

**The effect of language dominance on crosslinguistic influence: The acquisition of reference assignment of Dutch subject pronouns by Dutch-English bilingual children**

BA thesis English Language and Culture

Utrecht University

Megan Mackaaij

5545870

British English

Supervisors/First evaluators: Manuela Pinto (Ita), Shalom Zuckerman (Tlw)

Second evaluator: Elena Tribushinina (Eng)

Date: 19 April 2018

Word count: 9367 words

**Abstract**

This project set out to study the acquisition of reference assignment of Dutch subject pronouns by Dutch-English bilingual children between the ages of four and twelve. This study examined the reference assignment preference for the p-pronoun and d-pronoun of fifty-one Dutch-English bilingual children with the use of the Coloring Book Method (Pinto & Zuckerman, 2017a), which uses colouring pages and pre-recorded sentences to extract the child's comprehension of the Dutch discourse-tracking rules for the subject pronouns. The aim was to investigate the role of language dominance on a phenomenon thought to be sensitive to crosslinguistic influence. Language dominance as a construct as well as its effects are much debated and this study was aimed at gaining more insight into this area of research. Language dominance was determined based on the experience-based measure of calculated amount of exposure to both languages gathered through a parental questionnaire. The results revealed that although an effect of bilingualism and age are present during the acquisition of reference assignment of Dutch subject pronouns by Dutch-English bilinguals, an effect of language dominance was not convincingly supported by the data.

## Table of contents

1. Introduction.....	3
2. Theoretical background.....	4
2.1. Conceptualisation and operationalisation of language dominance.....	4
2.2. Subject pronouns in both languages.....	6
2.3. Explaining crosslinguistic influence.....	9
2.4. Language dominance and crosslinguistic influence.....	10
3. Research questions.....	12
4. Hypotheses.....	13
5. Method.....	16
5.1. Participants.....	16
5.2. Materials.....	17
5.3. Procedure.....	20
5.4. Analysis .....	21
6. Results.....	22
7. Discussion .....	24
8. Conclusion.....	30
9. References.....	34
10. Appendices .....	37
9.1. Appendix A: Overview of background information per participant.....	37
9.2. Appendix B: Test item colouring pages used in the game.....	39
9.3. Appendix C: Parental questionnaire.....	43
9.4. Appendix D: Individual mean scores for <i>ze</i> sentences and <i>die</i> sentences.....	51

## 1. Introduction

Much research has been conducted in the field of bilingualism and the interest in the phenomena crosslinguistic influence and language dominance has grown increasingly. Only in recent years, this area of linguistics has started researching the syntax-pragmatics interface in bilingual language acquisition (Serratrice, Sorace & Paoli, 2004; Argyri & Sorace, 2007; Pinto & Zuckerman, 2017b). This specific interest in the syntax-pragmatics interface emanates from findings in research (e.g. Sorace & Serratrice, 2009) that emphasise that crosslinguistic influence mostly manifests itself on interfaces involving syntax and other cognitive domains (e.g. pragmatics) and not on interfaces of grammar that are considered core grammar (e.g. morphology).

Although these phenomena have been receiving more attention, the research that studied the role of language dominance in crosslinguistic influence is still limited and the findings are often of mixed nature. These mixed results can be attributed to several controversial issues in the field of language dominance. Most of the issues concern conceptualisation and operationalisation since these often vary significantly between studies interested in language dominance. (Grosjean, 1998; Unsworth, 2013).

Research into crosslinguistic influence and language dominance not only has academic relevance, but it has also been proven to be particularly relevant outside of academia. It is well established that bilingual children go through a different language acquisition process than monolingual children (e.g. Cook, 1995; Grosjean, 2010). However, the extent of these differences in language acquisition are not yet fully established and therefore more insight into bilingual language acquisition is necessary. Expanding the current knowledge of bilingual acquisition and establishing which factors play a crucial role in the process of acquiring more than one language will help to determine the most successful ways of educating and guiding children when they grow up acquiring more than one language.

This study explores the acquisition of reference assignment of Dutch subject pronouns by Dutch-English bilingual children, with a special interest in the role of language dominance in this acquisition process. This research will give more insight into the acquisition of this particular phenomenon. It will also contribute to the growing field of research into the factors which potentially cause crosslinguistic influence, especially since this phenomenon finds itself on the syntax-pragmatics interface.

This paper begins by giving an overview of previous research in section 2. This section will start with introducing the construct language dominance, followed by an explanation of the functions of the subject pronouns in Dutch and English. This section will finish with discussing much-proposed factors influencing crosslinguistic influence. This discussion will lead to the research question in section 3. Section 4 will present the hypotheses. Section 5 is concerned with the methodology adopted in this study. Section 6 will present the results, followed by the discussion in section 7. The paper ends with the conclusion in section 8.

## **2. Theoretical background**

### **2.1. Conceptualisation and operationalisation of language dominance**

As this study looks into the role of language dominance on the acquisition of a phenomenon sensitive to crosslinguistic influence, it is necessary to discuss language dominance as a construct and be transparent about the conceptualisation and operationalisation of the construct in this study. Language dominance is a much-debated topic and studies concerning language dominance often contradict each other. Most scholars agree that when it comes to bilingualism, even simultaneous bilingualism, often one of the languages is more dominant than the other language (Grosjean, 1982). However, the effects of language dominance remain difficult to study and studies concerning language dominance are difficult to compare since no one clear conceptualisation and operationalisation of the concept exists.

With regards to conceptualisation, Genesee, Paradis and Crago (2004) describe language dominance as: “the condition in which bilingual people have greater grammatical proficiency in, more vocabulary in, or greater fluency in one language or simply use one language [...] more often” (p. 80). This definition essentially gives several different possibilities in which language dominance can be explained or conceptualised. This definition illustrates how no clear consensus exists on what the construct language dominance entails. This lack of consensus highlights the importance for scholars to clearly state how they conceptualise language dominance in their research in order to be able to make realistic comparisons between results. For this study, the concept of language dominance that is adopted is that of relative proficiency in both languages (also proposed by Unsworth, 2015) as opposed to absolute proficiency. Relative proficiency signifies the proficiency of bilinguals in one language when compared to the other language.

The operationalisation of language dominance also remains controversial and potentially explains the different outcomes between seemingly similar studies. There is no generally accepted method that scholars use to measure language dominance, but two different trends can be discerned. Once again the recognition that the choice of operationalisation of language dominance might affect the outcomes is crucial. Some scholars (e.g. Yip & Matthews, 2000; Kupisch, 2007) choose to use one or more performance-based measures such as mean length of utterance (MLU) or vocabulary size to establish proficiency in both languages and from that estimate the language dominance. Other scholars (e.g. Argyri & Sorace, 2007; Foroodi Nejad & Paradis, 2009) choose to use experience-based measures to determine language dominance. Schlyther (1993) put forward that it is usually the majority language that is the dominant language and the minority language that is the weaker language. Grosjean (1982) states that language dominance mostly occurs because the child is exposed to that particular language more and requires the language for communication in his/her direct

environment. Unsworth (2015) emphasises that these experience-based measures of language dominance are usually based on the assumption that a child's relative proficiency in his/her languages is determined by the amount of language exposure in both languages. Unsworth states, based on the findings of her study, "that when language dominance is narrowly defined as relative proficiency, the use of amount of exposure is a valid means of operationalising language dominance" (p. 173). In her study, the amount of exposure was based on a parental questionnaire. For the present study, it was eventually decided to use an experience-based measure following the findings by Unsworth (2015) and determine language dominance based on the amount of exposure in both languages, with the use of a parental questionnaire. The initial approach was to adopt the majority language of the environment of the child as the proxy of language dominance and use the questionnaire as a way of verifying that the language of the environment was indeed the language in which the children received most exposure. However, the questionnaires revealed that for three-quarters of the participants it was not the majority language in which the children received most exposure. This showed that it is not inherent that the majority language of the environment is also the dominant language. The data gathered from the questionnaire was deemed more accurate and therefore it was decided to use this data to measure exposure to both languages and determine language dominance as opposed to adopting the majority language as the measure of dominance.

## **2.2. Subject pronouns in both languages**

The phenomenon of interest in this study concerns the Dutch subject pronouns which are used for discourse coherence, with a special interest in the anaphoric pronouns *die* and *ze*. This phenomenon was chosen because it portrays itself on the syntax-pragmatics interface and would, therefore, be expected to be sensitive to crosslinguistic influence in Dutch-English bilinguals.

Van Kampen (2010) explains that Dutch can make use of two types of pronouns to make the connection between successive sentences through a relationship with an antecedent. The first group is third-person personal pronouns, or p-pronouns, in Dutch and English respectively {*hij*/he, *zij*/she, *hem*/him, *haar*/her, *het*/it}. The second type are demonstrative pronouns {*die*/that, *dat*/that, *daar*/there}, also d-pronouns. These d-pronouns and p-pronouns are not used under the same conditions and their functions also differ. Sentence-initial d-pronouns are used to demonstrate a topic shift with regards to the preceding sentence. The d-pronoun is used to demonstrate the new topic, which refers to the focus of the previous sentence. When *die* is used sentence-initial in Dutch, it cannot refer to the subject of the previous sentence. The d-pronoun manifests itself in the SpecCP position, which places the phenomenon in the complementizer domain. Contrary to the d-pronoun, the p-pronoun is not limited by a focus or topic status of the antecedent. The example below illustrates the function of the pronouns (taken from Van Kampen).

1)  ${}_{\text{topic}}$ [De kleine beer] ${}_i$  zag op de zolder  ${}_{\text{focus}}$ [een meisje] ${}_m$ .

${}_{\text{topic}}$ [The little bear] ${}_i$  saw in the attic  ${}_{\text{focus}}$ [a girl] ${}_m$ .

‘The little bear saw a girl in the attic’

a  ${}_{\text{topic}}$ *Die* ${}_m$  had hij ${}_i$  nog nooit gezien.

She? ${}_m$  had he ${}_i$  yet never seen.

‘He had never seen her before.’

a’ *Ze* ${}_m$  lag in zijn bedje. *Ze* ${}_m$  sliep.

She ${}_m$  lay in his bed. She ${}_m$  slept.

