifts a bit more to the English native group compared with the Dutch only group. This same pattern can be seen in table 7.

Table 7: *Results for 'Every boy is riding a camel' in percentages*

	Dutch-only	*English native*	*ESL*
Surface reading	88	60	84
Inverse reading	-	-	-
Ambiguous	12	40	16
Neither reading	-	-	-

Table 8: *Results for 'Every girl kissed a boy' in percentages*

	Dutch only	*English native*	*ESL*
Surface reading	80	60	80
Inverse reading	-	-	-
Ambiguous	20	30	20
Neither reading	-	10	-

Table 9: *Results for 'Every bird ate a berry' in percentages*

	Dutch only	*English native*	*ESL*
Surface reading	100	70	100
Inverse reading	-	-	-
Ambiguous	-	20	-
Neither reading	-	10	-

Tables 8 and 9, show a different pattern from the sentences mentioned before. In both sentences the Dutch-only group mostly, or only, allows for a surface interpretation. What makes it more interesting is that the sentence 'Every bird ate a berry' is taken from Ziel (2012), who believes these sentences to be ambiguous in Dutch. The data shows that, at least in this set-up, the Dutch participants only read the surface meaning and not the inverse pattern as well. The two tables show some similarities. Both tables show that the Dutch-only group and the ESL group have the exact same scores. The English natives definitely deviate from these.

Contrary to the above mentioned patterns, table 10 shows a sentence with a different pattern of used strategies within the groups. The ESL group used ambiguity more than the Dutch only group and more than the English native group. Also in the ESL and Dutch-only groups there was a preference for the inverse reading while the English native group showed a preference for surface reading.

Table 10: *Results for 'Maud draped a sheet over every armchair' in percentages*

	Dutch only	*English native*	*ESL*
Surface reading	24	50	4.2
Inverse reading	44	20	45.8
Ambiguous	32	10	50
Neither reading	-	20	-

Table 11: *Results for 'Someone loves everyone' in percentages*

	Dutch only	*English native*	*ESL*
Surface reading	-	50	80
Inverse reading	-	40	8
Ambiguous	4	10	12
Neither reading	96	-	-

Table 11 shows very different data from other tables. The Dutch-only group filled in a high preference for the 'neither reading' while the other two groups showed a predictable pattern.

The English natives showed a preference for the surface reading with the inverse reading a close second. ESL data showed a high preference for the surface reading.

5. Discussion

Previous research in L2 acquisition has mostly focuses on processing differences between native speakers and second language learners. Discrepancies between the two groups are by some researchers contributed to the L1. Hopp concluded that some syntactic phenomena can overload the brain, leading to non-native responses by L2 learners. This thesis set out to test claims about the influence of the L1 on the syntax-semantics relationship of the L2. Data is collected from three groups; Dutch ESL learners, Native speakers of English and another group of native speakers of Dutch. The results from the questionnaire can be compared to see whether L1 influences the responses. The data seems to point towards a confirmation of both hypotheses. The Dutch-only data seems to prefer a surface structure reading more than the native English group. The data from the ESL learners also seems to be similar to the data from the Dutch-only group, confirming the idea that ESL learners are influenced by their idea.

To answer the first hypothesis concerning the state of Dutch, the Dutch-only group must be analysed first. Van der Ziel (2012), and other researchers, claim that Dutch is a rather scope rigid language and that most of the time an inverse reading is blocked. This makes that for most sentences, a Dutch reader will go for the surface structure interpretation. Looking at the data, this assumption seems to be correct. Out of the possible 400, the Dutch-only group picked the surface structure reading 262 times. This means that more than half of the sentences we interpreted with the surface reading. Van der Ziel (2012) claims that the inverse reading is mostly blocked. The data seems to suggest that this option is indeed less favoured but is still chosen 28 times out of the possible 400. That comes down to 7% of the answers which can be seen as noise. The interesting result comes from the ambiguous answers. Even though all sentences were chosen because they were deemed ambiguous, the literature would point toward a surface interpretation for Dutch. The ambiguous answer was chosen 69 times out of 400, coming down to 17.25% of the time. These results show that de assumption made by Van der Ziel (2012) about Dutch, seems to be correct. The surface structure reading is by far the most preferred interpretation. The inverse reading seems to be mostly blocked in Dutch and instead, Dutch goes for an ambiguous reading more than an inverse reading. This confirms the first hypothesis. The hypothesis is further confirmed looking at the data of the English natives group. English natives show a similar preference for the inverse reading and

the ambiguous reading. The surface structure is favoured by all groups, and the English natives chose this answer 97 times out of the possible 150. However, for the inverse reading and the ambiguous reading, the group chose both answers 28 times. This shows that English is much less scope rigid than Dutch as was claimed.

The native English speakers seem rather open to an inverse reading, something that seems to be blocked for Dutch. The non-preference for either ambiguity or inverse reading, confirms this scopal freedom in English. It seems that English allows for an inverse interpretation instead of having a restriction that if an inverse reading is possible, it should be ambiguous.

