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Comparing the role of input in bilingual acquisition across domains

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Abstract

Amount of exposure has been observed to affect the linguistic development of bilingual children in a variety of domains. As yet, however, relatively few studies have compared the acquisition across domains within the same group of children. Such a comparative approach is arguably essential to gain a complete understanding of input effects in bilingual acquisition. Most studies in this area concentrate on the acquisition of vocabulary and grammar/morphosyntax; the bilingual acquisition of linguistic properties involving the interaction between syntax and semantics remains under-investigated. The present study seeks to address these gaps by examining – within the same group of English/Dutch bilinguals – the acquisition of linguistic properties taken from two different domains, namely gender-marking on definite determiners, a morphosyntactic property of Dutch with a considerable lexical component, and the acquisition of meaning restrictions on different word orders (scrambling), a property involving both compositional semantic and syntactic processes. The results show input effects for gender but not for scrambling. This is argued to be in line with approaches to acquisition which assume scrambling to constitute a poverty of the stimulus problem, but problematic for those approaches where input plays a more central role.

Word count (abstract): 190

1. Introduction: input effects in bilingual acquisition

Bilingual and second language (L2) children vary in the amount of contact they have with their two languages and the circumstances in which this contact takes place. The extent to which exposure to different amounts of input affects children's rate of acquisition and whether this is the same across children, across different acquisition contexts, and for different target language properties, has been subject to considerable investigation in recent years (e.g., Gathercole & Thomas, 2009; Hoff, Core, Place, Rumiche, Señor & Parra, 2012; Paradis, 2011). Different amounts of input have been observed to affect the linguistic development of bilingual children in a variety of domains; more specifically, differential input has been related to bilingual children's rate of acquisition and whether they reach monolingual norms. The exact nature of the relationship between input quantity and language acquisition in a dual language setting remains largely unclear, however. In particular, there are as yet relatively few studies which investigate the bilingual acquisition of target language properties from different linguistic domains within the same group of children. The present study seeks to address this question by examining the acquisition of grammatical gender and direct object scrambling in Dutch in the same group of simultaneous English/Dutch bilingual children.

The paper is organised as follows. In the remainder of this section, we briefly review some of the available studies on input effects in bilingual

acquisition, paying particular attention to the few which compare children's acquisition in different linguistic domains. Section 2 details the linguistic phenomena under investigation, namely gender and scrambling, what we know about their acquisition, and to what extent input effects might be expected for each. Section 3 presents and analyses the gender and scrambling data, and in section 4, we consider the extent to which our predictions are borne out, and what this means for the observation of input effects in bilingual acquisition and for the role of input in (bilingual) language acquisition in general.

A number of studies have examined the effect of amount of input/exposure on bilingual children's acquisition of grammar/morphosyntax, vocabulary (e.g., Barnes & García, in press; Thordardottir, 2011) and to a lesser extent, phonology (Nicoladis & Paradis, 2011; Sundara & Scutellaro, 2011). For grammar/morphosyntax, linguistic phenomena examined include various aspects of verb form and placement (Austin, 2009; Blom, 2010; Paradis, 2010; Paradis, Nicoladis, Crago & Genesee, 2011; Paradis, 2011), the mass/count distinction (Gathercole, 2002a), grammatical gender (Gathercole, 2002b; Montrul & Potowski, 2007), and more abstract linguistic properties such as *that*-trace effects (Gathercole, 2002c), as well as more comprehensive assessments of children's grammatical abilities (Chondrogianni & Marinis, 2011; Hoff et al., 2012; Jia & Aaronson, 2003; Jia & Fuse, 2007).

As yet, there are only a few studies (e.g., Mykhaylyk & Ko, 2010) which examine the acquisition of linguistic properties involving the interaction between syntax and (non-lexical) semantics in bilingual children, i.e., the acquisition of compositional semantic and syntactic processes that govern constituent and sentence meaning. Furthermore, those which do couple this to the role of input using very general measures of input only, such as the language of the community, largely in the context of whether crosslinguistic influence is observed rather than the role of input per se (Lee, Kwak, Lee & O'Grady, 2010; Sorace & Serratrice, 2009).

A handful of recent studies have compared acquisition across different domains within the same group of bilingual (or L2) children, asking whether the same input factors affect different domains similarly. The results are mixed. In a study on the Spanish/English bilingual toddlers, Hoff et al. (2012) observe similar input effects for vocabulary and grammar, as measured by parental report data. Specifically, children with the most input to the language in question behaved similarly to monolingual peers whereas those with considerably less exposure exhibited slower rates of development. Similar effects across domains, namely vocabulary and verbal morphology, are also observed for child L2 learners of English by Paradis (2011). In contrast, in a different study on child L2 learners of English, Chondrogianni and Marinis (2011) observe that amount of English input at home was a good predictor of children's skills in complex syntax (e.g., wh-questions) but not in vocabulary. Finally, Bohman, Bedore, Peña, Mendez-Perez and Gillam

(2010) find that as they begin to use the language, amount of input is a good predictor of children's early abilities in semantics (e.g., tell me all the foods you can eat for lunch, show me the dog that is different) and syntax (e.g., past tense inflectional morphology, clitics, articles); however, when further developing their abilities in these domains, how much children interact in the language, i.e., their own output, is important.