‘She was lying in his bed. She was asleep.’

The example shows that *die* ${}_m$  in (a) causes the topic to shift from [the little bear] to [a girl]. *Ze* ${}_m$  in (a’) does not portray a shift in topic, it still refers to [a girl] which is the new topic established in (a).

English does not have d-pronouns. English makes use of stressed pronouns to indicate topic shift (Van Kampen, 2010). Mikkelsen (2005) argues that the demonstrative pronoun *that* in sentence-initial position does not function as an anaphoric pronoun. This means that speakers of English do not have the choice between a d-pronoun and a p-pronoun when changing or retaining the topic. The following example taken from Comrie (1997) clearly shows the difference in anaphoric reference between Dutch and English.

2) a. Wim<sub>i</sub> sloeg Piet<sub>j</sub>, en toen sloeg *die*<sub>j</sub> *hem*<sub>i</sub>

b. Wim<sub>i</sub> hit Piet<sub>j</sub>, and then HE<sub>j</sub> hit *him*<sub>i</sub>

Dutch uses [*die*] to refer back to [Piet] whilst English uses articulatory emphasis on the personal pronoun [*he*] to indicate a shift in topic.

In order to comprehend the difference between the use of d-pronouns and p-pronouns in Dutch, it is crucial to have a grasp of the discourse-tracking rules. Pinto and Zuckerman (2017b) studied the acquisition of the p-pronoun and the d-pronoun by testing constructions containing the p-pronoun *ze* (female third-person personal pronoun) and the d-pronoun *die* (can refer to both males and females). They argued that adults know these rules, but that children have to acquire these rules without explicit teaching. They found that Dutch adults have a clear preference for the p-pronoun *ze* to refer back to the subject and the d-pronoun *die* to refer back to the object of the previous sentence. Furthermore, they found that children between the ages of four and twelve “show a clear development of the ‘die’ pronoun” (n.p.). In their study, the youngest group of children do not distinguish between the two types of pronouns. They understood both the p-pronoun and the d-pronoun to refer back to the subject of the previous sentence. This entails that the children quickly grasp the adult-like discourse-tracking rules for the p-pronoun, but have difficulty grasping the rules for the d-pronoun. The older children in the study showed to have more adult-like preferences with regards to the discourse-tracking rules of the d-pronoun.



### **2.3. Explaining crosslinguistic influence**

Crosslinguistic influence is defined as “the influence of a person’s knowledge of one language on that person’s knowledge or use of another language” (Jarvis & Pavlenko, 2008, p.1). It is becoming increasingly established that when a structure manifests itself on the syntax-pragmatics interface, the structure is more sensitive to crosslinguistic influence than structures that manifest themselves on purely syntactic domains (Müller & Hulk, 2001). The C-domain is the locus for the syntax-pragmatics interface (Argyri & Sorace, 2007). In this domain different levels of grammatical representations are connected, it anchors discourse pragmatics to the syntax of a language (Hulk and Müller, 2000). The Dutch subject pronouns are also located in the C-domain. The interfaces of areas in core grammar are often called language-internal interfaces whilst the syntax-pragmatics interface is a language external interface. Language external interfaces are a combination of an element from core grammar, combined with an element outside of core grammar. Hacoen and Schaeffer (2007) studied this theory on the locus of crosslinguistic influence and reported that the spontaneous Hebrew of a Hebrew-English bilingual child contained much more pragmatically inappropriate overt subjects than that of Hebrew monolingual children, but such a difference was not found for the purely syntactic phenomenon of subject-verb agreement. These results support the theory of crosslinguistic influence on the syntax-pragmatics interface.

Despite being established that language external interfaces are more sensitive to crosslinguistic influence, debate continues about which factors predict crosslinguistic influence on the syntax-pragmatics interface. Müller and Hulk (2001) try to find the answer in the structural complexity of a phenomenon with partial structural overlap in both languages. Their theory is that bilingual speakers analyse the structures in both languages and choose the option which has the least complex system. When language A uses one and the same construction in both contexts for which language B uses two separate constructions, with one

of these being the same as in language A, then crosslinguistic influence occurs through overextending the one construction in language A for both constructions in language B. This results in an inappropriate overextension of the construction that overlaps in both languages (Sorace & Serratrice, 2009). The directionality of the influence is thus predicted by the difference in economy of the structure between the two languages.

Some scholars attempt to find the answer to the sensitivity of language external interfaces in the idea of processing. Sorace and Serratrice (2009) promote the role of processing factors. They speak not so much of crosslinguistic influence but rather frame the sensitivity as interface optionality. It has been suggested in the literature that even for monolingual children it is demanding to integrate syntactic information within its relevant discourse framework (Serratrice, Sorace & Paoli, 2004). Bilingual children face an even more demanding task given that “they must map universal pragmatic principles onto language specific structures, and then select only those options that are syntactically viable in the target language” (p. 183). Bilinguals might not have the processing resources available to adequately integrate these different sources of information. These processing limitations are expected to be less problematic for language-internal interfaces since these do not involve as many different sources of information that need to be integrated (Sorace & Serratrice, 2009). The challenge for the advocates of processing factors is to operationalise the concept and to find experimental evidence of the role of processing factors.

#### **2.4. Language dominance and crosslinguistic influence**

Other scholars in this field are interested in investigating the role of language dominance in crosslinguistic influence and different opinions have been formed as to its effects. The theory by Müller and Hulk (2001) as discussed in section 2.3 does not imply any crosslinguistic influence based on language dominance. Hulk and Müller (2000) argue that “crosslinguistic

influence is due to language-internal reasons and not to language-external factors such as language dominance” (p. 229).

Other scholars are convinced of the role of language dominance with varying degrees. Kupisch (2007) argues that it is not only language dominance, but also language-internal factors (i.e. properties of the target languages such as complexity of the structure) that play an important part in the prediction of crosslinguistic influence. Paradis and Genesee (1996) state that “transfer is most likely to occur if the child has reached a more advanced level of syntactic complexity in one language than the other” (p.3). Yip and Matthews (2000) argue that the biggest factor determining the direction of crosslinguistic influence is language dominance. They studied one English-Cantonese bilingual child and found that the transfer they encountered in the child was very much unidirectional and linked to the dominance pattern of the child. They also found that this unidirectional transfer was limited to certain periods in language development. They determined language dominance with the performance-based measure of mean length of utterance in words (MLUw). In 2007, Yip and Matthews expanded on these findings by putting forward the Language Dominance Hypothesis. This hypothesis states that for children who are in contact with at least two languages simultaneously, the dominant language (i.e. the more developed language at that point) will instigate crosslinguistic influence on the weaker language (i.e. the less developed language at that point). The development of the languages is based on measurable differences such as MLU. Yip and Matthews (2007) state that language dominance plays a role in some domains of grammar but not all domains. Yip and Matthews are not certain yet which particular domains are vulnerable to language dominance and state that more research will be necessary to tease these different domains apart. They have found influence of language dominance on the domain of null objects and wh-movement (Yip & Matthews, 2007).

With the aim of contributing to the current views on the role of language dominance, this paper examines whether language dominance plays a role in the acquisition of phenomena sensitive to crosslinguistic influence by studying the acquisition of Dutch subject pronouns by Dutch-English bilingual children. Interesting in this respect is that this study investigates a phenomenon that is only acquired much later than the phenomena often studied with respect to crosslinguistic influence. Furthermore, this study examines the comprehension of a phenomenon, whilst often studies focus on crosslinguistic influence in production. This study will use the experience-based measure of exposure to both languages to establish language dominance.

### **3. Research question**

Does language dominance affect the acquisition of reference assignment of the Dutch subject pronouns *ze* and *die* by Dutch-English bilingual children?

Based on the design of this study, three different sub-questions have been added to help structure the findings:

1. Is there an effect of bilingualism on the acquisition Dutch subject pronouns by Dutch-English bilingual children as compared to Dutch monolingual children of similar ages?
2. Is there an effect of age on the acquisition of Dutch subject pronouns within the group of Dutch-English bilingual children, as there is for monolingual Dutch children?
3. Is there an effect of crosslinguistic influence based on language dominance on the acquisition of Dutch subject pronouns within the group of Dutch-English bilingual children?

#### 4. Hypotheses

Based on the overview of previous research provided in section 2, the following hypotheses are drafted. The hypotheses are split up for the p-pronoun *ze* and the d-pronoun *die*. For both of the subject pronouns, the predictions for each of the sub-questions are discussed.

With regards to the p-pronoun *ze*, it is expected that the Dutch-English bilingual group will score similarly to the Dutch monolingual group. This means that no effect of bilingualism, age or language dominance is expected. The p-pronoun is discourse neutral and can refer back both to the topic and the focus of the previous sentence. Therefore, children are correct when their preference is for *ze* to refer back to the subject or the object of the previous sentence. However, Pinto and Zuckerman (2017b) showed that Dutch monolingual children grasp the discourse-tracking rules for the p-pronoun already from a young age, with an adult-like preference for the p-pronoun to refer back to the subject of the previous sentence. This same preference is expected to be found in the Dutch-English bilingual children, meaning that the Dutch-English bilingual children have this same preference from the same age as the Dutch monolingual children. English only has the p-pronoun available for the discourse tracking at hand and therefore *she* without clear stress, the equivalent to *ze*, is also used to refer back to the topic of the previous sentence. In this sense, the structures overlap in both languages and hence an effect of crosslinguistic influence will not be able to be discerned. Therefore, it is not expected that an effect of language dominance will be found.

With regards to the Dutch d-pronoun *die*, an effect is expected for bilingualism. It is expected that the bilingual children as a group will show a lower degree of correct reference assignment and will not show the same amount of growth over time for the d-pronoun as the monolingual children. Pinto and Zuckerman (2017b) showed that the older the monolingual children were, the more they chose for the d-pronoun to refer back to the focus instead of the topic of the previous sentence. This gradual growth towards an adult-like preference fits with

the argument that for children, in general, it is demanding to make use of syntactic information appropriately for the discourse framework (Serratrice, Sorace & Paoli, 2004). However, for bilingual children, it could be argued that this is more demanding since they have to distinguish between two languages, where different syntactic information is necessary in different discourse frameworks depending on the target language the child uses at that time. Since this process is expected to be more demanding for bilinguals, it is expected that bilinguals will continue showing a non-adult like performance longer than monolingual children. Furthermore, the specific phenomenon that is being tested is quite a scarce structure and therefore the amount of input in the language is expected to play a part in the acquisition of the discourse-tracking rules. Since the Dutch input has to compete with the English input for the bilingual children, it is expected that this will slow down the acquisition.