The data already seems to confirm the influence of word-order rigidness in determining the scope preference but as a side step, the data can also test Croft's argument (1983) that polysemy is the reason for this ambiguity. However, it is hard to test this idea. The individual responses never showed a remarkable preference against the theory of the surface structure so for them to interpret the indefinite as a numeral seems to be untrue. If they did interpret the indefinite as a numeral, the reading would always be a collective reading. The data did not show a preference for the collective reading in the data of the Dutch-only group.

 Interestingly, the sentence where the indefinite starts the sentence *Een kat at elke worst* ('A cat ate every sausage') was answered with a collective reading for almost all the participants in the Dutch-only group. This might point towards a theory where when the indefinite is the first element, it receives extra stress making it more likely to be interpreted with a particular reading. Sentences where the indefinite was preceded by other elements, did not show such a strong pattern.

Certain test items showed a deviating pattern from the expected pattern. It was found that the deviating data from table 13 stems from a mistake in the AQ. The answer options were not given properly, forcing the respondents of the Dutch-only group to choose the 'neither reading' option. This mistake did not show up in the English variants of the AQ.

The group data confirms the claim made by Van der Ziel (2012) that Dutch seems to have less scopal freedom than English. In almost all case was the surface reading preferred by the Dutch-only group pointing towards a blocked inverse reading as was expected. The English native data showed a completely different picture, where although the surface reading was often preferred, other readings were also still found possible. Croft's theory on polysemy can not be confirmed with the current data.

The second hypothesis posed in this thesis regarded the L1 influence of Dutch ESL learners. Based on earlier literature on scopal freedom and first language influence, the

hypothesis posed in the thesis was that the reading of scope ambiguous sentences is influenced by a Dutch L1. Earlier data showed that the scopal freedom allowed in both languages differs greatly. This means that second language learners have to acquire new knowledge about sentence processing to be more target-like. Earlier research on relative clauses already showed that there is a difference between native speakers and second language learners and that it is highly likely that this is influenced by an L1. The data does not fully confirm this idea, but some remarks can be made about this.

Table 2

The cumulative number of readings per reading type per group with the percentages between brackets.

	Dutch only	*English native*	*ESL*
Surface reading	262 (65.5)	97 (60.6)	278 (70)
Inverse reading	28 (7)	28 (17.5)	40 (10)
Ambiguous	69 (17.3)	28 (17.5)	71 (17.9)
Incorrect	41 (10.2)	7 (4.4)	8 (2.1)

Table 2, here repeated, shows the overall number of times a certain reading was chosen within a group. To confirm the second hypothesis, the ESL data should show similarities to the Dutch-only data and not to the English native data.

The surface reading shows a similar preference in all groups but the data of the ESL group lies with 70 % closer to the Dutch-only group than to the English natives with 65% and 60% respectively. It is not conclusive evidence that the ESL learners completely rely on their L1 but some slight influence is visible.

The inverse reading should be mostly blocked in Dutch and the data of the Dutch-only group seems to point towards this claim. The native English data showed a higher preference for inverse reading, as expected. The ESL group allowed for 10% the inverse reading, which puts in between the Dutch-only group and the English native data. This points towards a shift

from L1 cues to more native-like responses. The percentages for the ESL group are not as high as in the English native group, but above the white noise level that the results of the Dutch-only group gives.

The ambiguous reading is similar across the board and is not conclusive enough to draw any conclusions from. The 'neither correct reading' can also not be analysed because of a mistake in the AQ. This caused the results of the Dutch-only group to be bias towards this reading while the results of the other two groups were not affected by this. Overall all the data is very similar and the differences are only minimal. Confirming the second hypothesis is difficult, but there seem to be some general tendencies that can be found. If on a greater scale the same tendencies can be found in the data, the claims made by Van der Ziel (2012) about the L1 influence on the interpretation of ambiguous sentences.

The questionnaire was distributed online, and even though respondents were given an explanation of what was expected, there was no supervision. This may mean that there was some confusion as was pointed out by a few respondents. This confusion might have manifested in selecting either at random or the 'neither reading' option. It is not clear whether this has actually happened, but if it has, it probably has influenced the results. It is impossible to detect so for the purpose of this thesis, this is ignored.

Another flaw was the homogeneity of the respondents. More than half of the respondents had a high level of English proficiency, according to the literature this should have resulted into more target-like responses so the more the responses showed similarities to the L1, the less this homogeneity seems to matter. After all, if the level of proficiency was the main factor, the responses should have been greatly similar to the native English responses. The data showed that this is not always the case, especially not on the sentence level. This would the factor of word-rigidness as influencing factor more important than the proficiency level and shows that L2 learners might not ever show target-like responses.

6. Conclusion

Dutch and English seem to allow for different levels of ambiguity. Ambiguity itself may arise on any level. Scope ambiguity can be said to either arise on the lexical level (Croft, 1983) or in the syntax (Lidz & Musolini, 2002; Van der Ziel, 2012). Research into the acquisition of syntactic ambiguity shows that languages all allow for different levels and different kinds of ambiguity. The difference between Dutch and English regarding the level of ambiguity, is said to be cause by the difference in scopal freedom (Van der Ziel 2012). Dutch is scope rigid

while English is rather scope free.