To summarise, amount of exposure has been observed to affect the linguistic development of bilingual children in a variety of domains, most especially vocabulary and certain aspects of morphosyntax. Little is known about the bilingual acquisition of linguistic properties involving the interaction of syntax and (compositional) semantics, and even less about the potential effect of differential input in this domain. While a number of recent studies compare bilingual children's development across domains, these studies a limited in number and the results are mixed.

This paper expands this line of research by investigating whether the input effects observed in previous studies manifest themselves similarly in the bilingual acquisition of two different properties of Dutch. These properties are (i) gender-marking, a morpho-syntactic property with a considerable lexical component, at least for the aspect of Dutch gender tested here, and (ii) the interpretive constraints on scrambled indefinites, a property of Dutch and a variety of other languages including German, Japanese and Russian, which involves syntax and (non-lexical) semantics. These properties were selected because they come from different linguistic domains, and

because they are expected to be affected by input in different ways. The research question to be addressed is the following: To what extent is bilingual acquisition across domains affected by differences in amount of input?

2. Two target language properties: grammatical gender and scrambling

Grammatical gender

Dutch has a two-way gender system, distinguishing between common and neuter; this distinction is marked on definite and demonstrative determiners, relative pronouns and attributive adjectives. The focus of the present study is on definite determiners, i.e., on what is generally interpreted as gender attribution (or concord) rather than pure gender agreement. Common nouns take the definite determiner *de*, as in *de muis* 'the mouse', whereas neuter nouns are preceded with *het*, as in *het huis* 'the house'.

The gender specification of a noun in Dutch is generally assumed to be arbitrary (Deutsch & Wijnen, 1985), and although a number of morphosyntactic and semantic cues exist, these are limited and numerous exceptions exist (Donaldson, 1987; Geerts et al., 1984); in addition, neuter nouns are outnumbered by common nouns by approximately 2:1 (Van Berkum, 1996), and the common form appears wherever the gender distinction is neutralised e.g., plurals. Taken together, these factors mean that

the task facing the language-learning child involves – to a considerable extent – the specification of gender on a word-by-word basis, at least for neuter nouns (e.g., Unsworth, 2008).

Monolingual and bilingual children have been found to overgeneralise the common determiner *de* with neuter nouns, producing non-target combinations of the type **de huis* 'the$_{COMMON}$ house$_{NEUTER}$', but overgeneralisations in the other direction are generally limited. Monolingual children commit errors until at least age six i.e., much later than children learning for example a Romance language (Blom et al., 2008; van der Velde, 2003), whereas bilingual children have been found to continue to make such errors beyond this age (Blom et al., 2008; Hulk & Cornips, 2006; Unsworth, 2008). Factors put forward to account for this observation include the sociolinguistic context involved, and – consistent with the acquisitional task outlined above – the quantity and quality of the input to which children are exposed (Blom & Vasic, 2011; Cornips & Hulk, 2008; Unsworth, 2008; 2013).

Scrambling

In English, indefinite objects in negative sentences such as (1) are ambiguous and can thus be interpreted either specifically or non-specifically. On the latter interpretation, the object is said to fall within the scope of the negator and as such, the meaning for (1) can be paraphrased as 'The boy didn't catch

any fish', whereas on the former, the object takes wide scope over the negator and the sentence is interpreted as 'There's a fish the boy didn't catch'.

(1) The boy didn't catch a fish (not > a; a > not)

(2) a. De jongen heeft geen (niet + een) vis gevangen (not > a)
the boy has no not a fish caught
'The boy didn't catch a(ny) fish.'

b. De jongen heeft [een vis]$_i$ niet t_i gevangen (a > not)
the boy has a fish not caught
'There a fish that the boy didn't catch.'

In Dutch, these two interpretations are associated with different word orders, that is, indefinite objects in the scrambled position, as in (2)-b, are interpreted specifically, whereas those which remain in their non-scrambled, or 'base' position within the verb phrase (VP), receive a non-specific interpretation, as in (2)-a; it is generally assumed that scrambling is the result of syntactic movement to some higher (VP-adjoined) position (see e.g., de Hoop, 1992 for relevant discussion), which position exactly is not important for the present discussion. It is important to note that in addition to indefinites, other types of objects, e.g., definite objects and pronouns, may also scramble, albeit without the same truth-conditional implications, and that scrambling

occurs in conjunction with other (scope-taking) sentence adverbials besides negation, such as 'twice', and in these cases, no suppletive forms (such as *geen* in (2)-a) are involved.

The task facing the language-learning child involves at least two parts: first, children must come to know that scrambling is an option in Dutch, and second, that in the case of indefinites, this particular word order is restricted in meaning, i.e., scrambled indefinites have a specific meaning whereas the non-specific meaning is disallowed. The acquisition of these interpretive constraints on scrambled indefinites constitutes a poverty-of-the-stimulus problem (see e.g., Crain & Thornton, 1998 for relevant discussion). The only available evidence to the child in the input is the target <scrambled, specific> form-meaning pairing; the non-target <*scrambled, non-specific> form-meaning pairing is never encountered and yet must be ruled out (Unsworth, 2005). Important to note is that scrambled indefinites are highly infrequent: in a large-scale corpus study of spoken Dutch, van Bergen and de Swart (2009) calculate that just 2% (19/1187) of indefinite objects are scrambled. Furthermore, for bilingual children with English as their other language, the task of ruling out the non-specific interpretation for scrambled indefinites is further complicated by the fact these children are acquiring another language which allows two different interpretations for the object with the same word order (cf. (1)).

