Effects of non-native input on bilingual preschoolers' Dutch language proficiency

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Table of Contents

1. Introduction

In a world that is becoming more and more bilingual – by estimation, half of the people in the world speak more than one language on a daily basis (Grosjean, 2010) – it is important to establish which factors determine the success or failure of bilingual children's language development. Such factors may include child-internal factors such as age of onset, chronological age and cognitive capacities, and child-external factors, such as parental strategy, the status of and linguistic distance between each of the languages learned, the family's socio-economic status and quantity and quality of the input. While many of the aforementioned factors have already been studied extensively, input quality has only recently become a focus of attention (e.g. Chondrogianni and Marinis, 2011; Paradis, 2011). Qualitative factors that have been found to influence bilingual first language (2L1) and/or child second language (L2) acquisition include richness of the language input (i.e. whether, and if so, how often, children engage in language and literacy related activities such as singing and being read to), parental proficiency level and the number of different sources that provide input to the child (Chondrogianni and Marinis, 2011; Paradis, 2011; Place and Hoff, 2011; Scheele et al., 2010).

A specific aspect of input quality that has received only a limited amount of attention so far is non-native input. Yet, non-native input is a very relevant factor to study, as many parents in bilingual families, especially immigrants, find themselves in a situation where they want to boost their children's proficiency in the majority language as much and as soon as possible, in order to enable their children to achieve academic success, even if that means providing input in a language which is not their native language (see e.g. Paradis 2011 for a discussion). However, as is pointed out by Paradis (2011), receiving non-native input is not necessarily beneficial for the children's acquisition of the majority language.[1] In fact, it has been found that the mother's proficiency level in the majority language affects several domains of the child's language development (Chondrogianni and Marinis, 2011). Furthermore, Place and Hoff (2011) have also indicated that the proportion of input that comes from native speakers is of influence on children's vocabulary development in the majority language (see Unsworth 2012, however, for a different result). These early findings suggest that non-native input indeed plays a role in 2L1 and child L2 acquisition, and emphasise that more research is needed to further investigate its effects.

The present study adds to the existing literature by investigating the effects of non-native input on bilingual preschoolers' Dutch language proficiency. Children from immigrants and expats in the Netherlands are a very suitable group to study, as there has been an ongoing debate in this country

[1] Moreover, the extra exposure to the majority language at home may come at the expense of the acquisition and maintenance of the minority language (Paradis, 2011).

on whether parents who learned Dutch as a second language should speak Dutch at home or not. Not only researchers have been involved in this debate, but also policy makers and educational professionals. The debate has resulted in conflicting advice being given to parents, with the Dutch government advocating speaking Dutch as much as possible to reduce the risks of the children encountering problems at school and to secure a smooth integration into the Dutch society, and language professionals emphasising the importance of maintaining the minority language and pointing out the possible harms of receiving exposure from non-proficient speakers. Obviously, more evidence about the effects of non-native input on bilingual children's Dutch language proficiency is needed in order to find a solution for this debate and to make sure that parents receive solid and unambiguous advice in the future.

The present study aims to shed more light on the effects of non-native input on bilingual preschoolers' Dutch language proficiency, thereby not only seeking to discover more about the underlying mechanisms of bilingual language acquisition, but also to add to the debate on whether immigrant families in the Netherlands should speak Dutch at home or not.

This study is set up as follows. In Chapter 2 the existent literature on input quality and in particular non-native input, which serves as a basis of the present study, will be discussed. The second chapter also provides an overview of the literature on the acquisition of the definiteness distinction, which is one of the domains on which the participants in the present study will be tested. At the end of the second chapter the research questions and predictions for this study will be presented. Chapter 3 describes the methodology that was used in the current study. This chapter contains a discussion of the participants that were included, the various standardised and non-standardised tests that were used and the procedures that were adopted to obtain the data. The results will be presented in Chapter 4. As we will see, no evidence was found that non-native input directly affects bilingual preschoolers' Dutch language proficiency, although we did find some indications that non-native input does play a role. These findings will be discussed in the light of recent literature in Chapter 5. Finally, Chapter 6 presents the main conclusions that can be drawn from the present study, as well as its practical implications and its limitations. The chapter ends with some suggestions for future research.

2. Theoretical background

2.1 Introduction

This chapter provides an overview of the literature that serves as a basis for the present study. It will first be explained why it can be useful to compare bilingual and monolingual children (section 2.2). In section 2.3 the effects of qualitative factors on bilingual and child L2 acquisition will be discussed, as well as the relative importance of such factors compared to other child-internal and child-external factors. Section 2.4 focuses on one aspect of quality of input, which is the topic of the present study: non-native input. As we will see, one particular domain of language development that may be affected by non-native input is the acquisition of the definiteness distinction. Therefore, an overview of how monolingual children, child L2 learners and adult L2 learners acquire this distinction is presented in section 2.5. In section 2.6 the relevance of the present study will be explained, followed by the research questions and predictions in section 2.7. A summary of this chapter is provided in section 2.8. Before we move on to section 2.2, it must first be noted that although the present study concerns bilingual first language acquisition, i.e. children whose age of onset of the L2 lies between birth and four years of age (Genesee and Nicoladis, 2007), much of the literature presented in this chapter focuses on child L2 learners, i.e. children whose age of onset of the L2 lies between the ages of four and seven years (Unsworth, 2005).[2] The reader must keep in mind though that research findings for child L2 acquisition cannot automatically be extended to bilingual first language acquisition, as the two groups are not the same in all aspects. For example, child L2 learners are cognitively more mature when they start acquiring their second language, and this may be beneficial to their rate of acquisition. Moreover, there may even be differences in acquisition patterns *within* the group of bilingual first language acquirers, as some of these children are exposed to two languages from birth, whilst others are so-called early child bilinguals, whose age of onset lies between one and four years of age (Unsworth et al., 2010). It is useful to keep this in mind throughout the remaining chapters of this study.

2.2 Comparing monolingual and bilingual children

Rather than providing an overview of the literature on the differences and similarities that have been found between monolingual and bilingual children's language acquisition patterns, the aim of this section is to explain why it is useful to compare these two groups in the first place (see however Genesee and Nicoladis, 2007 for an overview of the differences and similarities between monolingual and bilingual first language acquisition). Although it may be argued that a comparison

[2] In some of the studies discussed in this chapter the age of onset is even later, with twelve years of age being the absolute maximum (Ionin et al. 2009).

between monolingual and bilingual children is always unequal in the sense that bilingual children logically have to divide up their time between their two languages and therefore have less time to acquire each of their languages than their monolingual peers, comparing the two groups of children may still be useful, as the results of such comparisons may tell us something about the underlying processes of language acquisition. More in particular, bilingual language acquisition may differ from monolingual language acquisition in two ways: either bilingual children's developmental paths may diverge from those of monolingual children, or the rate at which the languages are acquired may be altered (or a combination of both). If developmental paths diverge, this tells us that factors that are specific to bilingual language acquisition (e.g. quantity and quality of input, the linguistic distance between the two languages involved, parental strategies, etc.) affect the way in which language is acquired.[3] This may result for example in transfer or code-mixing (see also Genesee and Nicoladis, 2007). If bilingual children's rate of acquisition differs from that of monolingual children, this gives us information mainly about the amount of input that is required within a certain time frame in order to successfully acquire a language. It must be noted though that rate of acquisition can also be altered in a positive sense, especially in child L2 learners, who may benefit from their (relative) cognitive maturity when they start acquiring a second language at a later age during childhood (see Paradis, 2009 for a discussion of this topic). If differences between monolinguals and bilingual children's language acquisition are established, it is of course essential that researchers attempt to pinpoint which factors that are specific to bilingual language acquisition cause such differences. It is important to know though, that it is not intended here that bilingual children should comply with monolingual norms for language acquisition.[4] Although it may sometimes be useful to compare monolingual and bilingual children's linguistic abilities in order to get a rough idea of where these abilities may diverge, it must always be kept in mind that bilinguals are not 'two monolinguals in one person' (Grosjean, 1989: 3) and that bilingualism should therefore be studied in its own merit. Thus, a combination of both approaches will be adopted in this study. The next section provides an overview of recent studies that have investigated the effects of quality of input on bilingual first language and child L2 acquisition.

[3] Note that this does not imply that ultimate attainment is also altered, children with diverging developmental paths may still reach native-like proficiency in that language.

[4] In fact, it would be very useful if bilingual norms existed, however, they are hard to formulate because of the heterogeneity of the bilingual population (see also Place and Hoff, 2011 for a discussion of this topic).

2.3 Effects of qualitative factors on bilingual first language and child L2 acquisition

The linguistic development of bilingual children depends on a variety of child-internal and child-external factors, which together lead to considerable variability in the amount (quantity) and type (quality) of language input bilingual children receive in each of their languages, which in turn leads to individual variability in these children's language outcomes (Unsworth, 2012). Examples of internal factors are age of onset, age at time of testing, and effects of transfer from the L1 to the L2. External factors include amount of exposure (quantity), richness of the input, number of sources providing input and language proficiency of input-providers (quality). Whilst child-internal factors, and in particular age of onset (see Herschensohn, 2007 for an overview), have been studied quite extensively, child-external factors have received less attention. Specifically, quality of input has only recently become a focus in the literature (Scheele et al., 2010; Place and Hoff, 2011). Furthermore, only a few studies have investigated the relative importance of child-internal and child-external factors (Paradis, 2011; Chondrogianni and Marinis, 2011). This section provides an overview of studies related to quality of input, as well as its relative importance compared to other internal and external factors.

Paradis (2011) investigated the effects of child-internal and child-external factors on the acquisition of vocabulary and verbal morphology in 169 child L2 learners of English between the ages of 4;10 and 7;0. The children came from immigrant families and had started acquiring English at around the age of four. Paradis found that the internal factors explained more variance in both children's vocabulary and verbal morphology scores than the external factors. Internal factors that emerged as significant predictors of children's outcomes on vocabulary and verbal morphology were phonological short term memory, non-verbal IQ and age at time of testing. Furthermore, whether the L1 was similar to English in the encoding of verbal morphology was also a significant predictor of children's outcomes on verbal morphology. As for the external factors, the quantitative factor length of exposure and the qualitative factor richness of the English environment were both found to be significant predictors of children's vocabulary and verbal morphology. Richness of the English environment was measured here as the amount of language-related activities, such as playing computer games, watching television, reading books and playing with friends, that took place in English, and how often the child engaged in such activities.

Another study that found that richness of the input influences bilingual children's language development is Scheele et al. (2010). In Scheele et al.'s study, 46 Moroccan-Dutch and 55 Turkish-Dutch 3-year-old bilingual children were tested on their vocabulary skills in both languages. The aim was to discover the effects of home language activities, such as shared book reading, storytelling and

singing, on children's vocabulary. The authors found that home language activities positively affected the children's vocabulary skills in both languages. It must be noted though that, as was the case for the measure for language richness in Paradis' (2011) study, the measure for home language activities was one that combined the *type* of activity with its *frequency* of occurrence. Thus, these qualitative measures also contain quantitative elements. It must therefore be acknowledged that for this type of measure, it is impossible to disentangle the effects of the qualitative elements of such measures from those of the quantitative elements (as is also pointed out by Paradis, 2011: 223). Scheele et al. (2010) furthermore found that effects of socio-economic status (SES), a factor which contains both quantitative and qualitative elements, were fully mediated by the input. It is surprising that no direct effects of SES were found in this study, as this factor has been found to play a role in monolingual language development (Hoff, 2006), as well as language development in child L2 learners (e.g. Bohman et al., 2010; Goldberg et al., 2008), especially in vocabulary.

Place and Hoff (2011) investigated the effects of quantity-oriented and quality-oriented factors on the language development of 29 Spanish-English bilingual two-year-olds. The children's mothers provided information about the children's exposure patterns, vocabulary skills and the grammatical complexity of the children's utterances through diaries and questionnaires. Place and Hoff found that the relative amount of exposure to English was a significant predictor for English vocabulary and grammar, and that the relative amount of exposure to Spanish was a significant predictor for Spanish vocabulary but not for grammar (the measure for grammar showed floor effects for Spanish). As for the qualitative factors, Place and Hoff found that the number of English-only conversational partners and the number of different sources from whom the child received English input were both significant predictors of the children's English vocabulary and grammatical complexity. For Spanish, the children's outcomes were best predicted by amount of exposure only.

Similar to Place and Hoff (2011), Unsworth (2012) also examined the effects of quanitity-oriented and quality-oriented factors on bilingual first language acquisition. In Unsworth's study, participants were 137 children between the ages of three and seventeen years, who had been exposed to both English and Dutch from birth. The children were tested on vocabulary and verbal morphology for English and on vocabulary and the use of the correct grammatical gender for Dutch. Information about the children's exposure patterns was extracted from a parental questionnaire. Unsworth found that quantity-oriented factors explained more variance in the children's outcomes than quality-oriented factors. For the English outcome variables, the proportion of English spoken by the child at home was a significant predictor. For English verbal morphology, age at time of testing (a child-internal variable) was also a significant predictor. Variance in Dutch vocabulary scores could not be explained by any of the predictor variables. For Dutch gender, significant predictors were

cumulative length of exposure to Dutch (see section 3.4.1 for more details on this variable), the proportion of Dutch spoken at daycare/school at the current time and richness of the input. In this study, richness was instantiated as the proportion of exposure to Dutch during extracurricular activities such as reading, watching television, using computers and practising sports. Note that this measure for richness again contains both a quantitative and a qualitative element, as was the case in Paradis' (2011) and Scheele et al.'s (2010) studies.

Thus, in this section we have seen that qualitative factors such as richness of the input, home language activities and the number of different sources providing input, may predict bilingual and L2 children's linguistic abilities, alongside internal and quantity-oriented external factors. The next section addresses the effects of a specific qualitative variable, namely non-native input, on bilingual first language and child L2 acquisition.

2.4 Effects of non-native input on monolingual, bilingual first language and child L2 acquisition

Non-native input is an aspect of quality of input that has received particularly little attention in the literature. Singleton and Newport (1994) and Ross and Newport (1996) were the first to indicate that non-native input may affect language acquisition. Both studies have examined the language development of the same profoundly deaf child, 'Simon', who received non-native input in American Sign Language (ASL) from both of his parents from birth. Simon's parents were also deaf, but had not learned ASL until they were fifteen to sixteen years old. The parents were the only known input providers of ASL to the child. We will mainly report on Ross and Newport's (1996) findings here, as this study covers a larger range of Simon's linguistic development over time. Ross and Newport investigated Simon's acquisition of the morphology of motion verbs between the ages of 2;6 and 9;1 years by means of an elicited production task. Simon's results were compared to those of sixteen deaf, native-signing children. The native-signing children were divided into different age groups in such a way that each group matched one age stage at which Simon had been tested. The children were tested on their use of movement morphemes and the relatively more complex classifier morphemes. Simon's parents had also carried out the elicited production task in Singleton and Newport's study. It was found that about 70% of their movement morphemes was correct, that is, form and meaning were mapped consistently onto each other. The parents' accuracy with classifier morphemes, on the other hand, was only about 45%. As for Simon's results, Ross and Newport found that his acquisition of movement morphemes was in parallel with the native-signing children, steadily increasing in accuracy from 2;6 years onwards. By the age of 9;1, Simon had reached an accuracy of 90%, thus surpassing his parents' input. Simon's acquisition of classifier morphemes, however, was in parallel the native-signing children until the age of 4;6 years, but showed a plateau

from this age onwards, whereas the native-signing children's accuracy continued to increase with age. By the age of 9;1 years, Simon's performance with classifier morphemes was similar to that of his parents. In a general conclusion, Ross and Newport suggest that children who receive non-native input may be able to creolise (i.e. render grammatical) this input under certain conditions, although a combination of factors may sometimes lead to incomplete acquisition. According to Ross and Newport, such factors may include the relative complexity of the target system, the consistency of the input and perhaps also the child's chronological age and cognitive maturation.

One study that has (indirectly) suggested that non-native input may also affect child L2 acquisition, is Chondrogianni and Marinis (2011). Chondrogianni and Marinis investigated the effects of Turkish immigrant parents' self-rated proficiency in English on their children's (L2) English development. Besides father's and mother's self-rated proficiency, various other child-internal and child-external factors were also taken into consideration. The participants in this study were 43 Turkish child L2 learners of English, ranging in age between 6;2 and 9;8 years, and a monolingual English control group matched on age. The L2 children had started acquiring English between the ages of 2;6 and 5;0 years. The children from both groups came from lower SES families. Participants were tested on English vocabulary, general grammatical abilities, verbal morphology and complex syntax. Chondrogianni and Marinis found that mother's self-rated proficiency was a significant predictor of the children's vocabulary skills, along with length of exposure and age of onset. Mother's self-rated proficiency and length of exposure were also significant predictors for children's general grammatical abilities in English. Only length of exposure could explain (certain aspects of) children's verbal morphology skills. For complex syntax, mother's self-rated proficiency and the proportion of English spoken at home were significant predictors. Finally, Chondrogianni and Marinis found that the L2 children were less accurate on all tasks than their monolingual peers. Thus, although Chondrogianni and Marinis do not directly address the issue of non-native input, we can conclude from their study that children's linguistic abilities in their L2 may be affected on several domains by their immigrant mother's proficiency level in that language.

Two studies that were described in the previous section have directly investigated the impact of non-native input on simultaneous bilingual children. As was discussed above, Place and Hoff (2011) examined the effects of several external factors on the language development of a group of Spanish-English bilingual two-year-olds. One of the factors taken into consideration was the percentage of language input in each of the languages that was provided by native speakers. Place and Hoff found that the percent of English input from native speakers was a significant predictor for children's English vocabulary scores.

The second study that has investigated the effects of non-native input on bilingual first language acquisition is Unsworth's (2012) study. As may be recalled from the previous section, Unsworth examined the effects of several child-external factors on the language development of English-Dutch bilingual children who had been exposed to both languages from birth. The proportion of exposure to English and Dutch at home provided by native speakers was one of the possible predictors of children's vocabulary and grammatical skills in this study. However, this factor was not a significant predictor for any of the outcome variables. As the author suggests herself, this may have been due to the fact that the children in this study mostly received input from native speakers only.

To summarise, evidence from bilingual first language and child L2 acquisition suggests that non-native input may affect bilingual children's language acquisition, in particular the mother's proficiency level and the percentage of input that is provided by native speakers. Evidence from monolingual language acquisition suggests that effects of non-native input only occur under certain circumstances, depending on the amount of non-native input that is provided, the consistency of this input, the relative complexity of the target structure and perhaps also the child's chronological age.

An aspect of language acquisition that could possibly be affected by non-native input, as it is rather complex, is the acquisition of the distinction between definite and indefinite articles. The next section provides a detailed overview of how the definiteness distinction is acquired and the errors that have been found to occur in monolingual, child L2 and adult L2 learners.