Looking back at the data, the data seems to confirm the two hypotheses posed in this thesis. The first being: Dutch is a scope rigid language and ambiguous sentences will only be interpreted with a surface structure interpretation The data showed that in most questions, the Dutch-only group was the group with the highest percentage for the surface structure. This suggests that this hypothesis is correct and that the first intuition for Dutch participants is the surface structure reading. A few sentences were exceptions on this pattern but they can be either explained by a mistake in the test itself or the semantic context of the question itself. These sentence make little sense with the surface interpretation because real life experience showed that the inverse reading is more common.

The second hypothesis, whether Dutch ESL learners are influenced by their L1 when reading ambiguous sentences, also seems to be correct. In many of the sentences the ESL group scored the second highest percentage in the surface structure reading, often very close to the number of the Dutch-only group. This suggests a relationship between the L1 and the interpretation of L2 sentences. As mentioned before this test was not completely sound. For the results to be scientifically significant, this test should be repeated in a corrected version. This is a small flaw in the test which makes it not completely trust worthy. It only happened with one single question and the rest of the test is not heavily affected by this. To conclude anything, it is easy enough to exclude this sentence from the analysis. The results should still show the same patterns. Another factor that has probably influenced the test results, is the fact that the majority of the ESL group has a great amount of knowledge about the English language and probably the phenomena that surface in this language, one of which is ambiguity. This prior knowledge of the inner workings of the English language, may have resulted in a bias toward the ambiguity answers. Still the data seems to not always support this. Many of the answers are in line with the idea that the ESL group is mainly influenced by their L1 and rely less on their knowledge of the English language. This may even point to a stronger argument that second language learners are influenced by their L1, even when their proficiency is at C1/C2 level. It seems like a good idea to test whether English proficiency really has little to no influence on the answers. This could be easily tested by recruiting groups of Dutch ESL learners with different proficiencies to see whether the answers differ between the groups. A rather major flaw in this test procedure, were the uneven test groups. This is the result of a time constraint. There was not enough time to recruit more English natives. This is also motivation for a follow-up experiment where the tests groups are even and preferably less homogenous. The ESL group in this test were for the majority English

bachelor students with a high education and proficiency, to get more sound results, this group should be more diverse. Overall, this test is best to be duplicated and slightly improved for better results. This is after all, one of the first tests that looks into adult ESL learners and scope ambiguity. So far most ambiguity research has focussed on child acquisition or relative clauses. Scope ambiguity is a whole new area to explore.

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APPENDIX A

General information of participants

Dutch participants (Dutch only + ESL)

Wha is your age?

4

9

5

32

■ 18 or younger   ■ 19-30   ■ 31-50   ■ > 50

English natives

I am a

2

8

■ Male   ■ Female

What is your age?

18 or younger   19-30   31-50   > 50

ESL Specific

highest level of English?

high school   HBO   Bachelor English   Other bachelor

English Master   Other Master   Other

CEFR Level (assumed)