Besides an effect of bilingualism, an effect of age is also expected for the acquisition of the d-pronoun discourse-tracking rules by the bilingual children as a group. It is expected that the older bilingual children will have acquired a better grasp of the discourse-tracking rules than the younger bilingual children, similarly to how the children in the study by Pinto and Zuckerman (2017b) showed to improve their preference when they became older. However, it is expected that this age pattern found in the monolingual children might be a little less steep for the bilingual children, given the expected effect of bilingualism discussed above. The next section will discuss the hypotheses for the effect of language dominance and this section will also discuss the expected differences for age for the two dominance groups.

With regards to the effect of language dominance, the current findings have been contradictory. According to Hulk and Müller (2000), crosslinguistic influence is in no way influenced by language dominance, it is only language-internal elements that affect crosslinguistic influence. When it is indeed the case that language dominance has no effect on crosslinguistic influence, it is expected that the Dutch dominant and English dominant

bilinguals score the same on the d-pronoun. Kupisch (2007) argues for some influence of language dominance in combination with other language-internal factors, such as complexity of the structure. According to Yip and Matthews (2007), it is primarily language dominance that influences crosslinguistic influence. According to the Language Dominance Hypothesis that they put forward, crosslinguistic influence will go in the direction of the dominant language onto the non-dominant language.

If language dominance does have some degree of influence on crosslinguistic influence, a difference in the development of the discourse-tracking rules is expected between the Dutch dominant and the English dominant bilinguals. For the Dutch dominant bilingual children, it is expected that they will acquire the difference in discourse-tracking between the p-pronoun *ze* and the d-pronoun *die* over time and will develop a preference for the d-pronoun to refer back to the focus of the previous sentence in a similar way to the Dutch monolinguals, but with a delay with respect to age. This is expected since Dutch is the dominant language and therefore no crosslinguistic influence from English will occur, according to the Language Dominance Hypothesis. Pinto and Zuckerman (2017b) showed that the older the monolingual children are, the more they choose for the d-pronoun to refer back to the focus instead of the topic of the previous sentence. This same process is expected for the Dutch dominant bilinguals, but with a possible delay due to the effect of bilingualism.

For the English dominant bilingual children, it is expected that they will acquire the discourse-tracking rules for the d-pronoun less accurately than the Dutch monolingual children and the Dutch dominant bilingual children. For this group, it is expected that the English counterpart of this phenomenon will affect the acquisition of the Dutch d-pronoun and its discourse-tracking rules through crosslinguistic influence. In English, the children are not confronted with a systematic mapping between form and interpretation, meaning that a different form is linked to a different interpretation. The English dominant bilinguals do hear

a difference between *ze* and *die* but because of the influence of English, they do not acquire the concept that *die* can only have one specific referent (i.e. object). This is expected since the form of the English p-pronoun *she* does not have a one-on-one relation with a specific interpretation. The English dominant children do acquire the form *die* but do not acquire the step to map this form onto specific discourse-tracking rules. It is expected that the English dominant children will pick out the subject of the previous sentence as the referent of *die*, given the fact that Dutch monolingual also prefer the p-pronoun to refer the topic, even though the Dutch p-pronoun also does not have this specific one-on-one relationship for discourse-tracking. With regards to the effect of age on the acquisition of the discourse-tracking rules, it is expected that there will be a limited to no effect of age for this group of participants since it is expected that they will not acquire the difference in discourse-tracking rules between the p-pronoun and d-pronoun.

## 5. Method

### 5.1. Participants

The participants in this study were children between the ages of four and twelve with different language backgrounds. The first group of participants consisted of fifty-one Dutch-English bilingual children. Twenty-one of these children lived in the Netherlands at the time of testing, twenty-seven children lived in England and three in Ireland at the time of testing. At least one parent is a native speaker of Dutch and/or the child is receiving education in Dutch. Most of the participants in the England and Ireland were gathered through contacting Dutch education centres in London and Dublin and putting out advertisements about the project on online bilingualism platforms. The participants in the Netherlands were contacted through a Dutch-English bilingual primary school as well as similar online platforms. The second group of participants consisted of twenty Dutch monolingual children living in the Netherlands. The data from this group was taken from the research conducted by Pinto and Zuckerman (2017b).



The results from this group were used for baseline purposes. Table 1 below gives a general overview of the participants in both groups. Appendix A contains more detailed information per participant, which were gathered with the parental questionnaire.

Table 1  
*Overview of participants per group*

Groups	N	Mean age	Dominance* (=N)	
			Dutch	English
Dutch-English bilinguals	51	7;8	25	16
Age group 1 (4;0-8;0)	29	6;2	14	10
Age group 2 (8;0-12;0)	22	9;8	11	6
Dutch monolinguals	20	8;7	20	0
Age group 1 (4;0-8;0)	6	5;7	6	0
Age group 2 (8;0-12;0)	14	10;0	14	0
Total	71	8;1	41	20

\*Dominance based on amount of exposure to both languages

## 5.2. Materials

The preferred reference assignment of the subject pronouns of the participants was tested with the Coloring Book Method designed by Pinto and Zuckerman (2017a). This method is designed to test language comprehension in young children. Pinto and Zuckerman state that this new method has the potential to mitigate task-related problems found in other similar testing methods, such as the explicit exposure of different possible interpretations. The method is a more natural and ecologically valid way to elicit children's grammatical knowledge. The child is presented with a digital colouring page on a tablet and simultaneously hears a sentence stimulus which triggers them to colour in one item on the page. "Through the playful act of colouring in the page, children reveal the level of their comprehension of grammatical constructions" (Pinto & Zuckerman, 2017a, p. 1).

The bilingual children were tested with the exact same colouring game as the monolingual children tested by Pinto and Zuckerman (2017b). The test consisted of twenty-four colouring pages such as Image 1 below.

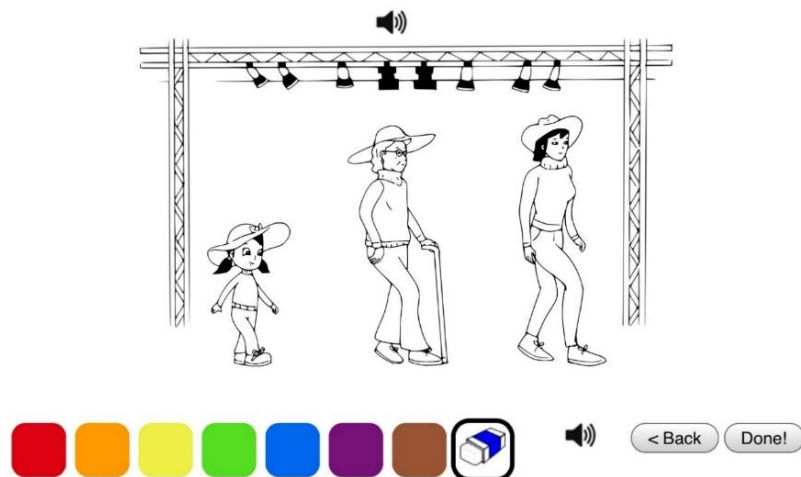


Image 1

*An example of a colouring page from the Coloring Book game.*

With each of the colouring pages, the children heard a pre-recorded sentence according to which they had to colour in an item on the page. The test not only measured which item the child coloured in but also registered the time the child spent on each colouring page. Appendix B contains all twelve test item colouring pages with the corresponding sentences and the expected answers. From the twelve test items, six contained the p-pronoun *ze* and six contained the d-pronoun *die*. The remaining twelve colouring pages consisted of fillers. The fillers were used to introduce the game as well as prevent the children from figuring out the objective of the game since the remaining fillers tested an additional phenomenon.

Furthermore, a parental questionnaire was designed which focused on determining the language dominance based on the amount of exposure in both languages. As described in section 2.1 it was decided to use the calculated amount of exposure as the measure of language dominance. The questionnaire was based on the Utrecht Bilingual Language Exposure Calculator (UBiLEC) questionnaire designed by Unsworth (2012). Ideally, the

exact same questionnaire would have been used, but this was not possible due to time constraints of the current project. Therefore it was not possible to use the algorithm behind the questionnaire by Unsworth (2012) to determine language dominance, though the questionnaire was useful to determine which questions are important to ask when determining language dominance based on exposure.

Appendix C contains a full copy of the questionnaire sent to the parents. The questionnaire contained qualitative and quantitative questions. The quantitative questions in the questionnaire were used to determine the hours of input the participants received in both languages and the amount of output the participants produced in both languages. With this data, the amount of exposure to both languages was operationalised. The first part of the quantitative questions concerned the people with which the participants had daily contact and the percentages in which these people spoke Dutch or English with the child. The parents were asked to fill this in for themselves, siblings, and teachers and there was also an option to add additional adults (such as grandparents or nannies). This section also questioned the output of the children towards the people in the home environment. The second part of the quantitative questions concerned the number of hours each of these people above spent with the child on an average weekday and an average weekend day. The final part of the quantitative questions was concerned with the number of hours per week the child spent on different activities in both languages (i.e. sport/clubs, reading, friends, television, computer/tablet). The indicated percentages and the indicated hours were used to calculate the amount of exposure per language.

The questionnaire also contained qualitative questions regarding the child's language background and language proficiency. These questions were not used for determining the language dominance, but these questions were crucial in determining whether the data gathered from each child could be included in the analysis. Through these questions, it was

possible to determine whether the children were indeed Dutch-English bilinguals with the correct language background (e.g. no additional languages). The data of six participants was excluded from further analysis since they spoke an additional language at home.