2.5 The acquisition of the definiteness distinction

The acquisition of the definiteness distinction was chosen as a topic of research in this study, because difficulties with selecting the correct (i.e. definite or indefinite) article have been reported in monolingual children (e.g. Schaeffer and Matthewson, 2005), as well as in child L2 learners (e.g. Zdorenko and Paradis, 2011) and adult L2 learners (e.g. Ionin et al., 2009). As errors have been found in all these three learner groups, the topic provides an interesting ground for comparing monolingual and bilingual children, as well as for investigating the effect of the adult (non-native) input on bilingual children' s proficiency. Two types of errors have been distinguished in the literature since the 1970's: the use of definite articles in indefinite contexts, so-called 'egocentric errors', and the use of indefinite articles in definite contexts, so-called 'incoherence errors' (see De Cat, 2011 for an overview). Examples of an egocentric error and an incoherence error are provided in (1) and (2) respectively (adapted from De Cat, 2011: 5).

(1) #He takes the block. (block unknown to hearer)

(2) #He sees a pig. (pig previously identified)

Different error patterns and error rates have been found in different learner groups. This section attempts to provide an overview of the most recent studies that have investigated the acquisition of the definiteness distinction in monolingual children (section 2.5.2), child L2 learners (section 2.5.3) and adult L2 learners (section 2.5.4), along with the theories that have been forward to explain the attested errors. As most of these studies focused on English (and French and Greek), whilst the current study investigates the acquisition of Dutch, an overview of the findings for Dutch will be presented in section 2.5.5. Section 2.5.6 provides an intermediate summary of what has been discussed in section 2.5. However, let us first consider the competence that children need to acquire in order to be able to use definite and indefinite articles correctly (section 2.5.1).

2.5.1 Competence to be acquired

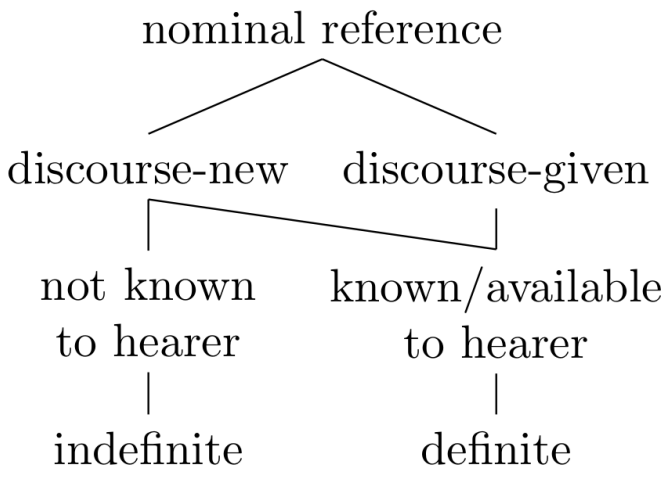
First of all, children need to learn that (at least in most Western languages) nominal referents require an article (or another type of determiner, such as a possessive or a demonstrative, however, we will only focus on articles in this study). Indicating a referent without using an article usually results in an omission error.[5] Second, children need to learn that articles can be either definite or indefinite. Selecting the correct article requires tracking the listener's knowledge state (i.e. 'is this referent new to my interlocutor?') as well as tracking the discourse (i.e. 'has this referent been mentioned before?'). If a referent has been mentioned before, it is automatically known to both speaker and hearer (i.e. there is mutual knowledge) and a definite article is required. Incoherence errors occur if an indefinite article is used to indicate a referent that is already given in the discourse. If a referent is new to the discourse, the choice between a definite and an indefinite article depends on whether the referent is known or available to the hearer. In most cases, new referents are (naturally) not known or available to the hearer, and an indefinite article is required. If a child for some reason fails to take the listener's knowledge state into account, the child may use a definite article to indicate the new referent, as this referent is not new to them (i.e. the child knows which particular referent he or she wishes to refer to). Hence the term *egocentric* errors. In some cases, referents may be known or available to the hearer despite their newness, and in these cases a definite article is required. Such cases include uniqueness in the context (e.g. '*the* sun', '*the* queen'),

[5] In some cases bare nouns are grammatical, however, discussion of this topic lies beyond the scope of this study.

presence in the physical context (mutual knowledge is established through deixis, for example by pointing or gazing), and so-called bridging contexts (e.g. 'I just read a wonderful novel, but I cannot remember who *the* author was'). Finally, children also need to master the distinction between specific and non-specific reference. Although this distinction is not directly relevant to the current study (only specific referents were used in our experiment, see section 3.3.2), it is briefly mentioned here, as it plays a role in some of the studies reviewed below. The specificity distinction is suggested to be based on 'whether the speaker does or does not have a particular entity in mind' (Roozendaal and Baker, 2008: 775), or on whether the speaker considers an entity 'to possess some noteworthy property' (Ionin et al., 2009: 338). The relationship between definiteness and specificity is not straightforward: both definite and indefinite articles may occur with specific as well as non-specific referents. For now it suffices for the reader to know that the selection of a definite or an indefinite article does not depend on specificity.

A schematic representation of the competence that children need to acquire in order to use definite and indefinite articles correctly is shown in Figure 1.

Figure 1 – schematic representation of the definiteness distinction



2.5.2 Monolingual children

Schafer and De Villiers (2000) tested the use of definite and indefinite articles in 3;6 to 5;5 year-old monolingual English children (N= 37, divided into four different age groups) and adult controls (N= 10) by means of an elicited production task in which participants were required to answer questions. There were no visual stimuli, as, the authors argue, these may induce definite articles through familiarity or uniqueness. Questions were divided into eight different conditions, depending on the type of definite and indefinite articles they aimed to elicit. Relevant to the current study are the

'familiar-the' condition, in which participants were required to refer to a previously mentioned object, and the 'specific-a' condition, in which participants were required to introduce a referent which was unknown to the hearer. In the 'familiar-the' condition, an introductory sentence was followed up by one of two types of questions: 'guess which?' or 'what was it'? The results were reported separately for these two subconditions. Schafer and De Villiers found adult-like responses in all age groups for the 'specific-a' condition. Thus, the children made hardly any egocentric errors. In the 'familiar-the' condition, overproduction of the indefinite article (i.e. incoherence errors) was found in all age groups, whilst the adult controls showed ceiling performance. In the 'guess which?' subcondition, error rates ranged from 3% in the youngest age group to 18% in the oldest age group. In the 'what was it?' subcondition, the youngest age group showed an error rate of 15%, and the oldest age group an error rate of 31%. Schafer and De Villiers provide a syntactic explanation for their findings, suggesting that children do not possess the DP category yet, which requires a feature marking for point of view ([±hearer]). Instead, the authors suggest, children project the definite article as the head of 'theP'. The authors claim that once children have acquired Theory of Mind (ToM), theP will be replaced by DP, which will enable them to use articles in an adult-like fashion.

Schaeffer and Matthewson (2005) found the opposite error pattern in their study of article use in monolingual English children between the ages of 2;1 and 3;10 years old (N= 26). In this study, children (and an adult control group, N= 38) witnessed scenarios or saw pictures, which they were later asked to answer questions about to a puppet who had been looking away during the action. Three different contexts were distinguished, of which the so-called 'A contexts' and 'B contexts' are relevant here. In 'A contexts' children were required to refer to an object that had previously been mentioned in the discourse. Children performed adult-like in this condition, (correctly) using the definite article in 98% of the cases. Thus, the number of incoherence errors was negligible in Schaeffer and Matthewson's study. In 'B contexts', on the other hand, children were required to refer to a new referent, not known to the puppet. In this case, children showed an overproduction of the definite article(i.e. egocentric errors) in 25% of the cases, whilst the adult controls showed an error rate of only 2%. The explanation that the authors provide for their findings is that children lack a pragmatic concept called the Concept of Non-Shared Assumptions (CNSA). That is, according to the authors, children sometimes fail to distinguish the hearer's assumptions from their own, which results in the automatic attribution of their own beliefs to the hearer. As a consequence, children overproduce the definite article in contexts which are not part of the common ground.

Interestingly, De Cat (2011) found both types of errors in her study of article use in monolingual French children. The age of the children in her study ranged from 2;6 to 5;6 years (N= 43, divided into three different age groups). The children carried out two elicited story-telling tasks, telling

stories on the basis of picture books to a blindfolded experimenter. De Cat distinguished three degrees of newness in her story-elicitation task: 'story-new, picture-new', 'story-old, picture-new' and 'story-old, picture-old'. In the former context, a new referent is introduced to the story and an indefinite article is required. This is the type of context where egocentric errors may occur. Incoherence errors may occur in the latter two types of contexts. In the 'story-old, picture-new' context, the referent has been introduced in the story before, but is new in the picture at hand, because the page has been turned. A definite article is required in this case. In the 'story-old, picture-old' context, the referent in the current picture was also present on a previous picture *on the same page*. A definite article is required in this case as well. De Cat found that the rate of egocentric errors in the 'story-new, picture-new' contexts decreased from 17% in the youngest age group to 5% in the oldest age group. Surprisingly, incoherence errors only occurred after a page had been turned, so in 'story-old, picture-new' contexts, whilst children performed at ceiling in the 'story-old, picture-old' contexts. For the 'story-old, picture-new' contexts, De Cat found an error rate of 50% in the youngest age group, decreasing to 17% in the oldest age group. As the rate of egocentric errors found in the children in De Cat's study was fairly low, and as children performed at ceiling in the 'story-old, picture-old' contexts, the author argues that children possess the required linguistic knowledge to encode new and old referents correctly. She suggests that the attested errors are therefore cognitive rather than linguistic in nature, being due to the incorrect *evaluation* of the hearer's knowledge state and/or the newness of the referent in the discourse.

Thus, both egocentric errors and incoherence errors have been attested in monolingual children, as well as a combination of both error types. Syntactic, pragmatic and cognitive theories have been put forward to explain children's error patterns. Let us now turn to the studies that have investigated article use in child L2 learners.

2.5.3 Child L2 learners

Ionin et al. (2009) examined article use in Russian child and adult L2 learners of English through a written elicitation task. The results for the L2 adults will be reported in the next section. Although Ionin et al.'s goal was not to directly compare native speakers and L2 learners, child and adult control groups, roughly matched on age with the L2 learner groups, were also included in the study (N= 11 and N= 12 respectively). The child L2 participants (N= 18) were between the ages of ten and twelve years old and attended specialised schools where English was taught on a daily basis. Participants were presented with sentences containing gaps, in which they were required to write down a definite or an indefinite article. There were four different types of contexts: [+definite, +specific], [+definite, -specific], [-definite, +specific] and [-definite, -specific]. Note that [+definite]

contexts always require a definite article and [-definite] contexts always require an indefinite article, regardless of specificity. Ionin et al. found that the L2 children often overproduced the definite article in [-definite, +specific] contexts (in roughly 33% of the cases[6]), but hardly made the opposite error of using the indefinite article in [+definite, -specific] contexts. Thus, egocentric errors occurred often, whilst incoherence errors were scarce. By means of comparison, the adult controls performed at ceiling and the child controls made a small percentage of errors with [-definite, -specific] contexts only. Ionin et al. provide a semantic explanation for their findings. As child L2 learners' errors occurred especially in contexts that were [-definite] but [+specific], the authors suggest that these children optionally use the definite article to mark specificity instead of definiteness. They propose that this is due to initial fluctuation between parameter settings. That is, the authors claim that there is a parameter setting for article grouping: whereas most languages group articles on the basis of definiteness, some languages (e.g. Samoan) do so based on specificity. L2 children would thus initially fluctuate between these two options, occasionally using the definite article for [-definite, +specific] referents (see Zdorenko and Paradis, 2007, 2008 for support of this 'Fluctuation Hypothesis').

Zdorenko and Paradis (2011) also found evidence that child L2 learners make egocentric errors but do not make incoherence errors. The child L2 learners of English in Zdorenko and Paradis' study were younger than the ones in Ionin et al.'s study: their age ranged from 5;0 to 6;11 years old (N= 40). Also, some children had L1s that do not express articles, whereas others had L1s that do express them. By including children with different L1 backgrounds, Zdorenko and Paradis sought to discover whether transfer effects would occur. All children had started learning English as their L2 at daycare, preschool or school, whilst their L1 was spoken at home (primarily or exclusively). The children carried out an elicited storytelling task, telling stories on the basis of picture books to an experimenter who was unable to see the pictures. Children's articles were scored as correct (*a* in indefinite contexts, *the* in definite contexts), substitution (*a* in definite contexts, *the* in indefinite contexts) or omission (null article) (Zdorenko and Paradis, 2011: 11). Note that the two types of substitution errors correspond with incoherence errors and egocentric errors respectively. Zdorenko and Paradis found an error rate of 38% for egocentric errors, whilst incoherence errors occurred in only 2% of the cases. The authors provide a semantic explanation for their findings, suggesting that the found error patterns are due to the relative inherent complexity of the indefinite article. That is, the authors propose that the indefinite article is more complex than the definite article, both

[6] Percentages were not provided in the original paper, calculations were carried out by the current author.

featurally[7] and in terms of the contexts in which it can be used. Therefore, Zdorenko and Paradis argue, the less complex definite article is acquired first and is initially overproduced in contexts in which an indefinite article is required. As for the influence of the L1, the authors found only limited effects of transfer: the [-article] L1 children made significantly more omission errors than the [+article] L1 children did, however, improvement already occurred within the first 18 months of exposure, indicating that the L1 influence is transient in nature. Although Zdorenko and Paradis did not have a monolingual control group in their study, they suggest on the basis of the literature that L2 children and monolingual children have similar acquisition patterns.

Contrary to Ionin et al. (2009) and Zdorenko and Paradis (2011), Chondrogianni et al. (2014) did compare monolingual children and L2 children directly.[8] In their study, 31 monolingual Greek children (age range 6;0 – 8;6) and 20 Turkish child L2 learners of Greek (age range 5;9 – 8;10) carried out a production as well as an on-line comprehension task. The child L2 learners had started learning Greek either at preschool or at school. In the production task, children were required to answer questions similar to the 'guess which?' condition in Schafer and De Villiers' (2000) study. As was the case in Schafer and De Villiers' (2000) study, no visual stimuli were used. Note that in Chondrogianni et al.'s (2014) experiment the target answer was always a definite article, so if errors were to be made, these could only be incoherence errors. Children's answers were scored as correct (definite article), substitution (indefinite article) or omission (null article). The comprehension task was a self-paced listening task. In such a task, children's reaction times are measured when they press a button to hear sentences in a phrase-by-phrase fashion. Each test item consisted of an introductory sentence followed by a target sentence in which the definite article was either present (i.e. the sentence was grammatical) or had been omitted (i.e. the sentence was ungrammatical). It was predicted that if the children were sensitive to the ungrammaticality of the latter type of sentences, their reaction times in these particular segments would be longer compared to those in the corresponding segments of the grammatical sentences. For the production task, the authors found that the L2 children were significantly less accurate (i.e. produced less definite articles) than the monolinguals. In terms of error types, the L2 children made significantly more omission errors than the monolingual children (80% versus 4.8% respectively), while there was no significant difference between the two groups in percentage of substitution errors (4.4% for the L2 children and 0.3% for

[7] I.e. the indefinite article needs to take number and the mass/count distinction into account, whereas the definite article does not (Zdorenko and Paradis, 2008: 233).

[8] Chondrogianni et al. (2014) also tested children with SLI, however, the results of this part of their study will not be presented here.

the monolinguals). For the comprehension task, it was found that both groups of children showed sensitivity to the grammatical violation induced by the omission of the definite article.[9] Thus, whilst the L2 children showed sensitivity to omission errors in comprehension, they nonetheless made these errors in production. Similar results were obtained for Turkish child L2 learners of English (Chondrogianni et al., submitted). On the basis of these findings, Chondrogianni et al. suggest that the L2 children possess the correct abstract grammatical representations, and that article misuse in production is merely due to problems at spell-out.

Thus, several studies have found egocentric errors in L2 children, whilst the rate of incoherence errors was very low. Note that egocentricity cannot be the only explanation for 'egocentric' errors in this case, as the pragmatic system (i.e. Theory of Mind-like knowledge) should well be in place at the age at which the children in these studies were tested (i.e. between 6 and 12 years old). The errors have therefore been proposed to be due to fluctuation between parameter settings or to the inherent difficulty of the indefinite article. It was also found that L2 children omit articles more frequently than monolingual children. Omission errors were ascribed to transfer or to problems at spell-out. In the following section, the use of definite and indefinite articles by adult L2 learners will be discussed.

2.5.4 Adult L2 learners

In the same study that was described in the previous section, Ionin et al. (2009) also tested a group of 21 Russian adult L2 learners of English. The participants ranged in age from 18 to 22 years and either studied English at university or had studied English previously and currently used it for work. The L2 adults carried out the same written elicitation task as the L2 children. Like the L2 children, L2 adults showed a substantial amount of overproduction of the definite article in [-definite, +specific] contexts (roughly 28%[10]). Contrary to the L2 children, however, the L2 adults also made the opposite (incoherence) error of using an indefinite article in [+definite, -specific] contexts (also in roughly 28% of the cases[11]). The authors argue that, unlike the former type of errors, which coincides with the Samoan parameter setting, the latter type of errors does not coincide with natural language data. Therefore, the authors claim, the L2 adults' errors with [+definite, -specific] contexts must be due to explicit learning strategies.

[9] The L2 children's reaction times were also significantly longer than those of the L1 children, however, Chondrogianni et al. (2014) do not provide an explanation for this difference.

[10] Ibid.

[11] Ibid.

Thus, the L2 adults in Ionin et al.'s (2009) study made both egocentric and incoherence errors. Note that, again, egocentricity cannot be the only explanation here, as adults' pragmatic systems have been fully developed. Rather, egocentric errors in adult L2 learners were ascribed to initial fluctuation between parameter settings. Incoherence errors were suggested to be due to explicit learning strategies. In the next section, the acquisition of the definiteness distinction in Dutch will be discussed.

2.5.5 The acquisition of articles and the definiteness distinction in Dutch

The Dutch article system is highly similar to the English one, although there is one important difference. Like English, Dutch has one indefinite article (i.e. *een*). However, as opposed to the single English definite article *the*, Dutch has two definite articles: *de* and *het*. The difference between these two definite articles is one of gender: in the singular, *de* precedes common nouns, while *het* is used with neuter nouns. In the plural, all nouns require *de*, regardless of gender.

Gillis and Schaerlaekens (2000) provide an overview of the order in which monolingual Dutch children acquire articles. The authors explain that Dutch children start using articles between the ages of 1;6 and 2;0 years old, and that the indefinite article usually emerges first, successively followed by *de* and *het*. Sometimes the use of articles is preceded by a stage in which a schwa is used, which may represent the definite as well as the indefinite article (Gillis and Schaerlaekens, 2000). Schaeffer (1997, as cited by Gillis and Schaerlaekens, 2000) found that omission errors are quite common in the early stages: 2-year-old monolingual Dutch children omit articles in 53% of the cases in which nouns occur in object position. By the age of three, this percentage has decreased to 22% (Schaeffer, ibid.). In terms of cross-linguistic comparison, Guasti et al. (2003) found that Dutch children's omission rates were higher than those of Catalan and Italian children, at least in the early stages of development. Only by the age of four do Dutch children reach target-like production of articles (Rozendaal, 2008), although egocentric errors may persist up to the age of six (Roelofs, 1998).