Legend: A1, A2, B1, B2, C1, C2

Values: 0, 2, 2, 3, 8, 9
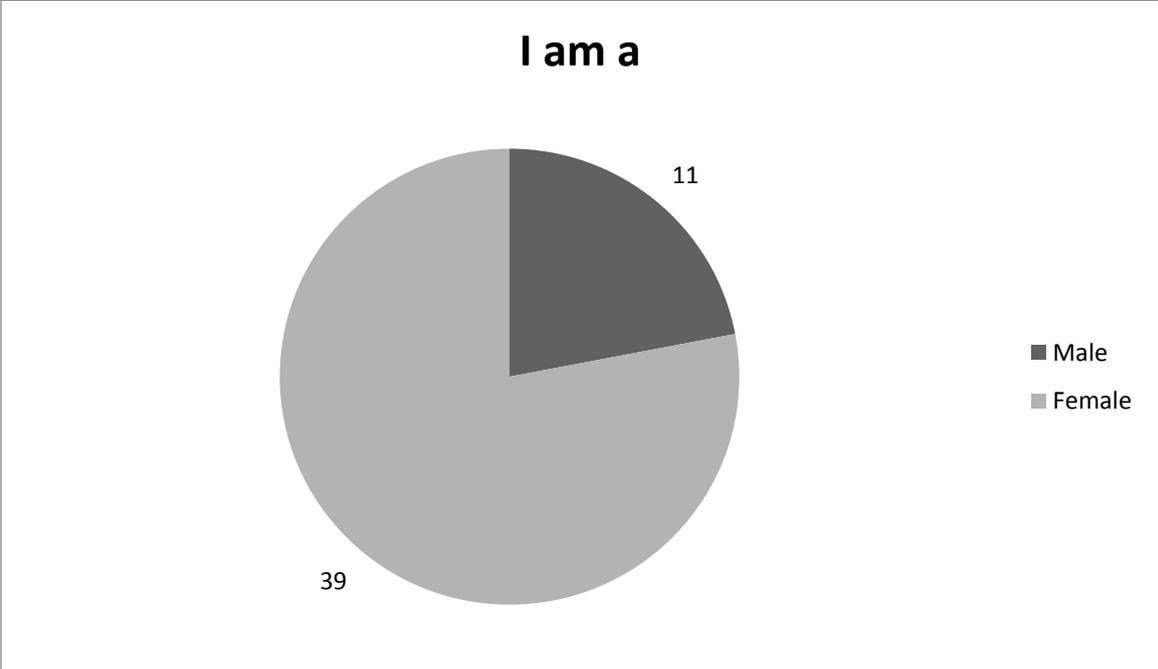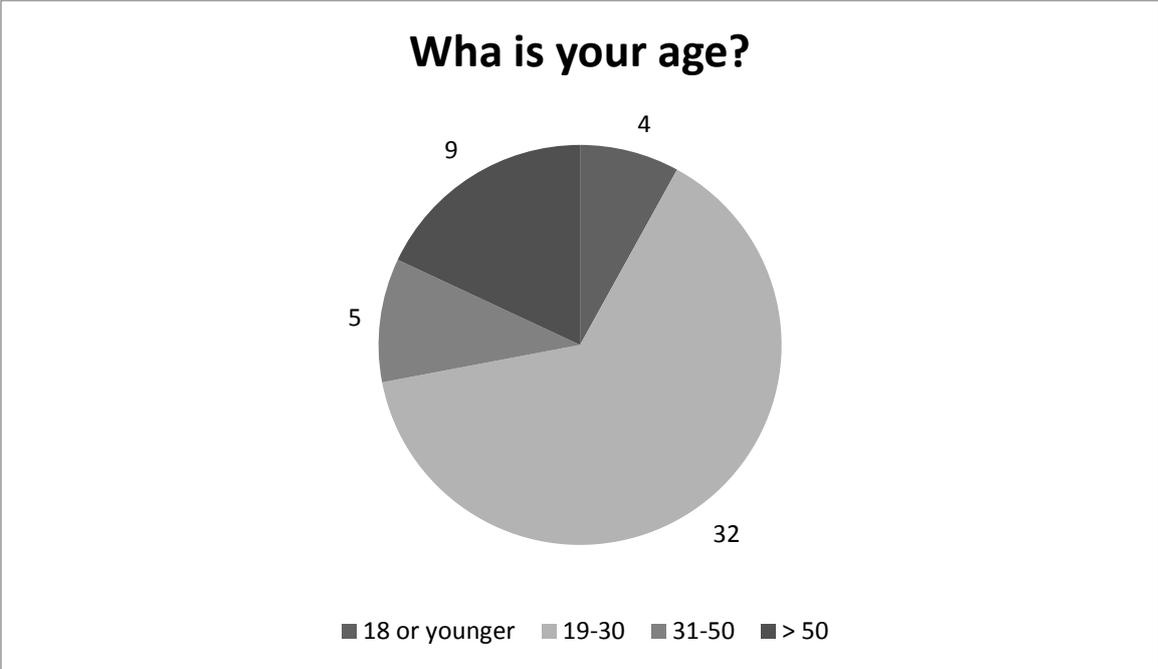