### **5.3. Procedure**

The procedure for playing the game on the tablet was essentially the same for all the participants in the study. Each child was sat with an adult in a quiet space where they would not be distracted. The adult explained what was expected of the child and introduced the task at hand, not as a test, but rather as a fun game. The adult would sit next to the child, whilst the child played the game essentially by him/herself. The children were allowed to have each sentence played as many times as they wanted if they did not understand the sentence. The adult would then also encourage the child to replay the sentence when the child indicated to be unsure which item to colour in. The adult was allowed to encourage the child to colour in an item but was not allowed to help the child in the decision. If the child remained unsure about the correct item, the colouring page was left empty and the next would be presented to the child.

There were some differences in the overall test procedure with regards to location and the accompanying adult. Thirty-four children were tested at their school and seventeen children were tested at home. Nonetheless, all the children were tested in a quiet and familiar environment. Furthermore, the adult who tested the children differed. The initial goal was to have the researcher guide all the children, but with parents' schedules, this was not always possible. Thirty-six of the participants were tested while the researcher was present to guide them through the game. The remaining fifteen participants were tested at home whilst their parents guided them through the game. The parents who guided their own children were sent a comprehensive document which explained how the game worked and how they were to

guide their child. This was deemed appropriate since the children essentially played the game by themselves and the adult only needed to be present to explain the game and keep the child engaged.

#### **5.4. Analysis**

The process of analysing the data was split up into two parts. First and foremost, the language dominance of the participants needed to be determined. The parental questionnaire contained the qualitative information necessary to determine the amount of exposure based on the hours of input and output for each language. The calculation was done as follows: the percentage of time the people in the child's environment either spoke English and/or Dutch with the child was multiplied by the number of hours this person spent with the child during one week. The same thing was done for the output of the child, for the people in the home environment. To this number, the number of hours spent on the different activities in both languages was added. This gave the total number of hours the child received exposure in both languages during a one week period. Children with a higher number of hours of exposure to Dutch were placed in the Dutch dominant group and the children with a higher amount of exposure to English were placed in the English dominant group. It was decided that the hours of exposure per language had to differ at least twenty-five hours in order to be placed in one of the two groups. Based on this criteria, four participants were excluded from being placed in one of the two dominance groups.

The second part of the analysis consisted of coding the data gathered with the colouring game. For sentences containing the p-pronoun, it is preference that determines the interpretation of – or + topic shift, given that p-pronouns are not limited by a focus or topic status of the antecedent. Therefore, for the six sentences which contained the p-pronoun both + (object) and – (subject) topic shift would have been correct. However, in order to find out

whether the bilinguals have the same preference as monolinguals for the p-pronoun to refer to the subject, only the answers without topic shift were considered correct. For the six sentences containing the d-pronoun, only the interpretation of topic shift is possible in Dutch (Van Kampen, 2010). Therefore, the answers to the sentences with the d-pronoun were only correct if the child had coloured in the correct item of clothing of the object of the first sentence. Furthermore, it was decided to mark sentences as correct when the wrong colour was used, but the correct item on the correct character was coloured in. For each of the participants, the total number of correct answers was calculated as well as the total number of correct answers for the p-pronoun sentences and the d-pronoun sentences separately.

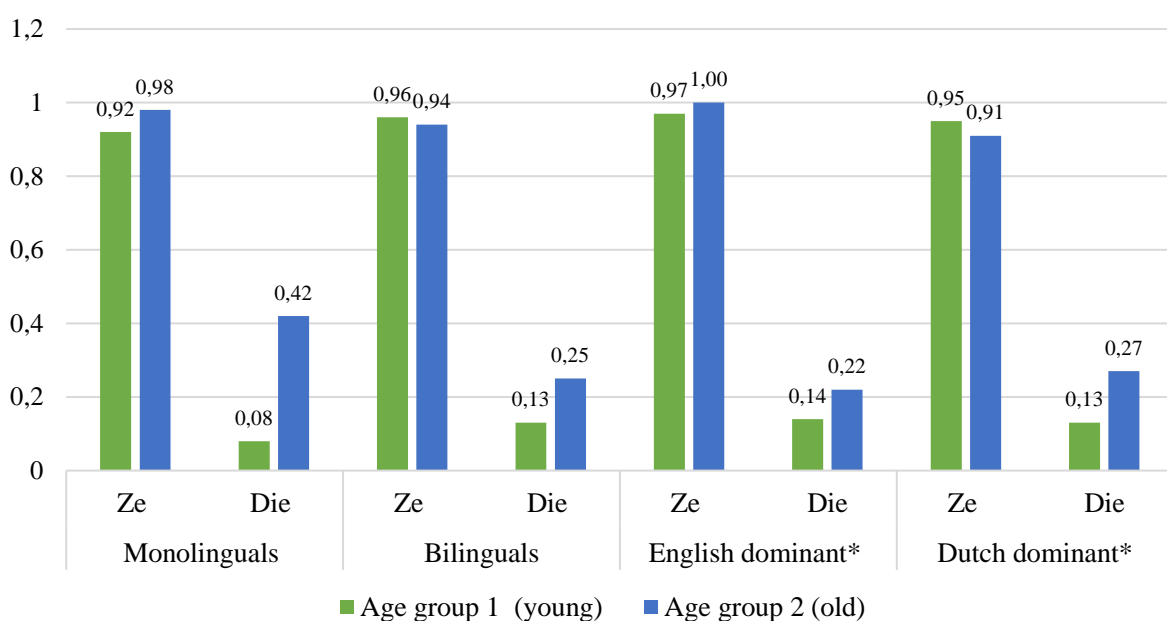
After determining the language dominance and coding the answers of the participants, the data was statistically analysed using SPSS software (version 24).

## 6. Results

Figure 1 presents an overview of the mean scores for the p-pronoun *ze* and d-pronoun *die*, for the monolinguals, all bilingual combined and the bilinguals split up for the English dominant participants and the Dutch dominant participants.

Figure 1

*Mean scores for 'ze' and 'die' for each of the participant groups*



\*English dominant or Dutch dominant based on amount of exposure to both languages

Figure 1 presents the correct answers based on the preference for *ze* to refer back to the subject and *die* to refer back to the object of the previous sentence. Appendix D provides an overview of the scores on the *ze* sentences and the *die* sentences for each of the bilingual participants individually.

The data in Figure 1 reveals that for the sentences which contained the p-pronoun *ze*, all participant groups scored relatively high. Both the younger as the older age group scored above ninety percent across all participant groups. The mean differences between the age groups for the monolinguals [ $t(118) = -1.497$ ;  $p = .137$ ] and bilinguals [ $t(244) = .613$ ;  $p = .54$ ] were found not to be significant. Furthermore, an independent samples t-test found no significant difference in mean scores between the monolingual [ $m=.96$ ] and bilingual participants [ $m=.95$ ] on the p-pronoun [ $t(364) = -.303$ ;  $p = .762$ ].

Further analysis was interested in the differences between participant groups on the *die* sentences since most variation was expected for this subject pronoun. Firstly, the scores between the monolinguals and the bilinguals were analysed. A comparison between the scores of the monolinguals in age group 1 [ $m=.08$ ] and the bilinguals in age group 1 [ $m=.13$ ] showed that on average the young bilingual participants scored better on the *die* sentences than the young monolingual participants. An independent samples t-test revealed that this difference was not significant [ $t(177) = .806$ ;  $p = .421$ ]. The difference in scores between monolingual age group 2 [ $m=.42$ ] and bilingual age group 2 [ $m=.25$ ] was significant. An independent samples t-test revealed that the monolinguals in age group 2 scored better than the bilinguals in age group 2 [ $t(184) = -2.361$ ;  $p = .019$ ].

Secondly, the differences between the age groups were analysed. A comparison between the scores of age group 1 and age group 2 within the bilinguals showed growth. The older group [ $m=.25$ ] scored better than the younger group [ $m=.13$ ]. An independent samples t-test showed that this difference was significant [ $t(243) = -2.452$ ;  $p = .015$ ]. Regarding the

mean scores of the Dutch dominant bilinguals and the English dominant bilinguals, both groups improved on their reference assignment with age. However, based on mean scores the Dutch dominant group seemed to improve more. Within the Dutch dominant bilinguals, the older group [ $m=.27$ ] scored significantly better than the younger group [ $m=.13$ ], based on an independent samples t-test [ $t(148) = -2.203$ ;  $p = .029$ ]. Within the English dominant bilinguals, the older group [ $m=.22$ ] scored higher than the younger group [ $m=.14$ ]. An independent samples t-test showed that this difference in mean score was not significant [ $t(93) = -1.090$ ;  $p = .279$ ].

Finally, the mean differences found between the Dutch dominant and the English dominant bilinguals were analysed. With regards to the younger age group, the Dutch dominant and English dominant bilinguals scored nearly the same. Although the older Dutch dominant group [ $m=.27$ ] scored higher than the old English dominant group [ $m=.22$ ] on the *die* sentences, an independent samples t-test revealed that the difference between the means score was not significant [ $t(100) = -.555$ ;  $p = .580$ ]. Furthermore, the time that the children remained on each colouring page, was analysed. The Dutch dominant bilinguals [ $m=9579$ ] were faster in both their decision of the *ze* sentences [ $m=8267$ ] and the *die* sentences [ $m=9579$ ] than the English dominant bilinguals on the *ze* sentences [ $m=10490$ ] and the *die* sentences [ $m=13893$ ]. An independent samples t-test revealed that this difference was significant for both the *die* sentences [ $t(243) = -4.049$ ;  $p = .001$ ] and the *ze* sentences [ $t(244) = 2.978$ ;  $p = .003$ ].

## 7. Discussion

This study set out with the aim of studying the role of language dominance on the acquisition of the Dutch reference assignment of subject pronouns. More generally, it aimed at investigating the role of language dominance on phenomena sensitive to crosslinguistic



influence. This section will first discuss the findings for each of the sub-questions, followed by a discussion of the findings to the main research question and its implications.

Firstly, no effect of bilingualism, age or crosslinguistic influence based on language dominance was expected for the p-pronoun *ze* when Dutch-English bilinguals were compared to Dutch monolinguals. The results revealed that the Dutch-English bilinguals did not score differently on the *ze* sentences than the Dutch monolinguals. These results show that both groups of participants grasp the discourse-tracking rules for the *ze* sentences from a young age. For the p-pronoun, no effect was found for bilingualism, age or language dominance. The results found by Pinto and Zuckerman (2017b) for monolinguals are comparable to the results found for Dutch-English bilingual children in this study. The Dutch-English bilingual children also generally preferred the p-pronoun to refer back to the topic even though Van Kampen (2010) argued that the p-pronoun is discourse neutral and could, therefore, refer back to both the topic and the focus of the previous sentence.