Previous studies on the monolingual acquisition of Dutch have shown that the non-scrambled order is produced before the scrambled order

(Schaeffer, 2000; Unsworth, 2007), the scrambled order is initially associated with a non-specific interpretation (Krämer, 2000; Unsworth, 2007), and the specific interpretation is not acquired until around age 6 (Unsworth et al., 2008). The observation that children initially associate the scrambled order with a non-specific interpretation reiterates the problematic nature of the acquisitional task: children must rule out this <*scrambled, non-specific> form-meaning pairing on the basis of input which only provides direct evidence for a different i.e., specific interpretation of the scrambled object. Forming a direct association between the non-specific interpretation and the non-scrambled object is further complicated by entailment relations which mean that the non-scrambled sentence entails the scrambled sentence, that is, if it is true that no fish is caught (the meaning of the non-scrambled sentence), it is also true that there is a fish that is not caught (the meaning of the scrambled sentence).[1] In such cases, evidence for the restriction of the non-specific interpretation to non-scrambled utterances is also not clear-cut.

Predictions

Input effects in bilingual acquisition may be detected in two ways: (i) by comparing bilingual children with their monolingual peers, and (ii) by

[1] This of course only holds on the assumption that there is indeed a (non-empty) set of relevant fish. Note furthermore that when the object scrambles over an adverbial such as "twice", the entailment relations are different.

comparing bilingual children with comparatively more or less target language exposure with each other. The logic of the first approach is as follows: by virtue of having to divide their 'language time' across two languages, bilingual children are assumed to have on average less exposure than monolinguals (Paradis & Genesee, 1996) and should thus show slower rates of development (Gathercole, 2007), at least for target language properties where the role of input is considered substantial. On the second approach, differences in rate of acquisition for such properties are expected to be associated with relative amount of exposure.

As argued in the preceding section, the two properties of Dutch under investigation here differ in the importance attributed to the input in their acquisition. For gender-marking on definite determiners, an input effect is predicted (Bianchi, 2012; Cornips & Hulk, 2008; Stöhr et al., 2012; Unsworth, 2013). The relative amount of input to which bilingual children are exposed should therefore be a good predictor of children's scores. In addition, acquisition is predicted to be slower for bilingual children than for monolinguals and thus bilingual-monolingual differences are expected.

For scrambling, the predictions differ. If the acquisition of the interpretive constraints on scrambled indefinites constitute a poverty-of-the-stimulus problem, then no real input effects are expected, that is, the relative amount of input to which bilingual children are exposed should not be a good predictor of children's scores and bilingual children should acquire the

meaning restrictions on scrambled indefinites within the same timeframe as monolinguals.

In addition to possible effects of (reduced) input, bilingual children's language development may be subject to crosslinguistic influence (see e.g., Serratrice 2013, Unsworth in press for reviews of the recent literature). In the present study, this would mean that the bilingual children's acquisition of scrambling and gender in Dutch may be affected by their other language, English. Regarding grammatical gender, English does not have this property and furthermore, the English definite determiner *the* is phonologically similar to the (overgeneralised) common definite determiner *de* in Dutch; with respect to scrambling, as noted above, English allows both the specific and non-specific interpretations for one and the same word order, which may further complicate the acquisitional task for bilinguals; if there is crosslinguistic influence from English to Dutch for either of these two properties, this will thus likely manifest itself as a delay in convergence for both.

3. The study

Participants

The participants were 109 children raised bilingually in English and Dutch from birth, mostly in a "one parent, one language" situation, and aged between 5 and 17 years at time of testing. They were all resident in the

Netherlands at time of testing. Table 1 provides complete biographical data for all children, divided into age at time of testing groups. Information concerning children's patterns of language exposure and use were collected using a detailed parental questionnaire and utilised to derive two input measures: *cumulative* length of exposure, i.e., the amount of exposure over time taking into account differences from year to year and relative amount of exposure to Dutch at the current time (see Unsworth, 2013 for further details). Table 1 also includes information concerning children's scores on standardised vocabulary tests in their two languages, in order to provide an indication of children's relative proficiency. These tests were the PPVT-4 (Dunn & Dunn, 2007) or BPVS (Dunn et al., 1997) for English, depending on the variety to which the child had been exposed, and the PPVT-III-NL (Dunn et al., 2005) for Dutch.