Let us now turn to some recent studies that have investigated the acquisition of the definiteness distinction in monolingual Dutch children and in child L2 learners of Dutch. In a cross-linguistic study, Rozendaal and Baker (2008) investigated the use of definite and indefinite articles in the spontaneous speech of monolingual Dutch, English and French children. The authors used data from three Dutch-speaking, three English-speaking and four French-speaking children in the age range of 2;0 to 3;3 years from the CHILDES database (MacWhinney 2000). The researchers checked for each noun whether the correct determiner was used given the pragmatic context. In particular, they examined whether the children mastered the following pragmatic distinctions: specific/non-specific,

discourse-new/discourse-given, mutual knowledge/no mutual knowledge. The latter two distinctions are of relevance to the current study, as together they represent the acquisition of the definiteness distinction. In addition to the children's data, a sample of the adult input was analysed in the same way, in order to investigate whether the children's outcomes were adult-like or not. Rozendaal and Baker (2008) found that the Dutch-acquiring children produced less articles than the French-acquiring and English-acquiring children at almost all ages. Overall, the pragmatic distinctions emerged earlier in the French-speaking and English-speaking children than in the Dutch-speaking children. The authors found that Dutch-acquiring children were able to distinguish between discourse-new and discourse-given referents from the age of 2;9. However, the Dutch-speaking children were unable to differentiate between mutual knowledge and no mutual knowledge, as they used definite and indefinite articles for both functions. Thus, both egocentric errors and incoherence errors were attested in these children. By means of comparison, no such errors were found in the adult input. Rozendaal and Baker argue that the attested egocentric errors are due to a lack of perspective-taking skills, which are part of Theory of Mind. According to the authors, children sometimes fail to take the listener's perspective into account and introduce new referents as if they were mutually known between them and the hearer. The authors furthermore note that, as discourse-new, not mutually known referents were scarce in the adult input, children may also lack morphosyntactic insight in how articles should be used in this type of contexts. No explanation was provided for the Dutch-speaking children's incoherence errors.

Van Hout et al. (2007) investigated the interpretation of definite and indefinite articles in the discourse in monolingual Dutch children between the ages of 4;1 and 5;4 (N= 19) by means of a truth-value judgment task. In this experiment, children were presented with pictures in which two similar characters were depicted. The children were then required to state whether propositions about these characters were true of false. The propositions varied in whether definite or indefinite articles were used to refer to mentioned or non-mentioned referents (all four possible combinations were included in the experiment). The aim of the experiment was to find out to which extent children would accept the use of definite and indefinite articles for mentioned and non-mentioned referents. Van Hout et al. found that the children correctly associated definite articles with mentioned referents (acceptance rate: 93% to 96%). They also accepted indefinite articles with mentioned referents in 88% to 89% of the cases (e.g. 'A girl is wearing a blue dress and *a* girl is eating an apple' (van Hout et al., 2007: 3), where the same girl is intended). Note that this behaviour mirrors incoherence errors in production. The authors argue however that the use of the indefinite article is not ungrammatical in this case, it is only infelicitous, and therefore the children did not make a mistake in accepting these articles for mentioned referents. Interestingly, children accepted

the use of the indefinite article for a non-mentioned referent only about half of the time (42 to 58%). Furthermore, they accepted the use of a definite article for non-mentioned referents to some extent as well (30% to 33%). For this latter finding, which corresponds with egocentric errors in production, the authors argue that presence in the visual context is often enough for children to accept a referent as 'mentioned', or in other words, as mutually known between speaker and hearer. As for children's guessing behaviour in the interpretation of indefinite articles with non-mentioned referents, the authors suggest that children possess the underlying grammatical competence, however, they fail to simultaneously take speaker and hearer perspectives into account. This would result in the inability to compute the scalar implicature that if the speaker had intended a unique referent, she would have used the definite article. For the children, the authors argue, the indefinite article may refer to unique and non-unique referents alike, either mentioned or non-mentioned.

Chondrogianni et al. (submitted) investigated the production and comprehension of definite and indefinite articles in Turkish child L2 learners of Dutch (N=17) and a monolingual control group (N= 20). The L2 children's age ranged from 6;1 to 8;10 and the monolingual children were matched on that. The L2 learners of Dutch had started acquiring this language at preschool (i.e. the age of 2;6) and had been exposed to Dutch for an average period of five years. In the production task, children were required to finish sentences in anaphoric and bridging contexts. The correct answer always contained a definite article, so, if errors were to be found, these would be incoherence errors. Responses were coded as correct, substitution or omission (cf. Chondrogianni et al., 2014, as described in section 2.5.3). The comprehension task was a self-paced listening task similar to the one that was used by Chondrogianni et al. (2014), i.e. the sentences to which the children listened either (correctly) contained the definite article or contained an omission error. Children's sensitivity to omission errors was assessed by measuring their reaction times. For the production task, Chondrogianni et al. (submitted) found that the L2 children were less accurate in their use of definite articles than the L1 controls. In terms of error patterns, it was found that the L2 children made more omission errors than the monolinguals. However, no significant difference was found between the two groups in rate of substitution errors. In the comprehension task, both groups showed sensitivity to omission errors, with longer reaction times in the critical segments. Note that these findings for child L2 learners of Dutch are very similar to those that were found for child L2 learners of Greek (and child L2 learners of English, see Chondrogianni et al., submitted). On the basis of their findings, Chondrogianni et al. (submitted) argue that omission errors in Turkish child L2 learners of Dutch are not caused by an absence of abstract grammatical representations, but are rather due to difficulties related to prosody, lexical retrieval, and/or articulation.

To summarise, research on monolingual Dutch children's acquisition of the definiteness distinction has indicated that these children make both egocentric and incoherence errors. These errors were also reflected in comprehension. Pragmatic and cognitive explanations have been put forward to account for these findings. Furthermore, it has been found that Dutch-speaking children acquire the definiteness distinction later than English-speaking and French-speaking children. For child L2 learners of Dutch it has been found that they made more omission errors than monolingual children did. However, the two groups did not differ in rate of incoherence errors. As the L2 children showed native-like performance on a comprehension task, it was suggested that these children do possess the required linguistic competence, but that problems arise at the output level. The use of definite articles in contexts which require an indefinite article has so far not been tested in child L2 learners of Dutch. The next section provides an intermediate summary of what has been discussed so far about the acquisition of the definiteness distinction.

2.5.6 Intermediate summary

Section 2.5 provided an overview of the literature on the acquisition of the definiteness distinction. We have seen that children need to learn to keep track of the listener's knowledge state as well as the discourse. It was shown that monolingual children sometimes have difficulties with selecting the correct article, resulting in egocentric errors (i.e. the use of definite articles in contexts in which an indefinite article is required) and incoherence errors (i.e. the use of indefinite articles in contexts in which a definite article is required). For child L2 learners it was found that these children make egocentric errors and to a lesser extent also incoherence errors. Furthermore, the child L2 learners made significantly more omission errors than the monolingual children did, even though they showed to possess the required linguistic knowledge. Adult L2 learners made an equal amount of egocentric and incoherence errors. Various theories have been developed to explain the error patterns in the different learner groups, including syntactic, pragmatic, semantic and cognitive theories. It was noted that egocentricity cannot be the only explanation for older L2 children's and L2 adults' egocentric errors. Finally, it is worth noting that different tasks have yielded different results in terms of error types and error rates (see also De Cat 2011 for discussion). Emslie and Stevenson (1981) have even suggested that (egocentric) errors can be the result of high task demands. Therefore, it is necessary also for the present study to interpret the results with caution and keep in mind that errors may be task-induced.

2.6 Motivation for the present study

In sections 2.3 and 2.4 we have seen that non-native input, amongst other qualitative factors, has been found to affect language development in bilingual children. However, the number of studies

that have investigated the effects of qualitative factors, and in particular non-native input, is still rather limited. Also, the relative impact of non-native input on bilingual children's language development compared to other (external and internal) factors remains largely unclear. Furthermore, many of the studies discussed in sections 2.3 and 2.4 focus on child L2 acquisition. As is pointed out by Unsworth (2012), the difficulty with this learner group is that age of onset is involved, which is often confounded with amount of exposure. Therefore, it is useful to test bilingual first language acquirers. Also, another advantage of testing younger children, for example at preschool age, is that these children still spend relatively much time at home, as they do not go to school yet. Any effects of the (quantity and quality of the) input provided by the parents are therefore expected to be more pronounced. Finally, most studies that have investigated the effects of qualitative factors on bilingual language acquisition have not compared bilingual children's outcomes to those of monolingual children. Thus, it remains unclear whether qualitative factors, and especially non-native input, influence bilingual children's language acquisition patterns in such a way that they differ from those of monolingual children.

The present study aims to contribute to the existing literature by investigating the effects of non-native input, compared to the effects of other child-internal and child-external factors, on bilingual first language acquisition. Furthermore, in the present study the acquisition patterns of bilingual first language acquirers who receive non-native input will be compared to those of monolingual children.

The language domains on which the children will be tested are general language proficiency, which is a combined measure of (active) vocabulary, verbal morphology and understanding of sentences, and the use of definite and indefinite articles. The definiteness distinction was chosen as a target structure for this study besides general language proficiency for two reasons. First, errors with the incorrect selection of the definite or indefinite article have been found to occur in monolingual and bilingual children as well as in L2 adults (see section 2.5 above), and we may thus expect the non-native input to which the bilingual participants in our study are exposed to contain such errors. Second, evidence from the literature has suggested that non-native input may particularly affect the acquisition of more complex grammatical structures (see section2.4). As the acquisition of the definiteness distinction involves the rather complex task of learning to track the discourse as well as the listener's knowledge state, we may expect this domain of language to be the type of structure that is affected by non-native input. In the following section, the research questions and predictions for the present study will be presented.

2.7 Research questions and predictions

The present study will address the following two research questions:

(i) How do bilingual preschoolers who receive non-native input compare to their monolingual peers in terms of Dutch language proficiency?

(ii) What are the effects of non-native input on bilingual preschoolers' Dutch language proficiency, and what is the relative impact of non-native input compared to other internal and external factors?

With regard to the first research question, it is expected that, depending on the effects of non-native input, the bilingual children's general language proficiency will either be similar to that of their monolingual peers (if the effects of non-native input are small), or will differ from that of their monolingual peers in terms of the bilinguals showing a lower language proficiency (if the effects of non-native input are large). As for the acquisition of the definiteness distinction, two predictions can be made on the basis of the literature discussed in section 2.5. First, we expect egocentric errors as well as incoherence errors to occur in the monolingual children, whereas we expect egocentric errors to prevail in the bilingual children. This is because both error types were found in monolinguals (De Cat, 2011), while bilingual children were found to make mostly egocentric errors, with incoherence errors only occurring at a very low rate (Ionin et al., 2009; Zdorenko and Paradis, 2011; Chondrogianni et al., 2014). Second, we expect the bilingual children to make more omission errors than the monolingual children, because Chondrogianni et al. (2014) found that the child L2 learners in their study omitted articles significantly more often than the monolingual controls. It must be noted, however, that omission errors may also still occur in the monolingual children, as Dutch-speaking children are relatively late in their acquisition of articles.

Concerning the second research question, it is expected on the basis of the literature discussed in section 2.4 that non-native input factors such as mother's self-rated proficiency and the proportion of Dutch exposure that is provided by native speakers may negatively affect the bilingual children's general language proficiency, although other internal and external factors may be stronger predictors of the children's outcomes. With regard to the acquisition of the definiteness distinction, it is expected that the bilingual children's parents, who have acquired Dutch as a second language, will make both egocentric errors and incoherence errors. If the bilingual children's acquisition of the definiteness distinction is affected by non-native input, we may expect these children's error patterns, and perhaps also their error rates, to be similar to those of their parents. If, on the hand, the effects of non-native input on the acquisition of the definiteness distinction are limited, it may

be expected that the children surpass their parents' input, being more accurate in their use of definite and indefinite articles than their parents.

The following section provides a summary of what has been discussed in this chapter.

2.8 Summary

This chapter has provided an overview of the literature that serves as a basis for the present study. After pointing out that it can sometimes be useful to compare bilingual children's acquisition patterns with those of monolingual children, the effects of quality of input on bilingual first language and child L2 acquisition were discussed. It was shown that qualitative factors may predict the linguistic abilities of bilingual and L2 children. However, it was also noted that qualitative factors often contain quantitative elements and that it is therefore difficult to disentangle the effects of quality versus quantity of the input. Moreover, other child-internal and child-external factors were often also found to be strong or stronger predictors of the children's outcomes.

Next, we looked into the effects of non-native input on monolingual and bilingual children. We saw that non-native input may negatively affect monolingual and bilingual children's acquisition patterns under certain circumstances. However, it was also noted that the body of research on non-native input is currently still rather small.

The chapter continued with a discussion of the acquisition of the definiteness distinction, and it was shown that monolingual children as well as child and adult L2 learners sometimes have difficulties with selecting the correct (definite or indefinite) article. Various explanations for the occurrence of different error types were reviewed. It was explained that, as acquiring the definiteness distinction requires rather complex knowledge, and as errors may be expected in adult L2 learners who provide non-native input to their children, the topic qualifies as a ground for investigating the effect of non-native input on bilingual children' s language acquisition.
Finally, the motivation for the present study was discussed and the research questions and predictions were presented. The present study aims to investigate the effects of non-native input, along with other internal and external factors, on bilingual preschoolers' general Dutch language proficiency and their use of definite and indefinite articles in Dutch. Furthermore, this study seeks to compare the bilingual children's Dutch language proficiency to that of their monolingual peers. In the next chapter, the method of the present study will be presented.

3. Method

3.1 Introduction

This study examines the effects of non-native input on bilingual preschoolers' Dutch proficiency level, as well as how these children compare to their monolingual peers. The current chapter successively discusses the participants (section 3.2), test battery (sections 3.3 and 3.4) and procedure (section 3.5) of the study. The chapter ends with a summary (section 3.6). The aim of this chapter is to provide the reader with in-depth information about the methodology used for this study, thereby offering the necessary context to be able to understand and interpret the results, which will be presented in Chapter 4.

3.2 Participants

A total number of 25 bilingual children (15 female) and 13 monolingual Dutch children (8 female) participated in this study. For each child included in the study, one parent also participated (N= 37, two of the bilingual children were twins). An important inclusion criterion for the bilingual children was that they received non-native Dutch input from at least one of their parents. Non-native input is defined here as input from a second language (L2) learner. Note that, as a consequence of setting the criterion at *at least one parent*, the bilingual group was rather heterogeneous, in the sense that it included, on the one hand, immigrant families from various countries, and, on the other, families comprised of a native Dutch parent and a parent who acquired Dutch as an L2. The bilingual children were all acquiring Dutch as one of their languages, with the other language varying between children. Other languages included Berber (N=6), Moroccan Arabic (N=3), English (N=3), Turkish (N=3), Greek (N=2), Spanish (N=2), Armenian (N=1), Kurdish (N=1) and Italian (N=1). Three bilinguals (or rather trilinguals) acquired two languages besides Dutch: Turkish/Kurdish (N=1), Armenian/Russian (N=1) and Greek/Kurdish (N=1). The age range of the bilingual group was 32 to 47 months (M=41.2, SD=5.18). The bilingual children's age of onset for Dutch ranged from 0 to 30 months (M= 4.56, SD= 9.05). The age at time of testing of the monolingual Dutch children lay between 30 and 46 months (M=37.2, SD=4.96).

For the bilingual children, the parent included in the study was the one who had learned Dutch as an L2, or, in case both parents were L2 learners of Dutch, the parent for whom participating was most convenient. In order to be included in the study, the parent in question had to use Dutch to communicate with their child at least some of the time. The 24 bilingual parents included in the study (19 female) started acquiring Dutch between the ages of 1 and 32 years (M=14.7, SD=8.70).

They spoke Dutch to their children between 1 and 90 percent of the time (M= 50.0, SD=27.0).[12] The 13 parents of the monolingual Dutch children (11 female), and their partners, were all native speakers of Dutch. Socio-economic status (SES) was assessed by determining the mother's highest level of education on a 6-point Likert scale (0= no formal education, 1= primary school, 2= secondary school, 3= intermediate vocational education (mbo in Dutch), 4= higher vocational education (hbo in Dutch), 5= university). SES ranged from 0 to 5 for the bilingual group (M= 2.96, SD= 1.34) and from 2 to 5 for the monolingual group (M= 3.15, SD= .90).

Families were recruited via playgroups and preschools in Utrecht and Arnhem in the Netherlands. All but one of the locations where families were recruited worked with so-called *Voor- en Vroegschoolse Educatie* (VVE, the Dutch equivalent of Early Childhood Education and Care (ECEC)) programmes. These programmes offer high quality education in the cognitive or linguistic domain (or both) to children at risk of developing linguistic or educational deficits (Driessen, 2013). The programmes are mostly aimed at children who have not been sufficiently exposed to Dutch at home, either because the parents have simply not provided enough input (low-SES native Dutch parents), or because a different language is spoken at home (immigrant families, often also low-SES) (Driessen, 2013). Whether children qualify for VVE is decided primarily on the basis of their parents' level of education, although in some cities other factors are also taken into account, such as linguistic, social or medical problems (Driessen, 2013; Stichting PAS 2013). For this reason, preschools which offer VVE are found predominantly in low SES neighbourhoods (see e.g. Stichting PAS, 2013). The national aim in the Netherlands is for the so-called 'target group children' to attend a VVE playgroup or preschool for at least four mornings or afternoons a week, and for at least a year, before going to primary school (Driessen, 2013).

In this study, bilingual and monolingual families were recruited at the same playgroups/preschools or at least in the same neighbourhoods as much as possible, in order to keep SES as equal as possible among the two groups. As most of the locations included in the study were VVE-locations, the majority of the children spent similar amounts of time at the playgroup/preschool.[13] Parents were asked to fill out an application form, thereby granting their informed consent for their child to be tested at the playgroup or preschool. The application form

[12] One father spoke Dutch to his child only one percent of the time, all other tested parents used Dutch in the communication with their child(ren) at least ten percent of the time. Although one percent input cannot really be considered 'substantial', this family was still included in the study, because the mother was also a non-native speaker of Dutch. As she spoke Dutch to her child 100 percent of the time, the total amount of non-native input received by the child was considered substantial enough to participate in the study.

[13] The time spent at the playgroup/preschool per week ranged from 0 to 15 hours (M= 10.30, SD= 3.17) for the bilingual children, for the monolingual children this was not recorded. One bilingual child did not attend preschool yet, her family was recruited via a personal contact in Arnhem.

included a part where separate consent was obtained for making video or audio recordings. For the bilingual group, 22 of the children were recorded with video, 2 were recorded with audio only and 1 was not recorded at all. Of the bilingual parents, 11 were recorded with video, 7 with audio only and 6 were not recorded at all. Of the monolingual children, 11 were recorded with video and 2 were recorded with audio only. The monolingual parents were not recorded, as they did not participate in any of the linguistic tests (see section 3.4 below).