Secondly, hypotheses were drafted for the acquisition of the d-pronoun with regards to the effect of bilingualism, age and language dominance. With regards to the effect of bilingualism, it was expected that the bilingual group would develop the reference assignment less accurately than the monolingual group, meaning that they would not show the same amount of growth over time as the monolinguals. The results revealed that this effect was present for the bilingual participants. For the younger age group, the monolinguals and bilinguals had the same amount of difficulty with the correct reference assignment and thus in this age range, the effect of bilingualism is not yet present. In this age group, both the monolingual and the bilingual group have a very limited grasp of the discourse-tracking rules, which was expected based on the findings by Pinto & Zuckerman (2017b). However, the older aged bilingual participants showed to have significantly less grasp of the discourse-tracking rules for the Dutch subject pronouns than the monolingual participants of the same

age. The bilingual children showed to have significantly grown less in their grasp of the discourse-tracking rules compared to the monolingual children. The finding that the older bilingual children portray to have less grasp of the reference assignment of subject pronouns in Dutch than the monolingual children could be due to, as hypothesised, the processing difficulties (e.g. Serratrice, Sorace & Paoli, 2004; Sorace & Serratrice, 2009) which bilingual children potentially experience more than monolingual children. Furthermore, it has to be taken into consideration that the phenomenon tested in this study is relatively scarce and therefore might require a lot of input to acquire. It could be argued that bilingual children hear this phenomenon less often than monolingual children since their Dutch input competes with their English input.

With regards to the effect of age, it was expected that the bilingual group as a whole would improve their grasp of the discourse-tracking rules but to a lesser extent than the monolingual group. The results revealed that the Dutch-English bilingual children did indeed improve their performance of the reference assignment. As hypothesised, the bilingual children did not improve as quickly as the monolingual children. In the older age group, the monolingual children had a better grasp of the discourse-tracking rules for the Dutch subject pronouns than the bilingual children. This section will also discuss the results with regards to the effect of age for the Dutch dominant and the English dominant children. It was expected that the Dutch dominant bilinguals would improve with age similarly to how the Dutch monolinguals improve with age, but with a slight delay. For the English dominant bilinguals, limited to no improvement was expected with age. The results revealed that in the younger age group, Dutch dominant bilinguals start at a similar level as the Dutch monolingual children. As established by Pinto and Zuckerman (2017b) for the monolingual children, the Dutch dominant bilinguals also have difficulty interpreting the antecedent of the d-pronoun when they are young and interpret it as referring back to the subject. The data revealed that

both groups portray a significant growth in their preference for the antecedent of the d-pronoun towards that of adult-like preference when they are older. However, the Dutch dominant bilinguals did not improve as much as the Dutch monolinguals. The results from the English dominant bilinguals showed that they began with a similar knowledge of the discourse-tracking rules as the Dutch dominant bilinguals and the Dutch monolinguals. However, the English dominant bilinguals did not significantly change their preference for the reference assignment of the d-pronoun with age. They preferred *die* to refer back to the subject of the previous sentence the same amount in both age groups and thus did not improve their grasp of the discourse-tracking rules preferred by Dutch native adults. This finding is in line with what was hypothesised.

Finally, this section will discuss the last sub-question regarding the effect of crosslinguistic influence based on Dutch or English language dominance on the acquisition of reference assignment of the Dutch d-pronoun. This final sub-question will then also lead to the discussion of the main research question. Due to contradicting findings in research, different possible results with regards to the effect of language dominance were considered. These expectations ranged from no effect of language dominance (Hulk & Müller, 2000) to a full effect of language dominance on crosslinguistic influence under the assumption of the Language Dominance Hypothesis (Yip & Matthews, 2007). The effect of language dominance would be most convincingly confirmed if the Dutch dominant bilinguals showed a better grasp of the discourse-tracking rules than the English dominant bilinguals. The results revealed that there was a very limited difference between the preferred reference assignment of the Dutch dominant bilinguals and the English dominant bilinguals. The Dutch dominant bilinguals did not score significantly better than the English dominant bilinguals in the younger nor in the older age group and thus did not have a better grasp of the discourse-tracking rules for the d-pronoun. However, as discussed in the section above, the English

dominant bilinguals did not improve on their preference of discourse-tracking from the younger to the older age group. The interpretation of the d-pronoun *die* remained steered towards referring back to the subject of the previous sentence as opposed to the object. The Dutch dominant bilinguals did significantly improve on their reference assignment preference towards a more adult native speaker preference. Furthermore, the Dutch dominant bilinguals were generally quicker in deciding to what both pronouns referred back to. But since Dutch dominant bilinguals were quicker for both subject pronouns, it is more difficult to argue that this quicker reaction time could be an indication that they have less difficulty deciding what the referent is since they do not experience the crosslinguistic influence like the English dominant bilinguals do. Especially since for the p-pronoun *ze* no crosslinguistic influence was expected and the Dutch dominant bilinguals were also faster on these sentences. It could be that the Dutch dominant bilinguals were more confident in their knowledge of Dutch and were, therefore, quicker in their decisions. In spite of these minor aspects which potentially point towards the influence of language dominance, the results revealed that there is no convincing effect of crosslinguistic influence based on language dominance on the acquisition of Dutch subject pronouns.

The findings above lead to the discussion of the main research question and its implications. The results have revealed that language dominance does not significantly influence the acquisition of the Dutch subject pronouns by Dutch dominant or English dominant bilinguals. For this specific phenomenon, it is not the case that the direction of the crosslinguistic influence is from the dominant language onto the non-dominant language, as proposed by the Language Dominance Hypothesis (Yip & Matthews, 2007). The English dominant bilinguals portrayed to have the same amount of grasp of the discourse-tracking rules as the Dutch dominant bilinguals. Based on the responses of the Dutch-English bilingual children, it was not possible to discern that the comprehension of the references assignment

rules of the Dutch subject pronouns of the English dominant bilinguals was influenced by the English counterpart of the phenomenon whilst the comprehension of the Dutch dominant bilinguals was not. These findings do not mean that the effect of language dominance on crosslinguistic influence is completely ruled out. Yip and Matthews (2007) stated that it has to be investigated for which domains language dominance plays a role in language acquisition. This study revealed that for this particular domain, Dutch subject pronouns, other factors more convincingly influence the difference in preference of interpretation between Dutch monolinguals and Dutch-English bilinguals. The results revealed an effect for bilingualism and age when compared to monolinguals of the same age but not an effect of language dominance. Since the findings of this study do not support the effect of language dominance on the acquisition of this phenomenon, the challenge that arises is to tease apart which factors do contribute to the general delay that is established for bilingual children on this phenomenon.

The first option that could explain the difference found between the scores of the monolingual and the bilingual children is an effect of crosslinguistic influence not based on language-external properties (such as language dominance) but on language-internal aspects, potentially in combination with a slight influence of language dominance. Kupisch (2007) did not argue that language dominance is completely ruled out, as Hulk and Müller (2000) did, but she does argue that language-internal aspects also play a role in crosslinguistic influence. The findings could point towards the theory put forward by Müller and Hulk (2001), which argues that bilingual children analyse the structure in both languages for structural complexity and choose the option which is least complex. It could be that both the Dutch and the English dominant bilinguals choose the English counterpart of the Dutch subject pronouns since it is less structurally complex and this structure influences the way the bilingual children

comprehend the two structures in Dutch. However, with the data gathered in this study, it is not possible to confirm this possibility.

It also needs to be considered that even though the phenomenon of subject pronouns (especially the d-pronoun) is considered to be vulnerable to crosslinguistic influence since it finds itself on the syntax-pragmatics interface, it could be other factors than crosslinguistic influence that influence the delay in bilingual children. The delay could be explained by the fact that the bilingual children receive too little input of this particular phenomenon in order to acquire it at the same rate as monolingual children. The monolingual children also acquire this phenomenon over time and at the age of twelve they still do not perform the same as adults. This slow acquisition process could be explained by the fact that they gradually receive more exposure to the structure and through this input acquire the difference in reference assignment. This combined with the difficulty children have with incorporating information from different sources (i.e. syntax and pragmatics) as proposed by amongst others Serratrice et al (2004) might explain the lengthy acquisition process. In order to acquire the discourse-tracking rules, it is necessary to combine different sources of information. These factors could also play a role for bilingual children acquiring the phenomenon but in a more severe manner given that they receive input from two languages that they need to keep separate. This study only studied the preference of children up to the age of twelve and therefore it not possible to predict how the bilingual children develop their reference assignment preference when they grow older. These proposed factors for the delay in bilingual children can only be speculated about and future research will be needed to tease apart these contributors.

## **8. Conclusion**

This study investigated the effect of language dominance on the acquisition of reference assignment of Dutch subject pronouns by Dutch-English bilingual children between the ages

of four and twelve. The phenomenon of Dutch subject pronouns was considered sensitive to crosslinguistic influence and therefore the role of language dominance in the process of crosslinguistic influence was of interest. Language dominance was determined by the amount of exposure to both languages. This study focused on three aspects in order to answer whether language dominance played a role in the acquisition process towards comprehending the discourse-tracking rules, namely the effect of bilingualism, the effect of age and the effect of language dominance. The study revealed that effects of bilingualism and age were certainly present amongst the Dutch-English bilingual participants when compared to monolinguals and when compared between age groups. The Dutch-English bilingual participants portrayed to have significantly less grasp of the discourse-tracking rules for reference assignment than the monolingual participants. However, similar to how the monolingual children improved with age, so did the bilingual children. Most importantly, the study revealed that the effect of language dominance on the acquisition of reference assignment of Dutch subject-pronouns was not convincingly present. In the event that language dominance was present, it was expected that the Dutch dominant bilinguals would outperform the English dominant bilinguals, based on the Language Dominance Hypothesis (Yip & Matthews, 2007). The Dutch dominant bilinguals did not score significantly better than the English dominant bilinguals.