Table 1. *Overview of participants*

Group	n	Length of exposure (cumulative) (in years)	% current exposure to Dutch	Dutch vocabulary score	English vocabulary score
5 year olds	14	2.8 *SD* 0.97	55.0 *SD* 20.5	110 *SD* 15.9	99 *SD* 9.7
6 year olds	15	3.7 *SD* 0.43	54.6 *SD* 17.4	107 *SD* 12.9	91 *SD* 8.6
7 year olds	14	4.1 *SD* 0.88	65.1 *SD* 14.7	117 *SD* 7.4	97 *SD* 15.0
8 year olds	15	4.2 *SD* 1.1	62.4 *SD* 23.2	109 *SD* 11.9	96 *SD* 12.2
9 to 10 year olds	18	5.3 *SD* 1.7	64.8 *SD* 23.8	105 *SD* 15.1	91 *SD* 18.8
11 to 12 year olds	18	5.4 *SD* 2.4	47.8 *SD* 23.1	116 *SD* 10.4	103 *SD* 15.3
13 to 17 year olds	15	4.7 *SD* 2.3	54.7 *SD* 23.8	110 *SD* 12.7	95 *SD* 14.5

Data were also collected from 19 monolingual Dutch 5 and 6 year olds. Their average score for vocabulary was 113 (*SD* 10) for the 5 year olds and 108 (*SD* 11) for the 6 year olds.

Method

The gender data are the same data as those reported in Unsworth (2013), with slight adjustments to the older age groups such that group sizes are more similar. These were collected using a forced-choice grammaticality judgement task where two puppets named previously introduced objects, one puppet using a congruent (definite) determiner-noun combination, e.g., *de*$_{\text{COMMON}}$ *boom*$_{\text{COMMON}}$ 'the tree', and the other its incongruent counterpart, e.g., **het*$_{\text{NEUTER}}$ *boom*$_{\text{COMMON}}$ 'the tree'. Children then had to say which puppet 'got it right'. Nine nouns per gender were used (for selection criteria, see Unsworth 2013: 91), and any unfamiliar nouns were excluded from the analysis on a child by child basis. Consistent with previous research, children were (mostly) at ceiling for common nouns; this paper therefore reports data for neuter nouns only. Accuracy scores were calculated for each child by dividing the number of neuter nouns for which the child selected the congruent determiner (*het*)~noun combination by the total number of neuter nouns to which the child responded.

The scrambling data were collected using a truth value judgement task. In this task, based on Krämer (2000) and adapted further by Unsworth, Gualmini and Helder (2008), children were presented with a story in which the main character manipulated two out of a set of three objects; for instance, a boy caught two out of three available fish in a pond. In other words, the scenario presented to the children was consistent with a specific interpretation of the relevant indefinite object (e.g., there was a fish that the boy did not catch) and inconsistent with a non-specific interpretation (i.e., it is not the case that the boy caught a fish). Subsequently, a puppet was asked to describe what had happened in the story and in doing so, uttered a negative sentence containing a scrambled indefinite (cf (2-b)). The child's task was to judge the truthfulness of this statement. On the target – specific – interpretation, the expected answer is 'yes', whereas on the non-target – non-specific – interpretation, the expected answer is 'no'. Fillers (n=8) were used to ensure that children could cope with true negatives, irrespective of their knowledge of scrambling. Accuracy scores were calculated for each child by dividing the number of target responses by the total number of items (n=5).

Results

The results are presented in two steps. First, a one-way ANOVA with age as between-subjects variable is used to examine development within the bilingual group, and correlational and regression analyses are used to examine the potential effect of differential input. For presentation purposes,

the children are divided into three exposure groups: children with mostly Dutch exposure (> 60%), children with mostly English exposure (> 60%) and children with roughly equal exposure to both languages (40 – 60% for each).[2] Second, the results of the bilingual children are compared with the available monolingual data, and – due to low numbers of children in these particular groups – non-parametric tests are used to examine potential bilingual-monolingual differences.

The results for gender for all the bilingual children are presented in Figure 1 and for scrambling in Figure 2. A complete analysis of the gender data – for the same sample as investigated in this paper – is available in Unsworth (2013); here we summarise the most relevant findings.

[2] Separate statistic analyses on these sub-groups was not possible due to the limited number of children in each, especially the 'mostly English' group.