3.3 Children's test battery

All children were invited to perform a test battery consisting of seven different tasks. The results reported here consider three of these tasks: the Dutch version of the Clinical Evaluation of Language Fundamentals Preschool – Second Edition (CELF-Preschool 2, CELF for short) (Wiig et al., 2004), an elicited production (EP) task and the Hand Movements task from the Kaufman Assessment Battery for Children (K-ABC) (Kaufman, 1983; Kaufman and Kaufman, 1983). An overview of the three tasks and what they were aimed at measuring is provided in Table 1. Each task will be discussed in more detail in the following sections.

Table 1 – Overview of children's test battery

Task	Measure for:
CELF	General language proficiency
Elicited production	Pragmatic use of articles
K-ABC Hand Movements	Non-verbal working memory

3.3.1 CELF

The CELF (Wiig et al., 2004) is a standardised measure of general language proficiency, often used for diagnosing language disabilities, and consists of three core parts and eight additional tests. For the purpose of this study only the three core parts were administered. These consist of 'sentence comprehension', 'word structure' and 'active vocabulary'. In the sentence comprehension part, children are shown four different pictures . The research assistant pronounces a sentence and asks the child to point at the corresponding picture. This part of the CELF contains 22 test items. The test is aborted when the child makes five consecutive errors. In the word structure part, the child is asked to complete the research assistant's sentences. The linguistic nature of the exercises varies, with items that aim at eliciting verbs, adjectives, diminutives, plurals, superlatives and possessives. In total, the word structure part contains 23 test items. The test is stopped when the child makes seven consecutive errors. In the final part, active vocabulary, the child is shown pictures of objects or persons performing an action, and is asked to name them. This part contains 20 test items. The test

is aborted when the child makes six consecutive errors. Each part of the CELF is introduced with an example item and two practice items. The child scores one point for each correct test item. Answers were scored immediately on an answer sheet by the research assistant, and, if permission had been granted, recorded for later checking. The raw scores of the three subtests were added up, thus forming a composite score for Dutch language proficiency. Raw scores were chosen over standardised scores for this study, as standardised scores could only be calculated for monolingual children and for children from the age of three years onwards, and some of the children in our study had not reached that age yet at the time of testing.

3.3.2 Elicited production task

The elicited production task was used as a more specific test of language proficiency. It was designed to assess children's use of articles with discourse-given versus discourse-new referents (cf. section 2.5 above). It consisted of twelve items divided over two conditions: a condition containing a discourse-given referent, thus requiring a definite article (definite condition), and a condition containing a discourse-new referent, thus requiring an indefinite article (indefinite condition).[14] Test items consisted of one or two photographs appearing on a computer screen. The child was requested to complete the research assistant's sentences.

At the beginning of the experiment, a blindfolded puppet was introduced to the children. It was explained to them that the puppet was not able to see the pictures on the screen and that he needed their help to understand what was going on. The puppet was used in order to avoid responses containing demonstratives or overproductions of the definite article due to mutual knowledge between the child and the experimenter. For example, children might refer to a carrot on a table as 'the carrot' when it is the only object on the table and the experimenter can see it as well. This phenomenon is less common in the (native) adult language. Thus, children were encouraged throughout the task to provide answers to the puppet (see also Van Hout et al., 2007). Other advantages of using a puppet are that children are expected to be more talkative when interacting with a puppet and that they are deemed to find the task more enjoyable (Thornton, 1996).

In the definite condition, a picture showing a person and an object appeared on the left side of the screen. The children were asked to name the person and the object. Then the picture disappeared, and another picture appeared on the right side of the screen. The second picture showed the same person carrying out an activity with the object that was introduced in the first

[14] Only specific referents were included in this study, as non-specific referents, being more abstract, were believed to create an extra layer of difficulty. Moreover, it would have been rather challenging to capture non-specific referents in a photograph.

picture. The children were asked to describe what the person was doing, by completing a sentence introduced by the research assistant. Crucially, a definite article was required here, since the object had already been introduced in the first picture. An example of an item in the definite condition is shown in (3).

(3) **Definite condition** **de bal (the ball)**

Situation: a picture of a man and a ball is shown on the computer screen.

Experimenter:	Wat is dit? *(wijst naar de man)*
	What is this? (*points at the man)*
Child:	Een man
	A man
Experimenter:	En wat is dit? *(wijst naar de bal)*
	And what is this? *(points at the ball)*
Child:	Een bal
	A ball

Situation: the picture disappears and another picture appears, showing the same man throwing the same ball.

Experimenter:	En wat doet de man nu? Hij gooit ...
	And what is the man doing now? He is throwing...
Child:	de bal
	the ball
	*een/ø bal
	* a/ø ball

If children struggled with naming the person and/or the object in the first picture, the research assistant was allowed to give the correct answer, as these answers were not part of the target structure we aimed to elicit. In case the child continued to struggle with this part, the prompt was shortened slightly for reasons of time management and for convenience of the child (see Appendix A).

The reason why an introductory picture was shown first, rather than only the target second picture, is that it was considered quite likely that children would respond to the first question with an answer also containing the object (i.e., when asked to name the person, it was possible that the children would provide an answer like: 'a man who is throwing a ball'). It would then become impossible to ask for the object again. Thus, the introductory picture was used in order to avoid this type of answers. As will be discussed below, this problem was irrelevant in the indefinite condition. Furthermore, we attempted to establish a chronological link between the two pictures by using the word 'now' in the prompt pertaining to the second picture (i.e.: 'And what is the man doing *now*?'). Moreover, the first picture was shown on the left side of the screen and the second one on the right, in order to enhance the chances that children would perceive the pictures as a 'story'. The rationale

behind this was that if the pictures had appeared both in the middle of the screen, directly after each other, it would have been more likely for the children to perceive them as two different items.

In the indefinite condition, a single picture appeared in the centre of the screen, showing a person engaged in an activity with an object. The children were asked to name the person. However, unlike in the definite condition, children were not asked to name the object. Rather, the children were asked what the person was doing. As in the definite condition, they were invited to complete the research assistant's sentence. An example of an item in the indefinite condition is shown in (4).

(4) **Indefinite condition** **een puzzel (a puzzle)**

Situation: a picture of a boy making a puzzle is shown on the computer screen.

Experimenter:	Wat is dit*? (wijst naar de jongen)*
	What is this? *(points at the boy)*
Child:	Een jongen
	A boy
Experimenter:	En wat doet de jongen? Hij maakt ...
	And what is the boy doing? He is making...
Child:	een puzzel
	a puzzle
	*de/ø puzzel
	* the/ø puzzle

Again, if children struggled with naming the person, the research assistant was allowed to give the correct answer, and if struggling continued, the prompt was slightly shortened (see Appendix A). In the indefinite condition, it was unproblematic if the children provided an answer including the object in response to the first question (e.g. 'a boy who is making a puzzle'), since this entailed the correct production of an indefinite article.

In order to avoid difficulties due to grammatical gender, only common gender nouns were used throughout this task, both for the definite and the indefinite condition. All nouns and verbs were selected from two lists containing Dutch words which are commonly known amongst Dutch monolingual three-year-olds, the 'Lexilijst' (Schlichting and Lutje Spelberg, 2002) and 'NCDI' (Zink and Lejaegere, 2002). The twelve items from this task were interspersed with twelve items from another task, not reported here, which tested verbal morphology and verb placement. This way, the items of the two test types served as each other's fillers. The items were randomized in such a way that no two items from the same condition were presented directly after another. The actual test items were preceded by eight practice items, two for each condition of each test type. If the first practice item of a condition was answered correctly, the second practice item of that condition was skipped. Hence, children performed between four and eight practice items. Two different versions of the task were created, with version B showing the items in the reverse order of version A. The two

versions of the task were counterbalanced across children within each group (bilingual and monolingual). Answers were scored immediately on an answer sheet as definite (de/het), indefinite (een) or omission (ø). Any answers deviating from the target were written down verbatim. Answers were also recorded for checking later, if parents had granted permission.

Responses were categorised as follows (cf. Zdorenko and Paradis, 2011; Blom, Vasić and Baker, 2014). In the definite condition, answers were regarded as 'correct' if they involved a definite article (either *de* or *het*). Responses in which no article was used were coded as 'omissions' and responses in which an indefinite article was produced instead of a definite article were coded as 'substitutions'. In the indefinite condition, answers including an indefinite article were coded as 'correct', responses without any articles as 'omissions' and responses involving a definite article as 'substitutions'. A category 'other' was created for answers that deviated from the target. All plurals were considered as 'other', because in these cases it was impossible to disentangle omission errors from correct omissions for the plural form. Proper names were also considered as 'other', as they never require an article in Dutch. Responses that did not include a noun were categorised as 'other', as well as any responses that followed an erroneous prompt (i.e. the research assistant accidentally pronounced the article in the prompt). Answers that deviated from the target semantically were considered case by case. If the child's response was semantically completely unrelated to the target (e.g. 'ice cream' instead of 'train'), it was considered as 'other'. If however the child's response differed only slightly from the target in a semantic sense (e.g. 'bus' instead of 'train'), the answer was considered target-like and was categorised in the same way as target answers were.

For an overview of the entire set of items, as well as examples of the pictures, see Appendices B and C respectively.

3.3.3 K-ABC Hand Movements task

The Hand Movements task is one of the 16 subtests of the Kaufman Assessment Battery for Children (Kaufman and Kaufman, 1983), a standardised test for assessing children's cognitive development. The Hand Movements task is part of a range of subtests that aims to measure mental processing. More in particular, the task measures non-verbal mental processing, and is used in this study as a measure for non-verbal working memory. The task is suitable for young children (from 2;6 years onwards), as it does not involve verbal stimuli, such as words or digits, like most other tests for working memory do. Furthermore, it is a useful tool for bilingual children, as the fact that it involves little language reduces the chances that these children perform poorly due to a possible language barrier.

The task consists of six units, the first three units containing four test items each, and the last three units of three test items each, making a total of 21 test items. Test items consist of sequences of hand shapes (i.e. palm, side and fist), increasing in length and difficulty. The child is invited to imitate the experimenter's movements. Each item is scored immediately as correct or incorrect on an answer sheet. The test is aborted if one whole unit is scored as incorrect, or at the end of the third unit. An exception is made if children make no errors in unit three, the test is then continued until the child makes a single error. The actual test is preceded by an example item, which is scored as correct or incorrect, but does not count for the child's total score. During the example item the experimenter may help the child if he or she struggles. The first two test items are also learning items, in which the experimenter is allowed to help, however, the child's original answer does count for his or her total score.

Raw scores were calculated by subtracting the number of errors from the ceiling item (i.e. final item that has been administered). The raw scores were subsequently converted into standardised scores on a scale from 1 to 19, taking age into account.

3.4 Parental test battery

The bilingual parents engaged in an extensive interview in which the language situation at home was assessed. The interview consisted of four different questionnaires, of which only one will be reported in this study: the 'Utrecht Bilingual Language Exposure Calculator'(UBiLEC) (Unsworth, 2013). In addition, the bilingual parents were invited to carry out three of the tasks that their children had also participated in, in order to assess their language abilities in Dutch. Two of these will be reported upon here: the Peabody Picture Vocabulary Test-III-NL (PPVT) (Dunn et al., 2005) and the elicited production task described above (see section 3.3.2). The monolingual parents took part in a shorter interview, which contained a single questionnaire, which will not be reported in the current study. An overview of the parental test battery is provided in Table 2.

Table 2 – Overview of parental test battery

Task	Measure for:
UBiLEC	Children's linguistic background, particularly quantity and quality of input
PPVT-III-NL	Passive vocabulary
Elicited production	Pragmatic use of articles

3.4.1 UBiLEC

The UBiLEC (Unsworth, 2013) is an extensive questionnaire aimed at investigating several aspects of the child's language background. It may be used for bilingual children between two and eighteen years old and is therefore suitable for the purposes of this study. The questionnaire is administered face to face with the parent and is accompanied by an Excel file in which the researcher enters the provided answers immediately. The questionnaire begins with a number of basic questions, designed to obtain some background information about the child (e.g. country and date of birth, number of older siblings, parents' level of education, languages to which the child is exposed, etc.). From this first part of the UBiLEC we extracted the following variables for the current study: a*ge at time of testing*, *age of onset of acquiring Dutch*, *socio-economic status*, operationalised as mother's level of education, and *number of older siblings*. The next part of the UBiLEC contains more specific questions and was designed to obtain more fine-grained information about the child's language background. More in particular, the Excel file contains a number of algorithms which together provide an estimation of three specific components of the child's linguistic environment: (i) current amount/quantity of exposure, (ii) current quality of exposure and (iii) cumulative length of exposure. The estimations are made for the target language (i.e. the language under investigation, in this case Dutch) as well as for the other language or languages. From here on, I will only refer to the outcomes for the target language, as this study investigates (non-native) input in Dutch.

The first component, current quantity of input, is a combined total of the amount of time the child is being exposed to Dutch at home, at the playgroup or preschool, during holidays and during other activities such as sports, playing with friends, playing (language-related) computer games and being read to. As for the purpose of this study we are particularly interested in the children's situation at home, a new variable was created by slightly modifying the existing algorithm, taking only the amount of input at home into account: *quantity of Dutch input at home*. The estimation of the amount of exposure to Dutch the child receives at home was made by taking into account the percentage of time each person at home (e.g. parents, older siblings, grandparents, babysitter) currently speaks Dutch to the child, the amount of time spent with each of these persons on an average day and the number of waking hours per day. The outcome of this calculation is the percentage of current Dutch input at home, as opposed to the percentage of exposure to the other language(s) at home. Furthermore, another variable was extracted from this first component of the UBiLEC: *quantity of non-native Dutch input at home*. For this variable the percentage of exposure to non-native Dutch at home was calculated, as opposed to the percentage of exposure to native Dutch at home. Although this second variable is extracted from the quantity-component of the UBiLEC, it will be used here as a measure for input *quality*, as the native versus non-native input ratio will most

likely tell us something about the quality of the input that the child receives, assuming that non-native input is of a lower quality than native input. Moreover, Place & Hoff (2011) have identified the percentage of English input coming from native speakers as a source of variance in English-Spanish bilingual children's proficiency in English, so it will be interesting to see if this finding could be replicated for Dutch.

The second component, current quality of input, is an average score for the quality of Dutch input the child receives at home, at the playgroup or preschool, during holidays and during other activities (as described above), weighted for the amount of time spent with each person or engaged in each activity. The average score for quality of input for each input provider is based on two dimensions of Dutch language proficiency: fluency and understanding, as rated by the interviewee on two different 6-point Likert scales (fluency (following Paradis 2008): 0= virtually no fluency, 1= limited fluency, 2= somewhat fluent, 3= quite fluent, 4= very fluent, 5= native-like fluency; understanding: 0= hardly any understanding, 1= little understanding, 2= reasonable understanding, 3= good understanding, 4= very good understanding, 5= native-like understanding). For the purpose of the current study, two extra dimensions of language proficiency were added to the questionnaire: errors and accent. These dimensions were rated by the interviewed parent for each input provider at home on a 4-point Likert scale (errors: 0= many errors, 1= frequent errors, 2= few errors, 3= hardly any errors (native-like); accent: 0= heavy accent, 1= clear accent, 2= small accent, 3= hardly any accent (native-like)). As our participants' Dutch proficiency was expected to be limited at least in some cases, each scale was represented by circles increasing in size, providing visual support in addition to the verbal description.

From this second component of the UBiLEC, three different variables for quality of input were extracted: *mother's self-rated proficiency*, *mother's weighted self-rated proficiency* and *variety of non-native speakers at home* . In choosing mother's self-rated proficiency (SRP) as a quality variable we followed Chondrogianni & Marinis (2011), who found that mother's SRP in English was a significant predictor of whether Turkish-English successive bilingual children reached age-appropriate norms for vocabulary, general grammatical abilities and complex syntax in English (see also section 2.4 above). Father's SRP on the other hand, did not significantly predict their children's linguistic abilities in English (Chondrogianni & Marinis, 2011). In our study, mother's SRP was calculated by adding up the mother's scores on fluency, understanding, errors and accent, and dividing the outcome by four. In order to find out whether the amount of time the mother speaks Dutch to the child is also relevant in addition to her proficiency level, we added a second variable, which incorporated quantity of input provided by the mother into her SRP: mother's weighted SRP (wSRP). Mother's wSRP was calculated by multiplying her SRP by the percentage of time she speaks

Dutch to the child. Finally, variety of non-native speakers (NNS) at home was selected as a predictor variable. Place & Hoff (2011) found that hearing English from several different (native) speakers was beneficial to the English skills of the Spanish-English bilingual children in their study. However, hearing a language from several different *non-native* speakers may actually have a negative effect on children's linguistic skills in that language. That is, on the assumption that a non-native speaker provides less rich input and perhaps also makes errors, children will logically receive a larger amount of input that is less rich and/or contains errors if they receive input from several non-native speakers. This may result in poorer linguistic skills. The effect of errors may work in two ways: either the non-native input providers make the same type of errors, resulting in a large(r) amount of positive evidence for erroneous linguistic forms, or they will make different types of errors, resulting in conflicting evidence in the input. A combination of these options is also possible of course. Either way, it will be harder for the child to acquire the correct linguistic forms if they are provided with erroneous input. Whether such negative effects of receiving non-native input from several speakers may indeed occur will be investigated in the current study. Variety of NNS was defined here as the number of persons speaking Dutch to the child in the home environment at least ten percent of the time, whilst Dutch was not their native language (i.e. age of onset was not zero). The admittedly arbitrary threshold of ten percent was chosen in order to include only those persons who provided substantial non-native input to the child. For the same reason, these persons needed to spend at least an hour a week with the child for them to be included in the measure. Older siblings could also be included in the measure, as long as they met the aforementioned criteria and were at least four years old. The rationale behind setting the threshold at the age of four is that school starts at this age, which will cause the older siblings to both receive and produce substantial amounts of the Dutch language, enabling them to also (possibly) provide substantial input to their younger siblings.

The third and final component of the UBiLEC represents the amount of exposure the child has received over time. Traditionally, this variable is represented as *length of exposure*, and is calculated by subtracting the age of onset from the age at time of testing. However, this may not be the most accurate way of operationalising the amount of past exposure, as for example a child with a traditional length of exposure (LoE) of three years has had to divide her time over her two (or more) languages during this period of time. As a consequence, she can never have received amounts of input that equal those of monolingual children in each of her languages. Moreover, the division of time between the languages the child is acquiring may vary over time, for example when the child starts attending daycare or preschool. Unsworth (2013) therefore developed a new measure, c*umulative length of exposure*, which takes variation in the amount of exposure over time into account. Cumulative length of exposure (CLoE) is calculated on the basis of information provided by

the interviewed parent about the following three factors: the percentage of time each person in the house spoke the target language to the child during each one-year period of the child's life thus far, whether the child attended daycare or (pre)school during these periods of time and which language was spoken there, and language use during the holidays. CLoE was used as a predictor variable for children's Dutch language proficiency in the current study.

An overview of the predictor variables used for this study is provided in the next chapter (see section 4.3.1).