Future research into this phenomenon could investigate the reference assignment preference of adult Dutch-English bilinguals. This will reveal to what extent it can be expected that Dutch-English bilingual children do eventually acquire the same reference assignment preference as the Dutch monolingual children. In this respect, it would also be interesting to investigate how often Dutch subject pronouns occur in the input of bilingual children for different ages to determine whether the delay can be (partly) ascribed to lack of input of the Dutch d-pronoun. Furthermore, it would also be fascinating to study whether the

results would be different if the test items were controlled for different aspects, such as the prosodic properties of the subject pronouns. This research did not specifically control for emphasis on the d-pronoun. It could be interesting to investigate the outcome of bilinguals when the test items are controlled for emphasis given that this is one of the factors determining discourse-tracking in English, as argued by Van Kampen (2010). It could be Dutch-English bilingual children use prosodic properties such as stress as a cue for discourse-tracking more than they use the actual form they hear due to the importance this has in English.

Besides further research into this specific phenomenon, it still also remains of paramount importance to investigate other phenomena in other language combinations to gain more conclusive ideas and theories on the effects of language dominance on crosslinguistic influence. The fact that language dominance did not affect the acquisition of Dutch subject pronouns does not mean that the effects of language dominance should be completely disregarded and might even push for more research in this area of linguistics.

After having discussed the possibilities for future research, it is deemed necessary to finish with a discussion of the operationalisation of language dominance in this study. The aim was to be as considerate and transparent as possible when it came to determining language dominance. As a result, it became clear that it is more accurate to use a parental questionnaire (as proposed by Unsworth, 2015) to determine in which language the children receive more exposure than it is to solely go by the majority language of the environment (e.g. Schlyther, 1993). However, this study is not trying to put forward that the chosen method does not have its shortcomings in determining language dominance nor is it attempting to argue that only experience-based measures can be used. One source of weakness in this study which could have affected the measurements of language dominance was the lack of differentiation between the importance of the types of exposure which were questioned in the



parental questionnaire. The study did not take into account the possibility that some types of exposure may contribute more to improving relative proficiency in a language than other types of exposure. Furthermore, the difference in hours of exposure that was set to determine in which language dominance group the participants belonged can, as of yet, not be proven to be the correct amount of difference. Further research would have to prove whether this was a validly chosen difference. These uncertainties could potentially have been avoided if it was possible to use the questionnaire by Unsworth (2012) since this questionnaire is supported by a specially designed algorithm to determine language dominance. As much as it is important to investigate the role of language dominance in crosslinguistic influence, it is just as important to establish the best ways to determine language dominance.

## References

- Argyri, E., & Sorace, A. (2007). Crosslinguistic influence and language dominance in older bilingual children. *Bilingualism: Language and Cognition*, 10(1), 79-99. doi:10.1017/S1366728906002835
- Comrie, B. (1997). Pragmatic binding: Demonstratives as anaphors in Dutch. *Annual Meeting of the Berkeley Linguistics Society*, 23(1), 50-61. doi:10.3765/bls.v 23i1.1281
- Cook, V.J. (1995). Multi-competence and the learning of many languages. *Language, Culture and Curriculum*, 8(2), 93-98. doi:10.1080/07908319509525193
- Foroodi-Nejad, F., & Paradis, J. (2009). Crosslinguistic transfer in the acquisition of compound nouns in Persian-English bilinguals. *Bilingualism: Language and Cognition*, 12(4), 411–42. doi:10.1017/S1366728909990241
- Genesee, F., Paradis, J., & Crago, M. (2004). *Dual language development and disorders: A handbook on bilingualism and second language learning*. Baltimore, MD: Brookes.
- Grosjean, F. (1982). *Life with two languages: An introduction to bilingualism*. Cambridge, MA: Harvard University Press.
- Grosjean, F. (1998). Studying bilinguals: Methodological and conceptual issues. *Bilingualism: Language and Cognition*, 1(2), 131-149. doi:10.1017/S136672899800025X
- Grosjean, F. (2010). *Bilingual: Life and reality*. Boston, MA: Harvard University Press.
- Hacohen, A., & Schaeffer, J. (2007). Subject realization in early Hebrew/English bilingual acquisition: The role of crosslinguistic influence. *Bilingualism: Language and Cognition*, 10(3), 333-344. doi:10.1017/S1366728907003100
- Hulk, A., & Müller, N. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition*, 3(3), 227–244. doi:10.1017/S1366728900000353

- Jarvis, S., & Pavlenko, A. (2008). *Crosslinguistic influence in language and cognition*. New York, NY: Routledge.
- Kupisch, T. (2007). Determiners in bilingual German–Italian children: What they tell us about the relation between language influence and language dominance. *Bilingualism: Language and Cognition*, 10(1), 57-78. doi:10.1017/S1366728906002823
- Mikkelsen, L. (2005). *Subject choice in copular clauses*. Unpublished manuscript, Department of Linguistics, University of California, Berkeley, California, United States of America.
- Müller, N. & Hulk, A. (2001). Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Bilingualism: Language and Cognition*, 4(1), 1–21. doi:10.1017/S1366728901000116
- Paradis, J., & Genesee, F. (1996). Syntactic acquisition in bilingual children: Autonomous or interdependent? *Studies in Second Language Acquisition*, 18(1), 1-25. doi: 10.1017/S0272263100014662
- Pinto, M., & Zuckerman, S. (2017a). Coloring Book: A new method for testing language comprehension. Retrieved from authors.
- Pinto, M., & Zuckerman, S. (2017b). Color your first intuition: A study on antecedent selection using the Coloring Book method [Presentation slides]. Retrieved from authors.
- 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), 183–205. doi:10.1017/S1366728904001610
- Schlyter, S. (1993). The weaker language in bilingual Swedish– French children. In K. Hyltenstam & Å. Viberg (Eds.), *Progression and regression in language:*

- Sociocultural, neuropsychological and linguistic perspectives* (pp. 289–308).  
Cambridge, England: Cambridge University Press.
- Sorace, A., & Serratrice, L. (2009). Internal and external interfaces in bilingual language development: Beyond structural overlap. *International Journal of Bilingualism*, 13(2), 195–210. doi:10.1177/1367006909339810
- Unsworth, S. (2012). Assessing the role of current and cumulative exposure in simultaneous bilingual acquisition: The case of Dutch gender. *Bilingualism: Language and Cognition*, 16(1), 86-110. doi:10.1017/S1366728912000284
- Unsworth, S. (2013). Current issues in multilingual first language acquisition. *Annual Review of Applied Linguistics*, 33, 21-50. doi:10.1017/S0267190513000044
- Unsworth, S. (2015). Amount of exposure as a proxy for dominance in bilingual language acquisition. In C. Silva-Corvalán & J. Treffers-Daller (Eds.), *Language dominance in bilinguals: Issues of measurement and operationalization* (pp. 156-173). New York, NY: Cambridge University Press.
- Van Kampen, J. (2010). Anaforische middelen voor topicverschuiving. *Nederlandse Taalkunde*, 15(2), 189-209. Retrieved from [www.ingentaconnect.com](http://www.ingentaconnect.com)
- Yip, V., & Matthews, S. (2000). Syntactic transfer in a Cantonese–English bilingual child. *Bilingualism: Language and Cognition*, 3(3), 193-208. Retrieved from <https://pdfs.semanticscholar.org>
- Yip, V., & Matthews, S. (2007). *The bilingual child: Early development and language contact*. New York, NY: Cambridge University Press.

**Appendix A: Overview of background information per participant**

ID	Age	Country of birth	Country of residence	Siblings	Mother tongue		Speaking skill <sup>1</sup>		Comprehension skill <sup>2</sup>		Dominance (exposure)
					Mother	Father	English	Dutch	English	Dutch	
20844	9;7	Netherlands	Netherlands	Yes	English	Dutch	4	5	5	5	Dutch
20845	6;6	Netherlands	Netherlands	Yes	English	Dutch	4	5	5	5	Dutch
20862	10;9	England	England	Yes	English	Dutch	5	4	5	4	English
20863	10;2	Netherlands	England	Yes	Dutch	Dutch	4	5	4	5	Dutch
20864	8;9	England	England	Yes	Dutch	English	5	5	5	5	English
20865	8;8	England	England	Yes	English	Dutch	5	4	5	4	English
20866	5;5	England	England	Yes	Dutch	Dutch	4-5	5	4-5	5	Dutch
20867	5;5	England	England	Yes	Dutch	Dutch	4-5	5	4-5	5	Dutch
20868	9;7	Netherlands	England	Yes	Dutch	Dutch	3	5	3	5	Dutch
20869	9;5	Netherlands	England	Yes	Dutch	Dutch	4-5	5	4-5	4-5	Dutch
20870	9;8	Netherlands	England	Yes	Dutch	Dutch	4	5	4	5	Dutch
20871	6;4	Netherlands	England	Yes	Dutch	Dutch	4	5	4	5	Dutch
20872	9;8	Netherlands	England	Yes	Dutch	Dutch	5	5	5	5	Dutch
20873	7;2	Netherlands	England	Yes	Dutch	Dutch	5	5	5	5	Dutch
20874	7;8	Netherlands	England	Yes	Dutch	Dutch	5	5	5	5	Dutch
20875	8;0	Netherlands	England	Yes	Dutch	Dutch	4	5	4	5	Dutch
20876	7;8	Netherlands	England	Yes	Dutch	Dutch	5	5	5	5	Dutch
20877	6;0	Netherlands	England	Yes	Dutch	Dutch	3	5	3	5	Dutch
20878	5;6	England	England	Yes	English	Dutch	5	3	5	3	English
20879	6;7	England	England	Yes	Dutch	English	5	5	5	5	English
20880	6;4	Netherlands	England	Yes	Dutch	Dutch	4	5	4	5	Dutch
20881	5;3	USA	England	Yes	Dutch	Dutch	3	5	3	5	Dutch
20882	8;1	Brazil	England	Yes	Portuguese	Dutch	4	3	4	4	Excluded
20885	11;4	Netherlands	England	Yes	Dutch	Dutch	5	5	5	5	Dutch
20886	10;9	Brazil	England	Yes	Portuguese	Dutch	3	4	4	4	Excluded