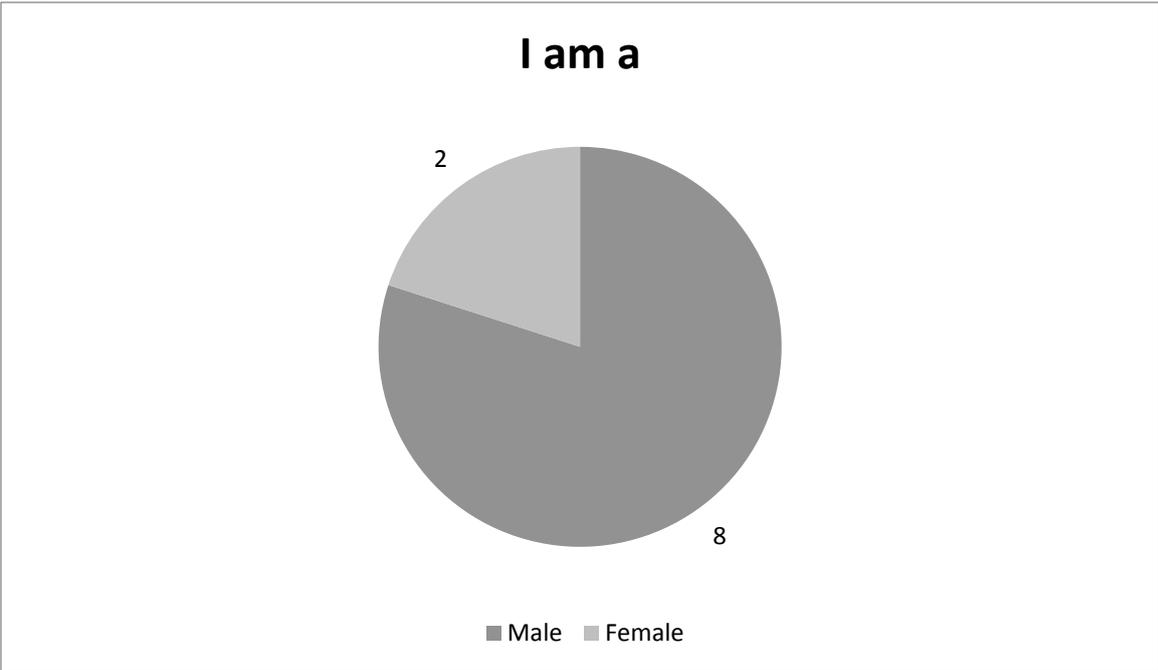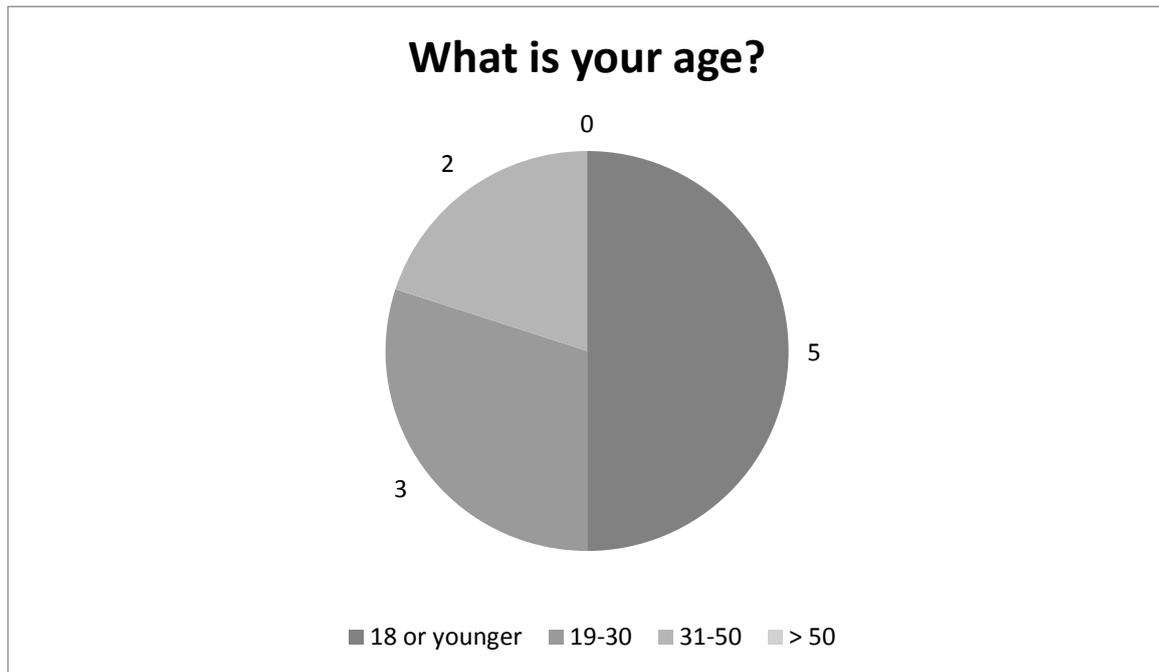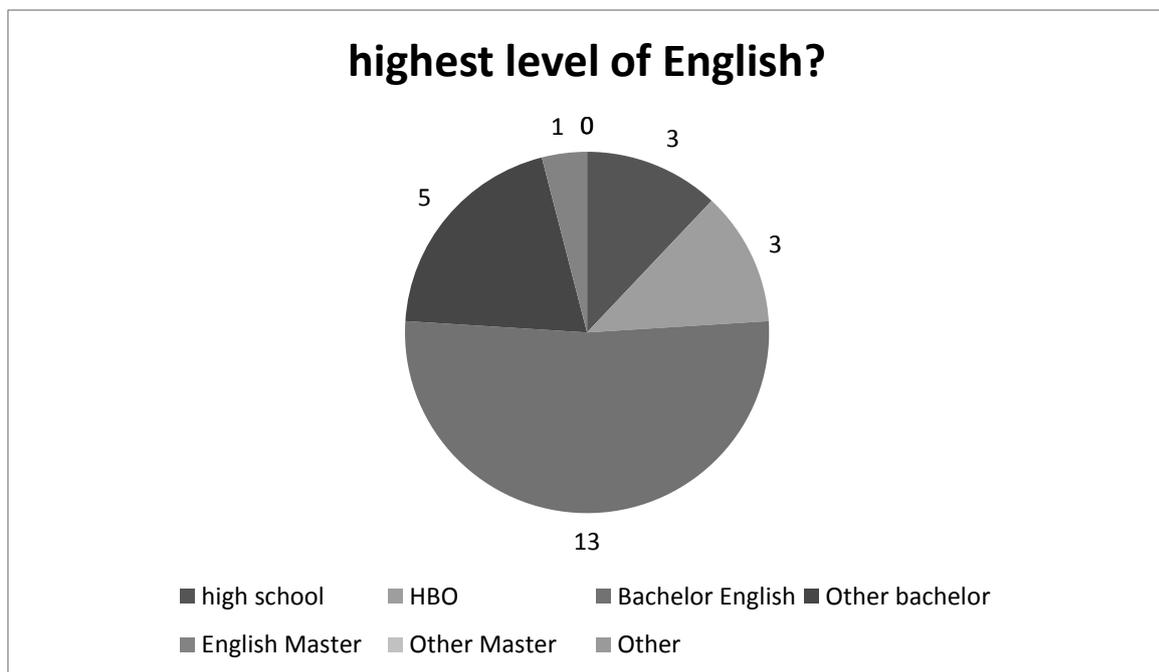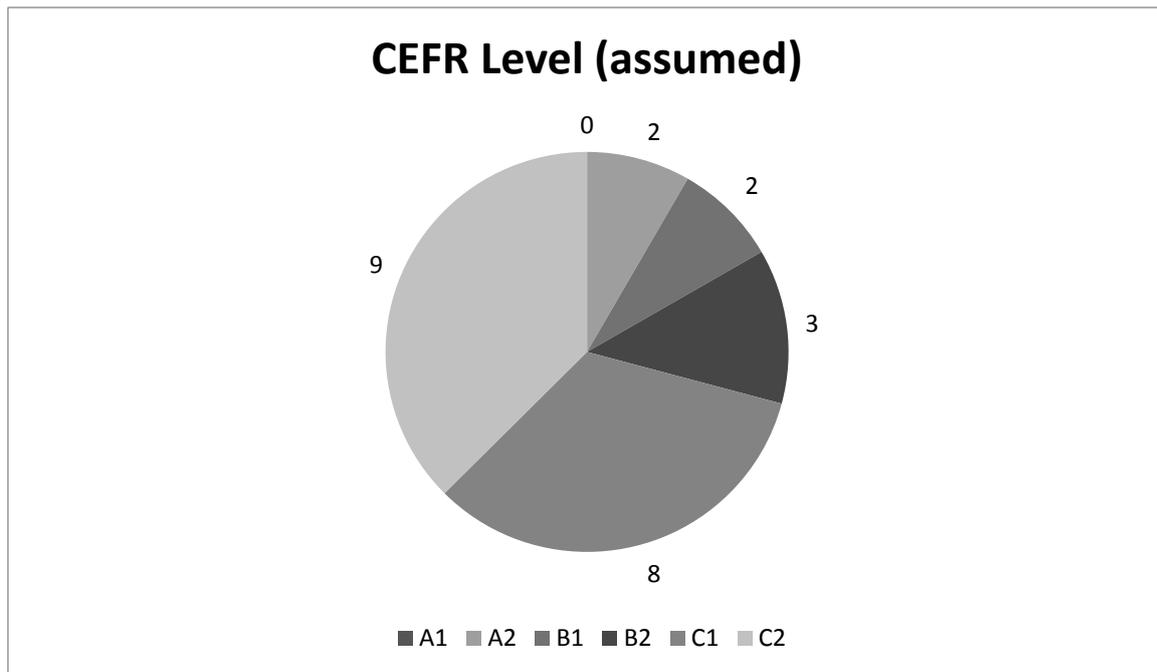
APPENDIX B-I