3.4.2 PPVT-III-NL

The PPVT-III-NL (Dunn et al., 2005) is a standardised measure of passive vocabulary and is very often used in the literature on (bilingual) language acquisition. With an age range of 2;3 to 90 years, it is a suitable instrument for children as well as for adults. The test consists of items in which four pictures are shown to the participant. The research assistant pronounces a word and the participant is requested to point at or name the corresponding picture. The test is preceded by two practice items. The test itself consists of 17 sets of 12 test items, increasing in difficulty. A start set is determined on the basis of the participant's age. Higher sets are administered until the participant makes at least nine errors in one set. At this point the test is aborted. In case the original start set turns out to be too difficult (i.e. five errors or more), the previous set is administered. This procedure is repeated until the participant makes four errors or less in one set: this set then becomes the start set. The experimenter then turns upwards again to higher sets (starting with the set following the original start set) and the test is further administered following the normal procedure.

For the current study, a digital version of the test was used. As the test was designed for monolinguals, we expected the usual start set (based on the participant's age) to be too difficult for our adult participants who had learned Dutch as a second language. In order to avoid participants becoming discouraged by the test's difficulty, it was decided to start with a fixed low set: set number five. If a participant did not meet the requirements for this start set (by making at least five errors), previous sets were administered as described above until the definitive start set was determined. The test was aborted as usual when the participant made at least nine errors in one set.

Answers were written down and scored immediately as correct or incorrect on an answer sheet. Recordings were made for later checking if permission had been granted. Raw scores were calculated by subtracting the total number of errors from the ceiling item (i.e. the last item in the final set that had been administered). Raw scores were used rather than standardised scores for this study, because some parents obtained such a low raw score that a standardised score could not be calculated, and because there are no normalised scores for L2 learners.

3.4.3 Elicited production task

This is the same task as was described in section 3.3.2 above. The task was carried out in the same way as with children, with the exception that the puppet was left out. The parents received the opposite version of the test that their children had carried out (i.e. version A if their child had carried out version B and vice versa). Answers were scored and categorised in the same way as the children's (see section 3.3.2 above). Recordings were made for later checking in case permission had been granted.

3.5 Procedure

All children except two were tested at their playgroup or preschool.[15] The test sessions were carried out by two native Dutch research assistants (one of them being the author of this thesis), each testing a separate set of children. Testing took place in a quiet, separate room and was divided over two sessions of approximately 30 minutes. A third session was added in case the child was somehow unable to finish the tasks within the first two sessions. Test sessions did not take place on the same day and the complete test battery was carried out within the time span of fourteen days. Tasks were administered in a fixed order as much as possible, going from passive/non-verbal to active/verbal within each session, thereby giving the children time to get used to the experimenter and the experimental setting before having to speak. The CELF was part of the first session, whilst the K-ABC Hand Movements task and the EP task were administered during the second session, the former before the latter.

Before testing began, the research assistants had been present at the playgroup or preschool at least once in order for the children to meet them. The children were told that they would go and play games with the experimenter and that they would receive stickers. Stickers were handed out after each task (and during a task if the child absolutely needed a break) and the children received a small gift at the end of each session.

Parents were interviewed at home or at the playgroup/preschool, depending on the participant's preferences. The interviews were carried out by two research assistants, each interviewing a separate set of parents. One of them was a native speaker of Dutch (the author of this thesis), the other a Dutch/Moroccan bilingual. All Moroccan parents were tested by the latter assistant, who was allowed to translate Dutch words into Moroccan Arabic for better understanding during the interview, but not during the Dutch proficiency tasks. The interview, including the

[15] The two children forming an exception were bilinguals and were tested at home during the summer holidays. One of them had attended a playgroup/preschool already, the other was about to start after the holidays.

administration of the three Dutch proficiency tasks, took place in one session of approximately an hour and a half. The interview was usually carried out before the Dutch proficiency tasks, but the order was sometimes reversed for reasons of convenience. The order of the Dutch proficiency tasks was always fixed, with the PPVT preceding the EP task.

A video camera was used to make recordings if permission had been granted. The recordings were later checked (i.e. compared to the written answers) by the research assistant that had tested the participant, and then checked again by another assistant. Any discrepancies were solved by a third person.

3.6 Summary

This chapter has provided the reader with information about the participants, test battery and procedure of the study at hand. It has introduced a participant group of bilingual children, which was fairly heterogeneous in terms of languages acquired besides Dutch, and a control group of monolingual Dutch children. All children attended or were about to attend a playgroup or preschool in the Netherlands at the time of testing. The bilingual children received non-native Dutch input from at least one of their parents; this parent also participated in the study. Children were tested on general language proficiency and article use in Dutch, as well as non-verbal working memory. Parents were tested on passive vocabulary and article use in Dutch, and engaged in an extensive interview concerning the child's linguistic environment, particularly quantity and quality of input. Children were tested at the playgroup or preschool, whilst their parents were tested either at the playgroup/preschool or at home. In case permission had been granted, video recordings were made during test sessions for later checking.

In the following chapter, the results of the present study will be presented.

4. Results

4.1 Introduction

This chapter presents an overview of the analyses that have been carried out to answer the research questions, and the results that have come out of them. The results for the first research question, i.e. how bilingual children compare to their monolingual peers terms of Dutch language proficiency, will be discussed in section 4.2. The second part of the chapter, section 4.3, discusses the results for the second research question, i.e. what the effects of non-native Dutch input are on bilingual children's language proficiency. Section 4.4 provides a summary of this chapter. The analyses presented in this chapter were carried out using IBM SPSS statistics (2011).

4.2 Research question I: comparing bilingual and monolingual children

All outliers were removed before running the analyses. In order to investigate whether the monolingual and bilingual children matched on SES and age at time of testing, a prerequisite for being able to compare their Dutch language abilities, independent t-tests were performed for these two variables. The monolinguals (M= 3.00, SD= .74) matched the bilinguals (M= 3.22, SD= 1.04) on SES: $t(33)= .641$, $p= .526$. However, there was a significant difference in age between the two groups, the monolinguals (M= 37.2, SD= 5.18) being younger than the bilinguals (M= 41.2, SD= 4.96): $t(36)=2.338$, $p= .025$. This must be kept in mind when reading and interpreting the results presented in this section.

4.2.1 CELF

To investigate how the bilingual children compared to the monolingual children on general language proficiency in Dutch, an independent t-test was carried out for their raw scores on the CELF. On average, the monolinguals (M= 32.5, SD= 13.8) scored higher on the CELF than the bilinguals (M= 26.2, SD= 14.8), however, the difference was not significant: $t(35)= -1.277$, $p= .210$.

4.2.2 EP task

The bilingual and monolingual children were also compared on their (pragmatic) ability to use articles in given (definite condition) and non-given (indefinite condition) contexts. As was explained in section 3.3.2, in performing the elicited production task of this study, children could either omit or substitute the article, or use it correctly. Three bilingual children were unable to complete the indefinite part of the EP task, i.e. three or more of their answers in this condition were categorised as 'other'. The scores of these three children on the indefinite part of the EP task were therefore not taken into consideration.

Descriptives

Figure 2 presents an overview of the children's results for the definite condition of the elicited production task. Figure 3 shows the results for the indefinite condition. As can be seen in these figures, article use patterns look quite similar for monolingual and bilingual children, although the bilinguals seem to use less articles correctly and omit slightly more than the monolinguals in the definite condition. Both groups made no substitution errors in the indefinite condition and used the indefinite article quite accurately.

Figure 2 - Mean percentages correct article use, substituted articles and omitted articles in the definite condition across groups. Error bars represent standard deviations.

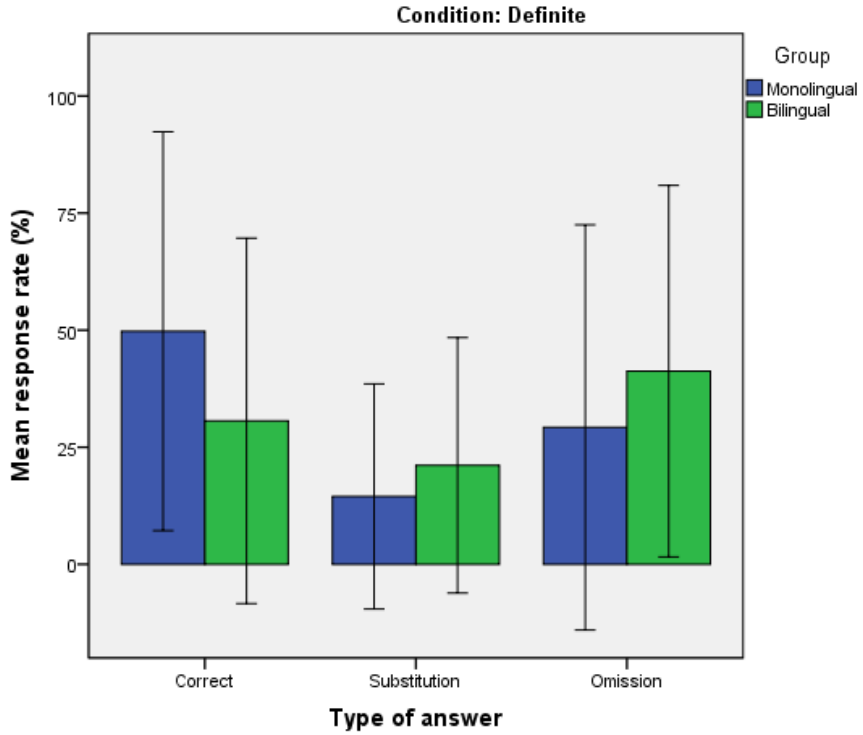
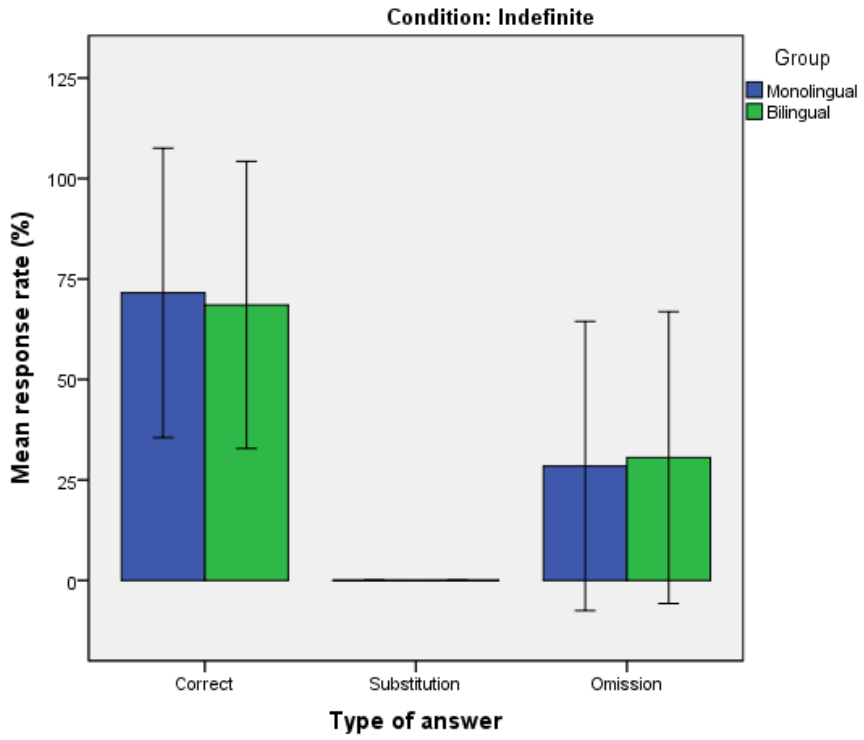


Figure 3 - Mean percentages correct article use, substituted articles and omitted articles in the indefinite condition across groups. Error bars represent standard deviations.



RM-ANOVA

In order to compare the rates of correct article use across groups and across conditions, a repeated measures ANOVA for accuracy (rate of correct definites/indefinites) was performed, with condition (definite or indefinite) as within-subjects factor and group (monolingual or bilingual) as between-subjects factor. The within-subjects test revealed that accuracy was significantly affected by condition, $F(1,33)= 14.436$, $p= .001$. Thus, both monolinguals and bilinguals scored significantly better on indefinites than on definites. The between-subjects test revealed no significant difference in accuracy between groups, $F(1,33)= .697$, $p= .410$. No significant interaction effect was found between condition and group: $F(1,33)= .751$, $p= .392$.

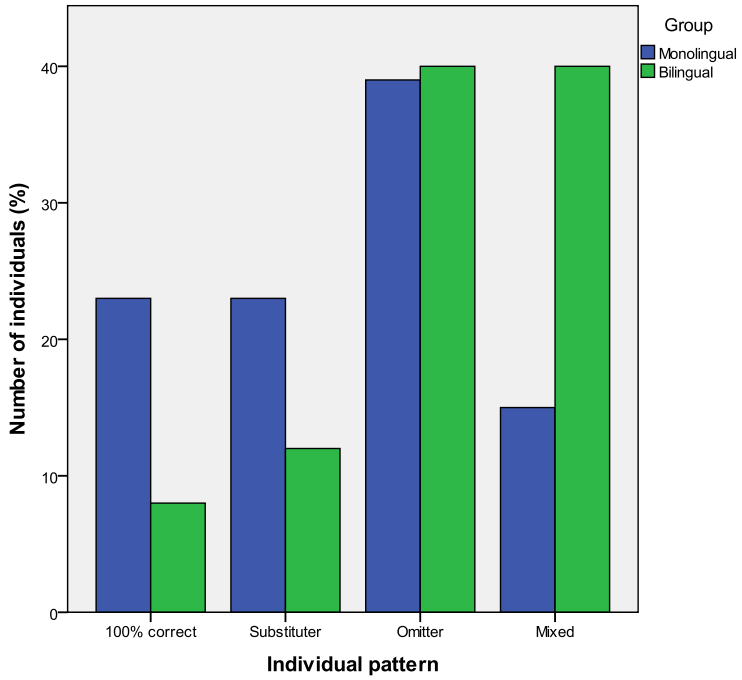
Individual patterns

Although monolinguals and bilinguals show no significant differences in article use at the group level, differences between both groups may still occur at the individual level. Therefore, an analysis was made of the children's individual patterns. Each child was assigned one out of four different individual patterns (following Blom et al., 2014):

- 100% correct: the participant did not make any mistakes in either of the conditions
- Omitter: the participant made at least one omission error in at least one of the conditions, and made no substitution errors
- Substituter: the participant made at least one substitution error in at least one of the conditions, and made no omission errors
- Mixed: the participant made at least one omission error and one substitution error in either of the conditions

The three children who were unable to complete the indefinite part of the EP task made only omission errors in the definite condition as well as in the part of the indefinite condition they did complete, and were therefore categorised as omitters. Of the monolingual children, three were categorised as 100% correct, three as substituter, five as omitter and two as mixed. Two bilingual children were categorised as 100% correct, three as substituter, ten as omitter and ten as mixed. Figure 4 presents the distribution of children over the four different individual patterns in percentages per group. As can be seen in the figure, the percentage of omitters is about the same for both groups. Monolinguals and bilinguals seem to differ however on the other patterns, with the monolinguals showing 100% correct and substituter patterns more often, whilst the bilinguals show a mixed pattern more often. However, after the raw numbers had been entered in a table, a Fisher's Exact test was performed on the data, which revealed no significant difference in the distribution of patterns between the two groups (p= .278).

Figure 4 – Distribution of individual patterns for monolingual and bilingual children in percentages across conditions



4.3 Research question II: effects of non-native input on bilingual children's Dutch language proficiency

For this part of the analysis, only the data from the bilingual children were taken into account. The data from their parents were used to get a closer look at the amount and type of input they received, and, most importantly to determine the effects of non-native input on the children's language acquisition. Again, all outliers were removed before running the analyses.

4.3.1 Descriptives

Predictor variables

A list of all predictor variables used for this study, as well the mean scores, standard deviations and ranges, is provided in Table 3. The variables are categorised as internal or external, depending on whether they are inherent to the child, or concern properties of the child's environment, more specifically, of the linguistic input the child receives. The child-internal factors are subdivided in age-related and cognition-related factors. The child-external factors are subdivided in family-related, quantity of input-related and quality of input-related factors.

Table 3 – List of variables used to predict children's Dutch language proficiency

Type		Predictor	N	Mean	SD	Range
Internal	Age	**ATT (months)**	25	41.2	5.18	32 – 47
		CLoE (years)	25	1.96	1.03	.16 – 3.72
	Cognition	**WM**	25	7.88	2.01	4 – 11
External	Family	**SES**	23	2.96	1.34	1 – 5
		No. older sibl.	24	.96	1.06	0 – 3
	Quantity	**Quanthome**	24	62.2	21.9	21 – 94
	Quality	**Variety NNS**	23	2.08	.95	1 – 3
		SRPmother	24	3.86	.83	3 – 5
		wSRPmother	25	2.49	1.36	.35 – 5.00
		QuantNN	25	62.6	32.7	5 – 100
		pDefCor	23	88.7	14.4	60 – 100
		pIndefCor	23	93.0	12.9	60 – 100
		PPVT	14	140.0	24.5	97 – 195

Within the group of child-internal variables, the age-related variables were *age at time of testing* (ATT) and *cumulative length of exposure* (CLoE). The children's ATT fell well within preschool age (i.e. 2.5 to 4 years). As described in section 3.4.1 above, CLoE reflects the total amount of time that the child has been exposed to Dutch since birth. Being dependent on the child's age, we consider CLoE as an age/time-related, and therefore child-internal, factor here (cf. Chondrogianni & Marinis, 2011 for *traditional* length of exposure).[16] As can be seen in Table 3, even though the children were all still very young, their CLoE already varied considerably, ranging from hardly any exposure to Dutch, to almost only exposure to Dutch. The cognition-related variable included in this study was *working memory* (WM), the final internal variable. This variable was included because it could explain possible individual differences between the children which were due to general cognitive capacities rather than to pure linguistic factors. As can been seen in Table 3, there was considerable variation in the children's WM, even though age was controlled for. Moving on to the external factors, the family-related variables were *socio-economic status* (SES) and *number of older siblings* (No. older siblings). These factors were included because they tell us something about the type and amount of linguistic interactions the child experiences at home. A single quantity of input-related factor was included in this study: *current quantity of Dutch input at home* (Quanthome, presented in percentages). As was explained in section 3.4.1, this factor tells us the percentage of Dutch input (as opposed to input in the other language) the child currently (i.e. at the time of testing) receives at home. Note that unlike CLoE, current quantity of input at home is not related to or dependent on age. On average, most of the input the children received at home was in Dutch (62%), although

[16] See however Paradis (2011) and Unsworth (2012) for examples of traditional and cumulative length of exposure being regarded as external factors.

there was a rather large amount of variation (21-94%). Being the focus of this study, the qualitative factors were more numerous, seven in total. The children received input from one, two or three different non-native speakers, so the *variety of non-native speakers* was rather small in range. *Mother's self-rated proficiency* (SRPmother) was relatively high, with all mothers scoring between 3 and 5 out of a maximum of 5 points. *Mother's weighted self-rated proficiency* (wSRPmother) ranged from .35 to 5 and showed therefore a bit more variation. The *quantity of non-native Dutch input at home* (QuantNN, presented in percentages) was rather high on average (63%), although there was a large variation between children, ranging from hardly any non-native input (and thus almost only native input) to only non-native input at home. The final three qualitative variables regard the parents' scores on the linguistic tasks. As can be seen in Table 3, parents scored really well on the definite part of the EP task (pDefCor, presented in percentages), with 89 percent correct articles used on average, as well as on the indefinite part of the EP task (pIndefCor, presented in percentages), with on average 93 percent of articles used correctly. Parents' raw scores on the *PPVT* ranged from 97 to 195, and showed therefore a considerable amount of variation. Note though that only fourteen parents performed the PPVT.