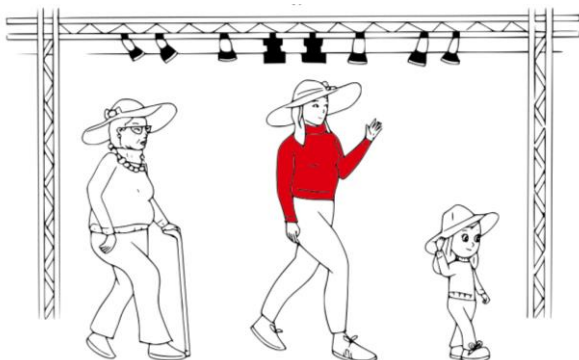
<sup>1</sup>Score given by parent based on scale from 0-5; 0 corresponding to 'having virtually no fluency' and 5 corresponding to 'native fluency'

<sup>2</sup>Scores given by parent based on scale from 0-5; 0 corresponding to 'almost no understanding' and 5 corresponding to 'native understanding'

20887	9;5	Netherlands	England	Yes	Dutch	Dutch	5	5	5	5	Dutch
20888	5;1	Netherlands	England	Yes	Finnish	Dutch	4	4	4	4	Excluded
20889	6;6	Netherlands	England	Yes	Finnish	Dutch	4	4	4	4	Excluded
20894	4;4	England	Netherlands	Yes	Dutch	English	5	3	5	3	English
20895	6;8	Netherlands	Netherlands	Yes	English	Dutch	5	5	5	5	Excluded
20896	7;6	Netherlands	Netherlands	Yes	Dutch	English	4	5	4-5	5	Dutch
20897	5;11	Netherlands	Netherlands	Yes	Dutch	Dutch	3	5	4	5	Dutch
20898	7;6	Netherlands	Netherlands	Yes	English	English	5	4	5	4	English
20899	5;7	Netherlands	Netherlands	Yes	English	English	5	4	5	4	English
20900	9;3	USA	Netherlands	Yes	Dutch	English	5	5	5	5	English
20901	10;7	England	Netherlands	Yes	Dutch	English	5	5	5	5	Excluded
20902	11;11	England	Netherlands	Yes	Dutch	English	5	5	5	5	Excluded
20904	4;0	Netherlands	Netherlands	No	English	Dutch	5	5	5	5	English
20905	6;2	England	England	Yes	English	Dutch	5	3	5	4	English
20906	7;8	Ireland	Ireland	Yes	Dutch	Dutch	5	5	5	5	Dutch
20907	5;3	Ireland	Ireland	Yes	Dutch	Dutch	5	5	5	5	Dutch
20908	12;0	Netherlands	Ireland	Yes	Dutch	Dutch	3-4	4-5	4-5	4-5	Dutch
20910	7;1	Netherlands	Netherlands	Yes	English	English	5	5	5	5	Excluded
20911	9;8	Netherlands	Netherlands	Yes	English	English	4	5	4	5	Excluded
20912	5;9	Netherlands	Netherlands	No	English	Dutch	5	5	5	5	Excluded
20913	7;10	America	Netherlands	Yes	English	Dutch	5	1	5	1	English
20914	10;0	USA	Netherlands	Yes	English	Dutch	5	1	5	1	English
20915	8;11	Netherlands	Netherlands	No	English	Dutch	3	5	4	5	Dutch
20916	6;11	USA	Netherlands	No	English	English	5	5	5	4	English
20917	8;10	United Arab Emirates	Netherlands	Yes	Dutch	English	5	3	5	5	English
20918	6;6	Turkey	Netherlands	Yes	Dutch	English	5	4	5	5	English

## Appendix B: Test item colouring pages used in the game

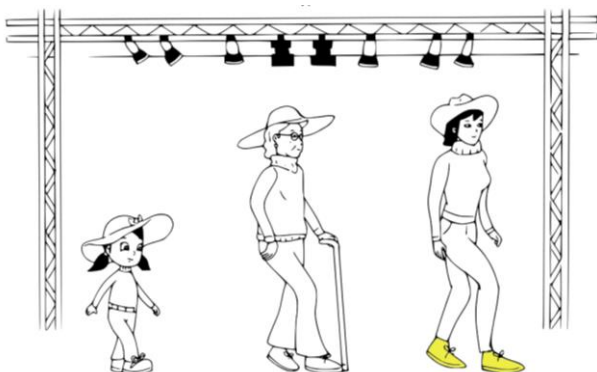
### Test item 1



*De moeder loopt voor de oma.*  
 “The mother is walking in front of the grandmother.”

*Ze draagt een rode trui*  
 “She is wearing a red jumper.”

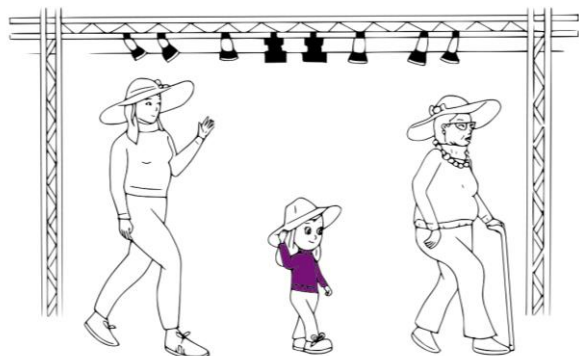
### Test item 2



*De oma loopt achter de moeder.*  
 “The grandmother is walking behind the mother.”

*Die draagt gele schoenen*  
 “She is wearing yellow shoes.”

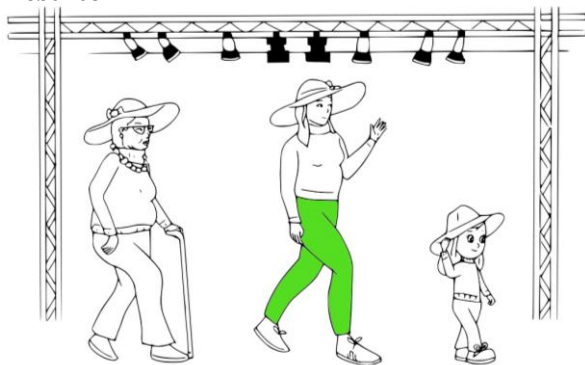
### Test item 3



*Het meisje loopt voor de moeder.*  
 “The girl is walking in front of the mother.”

*Ze draagt een paart trui.*  
 “She is wearing a purple jumper.”

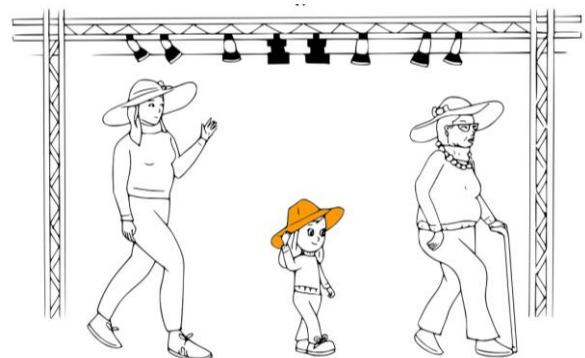
## Test item 4



*De moeder loopt achter het meisje.*  
 “The mother is walking behind the girl.”

*Ze draag een groene broek.*  
 “She is wearing green trousers.”

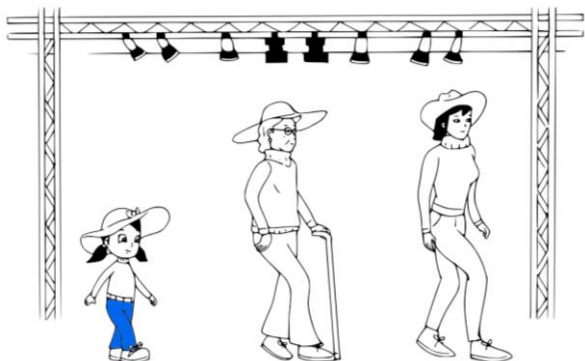
## Test item 5



*De oma loopt voor het meisje.*  
 “The grandmother is walking in front of the girl.”

*Die draagt een oranje hoed.*  
 “She is wearing an orange hat.”

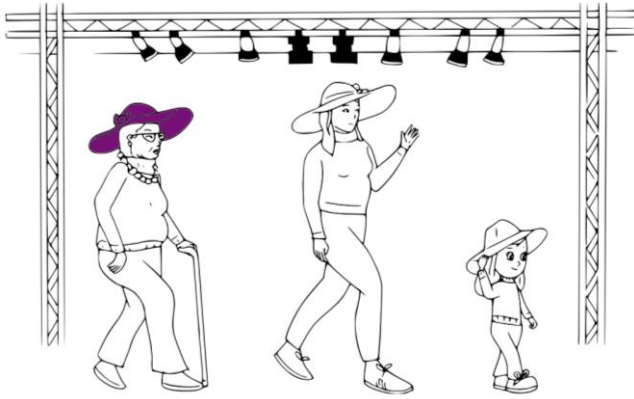
## Test item 6



*Het meisje loopt achter de oma.*  
 “The girl is walking behind the grandmother.”

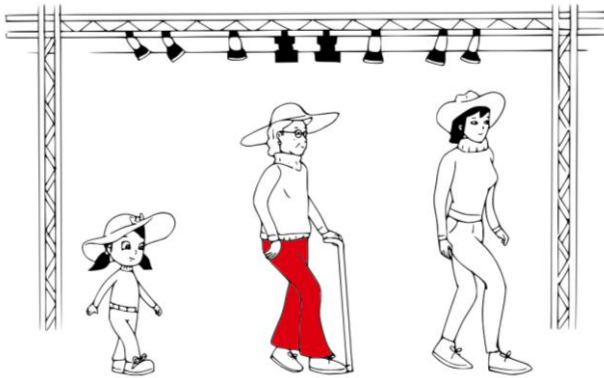
*Ze draagt een blauwe broek.*  
 “She is wearing blue trousers.”