Questions for Dutch only group

These questions were given at random to the participants

Questions 1-16 test ambiguity 17-24 are fillers

1. Iemand houdt van iedereen.

Er is een iemand waar iedereen van houdt
Iedereen houdt van dezelfde iemand
Bovenstaande beweringen zijn beide waar
Geen van bovenstaande beweringen is
waar

2. Iemand las elk boek.

Elk boek is door dezelfde iemand gelezen
Elk boek is door verschillende mensen
gelezen
Beide beweringen zijn waar
Geen van de beweringen is waar

3. Een toerist bezocht elke stad.

Elke stad is door dezelfde toerist bezocht
Elke stad is bezocht door verschillende
toeristen
Bovenstaande beweringen zijn beide waar
Geen van de beweringen is waar

4. Iedereen las een boek over linguïstiek.

Iedereen leest hetzelfde boek
Er zijn verschillende boeken en iedereen
leest er een

Bovenstaande antwoorden kunnen allebei
Geen van bovenstaande antwoorden kan

5. Elke man houdt van een vrouw.

Er is voor iedere man een vrouw waar hij
van houdt
Elke man houdt van dezelfde vrouw
Bovenstaande beweringen zijn allebei waar
Geen van de beweringen is waar

6. Iedere student heeft een seminar bijgewoond.

Iedere student is naar dezelfde seminar
geweest
Alle studenten zijn naar verschillende
seminars geweest
Bovenstaande beweringen zijn allebei waar
Geen van de beweringen is waar

7. Iedereen houdt van iemand.

Iedereen houdt van dezelfde persoon
Iedereen houdt van een ander persoon
Bovenstaande beweringen zijn beide waar
Geen van de beweringen is waar

8. Elk meisje kuste een jongen.

Elk meisje heeft dezelfde jongen gekust
Elk meisje heeft een andere jongen gekust
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