Outcome variables

Table 4 provides an overview of the outcome variables used for this study: CELF, children's rate of correct definites (cDefCor, presented in percentages) and children's rate of correct indefinites (cIndefCor, presented in percentages). Recall that three children were unable to complete the indefinite part of the EP task, i.e. they produced less than three target structures out of six, and were therefore excluded from the analysis.

Table 4 – List of outcome variables for children's Dutch proficiency

Outcome	N	Mean	SD	Range
CELF	24	26.2	14.8	3 – 56
cDefCor	25	30.6	39.0	0 – 100
cIndefCor	22	68.6	35.7	0 – 100

There is considerable variation in all three of the outcome variables, with CELF raw scores ranging from 3 to 56, and with both parts of the EP task ranging from 0 to 100 percent correct articles used. Recall from section 4.2.2, however, that the children scored significantly better on the indefinites than on the definites, which is reflected in the mean scores: 69 percent correct articles versus 31 percent correct articles respectively.

4.3.2 Correlations between predictor variables

In order to find out whether there were correlations between any of the predictor variables, and if so, whether multicollinearity occurred, the predictor variables were entered into a correlation matrix. Multicollinearity was defined as a correlation coefficient above .70 or below -.70. Table 5 shows all significant correlations between predictor variables.

Table 5 – Significant correlations between predictor variables

	ATT	CLoE	SES	No. older siblings	Quant home	SRPmoth	wSRPmoth
CLoE		1					
SES			1				
No. older sibl.			-.457*	1			
Quanthome		.610**			1		
SRPmother			.592**	-.442*		1	
wSRPmother		.451*	.620**		.545**	.748**	1
VarietyNNS	-.449*		-.510*				
QuantNN		-.432*					
pDefCor		-.433*					-.488*
PPVT			.816**			.635*	.693**

*p <.05, two-tailed. **p <.001, two-tailed.

As can be seen in Table 5, there was a weak negative correlation between age at time of testing and variety of non-native speakers. Cumulative length of exposure correlated strongly with quantity of input at home, and weakly with mother's weighted SRP. Weak negative correlations existed between cumulative length of exposure and both quantity of non-native input and parent's rate of correct definites. Weak negative correlations existed between SES and both number of older siblings and variety of non-native speakers. Furthermore, SES correlated strongly with SRPmother and weighted SRPmother, and correlated with the PPVT to the point of multicollinearity. There was a weak negative correlation between number of older siblings and mother's SRP. A strong positive correlation existed between quantity of input at home and mother's weighted SRP. Multicollinearity was found between mother's SRP and mother's weighted SRP. Both variables also correlated with the PPVT. A weak negative correlation was found between mother's weighted SRP and parent's rate of correct definites. However, the correlation between the tested parent's weighted SRP and their rate of correct definites was not significant. Working memory and parent's rate of correct indefinites were not significantly correlated to any of the other predictor variables.

4.3.3 Correlations between outcome variables

The outcome variables were also entered into a correlation matrix to find out how they related to each other. The significant correlations between the outcome variables are presented in table 6.

Table 6 – Significant correlations between outcome variables

	cDefCor	cIndefCor
CELF	.617**	.747**

***p* <.001, two-tailed.

The CELF correlated strongly with children's rate of correct definites as well as children's rate of correct indefinites. No significant correlation was found between children's rate of correct answers on both parts of the EP task.

4.3.4 Correlations between predictor and outcome variables

In order to find out which predictor variables correlated with the different outcome variables, and might therefore be of influence to children's linguistic abilities in Dutch, another correlation matrix was created. An overview of the significant correlations between predictor and outcome variables is provided in Table 7. In the following subsections the results will be discussed for each outcome variable separately.

Table 7 – Significant correlations between predictor and outcome variables

Type	Predictor	CELF	CDefCor	CIndefCor
Age	**ATT**	.563**		
	CLoE	.474*		.566**
Cognition	**WM**		.417*	
Family	**SES**	.523*	.520*	
Quality	**VarietyNNS**	-.424*	-.510*	
	wSRPmother	.533**		
	PPVT		.605*	

**p* <.05, two-tailed. ***p* <.001, two-tailed.

CELF

Strong positive correlations existed between the CELF and both age at time of testing and mother's weighted SRP. The CELF also correlated weakly with cumulative length of exposure and SES. A weak negative correlation existed between the CELF and variety of non-native speakers. To investigate which factors could explain most of the variance in children's CELF scores, a regression analysis was performed, the results of which will be discussed in section 4.3.5.

Rate of correct definites

Children's rate of correct definites correlated weakly and positively with SES, working memory and parents' PPVT scores. There was a weak negative correlation between children's rate of correct definites and variety of non-native speakers. As children's rate of correct definites correlated with only four predictor variables, of which one had an N of only fourteen, it was not considered useful to carry out a regression analysis. In order to still investigate the role of qualitative factors in children's correct use of definite articles, partial correlations were performed for variety of non-native speakers and PPVT, controlling for SES and working memory. This analysis revealed that the correlations between children's rate of correct definites and both variety of non-native speakers and PPVT were not significant anymore when SES and working memory were controlled for ($r(21)= -.299$, $p= .214$ and $r(14)= .347$, $p= .269$ respectively).

Rate of correct indefinites

Children's rate of correct indefinites significantly correlated with only one predictor variable: cumulative length of exposure. As no more than one predictor variable correlated with children's correct use of indefinite articles, it was considered not useful to perform a regression analysis for this outcome variable.

4.3.5 Regression analysis CELF

The variance in a certain outcome variable is not simply explained by the sum of all the significant predictor variables. Instead, the predictor variables form a complicated interplay, which can explain different amounts of variation in different configurations. In this study, we are interested in finding out the additional value of qualitative factors in explaining the variance in children's raw scores on the CELF, when added to a statistical model in which the internal and other external factors have already been taken into account. Predictors were therefore entered blockwise into a hierarchical regression, with the internal variables forming the first block, the external, family-related factors constituting the second, the external, quantitative factor forming the third, and finally the external, qualitative factors representing the fourth block.

Before the actual analysis could be carried out, it was first necessary to establish which predictors would be used in the model. As every predictor may in principle have an effect on the outcome variable, even if the correlation between predictor and outcome was not significant, all predictors listed in Table 7 above were entered into the model. An exception was made for PPVT and mother's SRP, because multicollinearity was found with SES and mother's weighted SRP respectively. SES was chosen over PPVT, even though the latter variable gives us more precise information about the parent's linguistic abilities, because only fourteen parents had carried out the

passive vocabulary task. The variable would therefore reduce the statistical power of the model. Mother's weighted SRP was chosen over mother's SRP, because the former variable is more comprehensive. Moreover, mother's weighted SRP correlated significantly with children's CELF scores, whereas mother's SRP did not. Parent's rate of correct definites and indefinites were also not used in the regression analysis, as these variables only served to predict children's article use, not their general language proficiency. Thus, the following variables were used in the model:

- Internal: ATT, CLoE, WM
- External, family-related: SES, no. older siblings
- External, quantitative: Quanthome
- External, qualitative: variety of NNS, wSRPmother, QuantNN

Instead of running the regression analysis with all variables, we will first run a basic model with all variables except the qualitative ones. The internal, family-related and quantitative variables will be entered in separate blocks, in order to establish the relative importance of the internal variables, and the additional value of the family-related and quantitative variables.

Model 1

In the first model (N=21), the internal variables were entered as the first block, the family-related variables as the second, and the quantitative variable was entered as the third block. The results of the analysis are presented concisely in Table 8, please see Appendix D for a more extended table, in which all variables (significant and non-significant) are shown. The first block was able to explain 40 percent of the variance in children's raw scores on the CELF. In this block, age at time of testing was the only (marginally) significant predictor (p= .05). The second block was able to explain an additional 24 percent of the variance in the children's scores, which was a significant change (p< .05). The total amount of variance explained by the first two blocks together was 64 percent. After the addition of the second block, age at time of testing remained a significant predictor (p< .05), whilst number of older siblings was marginally significant (p= .08). The addition of the third block did not result in more variance being explained (ΔR^2= .000). This is probably due to multicollinearity between cumulative length of exposure and quantity of input at home, as these variables correlated strongly with each other (see section 4.3.2). After the third block had been added, age at time of testing remained the only significant predictor for children's CELF scores (p< .05), with number of older siblings still being marginally significant (p= .09). With every month in age added, the child's score would increase by 1.25 points, whilst with every older sibling, the child's score would actually decrease by 6.13 points.

Table 8 – Regression analysis results for CELF scores based on model 1

Predictor	Unstandardised Coefficients		Standardised Coefficients	t	Sign.
	B	Std. Error	Beta		
Block 1					
(Constant)	-45.046	27.144		-1.660	.115
ATT	1.261	.603	.422	2.091	.052
Block 2					
(Constant)	-47.367	23.537		-2.013	.062
ATT	1.250	.514	.418	2.429	.028
No. older sibl.	-6.131	3.219	-.347	-1.905	.076
Block 3					
(Constant)	-47.306	27.083		-1.747	.103
ATT	1.249	.568	.417	2.200	.045
No. older sibl.	-6.129	3.356	-.347	-1.826	.089

R^2= .401 for block 1 (F= 3.801, p= .030), ΔR^2= .237 for block 2 (F Change= 4.912, p = .023, F = 5.295, p= .005), ΔR^2= .000 for block 3 (F Change= .000, p = .996, F = 4.118, p= .014)

Model 2

As it was found in the previous model that the addition of the quantitative factor (the third block) did not significantly increase the model's predictive power, it was left out in the second model. In this model (N=20), the internal variables were entered as the first block, the family-related variables as the second block, and the qualitative variables as the third block. Recall that the qualitative variables were variety of non-native speakers, mother's weighted SRP and quantity of non-native input. Table 9 summarises the results of the analysis; a more elaborate overview of results can be found in Appendix D. The first block of variables was able to explain 46 percent of the variance in children's CELF scores. As was the case in the previous model, age at time of testing was the only significant predictor in this block (p< .05). Similar to the previous model, the second block was able to explain an additional 24 percent of the variance in the children's scores. This change was significant (p< .05). Together, the first two blocks of this model explained 71 percent of the variance in the children's scores. Both age at time of testing and number of older siblings were significant predictors of the outcome (p< .01 and p< .05 respectively). The addition of the third block, i.e. the qualitative variables, did not result in significantly more variance being explained (ΔR^2= .014, p= .91). The total amount of variance explained by the model was 72 percent. After the third block had been entered to the model, age at time of testing remained a significant predictor (p< .05), whereas number of older siblings was only marginally significant (p= .10). With every month in age added, the child's score would increase by 1.59 points, whilst with every older sibling, the child's score would decrease by 7.75 points.

Table 9 – Regression analysis results for CELF scores based on model 2

Predictor	Unstandardised Coefficients		Standardised Coefficients	t	Sign.
	B	Std. Error	Beta		
Block 1					
(Constant)	-49.680	25.106		-1.979	.065
ATT	1.616	.606	.552	2.669	.017
Block 2					
(Constant)	-55.879	20.576		-2.716	.017
ATT	1.588	.492	.543	3.226	.006
No. older sibl.	-6.244	2.907	-.355	-2.147	.050
Block 3					
(Constant)	-50.359	37.711		-1.335	.209
ATT	1.592	.601	.544	2.646	.023
No. older sibl.	-7.750	4.300	-.440	-1.802	.099

R^2= .464 for block 1 (F= 4.614, p= .016), ΔR^2= .243 for block 2 (F Change= 5.804, p= .015, F= 6.752, p= .002), ΔR^2= .014 for block 3 (F Change= .018, p= .908, F= 3.546, p= .028)

4.3.6 Individual patterns EP task

As no effects were found for parents' rate of correct definites and indefinites on children's accuracy in article use at the group level, it was considered useful to take a closer look at how the individual children and their parents behaved. Figures 5 and 6 provide an overview of children's and parents' mean scores on the definite and indefinite part of the EP task respectively.

As can be seen in Figure 5, the parents scored much better on the definite articles than the children did. Also, the parents made no omission errors, whilst the children omitted articles in almost 50 percent of cases. The parents did make some substitution errors, although they were still less in number than the children's substitution errors. Please note that the standard deviations of the children's scores are rather large, whereas those of the parents' scores are much smaller.

Although the children scored significantly better on the indefinites than on the definites (see section 4.2.2), the parents were more accurate in the indefinite condition as well (see Figure 6). As was the case in the definite condition, the parents did not omit any articles in the indefinite condition either. They did make some substitution errors, whilst the children did not. However, the parents' mean rate of substitution was only four percent. Again, standard deviations were much larger for the children's scores than for the parents' scores.

Figure 5 –Children's and parents' mean percentages correct article use, substituted articles and omitted articles in the definite condition. Error bars represent standard deviations.

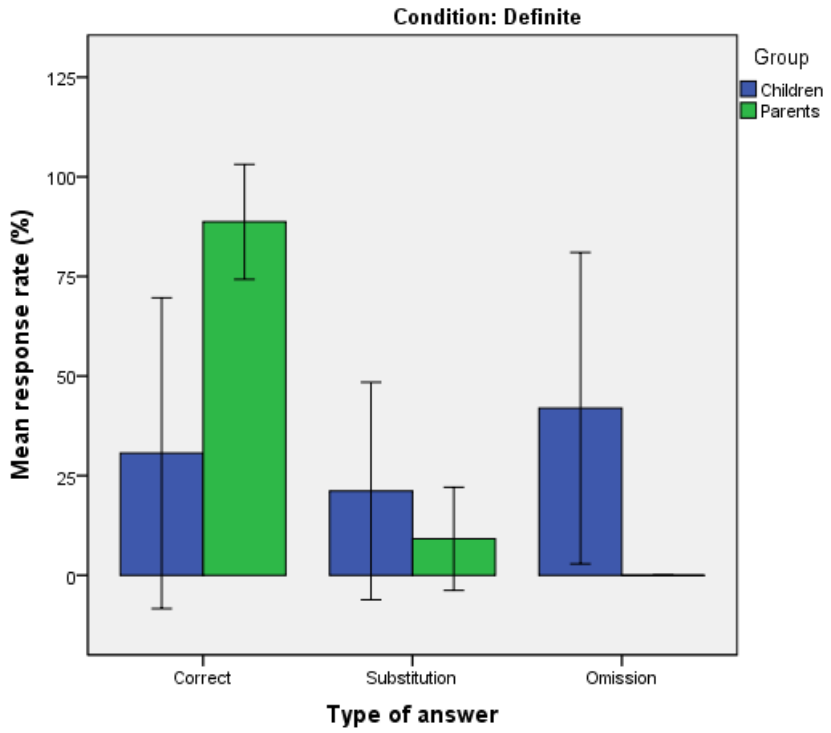
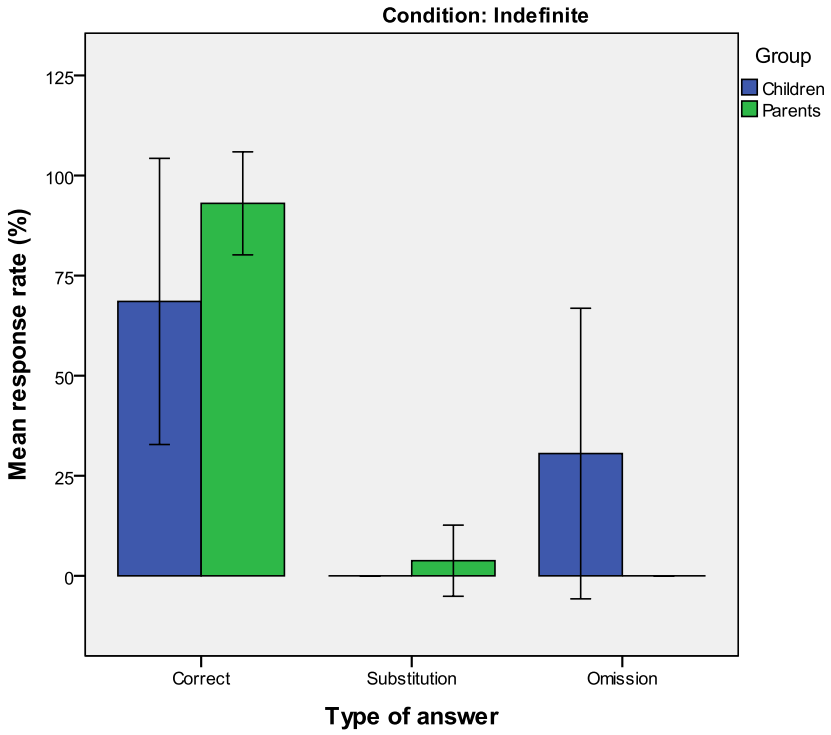


Figure 6 – Children's and parents' mean percentages correct article use, substituted articles and omitted articles in the indefinite condition. Error bars represent standard deviations.



As may be recalled from section 4.2.2, children were assigned one out of four different individual patterns: 100% correct, substituter, omitter and mixed. The criteria on the basis of which the categorisation was made (following Blom et al., 2014), will be repeated here for the reader's convenience:

- 100% correct: the participant did not make any mistakes in either of the conditions
- Omitter: the participant made at least one omission error in at least one of the conditions, and made no substitution errors
- Substituter: the participant made at least one substitution error in at least one of the conditions, and made no omission errors
- Mixed: the participant made at least one omission error and one substitution error in either of the conditions

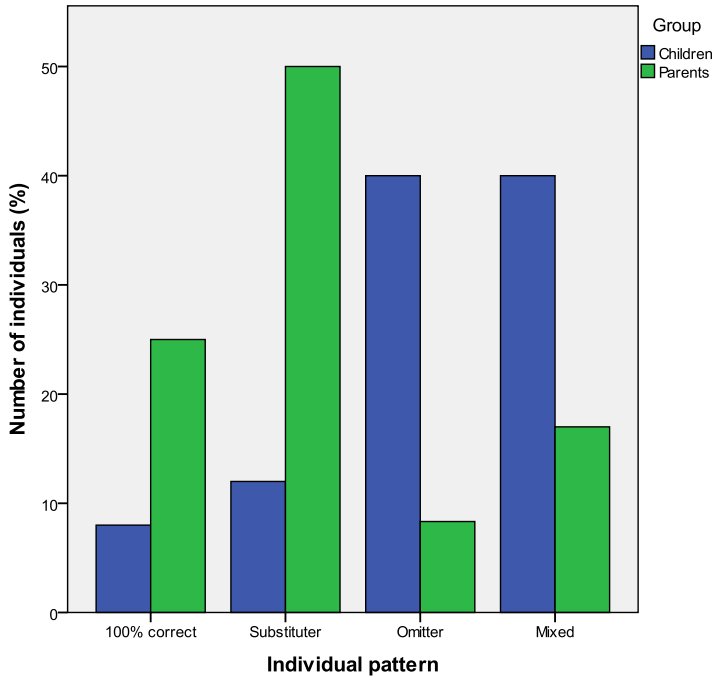
The parents were assigned an individual pattern following the same criteria: six parents obtained a perfect score and were thus categorised as 100% correct, twelve were substituters, two were omitters, and four made both substitution and omission errors, and were therefore assigned the mixed pattern (cf. section 4.2.2 above for the results of the children).[17] Figure 7 shows the distribution of participants over the four different patterns in percentages per group. From this figure it becomes clear that, whilst most of the children were either an omitter or showed a mixed error pattern, half of the parents were substituters and 25 percent obtained a perfect score. Looking at an individual child's pattern and the pattern of the child's parent, there was an overlap of patterns in 32 percent of the cases.