**Test item 7**

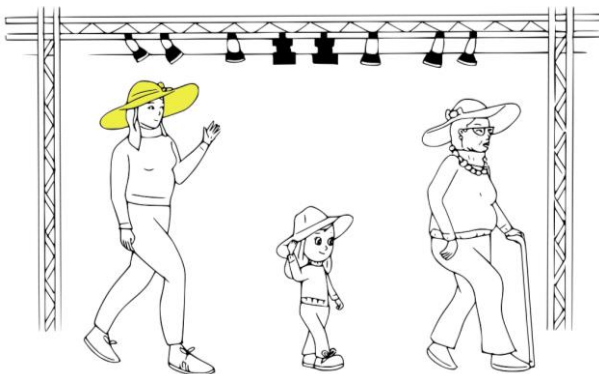
*De moeder loopt voor de oma.*  
 “The mother is walking in front of the grandmother.”

*Die draagt een paarse hoed.*  
 “She is wearing a purple hat”

**Test item 8**

*De oma loopt achter de moeder.*  
 “The grandmother is walking behind the mother.”

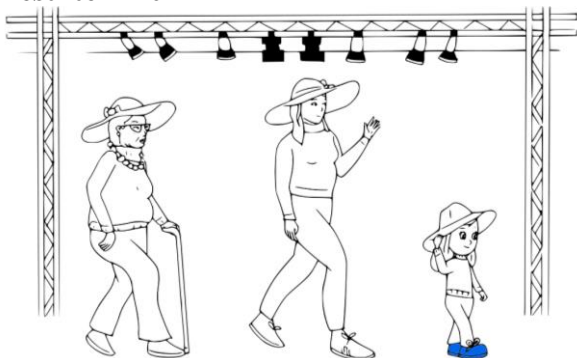
*Ze draagt een rode broek.*  
 “She is wearing red trousers.”

**Test item 9**

*Het meisje loopt voor de moeder.*  
 “The girl is walking in front of the mother.”

*Die draagt een gele hoed.*  
 “She is wearing a yellow hat.”

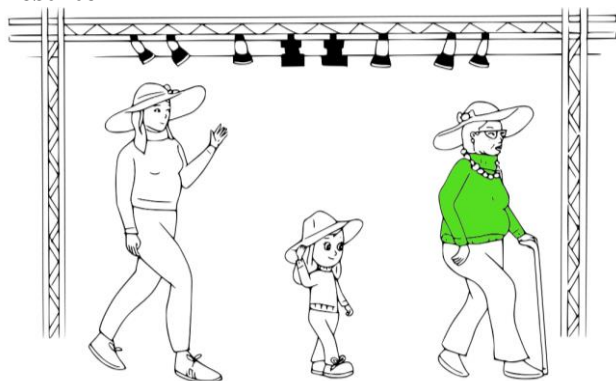
## Test item 10



*De moeder achter het meisje.*  
 “The mother is walking behind the girl.”

*Die draagt blauwe schoenen.*  
 “She is wearing blue shoes.”

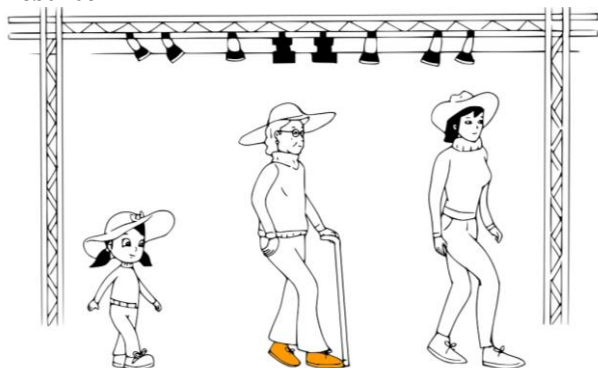
## Test item 11



*De oma loopt voor het meisje.*  
 “The grandmother is walking in front of the girl.”

*Ze draagt een groene trui.*  
 “She is wearing a green jumper”

## Test item 12



*Het meisje loopt achter de oma.*  
 “The girl is walking behind the grandmother.”

*Die draagt oranje schoenen.*  
 “She is wearing orange shoes.”

## Appendix C: Parental questionnaire

### Questionnaire for parents: language dominance

\*Vereist

#### Permission for participation of your child

1. By choosing the option 'yes' you are giving official permission for the participation of your child in this language research project and the use of the collected data for scientific research.

Yes

No

2. Please enter the name of your child (first- and surname) below

---

3. Please enter the date of birth of your child below

---

4. Please enter which group in school your child attends

Groep 1

Groep 2

Groep 3

Groep 4

Groep 5

Groep 6

Groep 7

Groep 8

#### Consent for the questionnaire

5. By choosing the option 'yes' below, you agree to fill in the questionnaire and you give official consent for the use of the collected data for scientific research.

Yes

No

6. Please enter your name below \*

---

## Background information

The next sections of questions belong to the official questionnaire. Please answer the questions as precise as possible.

7. In which country was your child born?

---

8. How old was your child when you came to live in the Netherlands/England? (estimate age or enter 'from birth')

---

9. Does your child have any sisters or brothers? \*

Yes

No

10. If answer to the previous question was 'yes', enter the names and ages of the siblings. If your answer was 'no' you can leave this question open.

---



---



---



---



---

## Child's exposure to and use of Dutch and English

11. How did your child first come into contact with English and Dutch? (pick max. of 3 options)

	English	Dutch
Mother	<input type="checkbox"/>	<input type="checkbox"/>
Father	<input type="checkbox"/>	<input type="checkbox"/>
Both parents	<input type="checkbox"/>	<input type="checkbox"/>
Siblings	<input type="checkbox"/>	<input type="checkbox"/>
Grandparents	<input type="checkbox"/>	<input type="checkbox"/>
Nursery / day-care	<input type="checkbox"/>	<input type="checkbox"/>
School	<input type="checkbox"/>	<input type="checkbox"/>
Language of surrounding (not at school/ at home)	<input type="checkbox"/>	<input type="checkbox"/>

12. At what age did your child start receiving consistent and significant exposure to English and Dutch?

English

---

Dutch \*

---

14. How well does your child speak English and Dutch? (based on peers of the same age)

	English	Dutch
Virtually no fluency	<input type="checkbox"/>	<input type="checkbox"/>
Limited fluency	<input type="checkbox"/>	<input type="checkbox"/>
Somewhat fluent	<input type="checkbox"/>	<input type="checkbox"/>
Quite fluent	<input type="checkbox"/>	<input type="checkbox"/>
Very fluent	<input type="checkbox"/>	<input type="checkbox"/>
Native fluency	<input type="checkbox"/>	<input type="checkbox"/>

15. How well does your child understand English and Dutch? (based on peers of the same age)

	English	Dutch
Almost no understanding	<input type="checkbox"/>	<input type="checkbox"/>
Limited understanding	<input type="checkbox"/>	<input type="checkbox"/>
Some understanding	<input type="checkbox"/>	<input type="checkbox"/>
Good understanding	<input type="checkbox"/>	<input type="checkbox"/>
Excellent understanding	<input type="checkbox"/>	<input type="checkbox"/>
Native understanding	<input type="checkbox"/>	<input type="checkbox"/>

### Languages in the home environment

For each of the following people, rate the amount of time (in percentage) that this person speaks English or Dutch to your child. This may mean that you speak English to your child 75% of the time and Dutch 25% of the time. Please make sure the total percentage per person is 100%. If one or more of the proposed persons does not have daily contact with your child, you can opt for the option 'not applicable' (n.a.). In addition, enter the native language(s) of the people with daily contact.

#### Mother/ Guardian 1

16.

n.a. 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Percentage English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Percentage Dutch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Native language(s) of mother/guardian 1

---

#### Father / Guardian 2

18.

n.a. 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Percentage English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Percentage Dutch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Native language(s) of father/guardian 2

---











## Other sources of language exposure

Estimate the amount of time in hours that your child spends on the following activities in a week for both English and Dutch.

47. Sports/clubs in English (in hours per week)

---

48. Sports/clubs in Dutch (in hours per week)

---

49. Contact with friends in English (in hours per week)

---

50. Contact with friends in Dutch (in hours per week)

---

51. Watching English television (in hours per week)

---

52. Watching Dutch television (in hours per week)

---

53. Reading/being read to in English (in hours per week)

---

54. Reading/being read to in Dutch (in hours per week)

---

55. Use of tablet/computer in English (in hours per week)

---

56. Use of tablet/computer in Dutch (in hours per week)

---

## End of the questionnaire

Thank you for completing the questionnaire. The data we collect from this will be treated confidentially. Personal details will not be mentioned, neither during the study nor in any publication of the results of this study.

57. Do you have any comments about your current language situation or that of your child that you may consider important, please leave them here

---



---



---



---



---

**Appendix D:** Individual mean scores for *ze* sentences and *die* sentences

ID	Score <i>ze</i> sentences <sup>3</sup>		Score <i>die</i> sentences <sup>4</sup>	
	Number correct	% correct	Number correct	% correct
20844	6	100	2	33
20845	6	100	1	17
20862	6	100	0	0
20863	5	83	4	67
20864	6	100	3	50
20865	6	100	0	0
20866	6	100	0	0
20867	4	67	0	0
20868	6	100	0	0
20869	2	33	6	100
20870	6	100	0	0
20871	5	83	1	17
20872	5	83	0	0
20873	6	100	2	33
20874	5	83	1	17
20875	6	100	1	17
20876	6	100	0	0
20877	6	100	0	0
20878	6	100	0	0
20879	6	100	2	33
20880	6	100	1	17
20881	6	100	1	17
20882	6	100	4	67
20885	6	100	2	33
20886	6	100	0	0
20887	6	100	1	17
20888	4	67	2	33
20889	6	100	0	0
20894	5	83	1	17
20895	6	100	0	0
20896	6	100	0	0
20897	6	100	0	0
20898	6	100	1	17
20899	5	83	1	17
20900	6	100	0	0
20901	6	100	0	0
20902	6	100	5	83
20904	6	100	1	17
20905	6	100	1	17
20906	6	100	1	17
20907	6	100	3	50

<sup>3</sup>Number of correct reference assignments out of 6 items<sup>4</sup>Number of correct reference assignments out of 6 items

20908	6	100	2	33
20910	6	100	0	0
20911	6	100	0	0
20912	5	83	1	17
20913	6	100	0	0
20914	6	100	0	0
20915	6	100	0	0
20916	6	100	1	17
20917	6	100	5	83
20918	6	100	0	0