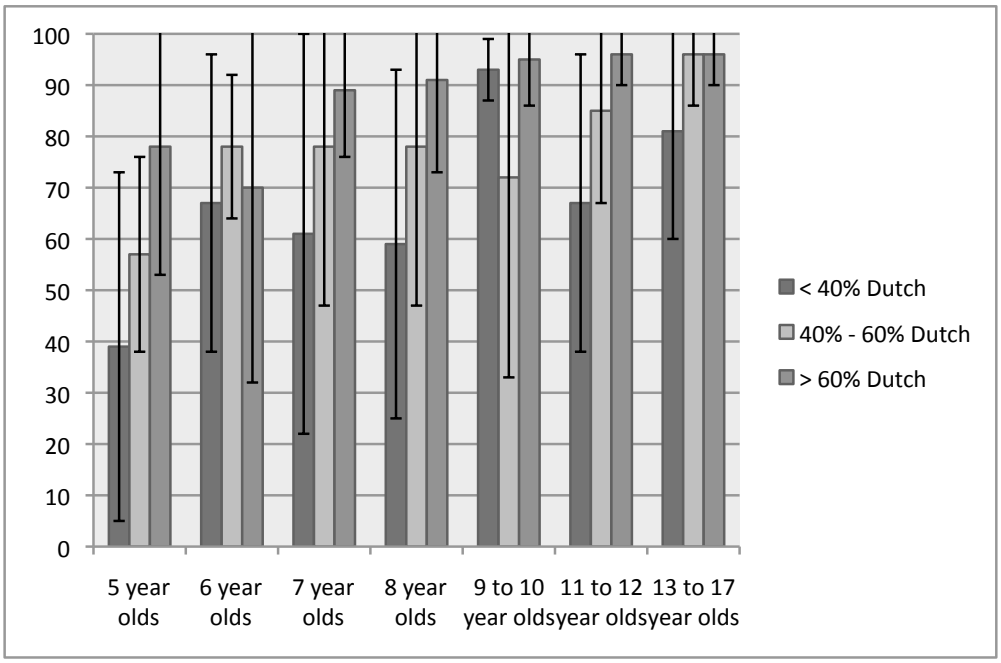

Figure 1. Gender: Accuracy scores for bilingual children (error bars ± 1SD)

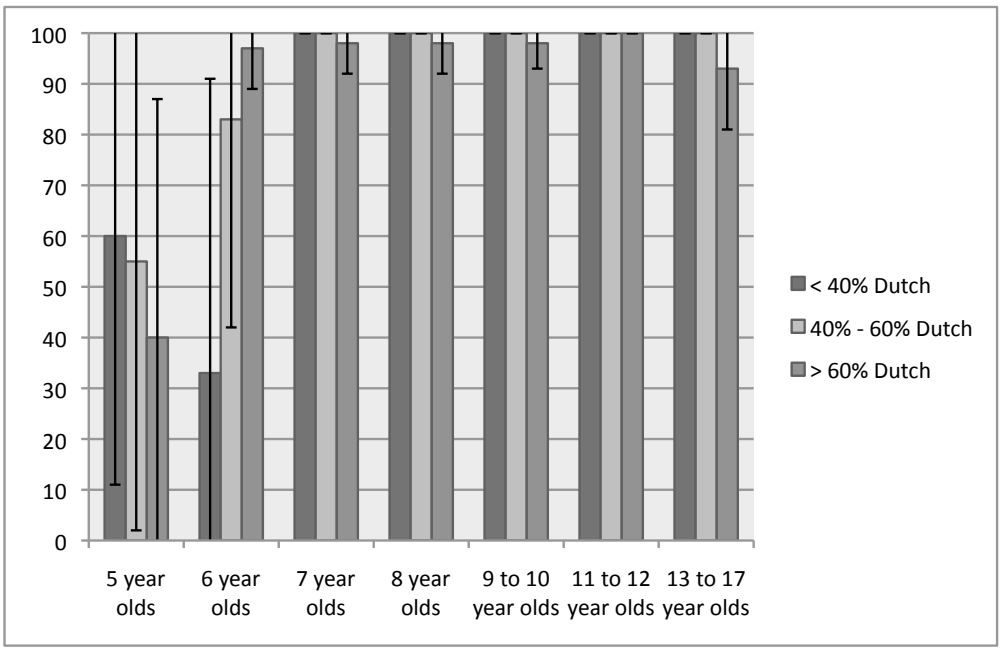

Figure 2. Scrambling: Accuracy scores for bilingual children (error bars ± 1SD)

A cursory glance at Figure 1 suggests improvement with age and with more exposure, but considerable variation, even amongst the older children. The

results of the ANOVA revealed a significant main effect ($F(6,105) = 4.12$, $p = .001$, $\eta^2_p = .20$) with post-hoc (Bonferroni) tests showing significant differences between 5 year olds and all groups except the 6 year olds ($p < .05$ for all comparisons) and no further differences. When we compare accuracy scores across exposure groups, a similar pattern emerges in (almost) all age groups, namely the more exposure to Dutch, the more accurate children's scores.

Both input measures were found to significantly correlate with gender scores and were therefore entered into a backward-elimination regression analysis, the results of which indicated that both current amount of exposure ($\beta = .24$, $p < .05$) and cumulative length of exposure ($\beta = .36$, $p < .001$) were significant predictors of children's accuracy scores ($R^2 = .22$ ($F(2,97) = 14.8$, $p < .001$).

The scrambling data in Figure 2 show a clear age effect, with considerable variation amongst the youngest two groups, especially the 5 year olds, and all children at ceiling by age 7. The ANOVA revealed a significant main effect ($F(6,105) = 6.85$, $p < .001$, $\eta^2_p = .29$) with post-hoc (Bonferroni) tests showing significant differences between 5 year olds and all groups except the 6 year olds ($p < .001$ for all comparisons) and no further differences. Following the same steps as for the gender data, bivariate correlations were first carried out between scrambling scores and the two input measures, current amount and cumulative length of exposure to Dutch. This analysis was conducted for the youngest two groups of children only,

i.e., those where variation on scrambling is attested. Neither input measure was found to correlate significantly with children's accuracy scores (both groups together; $r(26) = .19$, $p = .344$ for current exposure and $r(26) = .12$, $p = .558$ for cumulative length of exposure) and thus a regression analysis was not conducted for these data.