9. Iedere docent las een boek voor

Alle docenten lazen hetzelfde boek
Alle docenten lazen een ander boek
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

10. Elke jongen rijdt een kameel

De jongens rijden dezelfde kameel
De jongens rijden allemaal een andere

kameel
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

11. Elk kind klom in een boom

Elk kind klom in dezelfde boom
De kinderen beklommen verschillende
bomen
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

12. Iedere vrouw zag een film

de vrouwen zagen dezelfde film
Elke vrouw zag een andere film
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

13. Elke vogel heeft een bosbes opgegeten

De vogels aten dezelfde bosbes op
Elke vogel at zijn eigen bosbes op
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

14. Maud drapeerde een doek over iedere stoel

Maud gebruikte maar één doek
Maud gebruikte meerdere doeken
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

15. Christine liet een bezoeker ieder schilderij van Picasso zien

Christine liet een enkele bezoeker alle
schilderijen zien
Christine liet meerder bezoekers
schilderijen zien
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

16. Een kat heeft elke worst opgegeten

Elke worst is door dezelfde kat opgegeten
De worsten zijn door verschillende katten
opgegeten
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

17. Elke vrouw maakt kleding

De vrouwen werken aan dezelfde kleren
Elke vrouw werkt aan haar eigen kleren
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

18. Elke boek staat in de bibliotheek

De boeken staan in dezelfde bibliotheek
De boeken staat in verschillende
bibliotheken
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

19. Iedere man keek naar de televisie

Alle mannen keken naar dezelfde televisie
Alle mannen keken naar verschillende
televisies
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

20. Elke kat zag de muis wegrennen

Alle katten zagen dezelfde muis
wegrennen
Alle katten zagen een andere muis
wegrennen

21. Elk kopje staat op tafel

De kopjes staan op verschillende tafels
Alle kopjes staan op dezelfde tafel
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

22. De jongen at elk stukje taart

Elk stukje taart was opgegeten door
dezelfde jongen
Verschillende jongens aten ieder een stuk
taart
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

23. De spin at elke vlieg op

Een spin at elke vlieg op
Verschillende spinnen aten elk een vlieg
op
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

24. Het meisje pakte elke steen op

Elke steen werd door hetzelfde meisje
opgepakt
De stenen werden door verschillende
meisjes opgepakt
Bovenstaande beweringen zijn allebei waar
Geen van bovenstaande beweringen is
waar

APPENDIX B-II

Questions given to English natives and ESL group

1. Everyone read a book on linguistics yesterday

Everyone read the same book
There are different books and everyone read one of them
Both statements are true
None of the above statements are true

2. Every man loves a woman

All men love the same woman
There is a different woman for each man
Both statements are true
None of the above statements are true

3. Each student attended a seminar

All students went to the same seminar

The students all attended a different seminar
Both statements are true
None of the above statements are true

4. Everyone loves someone

Everyone loves someone different
Everyone loves the same someone
Both statements are true
None of the above statements are true

5. Every girl kissed a boy

Every girl kissed the same boy
Every girl kissed a different boy
Both statements are true
None of the above statements are true

6. Every teacher read a book last week

All teachers read the same book
The teachers read a different book
Both statements are true
None of the above statements are true

7. Every boy is riding a camel

The boys are riding the same camel
The boys all ride a different camel
Both statements are true
None of the above statements are true

8. Every kid climbed a tree

The kids climbed the same tree
The kids climbed different trees
Both statements are true
None of the above statements are true

9. Every woman saw a movie

They all went to the same movie
They all went to a different movie
Both statements are true
None of the above statements are true

10. Every bird ate a berry

They all ate the same berry
They all ate different berries
Both statements are true
None of the above statements are true

11. Someone loves everyone

There is one someone that everyone loves
Everyone is loved by different someones
Both statements are true
None of the above statements are true

12. Someone read every book last year

Every book was read by the same someone
The books were read by different
someones
Both statements are true
None of the above statements are true

13. A tourist visited every city

One tourist every city
Multiple tourist together visited all the
cities
Both statements are true
None of the above statements are true

*14. Maud draped a sheet over every
armchair*

Maud used one sheet to cover all of them
Maud used multiple sheets to cover them
Both statements are true
None of the above statements are true

*15. Christine showed a visitor every
painting by Picasso*

She showed one visitor all the paintings
She showed the paintings to different
visitors
Both statements are true
None of the above statements are true

16. A cat ate every sausage

One cat ate all of the sausages
Different cats each ate a sausage
Both statements are true
None of the above statements are true

17. Every man watched the television

All men watch the same television
All men watched different televisions
Both statements are true
None of the above statements are true

18. Every cat saw the mouse run away

All cats saw the same mouse
All cats saw a different mouse run away
Both statements are true
None of the above statements are true

19. Every cup is on the table

All cups are on a different table
The cups are all on the same table
Both statements are true
None of the above statements are true

20. The boy ate every piece of cake

One boy ate every piece
Multiple boys ate the entire cake
Both statements are true
None of the above statements are true