In order to investigate whether children of substituters made more substitution errors than children of non-substituters, the children were divided into two groups based on whether their parents made at least two substitution errors across both conditions. The threshold was set at two errors, because the aim was to exclude any parents who accidentally made a single error and were in fact perfectly able to use articles in a pragmatically felicitous way. An independent t-test was carried out to compare the substitution rates of both groups of children. This could only be done for the definites, as none of the children made substitution errors in the indefinite condition. On average, children of substituters (M= 29.0, SD= 32.7) made more substitution errors than children of non-substituters (M= 17.7, SD= 25.0); however, the difference was not significant: $t(21) = -.911$, $p = .373$. The same procedure could not be carried out for omission errors, as none of the parents

[17] Recall that two bilingual children were twins, hence the total number of parents is 24.

passed the threshold of making a minimum of two errors across conditions. That is, none of the parents made more than one omission error throughout the entire task.[18]

Figure 7 – Distribution of individual patterns for children and parents in percentages across conditions



4.4 Summary

In this chapter the results of the study were presented. It was found that the bilingual children did not differ significantly from the monolingual children in general language proficiency and correct article use, although the monolinguals were significantly younger. No significant difference was found between the two groups of children in the distribution over four individual patterns: 100% correct, substituter, omitter and mixed.

In terms of the effects of non-native input on bilingual children's language proficiency, a negative correlation was found between variety of non-native speakers and both general language proficiency and the correct use of definite articles. Furthermore, positive correlations were found between mother's weighted self-rated proficiency and the child's general language proficiency, and between the tested parent's passive vocabulary and the child's correct use of definite articles. No correlations were found between qualitative factors and the correct use of indefinite articles. The correlations between the qualitative factors and the correct use of definite articles disappeared

[18] Note that analysing the two conditions separately would not be of any additive value here, as the parents would still not pass the aforementioned threshold.

when controlling for the internal factors socio-economic status and working memory. A regression analysis with general language proficiency as the outcome variable revealed age at time of testing and number of older siblings as the only significant predictors. When looking at individual patterns, no significant difference in rate of substitution was found between children of substituters and children of parents who did not make substitution errors.

These results will be interpreted and discussed within the context of the existing literature in the following chapter.

5. Discussion

5.1 Introduction

In this chapter the results of the present study will be summarised and interpreted in the context of the literature discussed in Chapter 2. The discussion is split into two parts, corresponding to research questions I and II. In section 5.2 the results regarding the differences and similarities between monolingual and bilingual children will be put in perspective. In section 5.3, the results concerning the effects of non-native input on bilingual preschoolers' Dutch language proficiency will be discussed in the light of recent literature. The chapter ends with a summary (section 5.4).

5.2 Research question I: comparing bilingual and monolingual children

5.2.1 General discussion

The first research question investigated how bilingual preschoolers who receive non-native input compared to their monolingual peers with respect to their Dutch language proficiency. It was found that both groups scored equally well on general language proficiency as well as on accuracy in the use of definite and indefinite articles. Thus, it seems that the bilingual children in our study acquire Dutch in a similar way as monolingual children do. However, the monolingual children were significantly younger than the bilinguals. Although unfortunately we were unable to directly compare the bilingual children in our study to age-matched peers, the fact that the monolingual children in our study scored as well as the bilinguals did, even though the former group was younger, seems to suggest that bilingual children need more time to reach the same proficiency level as their monolingual peers. In other words, the bilingual children in our study seem to acquire Dutch at a slower rate than monolingual children do.

It is important to keep in mind however that the bilingual children had been exposed to Dutch for only two years on average. The monolinguals, on the other hand, were on average about three years old and had been exposed only to Dutch throughout their lives. Thus, when we take the amount of exposure that the children have received over time into account, that is, their *cumulative* length of exposure, the bilingual children do not seem to lag behind so much (see Unsworth, 2013 for a discussion of this topic). In this sense, then, the bilingual children in our study seem to catch up with their monolingual peers rather quickly.

Overall, we may say that the effects of non-native input on the bilingual children in our study seemed small, because the bilingual children's developmental path did not seem to differ from that of monolingual children and they seemed to keep up with their monolingual peers quite well in terms of rate of acquisition. It must be emphasised though, that a better control group, i.e. with

monolingual children that are matched in age with the bilinguals, is mandatory in order to be able to draw any firm conclusions on this issue. In section 5.3 the effects of non-native input on the bilingual children's Dutch language development will be discussed in more detail. The following section provides an in-depth discussion of the results from the elicited production task.

5.2.2 Elicited Production task

Let us now take a closer look at the results from the elicited production task, which measured the use of definite and indefinite articles in discourse-given and discourse-new contexts. Recall from Chapter 2 that two types of errors have been described in the literature: egocentric errors and incoherence errors. Examples of an egocentric error and an incoherence error that were presented in Chapter 2 are repeated here as 5 and 6 respectively for the reader's convenience (adapted from De Cat, 2011: 5).

(5) #He takes the block. (block unknown to hearer)

(6) #He sees a pig. (pig previously identified)

On the basis of the previous literature, we expected the bilingual children to show different error patterns than the monolingual children. More in particular, because previous research has indicated that monolingual children make egocentric errors as well as incoherence errors (De Cat, 2011), it was expected that the monolingual children in the present study would make both types of errors as well. As for the bilingual children, previous research has revealed that egocentric errors prevailed in 2L1 and child L2 learners, with incoherence errors occurring only at a low rate (Ionin et al., 2009; Zdorenko and Paradis, 2011; Chondrogianni et al., 2014). We expected the bilingual children in the present study to mirror this pattern. Our second prediction was that the bilingual children would omit articles more frequently than the monolingual children. This was because Chondrogianni et al. (2014) found that the child L2 learners in their study made significantly more omission errors than the monolingual controls.

Summarising the results of the present study, it was found that both the monolingual and the bilingual children were significantly more accurate in their use of indefinite articles than in their use of definite articles. As was mentioned before, no significant difference in accuracy was found between the two groups in either of the conditions. Also, none of the children – bilingual or monolingual – made egocentric errors. Incoherence errors occurred in both groups, however: the monolingual children made this type of error at a rate of about 15 percent, whilst the bilingual children did so at a rate of about 20 percent. Thus, against our expectations, no evidence was found

for the prediction that bilingual and monolingual children would show different error patterns in terms of the occurrence of egocentric and incoherence errors. Furthermore, although we did not measure this directly, there seemed to be no significant difference in rate of omission errors between the two groups. The results from our analysis of children's individual patterns reinforced this observation, as no significant difference could be found between the monolingual and bilingual children in terms of their distribution over different error patterns. Thus, there seemed to be as many omitters in the monolingual group as there were in the bilingual group. We can therefore conclude that no evidence was found for the expectation that the bilingual children would make more omission errors than the monolingual children. As none of our predictions were borne out, the question arises how we can explain the results of the present study. In what follows, I will attempt to answer this question, addressing first the results regarding egocentric and incoherence errors and subsequently the results concerning omission errors.

Egocentric and incoherence errors

In order to find an explanation for the results of the present study, it is useful to reconsider the different theories that have been put forward to explain monolingual and bilingual children's egocentric and incoherence errors. Recall from Chapter 2 that the different theories could be divided into four categories: syntactic, pragmatic, semantic and cognitive. In what follows, we will evaluate how well each of the theories can predict the results of the present study.

We may disregard pragmatic and semantic theories straight away, as they were designed to explain egocentric errors, but cannot explain incoherence errors. More in particular, pragmatic theories (e.g. Schaeffer and Matthewson, 2005; Rozendaal and Baker, 2008) suggest that children make egocentric errors because they adopt an egocentric view, thereby failing to take the listener's perspective into consideration. The results of the present study actually show the opposite: monolingual as well as bilingual children are in fact able to select the indefinite article to refer to a referent that is unknown to the hearer from as young as preschool age. As for the semantic theories, we saw in Chapter 2 that Zdorenko and Paradis (2011) have suggested that children's difficulties with selecting the correct article are due to the inherent complexity of the indefinite article. The results of the present study show that children do know how to use the indefinite article properly. As a matter of fact, the children in our study were even more accurate with the indefinite article than with the definite article. A second semantic theory was provided by Ionin et al. (2009), who suggested that children optionally use the definite article to mark specificity. However, this theory cannot explain why children make incoherence errors. Thus, both pragmatic and semantic theories are unable to explain the results of the present study.

Let us now move on to the syntactic theory which was put forward by Schafer and De Villiers (2000). Similar to the present study, Schafer and De Villiers also found incoherence errors and no egocentric errors. However, there is a fundamental problem with Schafer and De Villiers' explanation for their findings. Schafer and De Villiers' theory is based on the assumption that children will use articles correctly once Theory of Mind (ToM) is in place. De Cat (2013) has however shown that there is no direct relationship between passing ToM-tests and correct article use. Therefore, Schafer and De Villiers' theory could only explain the results if it were modified in some fundamental fashion.

This leaves us with the cognitive theory that has been put forward by De Cat (2011). As was discussed in section 2.5.2, De Cat suggested that children possess the required linguistic knowledge to use definite and indefinite articles correctly, but they sometimes fail to correctly evaluate the hearer's knowledge state (leading to egocentric errors) and/or the newness of the referent in the discourse (leading to incoherence errors). Recall that in De Cat's study, incoherence errors only occurred when the page of the picture book had been turned and the previously mentioned referent had thus disappeared from the visual context. Strikingly, in the present study, incoherence errors arose under similar conditions. That is, in the present study, a picture containing the target referent appeared first and then disappeared after the referent had been mentioned for the first time. Then a second picture appeared, which again contained the target referent, in order for it to be referred to for the second time. It is very much possible that the young children in our study had difficulties with recognising the target referent in the second picture as being the same as the referent that had appeared in the first picture. This would explain why they sometimes referred to the target with an indefinite article, as if it were new to the discourse. Thus, De Cat's (2011) cognitive theory is able to explain the occurrence of incoherence errors in the present study very well.

However, the question still remains why no egocentric errors were made in the indefinite condition in the elicited production task of the present study. Or, to stay with De Cat's (2011) theory, why the children in our study were always able to correctly evaluate the listener's knowledge state. Although we cannot be sure in this case, my suggestion is that the cognitive demands of the indefinite part of the elicited production task were low to such an extent that the children were able to show their linguistic knowledge, without being impeded by limitations in their processing capacities (cf. Emslie and Stevenson, 1981). I suspect that the cognitive demands were low in this case, because in the indefinite condition, contrary to the definite condition, the target referent did not disappear from the visual context. This would provide the children with the opportunity to take their time to evaluate the discourse, and, importantly, their listener's knowledge state.

Omission errors

Finally, an explanation is required for the fact that no evidence was found for a difference between monolingual and bilingual children in the amount of omission errors that were made. Three issues may be at play here.

First, the monolingual children were relatively young and therefore still made quite a large amount of omission errors (recall from section 2.5.5that omission errors in monolingual Dutch children decrease with age). Had the monolingual control group been age-matched with the bilinguals, maybe we would have found a significant difference in the amount of omission errors between the two groups, as the monolinguals would then have been older and would have probably made less omission errors.

Second, our prediction that the bilingual children in the present study would make more omission errors than the monolingual children was based on Chondrogianni et al. (2014), who studied only children whose first language did not contain articles (i.e. Turkish L1 children). As may be recalled from section 2.5.3, Zdorenko and Paradis (2011) found that children whose first language did not have articles made significantly more omission errors than children whose first language did contain articles. In the present study, the group of bilingual children was heterogeneous in the sense that some of them had a first language without articles (eleven in total), while others had a first language with articles (fourteen in total). As on the basis of Zdorenko and Paradis' (2011) findings we would expect the former group to make more omission errors than the latter group, their results taken together may balance each other out, resulting in a relatively low average of omission errors in the bilingual group compared to the bilinguals in Chondrogianni et al.'s (2014) study.

Third, Zdorenko and Paradis (2011) found that transfer effects in the form of an elevated number of omission errors in bilingual children whose first language does not contain articles were limited. That is, the difference in amount of omission errors between children whose first language contained articles and those whose first language did not contain articles disappeared quickly once the children had received more exposure in their second language. It may be the case that the children in the present study had already received a sufficient amount of exposure to overcome transfer effects.

To summarise, no evidence was found for any differences in linguistic development between bilingual children who receive non-native input and monolingual children. The role of non-native input thus seems limited, although a better control group, consisting of monolingual age-matched children, is needed to be able to make more firm conclusions in the future. The monolingual and bilingual children's error patterns with regards to their use of definite and indefinite articles was

ascribed to the children's cognitive capacities, as well some specific characteristics of the two groups of children.

In the following section, the results regarding the second research question, which aimed to investigate the effects of non-native input on bilingual children's Dutch language proficiency, will be discussed in the light of recent literature.

5.3 Research question II: effects of non-native input on bilingual children's Dutch language proficiency

The second part of the present study focused exclusively on the bilingual children. It addressed the specific effects of non-native input on bilingual children's general Dutch language proficiency, as well as on their use of definite and indefinite articles. This part of the study also examined the relative importance of non-native input compared to other child-internal and child-external factors on the bilingual children's Dutch language development.

On the basis of previous literature, it was expected that non-native input factors such as a low Dutch proficiency level of the mother and a small proportion of Dutch input that is provided by native speakers would negatively affect bilingual children's general Dutch language proficiency. It was also acknowledged though, that other (internal and external) factors could possibly be stronger predictors of the children's outcomes. As for the elicited production task, it was expected that, depending on the relative impact of non-native input, the bilingual children's use of definite and indefinite articles, and in particular their error patterns and error rates, may be more or less affected by their parents' article (mis)use.

The results of the present study showed that different factors measuring various aspects of non-native input correlated with the children's outcomes, although internal and family-related external factors were indeed stronger predictors of children's Dutch language proficiency. More in particular, internal variables *age at time of testing* and *cumulative length of exposure*, family-related variable *socio-economic status*, and qualitative (non-native input) variables *variety of non-native speakers* and *mother's weighted self-rated proficiency* all correlated significantly with the children's scores for general Dutch language proficiency. However, a regression analysis for this outcome variable showed that *age at time of testing* and family-related variable *number of older siblings* were the only significant predictor variables.

The children's accuracy with definite articles correlated significantly with the internal variable *working memory*, family-related variable *socio-economic status*, and qualitative (non-native input) variables *variety of non-native speakers* and *parent's Dutch passive vocabulary*. *Cumulative length of exposure* was the only factor that significantly correlated with children's accuracy with indefinite articles. No regression analyses were performed for children's accuracy with definite and indefinite

articles, as too few predictor variables correlated with these outcome variables. No evidence was found for our prediction that the parents' error rates and/or error patterns would influence the children's outcomes on the elicited production task.

The following two sections provide a more detailed discussion of the results for children's general language proficiency and the children's use of definite and indefinite articles respectively. These sections are followed by a more general discussion of the relative importance of different factors, and the interplay between these factors.

5.3.1 General language proficiency

We saw that age at time of testing and number of older siblings were the only significant predictors of the children's general Dutch language proficiency. Oddly enough, while the children's scores increased with age, they actually decreased with each older sibling the child had.

It is unsurprising that chronological age emerged as a significant predictor for children's general language proficiency, as raw scores were used in this case. It is only logical that older children obtain higher raw scores than younger children, as they are cognitively more mature and have been exposed to language in general for a longer time. Had standardised scores been used, age could have been taken into account on beforehand, and perhaps other factors would have emerged as significant predictors. Recall, however, that this was impossible, as the threshold for calculating standardised scores lay at three years of age, and some of the children included in the present study did not reach this threshold. One solution for this problem would have been to exclude the children who were less than three years old. However, this would result in a problem of statistical power, as the size of the remaining sample would have been too small to be able to perform a regression analysis. Thus, in future research it would be required to include a larger number of children, who are preferably at least three years old, in order to obtain a clearer picture of which factors can predict children's general language proficiency scores after chronological age has been taken into account.

As for the odd finding that the number of older siblings negatively affects children's general Dutch language proficiency, there are a couple of possible explanations. First, it is possible that the negative effect of having more older siblings is actually a reflection of the family's lower socio-economic status. This is a possibility because the two predictor variables were correlated: lower SES families generally had more children, and vice versa (cf. section 4.3.2). SES has been found to be a significant predictor of L1 and L2 children's language development in earlier studies (Hoff, 2006; Bohman et al., 2010; Goldberg et al., 2008). However, if this explanation were correct, this would raise the question why number of older siblings came out as a significant predictor rather than socio-

economic status. On the basis of the amount of variation that the variables showed, it would have been more likely that SES itself was a significant predictor, as this variable had a larger range (see section 4.3.1). Thus, it seems unlikely that this explanation is correct.

A more likely explanation is that the negative effect of the number of older siblings on children's general Dutch language proficiency is due to the nature of the input that older siblings provide. On the basis of previous literature we may assume that input coming from older siblings is less beneficial to children's language development than input from a parent, as it has been shown that older siblings' input is less rich in terms of linguistic complexity and vocabulary than that of mothers (Hoff-Ginsberg and Krueger, 1991). This would not explain, however, why in the present study the effect of older siblings' input is actually *negative*. One explanation could be that the parents in the present study have passed on errors to their older children, who in turn may pass these errors on to their younger siblings. More research is needed to confirm or reject this hypothesis.

Although none of the qualitative factors came out as significant predictors of children's general language proficiency, there were some significant correlations between non-native input factors and the children's outcomes. Specifically, mother's weighted self-rated proficiency correlated with children's general language proficiency. This finding is in line with previous research (Chondrogianni and Marinis, 2011), although in the present study it was found that besides *how well* the mother speaks her second language, it also matters *how often* she speaks it. As the correlation between mother's weighted self-rated proficiency and children's general language proficiency was strong, it is possible that mother's weighted self-rated proficiency would come out as a significant predictor if a larger sample size would have been used.