The two sets of results presented above suggest that children are on the whole less accurate on grammatical gender than on scrambling and that for both phenomena, similar between-group differences for the various age groups are attested. For the sake of completeness, children's scores across domains were also compared directly: a two-way ANOVA with domain (gender vs. scrambling) as within-subjects variable and age group as between-subjects variable indeed reveals a significant main effect of domain ($F(1,99) = 14.1$, $p < .001$, $\eta^2_p = .13$), with children scoring significantly higher on scrambling than on gender, and of age group ($F(6,99) = 8.94$, $p < .001$, $\eta^2_p = .35$) but no interaction between the two ($F(6,99) = .492$, $p = .813$, $\eta^2_p = .03$). The estimated marginal mean for the scrambling is 90.2% (*S.E.* 2.1%) and 79.9% (*S.E.* 2.2%) for gender.

We now turn to a comparison of the bilingual data with the available monolingual data. Figures 3 and 4 present the data for the youngest two groups of bilingual children with their monolingual peers for gender and scrambling, respectively.

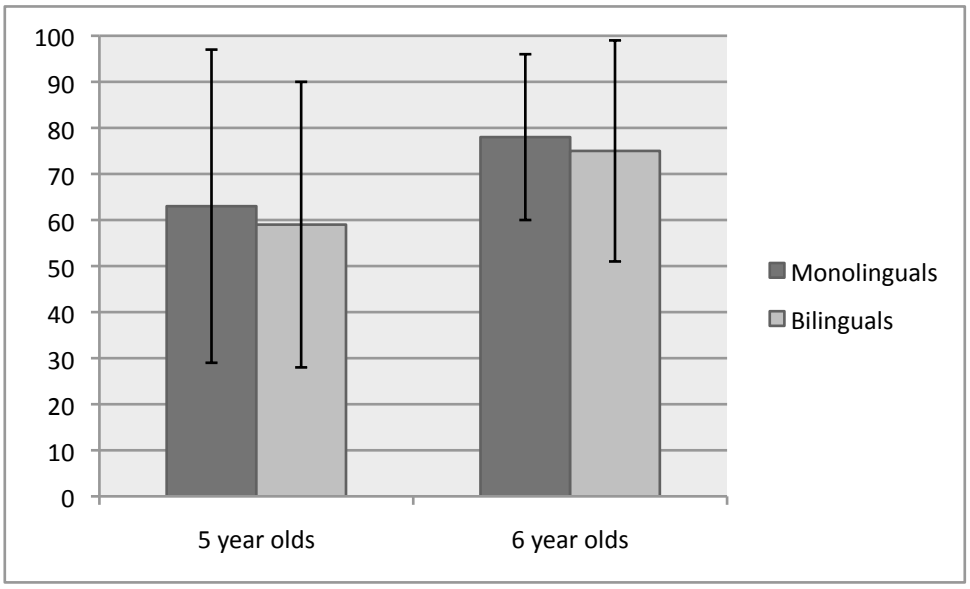

Figure 3. Gender: Accuracy scores for bilingual and monolingual children (error bars ± 1SD)

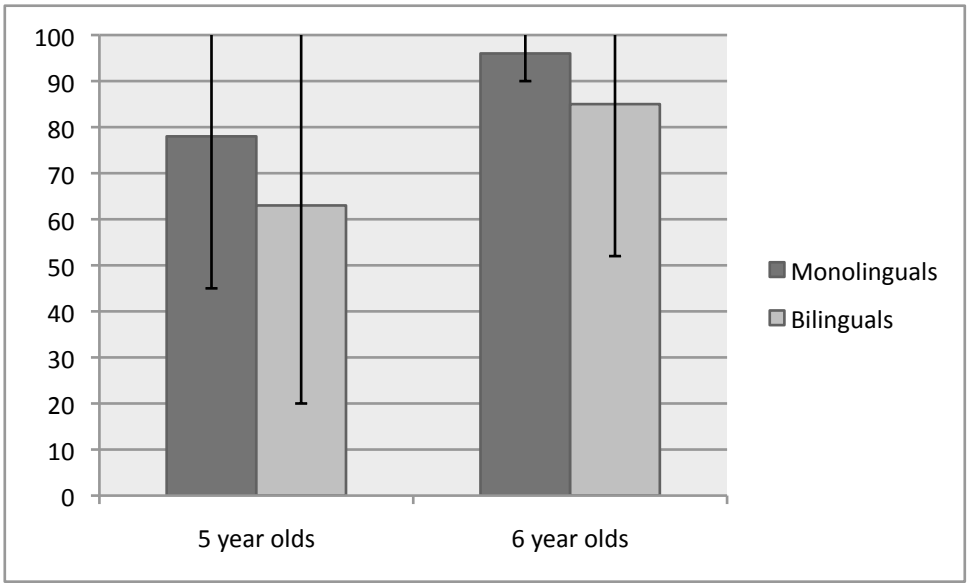

Figure 4. Scrambling: Accuracy scores for bilingual and monolingual children (error bars ± 1SD)

There were no significant bilingual-monolingual differences for either gender (5 year olds: $U = 35.0$, $p = .295$; 6 year olds: $U = 63.5$, $p = .815$) or scrambling (5 year olds: $U = 35.5$, $p = .295$; 6 year olds: $U = 61.5$, $p = .726$).