21. The spider ate every fly

Every fly was eaten by one spider
The flies were eaten by multiple spiders
Both statements are true
None of the above statements are true

22. The girls picked up every stone

All stones were picked up by the same girl
Multiple girls picked up the stones

Both statements are true
None of the above statements are true

23. Every woman makes clothing

They all work on the same clothes
All women work on different clothes
Both statements are true
None of the above statements are true

24. Every book is in the library

One library holds all the books
The books are in different libraries
Both statements are true
None of the above statements are true

Appendix C
Percentages per ambiguous test item per group, with in between brackets the numbers

Everyone read a book on linguistics yesterday

	Dutch native		English native		ESL	
Surface reading	28 (7)		20 (2)		40 (10)	
Inverse reading	36 (9)		70 (7)		12 (3)	
Ambiguous	32 (8)		10 (1)		48 (12))	
Neither is correct	4 (1)		-		-	

Every man loves a woman

	Dutch native		English native		ESL	
Surface reading	92 (23)		90 (9)		68 (21)	
Inverse reading	-		-		-	
Ambiguous	4 (1)		10 (1)		16 (4)	
Neither is correct	4 (1)		-		-	

Each student attended a seminar

	Dutch native		English native		ESL	
Surface reading	56 (14)		50 (5)		54.2 (13)	
Inverse reading	-		30 (3)		4.2 (1)	
Ambiguous	36 (9)		20(2)		37.5 (9)	
Neither is correct	8 (2)		-		4.2 (1)	

Everyone loves someone

	Dutch native	English native	ESL
Surface reading	72 (18)	70 (7)	83.3 (20)
Inverse reading	8 (2)	20(2)	-
Ambiguous	-	10(1)	12.5 (3)
Neither is correct	20 (5)	-	4.2 (1)

Every girl kissed a boy

	Dutch native	English native	ESL
Surface reading	80 (20)	60(6)	80 (20)
Inverse reading	-	-	-
Ambiguous	20 (5)	30 (3)	20 (5)
Neither is correct	-	10(1)	-

Every teacher read a book last week

	Dutch native	English native	ESL
Surface reading	40 (10)	60 (6)	-
Inverse reading	4 (1)	10 (1)	84 (21)
Ambiguous	40 (10)	20 (2)	16 (4)
Neither is correct	16 (4)	10 (1)	-

Every boy is riding a camel

	Dutch native	English native	ESL
Surface reading	88 (22)	60 (6)	84 (21)
Inverse reading	-	-	-
Ambiguous	12 (3)	40 (4)	16 (4)
Neither is correct	-	-	-

Every kid climbed a tree

	Dutch native	English native	ESL
Surface reading	60 (15)	70 (7)	76 (19)
Inverse reading	4 (1)	10(1)	-
Ambiguous	36 (9)	20(2)	20 (5)
Neither is correct	-	-	4 (1)

Every woman saw a movie

	Dutch native	English native	ESL
Surface reading	56 (14)	40 (4)	64 (16)
Inverse reading	-	20 (2)	8 (2)
Ambiguous	36 (9)	30 (3)	20 (5)
Neither is correct	8 (2)	10 (1)	8 (2)

Every bird ate a berry

	Dutch native	English native	ESL
Surface reading	100 (25)	70 (7)	100 (25)
Inverse reading	-	-	-
Ambiguous	-	20 (2)	-
Neither is correct	-	10 (1)	-

Someone loves everyone

	Dutch native	English native	ESL
Surface reading	-	50 (5)	80 (20)
Inverse reading	-	40 (4)	8 (2)
Ambiguous	4 (1)	10 (1)	12 (3)
Neither is correct	96 (24)	-	-

Someone read every book last year

	Dutch native	English native	ESL
Surface reading	88 (22)	60 (6)	84 (21)
Inverse reading	4 (1)	20 (2)	-
Ambiguous	8 (2)	20 (2)	8 (2)
Neither is correct	-	-	8 (2)

A tourist visited every city

	Dutch native	English native	ESL
Surface reading	88 (22)	80 (8)	84 (21)
Inverse reading	8 (2)	10 (1)	-
Ambiguous	4 (1)	10 (1)	12 (3)
Neither is correct	-	-	4 (1)

Maud draped a sheet over every armchair

	Dutch native	English native	ESL
Surface reading	24 (6)	50 (5)	4.2 (1)
Inverse reading	44 (11)	20 (2)	45.8 (11)
Ambiguous	32 (8)	10 (1)	50 (12)
Neither is correct	-	20 (2)	-

Christine showed a visitor every painting by Picasso

	Dutch native	English native	ESL
Surface reading	84 (21)	60 (6)	100 (25)
Inverse reading	-	20(2)	-
Ambiguous	8 (2)	10 (1)	-
Neither is correct	8(2)	10 (1)	-

A cat ate every sausage

	Dutch native	English native	ESL
Surface reading	92 (23)	80 (8)	100 (25)
Inverse reading	4 (1)	10(1)	-
Ambiguous	4 (1)	10(1)	-
Neither is correct	-	-	-