In addition to mother's self-rated proficiency, children's general language proficiency correlated weakly and negatively with variety of non-native speakers. Again, future research should indicate whether variety of non-native speakers could come out as a significant predictor if a larger group of participants were included. If this would be the case, then it seems that hearing a language from several non-native speakers negatively affects children's language development in that language. This finding would complement Place and Hoff's (2011) finding that hearing a language from various *native* speakers is beneficial to children's language development.

To summarise, in this section explanations were provided for the findings concerning children's general language proficiency. It was suggested that the negative effect of the number of older siblings on children's general language proficiency was due to the nature of older siblings' speech, although it was emphasised that more research is needed to clarify this topic. In the following section, the results of the elicited production task will be summarised and explained in the light of recent literature.

5.3.2 The use of definite and indefinite articles

As for children's accuracy with definite and indefinite articles, it was found that the two outcome variables correlated with different sets of predictor variables. More in particular, children's accuracy with definite articles correlated significantly with working memory, socio-economic status, variety of non-native speakers and the parent's Dutch passive vocabulary, while children's accuracy with indefinite articles correlated with cumulative length of exposure only.

Strikingly, children's accuracy with definite articles correlated with working memory, while their accuracy with indefinite articles did not. This finding corresponds surprisingly well with the theory that was discussed in section 5.2.2 of this chapter, which suggested that children were less accurate with definite articles than with indefinite articles because cognitive demands were higher in the definite part of the task (i.e. the target referent temporarily disappeared from the visual context). The finding that working memory plays a role in article selection, and thus in keeping track of the discourse and the listener's perspective, is in line with research by Hendriks et al. (2014), who found that children with good working memory skills were better able to take their listener's perspective into account when choosing between a full noun phrase or a pronoun in order to refer to a particular entity. It would be interesting to find out whether other executive function skills also play a role in article selection. Evidence from a study by Nilsen and Graham (2009) suggests that this could be the case. Nilsen and Graham found that children with good inhibitory skills were better able to suppress their own (egocentric) point of view and take into account their interlocutor's perspective when selecting one out of two similar objects, of which one was visible to the child but not to the interlocutor while the other was visible to both. These findings suggest that inhibitory control may also play a role in article selection, in the sense that it is possible that good inhibitory control skills may prevent a child from making egocentric errors.

Let us now move on to the other factors that correlated with the outcomes of the elicited production task. As for the children's accuracy with indefinite articles, the only factor that significantly correlated with this outcome was cumulative length of exposure. Thus, it seems that if the cognitive demands of the elicited production task are low (as seemed to be the case for the indefinite part of the task), then children's accuracy with indefinite articles is entirely determined by the amount of exposure they have received over time. The finding that cumulative length of exposure plays a role in bilingual language acquisition is in line with previous research, which has shown that (cumulative or traditional) length of exposure affects the acquisition of Dutch gender (Unsworth, 2012), English vocabulary (Paradis, 2011; Chondrogianni and Marinis, 2011), English verbal morphology (Paradis, 2011) and general grammatical abilities in English (Chondrogianni and Marinis, 2011) in bilingual first language and/or child L2 learners.

As for the results regarding the definite part of the elicited production task, we saw that several factors besides working memory correlated with children's accuracy scores: socio-economic status, variety of non-native speakers and parent's passive vocabulary score. This suggests that contrary to the findings for indefinite articles, non-native input does play a role in children's accuracy with definite articles. More in particular, although we cannot be sure whether there is a causal relation, it seems that hearing Dutch from several non-native speakers negatively affects children's accuracy with definite articles, whilst parents' vocabulary skills seem to have a positive effect. However, when controlling for working memory and SES, the correlation between the non-native input factors and children's accuracy with definite articles disappeared, suggesting that working memory and SES play a more important role than non-native input in the acquisition of the definite article. Although a regression analysis would be needed to confirm this, it seems that internal and family-related factors are stronger predictors of children's accuracy with definite articles than non-native input factors, as was the case for children's general language proficiency as well. Again, future research could tell us whether non-native input factors can emerge as significant predictors if larger sample sizes were used.

As was noted above, no effect was found of the parents' accuracy with definite and indefinite articles on the children's performance on the same task. A closer look at the parents' results reveals a possible explanation for this finding. The parents made no omission errors and made substitution errors only at a very low rate, which may have resulted in ceiling effects. In other words, the parents performed so well on the elicited production task that there was not enough variation in their scores to serve as a predictor for the children's outcomes. A similar explanation may also hold for the finding that children of substituters did not make more substitution errors than children of non-substituters: the substituters did simply not make enough substitution errors to influence their children's article use. Note that this explanation is consistent with Ross and Newport (1996), who suggested that non-native input needs to be fairly inconsistent in order for it to affect children's acquisition patterns. Future research should therefore focus on children who receive non-native input from parents who have a very low proficiency.

Thus, in this section we have seen that no evidence was found for our prediction that non-native input would affect children's use of definite and indefinite articles. Rather, children's accuracy with definite articles seemed to be predicted by their working memory skills as well as their family's socio-economic status. Children's accuracy with indefinite articles was only predicted by the amount of exposure to Dutch that they have received over time. The lack of any effects of the parents' accuracy with definite and indefinite articles on the children's scores on the same task was ascribed

to ceiling effects. In the next section, the relative importance of non-native input factors compared to other child-internal and child-external factors will be discussed.

5.3.3 Relative importance of different factors

In the present study we saw that internal factors and family-related external factors together explained 71 percent of the variance in children's general language proficiency scores. The addition of qualitative (non-native input) factors to the model did not result in significantly more variance in children's outcomes being explained. In other words, other internal and external factors seem to affect children's language development more than input quality. It is important to note though, that this does not necessarily mean that non-native input is unimportant in bilingual children's language development.

First, qualitative factors did significantly correlate with children's outcomes. In particular, variety of non-native speakers correlated (negatively) with children's general language proficiency as well as children's accuracy with definite articles. The fact that significant correlations were found with both these outcome variables suggests that variety of non-native speakers may play a role in bilingual children's Dutch language acquisition, at least to a certain extent. Furthermore, a strong correlation was found between mother's weighted self-rated proficiency and children's general language proficiency. This strong correlation also suggests that the qualitative factor mother's weighted self-rated proficiency does at least play some role in bilingual children's language development, especially since mother's proficiency level has also been found to be a significant predictor of children's outcomes in earlier research (Chondrogianni and Marinis, 2011). Future research with a larger group of participants should shed light on whether the aforementioned non-native input factors could indeed come out as significant predictors of bilingual first language acquirers' language development.

Second, it is often difficult, if possible at all, to separate quantitative from qualitative factors. As was mentioned in section 2.3, qualitative variables often have quantitative aspects in them (and vice versa). It is therefore not surprising that qualitative factors do not come out as significant predictors after input quantity has already been taken into account. Moreover, arbitrary decisions often lie at the basis of the categorisation of variables. These difficulties with disentangling and categorising various factors raise the question of whether it is useful to separate quantitative and qualitative factors in the first place. This issue should be addressed in future research.

Third, as may be recalled from section 4.3.2, many of the predictor variables used in the present study correlated with each other. For example, in our study, children from higher SES families generally had less older siblings and had mothers whose Dutch skills were more advanced than

children from lower SES families. Although all these factors may together work towards the same result (i.e. high SES, few older siblings and a high proficiency of the mother all seem to be beneficial for the child's language development), it is not difficult to imagine why fine-grained factors such as mother's weighted self-rated proficiency do not come out as significant predictors of children's outcomes after very general, coarse-grained factors such as SES have already been taken into account, especially not when the sample size is small.

Finally, our sample may have been biased in the sense that the parents included in the present study may have been relatively proficient in Dutch. The fact that the mothers' self-rated proficiency score was on average four on a scale from zero to five, does indeed suggest that this was the case.[19] Effects of non-native input may be less pronounced if the input is provided by fairly proficient speakers.

In sum, there are several reasons to believe that qualitative, non-native input factors do play a role in bilingual first language acquisition, even though they did not come out as significant predictors in the present study. Future research with a larger group of participants should shed more light onto the exact role which qualitative factors play, while at the same time taking into account the fact that quantitative and qualitative factors are often difficult to disentangle, and that general factors such as socio-economic status can already provide us with a lot of information on the child's linguistic environment.

5.4 Summary

To summarise our discussion of the results of the first research question, it was noted that no significant difference was found between bilingual and monolingual children in their Dutch language proficiency. It was concluded that the bilingual children's language development seemed similar to that of the monolingual children in terms of developmental path as well as rate of acquisition. It was therefore suggested that the effects of non-native input on bilingual children's Dutch language development seem limited. However, it was emphasised that more research, especially research involving an age-matched monolingual control group, is necessary to provide conclusive evidence for this suggestion. With regard to the elicited production task, it was proposed that the occurrence of incoherence errors and the lack of egocentric errors could be explained by a cognitive theory, which suggests that children sometimes have difficulties with evaluating the discourse and the listener's knowledge state, especially when the referent has temporarily disappeared from the visual context.

[19] It must be acknowledged though that there was considerable variation in parents' passive vocabulary scores. However, only 14 out of 24 parents carried out the passive vocabulary task.

The lack of a difference in amount of omission errors between monolingual and bilingual children in this study was ascribed to the specific characteristics of both groups.

As for the second research question, no evidence was found for a direct effect of non-native input on bilingual preschoolers' Dutch language proficiency. Although general language proficiency did correlate with mother's self-rated proficiency and variety of non-native speakers, chronological age and number of older siblings were stronger predictors of the outcome. It was suggested that the reason why older siblings negatively affect children's language development must be sought in the nature of the input that older siblings provide. For children's accuracy with definite articles, correlations were found with variety of non-native speakers and parent's passive vocabulary. However, these correlations disappeared when working memory and socio-economic status were taken into account, suggesting that these latter variables play a more important role in the acquisition of the definite article. Cumulative length of exposure was the only variable that significantly correlated with children's accuracy with indefinite articles, suggesting that indefinite article (mis)use is entirely determined by the amount of exposure that a child has received over time.

The chapter ended with a discussion of the relative importance of various child-internal and child-external factors, including non-native input. It was suggested that there are reasons to believe that non-native input does play a role in bilingual preschoolers' Dutch language development, even though no direct effect of factors related to non-native input on the children's outcomes was found in this study.

The next chapter provides a summary of the main findings of the present study, and discusses its practical implications as well as its limitations. Finally, some suggestions will be made for future research.

6. Conclusion

This study investigated the effects of non-native input on bilingual preschoolers' Dutch language proficiency, as well as how these children compared to their monolingual peers. This final chapter provides a summary of the main findings (section 6.1), and will subsequently discuss the implications of these findings for the debate on whether immigrant parents should speak Dutch at home or not (section 6.2). The chapter ends with a discussion of the limitations of the present study (section 6.3) and some suggestions for future research (section 6.4).

6.1 Summary of findings

In this study, no direct effects of non-native input on bilingual children's Dutch language proficiency was found. In the first part of the study, bilingual children were compared with a monolingual control group. The bilingual children showed similar acquisition patterns as the monolingual children with regard to general language proficiency and the use of definite and indefinite articles. Also, the bilinguals seemed to keep up fairly well with the monolinguals in terms of rate of acquisition. These findings suggest that non-native input does not significantly alter bilingual children's developmental paths, nor does it seem to cause them much delay in their acquisition of the Dutch language.

The second part of the study focused exclusively on the bilingual children. It investigated the relative impact of various child-internal and child-external factors, including non-native input factors, on the children's general language proficiency and their accuracy with definite and indefinite articles. Although some correlations were found between non-native input factors and the children's outcomes, child-internal and family-related factors were found to be stronger predictors of the children's scores, suggesting that non-native input only plays a limited role in bilingual children's language acquisition.

Some of the reasons why no direct effects of non-native input were found in this study may have been that the sample size was very small and that qualitative factors often have quantitative aspects in them, which makes it difficult to find an effect for such factors after quantitative factors have already been taken into account.

Some practical implications of the present study will be discussed in the next section.

6.2 Practical implications

As no evidence was found for any negative effects of non-native input on bilingual children's Dutch language proficiency in the present study, we cannot discourage speaking Dutch at home. However, we cannot encourage it either, as some of the findings of this study did suggest that non-native input plays a role in bilingual children's acquisition of Dutch. The present study's findings suggest that especially the role of the mother in the family is of significance. It seems most beneficial to the

children's language development if the mother has a relatively high proficiency in the language, and if she is able to provide her children with a fair amount of input. Moreover, it seems that parents should best try to keep the number of different people who provide non-native input to their child as low as possible.

Importantly, more research is necessary in order to be able to provide parents with more adequate advice. Some suggestions for future research will be made in section 6.4. In the next section, the limitations of the present study will be discussed.

6.3 Limitations

As has already been mentioned in Chapter 5 and in section 6.1 of the current chapter, the sample size of the present study was rather small, which may have affected the outcomes. That is, non-native input factors may not have emerged as significant predictors of children's Dutch language proficiency due to a lack of statistical power. Second, the monolingual control group in this study was not matched in age with the bilinguals. The difference in age between the two groups may have affected the results. A third limitation of the present study is that the children were only tested in the majority language. Ideally, researchers should assess bilingual children's proficiency in both of their languages, in order to obtain a more clear picture of the children's linguistic abilities. Finally, the sample of the present study may have been a bit biased in the sense that most parents seemed to be fairly proficient speakers of Dutch. This may have been partially due to the fact that families were approached in Dutch and that parents were required to fill out an application form which was also in Dutch. This may have caused a threshold for people who are not so proficient in the language. It would therefore have probably been better to approach these people in their native language. It is possible that the effects of non-native input would have been more pronounced if less proficient speakers of Dutch had been included in the study.

The next section provides some directions for future research.

6.4 Suggestions for future research

Many suggestions for future research have already been presented in Chapter 5 of this study. The most important suggestions will be summarized in this section. First, as will probably have become clear by now, future research should focus on including a larger sample of participants, in order to obtain more statistical power. This would probably also solve the problem of the monolingual children not being matched in age with the bilinguals. Second, it would be interesting if the role of older siblings in bilingual children's language development would be further investigated. In particular, the focus should be on pinpointing the exact aspects of older siblings' speech that influence bilingual children's language development. Ideally, entire families would participate in

such studies, in order for the researchers to obtain a clear picture of the linguistic situation of the child at home and the quality of the input to which she is exposed. Finally, as effects of non-native input are probably more pronounced in children who receive input from speakers who have a relatively low proficiency, it is advisable that future research focuses on including families with parents whose linguistic abilities in the majority language are limited.

Findings of studies such as the ones described in this section should together provide us with a more clear picture of the effects of non-native input on bilingual children's language development. This would not only help us gain more insight in the underlying mechanisms of (bilingual) language acquisition, but it would also enable us to provide more adequate advice to parents, politicians and educational professionals.

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Appendix A

Shortened prompt for the elicited production task

Definite condition **de bal (the ball)**

Situation: a picture of a man and a ball is shown on the computer screen.

Experimenter:	Kijk, hier is een man. (*wijst naar de man*)
	Look, here is a man. (*points at the man*)
	En dat is? *(wijst naar de bal)*
	And that is? (*points at the ball)*
Child:	Een bal
	A ball

Situation: the picture disappears and another picture appears, showing the same man throwing the same ball.

Experimenter:	En wat doet de man nu? Hij gooit ...
	And what is the man doing now? He is throwing...
Child:	de bal
	the ball
	*een/ø bal
	* a/ø ball

Indefinite condition **een puzzel (a puzzle)**

Situation: a picture of a boy making a puzzle is shown on the computer screen.

Experimenter:	Kijk, hier is een jongen. *(wijst naar de jongen)*
	Look, here is a boy. (*points at the boy*)
	Wat doet de jongen? Hij maakt...
	What is the boy doing? He is making...
Child:	een puzzel
	a puzzle
	*de/ø puzzel
	* the/ø puzzle

Appendix B

Complete set of items of the elicited production task

Definite condition: noun (verb)	Indefinite condition: noun (verb)
Television (to carry) *practice item*	Duck (to feed) *practice item*
Bag (to carry) *practice item*	Goat (to feed) *practice item*
Ball (to throw)	Puzzle (to make)
Balloon (to throw)	Necklace (to make)
Pear (to eat)	Train (to draw)
Carrot (to eat)	Boat (to draw)
Bear (to kiss)	Tower (to build)
Doll (to kiss)	Bridge (to build)

Appendix C

Accompanying images for items ‘the ball’ and ‘a puzzle’

Figure 1 – Accompanying images for item ‘the ball’

Figure 2 – Accompanying image for item ‘a puzzle’

Appendix D

Results regression analysis for children's CELF scores

Table 1 – Regression analysis results for CELF scores based on model 1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-45,046	27,144		-1,660	,115
	Age at time of testing	1,261	,603	,422	2,091	,052
	Cumulative Length of Exposure	5,168	3,032	,344	1,704	,107
	Working memory	1,204	1,395	,163	,863	,400
2	(Constant)	-47,367	23,537		-2,013	,062
	Age at time of testing	1,250	,514	,418	2,429	,028
	Cumulative Length of Exposure	4,296	2,552	,286	1,683	,113
	Working memory	1,098	1,198	,149	,917	,374
	Socio-economic status	3,367	2,832	,226	1,189	,253
	Number of older siblings	-6,131	3,219	-,347	-1,905	,076
3	(Constant)	-47,306	27,083		-1,747	,103
	Age at time of testing	1,249	,568	,417	2,200	,045
	Cumulative Length of Exposure	4,306	3,323	,287	1,296	,216
	Working memory	1,098	1,241	,149	,885	,391
	Socio-economic status	3,370	2,999	,227	1,124	,280
	Number of older siblings	-6,129	3,356	-,347	-1,826	,089
	Quantity of input at home	-,001	,161	-,001	-,005	,996

a. Dependent Variable: CELF raw scores

Table 2 – Regression analysis results for CELF scores based on model 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-49,680	25,106		-1,979	,065
	Age at time of testing	1,616	,606	,552	2,669	,017
	Cumulative Length of Exposure	2,969	3,017	,204	,984	,340
	Working memory	,641	1,312	,090	,489	,632
2	(Constant)	-55,879	20,576		-2,716	,017
	Age at time of testing	1,588	,492	,543	3,226	,006
	Cumulative Length of Exposure	2,197	2,432	,151	,904	,382
	Working memory	1,030	1,062	,144	,970	,348
	Socio-economic status	3,314	2,543	,230	1,303	,214
	Number of older siblings	-6,244	2,907	-,355	-2,147	,050
3	(Constant)	-50,359	37,711		-1,335	,209
	Age at time of testing	1,592	,601	,544	2,646	,023
	Cumulative Length of Exposure	1,287	3,113	,088	,413	,687
	Working memory	,861	1,312	,120	,656	,525
	Socio-economic status	2,915	3,679	,202	,792	,445
	Number of older siblings	-7,750	4,300	-,440	-1,802	,099
	Variety of non-native speakers	1,449	4,998	,062	,290	,777
	Weighted SRP mother	,395	3,074	,036	,128	,900
	Quantity of non-native Dutch input at home	-,065	,115	-,146	-,570	,580

a. Dependent Variable: CELF raw scores