To summarise, the results for grammatical gender indicate that there is considerable variation in children's scores for neuter nouns, even amongst the older age groups, and this variation is (at least in part) related to the amount of input to which children are (or have been) exposed. (Virtually) all the bilingual children consistently interpret scrambled indefinite objects specifically by age 7, and so do the majority of those bilingual 6 year olds with more exposure to Dutch than English. Quantitative measures of input do not significantly correlate with children's accuracy scores on scrambling. When the youngest bilingual groups are compared with monolingual peers, there are no significant differences for either scrambling or gender.

4. Discussion

This paper investigated the role of (amount of) input in the bilingual acquisition of two distinct properties of Dutch, namely gender-marking on definite determiners and the interpretive constraints on scrambled indefinite objects. These two properties were selected as a good test case for the role of input in bilingual acquisition because they differ in the importance attributed to the input in their acquisition. Predictions were made concerning (i) differences between bilinguals associated with relative amount of exposure, and (ii) bilingual-monolingual differences.

With respect to gender-marking on definite determiners, we predicted that relative amount of exposure should be a good predictor of bilingual

children's accuracy, and that bilingual children's scores should be significantly lower than their monolingual peers. Grammaticality judgement data on definite determiners in combination with neuter nouns, taken from Unsworth (2013), were consistent with the first prediction: current and cumulative amount of exposure were both significant predictors of the bilingual children's scores. The second prediction was however not borne out: the differences between the bilingual 5 and 6 year olds and their monolingual peers were not significantly different.

The lack of significant bilingual-monolingual differences may at first appear surprising given the poor performance by bilingual and second language (L2) children in previous studies (e.g., Blom et al., 2008; Hulk & Cornips, 2006). The apparent comparative success of the bilingual children in the present study may (in part) be due to the type of data used. Most of the previous literature on the acquisition of grammatical gender in Dutch uses production data; it has been argued that children's low accuracy scores may reflect problems with production as much as or even more so than with gender (Blom et al., 2008; Brouwer et al., 2008; Weerman et al., 2011), and as argued in Unsworth (2013), the present data are in line with this claim. Gender scores on a production task for the same group of children were significantly lower than on the judgement task, and furthermore, for production, bilingual-monolingual differences *were* attested for the youngest two age groups. Given the considerable between-child variation amongst the older bilingual children (cf. Figure 1), it is quite possible that bilingual-

monolingual differences on the judgement task, may only emerge later; additional monolingual data from older children are of course necessary to confirm this conjecture.

The observation that rate of acquisition in the bilingual development of gender-marking on definite determiners in Dutch is related to relative amount of input in that language is consistent with previous findings showing input effects for other linguistic properties and domains. In several of these studies, the existence of input effects has been argued to provide support for a usage-based (or constructivist) approach to language acquisition (Gathercole & Thomas, 2009; Hammer, Komaroff, Rodriguez, Lopez, Scarpino & Goldstein, 2012; Hoff et al., 2012; Paradis, 2010; Paradis et al., 2011). Oversimplifying somewhat, the general idea is that if language is acquired in a piecemeal fashion on the basis of the input, as is claimed to be the case on this approach, we can expect an effect of relative amount of input for bilingual children across different domains, and crucially in the acquisition of grammar/morphosyntax as well as in the acquisition of vocabulary, the latter being an area where any approach to language acquisition would predict there to be input effects.

The present findings are in principle consistent with this: we find evidence of input effects in the area of morphosyntax, i.e., in syntactic agreement between neuter nouns and definite determiner. For gender-marking on definite determiners, it is however difficult (if not impossible) to disentangle knowledge of gender agreement from knowledge of gender

attribution (or concord). In fact, in most studies, including this one, gender-marking on definite determiners is taken to indicate the latter. As argued in Unsworth (2013) and elsewhere, given that the acquisition of gender-marking on definite determiners must include a large lexical component (cf. section 2), the significant role played here by input is to be expected. When in the same study children's knowledge of gender agreement (adjectival inflection) was examined, input variables were found to significantly correlate with children's accuracy scores in this domain. However, crucially, once knowledge of gender attribution was controlled for, no such relation remained. In other words, once the lexical component of gender was removed, and the focus was on morphosyntactic agreement only, no input effects were observed.

What these findings hopefully illustrate, then, is that there are input effects in areas other than vocabulary and evaluating what this means with respect to theories of language acquisition requires careful consideration of the various component parts of the target language property in question and the task facing the language-learning child. Where specific morphemes or exceptions to rules must be acquired, e.g., in verbal morphology or irregular past tense forms, it comes as little surprise that a certain amount of exposure is necessary for acquisition to take place. Even if one assumes there are underlying morphosyntactic rules governing the application or insertion of these morphemes, the language-learning child must still acquire the specific form of the morpheme in question. Where input effects are not expected,

however, or at least not to the same extent, is in the acquisition of those underlying (morphosyntactic) rules. The challenge at this juncture lies in how to tease apart these various elements such that such predictions can be adequately tested.

The second set of predictions in the present study concerned a completely different linguistic domain, namely the interpretive constraints on scrambled indefinite objects. It was argued that if the acquisition of this property of Dutch constitutes a poverty-of-the-stimulus problem, then no real input effects should be expected, and the bilingual acquisition of the meaning of scrambled indefinites should occur within the same timeframe as monolingual acquisition. Neither of our quantitative input measures correlated with the younger children's accuracy scores in this domain. Furthermore, the bilingual children were at ceiling by age 7, and for those children with more exposure to Dutch than English, by age 6. In addition, there were no significant bilingual-monolingual differences. Taken together, these results suggest that – consistent with our prediction – bilingual children acquire this property of Dutch within the same timeframe as their monolingual peers. This is furthermore in line with findings on the acquisition of scrambling in Ukrainian- and English-speaking bilingual children, which also show similar patterns of development as monolingual children (Mykhaylyk & Ko, 2010; Mykhaylyk, in press).

The observation that bilingual children acquire the interpretive constraints within the same timeframe as monolingual children is difficult to

reconcile with approaches to acquisition where input plays a central role, for example, usage-based approaches to acquisition. If the generalisations which children form about the language they hear are restricted through their "understanding of meaning" rather than some innately given principles (Ambridge & Lieven, 2011: 371), then on the assumption that understanding meaning comes from exposure to the relevant data in context, the availability of the such data, in this case scrambled indefinites, is essential. As noted in section 2, however, indefinite objects overwhelmingly appear in the non-scrambled position (Bergen & Swart, 2010), and thus we might expect – for monolingual children but much more so for (many) bilingual children – that the acquisition of the interpretive constraints on scrambling should involve a much longer and more protracted development than observed here. And whilst the evidence for grammatical gender in Dutch, and in particular for neuter gender, is also limited, it is surely more prevalent than the available evidence for scrambling; nevertheless, the bilingual children score significantly higher on scrambling than on gender. Furthermore, if children are expected to derive the interpretive constraints on scrambling from the input alone, we might also expect greater variability between children, as children will presumably encounter the relevant data at different points. Finally, putting the question of how children come to know the target, specific interpretation of scrambled indefinites aside, it is more importantly unclear as to how, if children must rely on the input and generalisations based (at least in the initial stages) on their "understanding of meaning" in

the input, they should come to know that the non-target, non-specific interpretation is *not* allowed.

One possible explanation for how children might do this, which does not rely on the input, might be the following. Children could make use of a Blocking Principle (Williams, 1997), which would mean that once they associate the non-scrambled and scrambled forms with each other by means of a rule involving syntactic movement, the non-specific interpretation of the scrambled object is ruled out, because for this interpretation, a less 'costly' alternative, the non-scrambled form, is available. Theoretically speaking, this follows from the idea that a derivation which does not involve movement is 'cheaper' than a derivation which does (i.e., economy construed globally in the sense of Adger, 1994; Reinhart, 1995). The Blocking Principle, which appears under various guises in the literature (e.g. Elsewhere Condition (Kiparsky, 1973); Unique Entry Principle (Pinker, 1984); Uniqueness Principle (Pinker, 1986; Wexler & Culicover, 1980)), should be viewed as a vital part of the language acquisition process, a language acquisition principle which exploits linguistic primitives, such as syntactic movement and semantic types, and which ensures that language learners are able to acquire the target language constraints in question. For more details about how this would work for the acquisition of scrambling in particular, the reader is referred to Unsworth (2005, Chapter 7).

De Hoop and Krämer (2006) put forward an alternative proposal within the framework of Optimality Theory, which also makes use of

blocking. For them, blocking is part of the process of bidirectional optimisation, which is linked to children's ability to take the speaker's perspective, an ability which they are assumed to acquire relatively late (at least age 7). They argue that this accounts for children's relatively late acquisition of the interpretive constraints on scrambling. This finding is however in part due to a methodological flaw in the tasks used (Krämer, 2000; Unsworth, 2005); this problem has since been addressed and as evidenced in the monolingual data presented here, children have been shown to reach target much earlier (Unsworth et al., 2008).

There are a number of limitations to the present study. Whilst the overall number of participants is relatively high, once each age group is divided into exposure groups, the number of the children per group is low and this limits the type of statistical analysis possible. Furthermore, the data presented here concern children aged 5 and older. We cannot rule out that different results may obtain for younger children. Finally, to be able to fully assess whether bilingual-monolingual differences exist in the acquisition of gender, data from older monolingual children are necessary.

5. Conclusion

The present study illustrates the need to examine data from different linguistic domains to gain a complete understanding of input effects in

bilingual acquisition. Comparing acquisition of different target language properties within the same children allows us to hold child-internal and child-external factors constant. The data presented here suggest that input may affect domains differently: whereas input effects were observed in the acquisition of gender-marking on definite determiners, this was not the case for the acquisition of the interpretive constraints on scrambled indefinites. To fully understand the role of input, and in particular, different amounts of input in bilingual language development, and what this means for theories of language acquisition, more exacting predictions are needed from both sides of the debate concerning the role of specific properties of the input and how they interact with the language learning mechanisms available to the child.

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