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Testing for Crosslinguistic Influence and Exposure Effects in the Bilingual Acquisition of Specific Indefinite Objects

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1. Introduction

Various factors have been shown to play a role in bilingual language acquisition. These include child-internal factors, such as chronological age, general cognitive abilities, age of onset, knowledge of another language and language aptitude, as well as child-external factors, such as SES, maternal education, amount and type of exposure (see Unsworth, Hulk, & Marinis, 2011 for overview). The present study focuses on two of these: amount of exposure and knowledge of another language. It investigates whether knowledge of another language leads to crosslinguistic influence at the syntax-semantics interface and whether amount of exposure modulates the extent of any such influence.

2. Exposure effects, crosslinguistic influence and syntax-semantics in bilingual acquisition

The relative amount of exposure to which bilingual children are exposed has been shown to affect their rate of acquisition of vocabulary and certain aspects of morphosyntax (see e.g., Gathercole & Thomas, 2009; Oller & Eilers, 2002; Paradis, 2010). More generally, it has also been suggested that the reduced amount of input to which bilinguals are typically exposed (when compared with monolinguals) may sometimes lead to a "bilingual delay" until children are able to accumulate enough evidence (or a "critical mass") for the target language property in question (Gathercole, 2007). It has furthermore been claimed that amount of exposure may modulate the magnitude of crosslinguistic influence (e.g., Austin, 2009; Sorace & Serratrice, 2009).

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In what has turned out to be a very influential paper, Hulk and Müller (2000) propose two conditions on crosslinguistic influence. The first states that crosslinguistic influence should take place at the syntax-pragmatics interface i.e., in the C-domain, and the second that for crosslinguistic influence to occur, there must be surface overlap between the two languages. More specifically with respect to the latter condition, if language A offers evidence for more than one grammatical analysis of a particular structure, and language B reinforces one of these analyses, crosslinguistic influence is predicted. Crucially, the availability of more than one grammatical analysis should be assessed from the child's perspective (Müller & Hulk, 2001). In other words, the analysis in question may be one which is characteristic of a particular developmental stage rather than of the adult grammar.

Whilst numerous studies have found evidence for the validity of the condition of surface overlap (e.g., Foroodi-Nejad & Paradis, 2009; Hacohen & Schaeffer, 2007; Paradis & Navarro, 2003; Serratrice, Sorace, & Paoli, 2004), the condition concerning the syntax-pragmatics interface has not received much empirical support. Several studies have observed crosslinguistic influence within other domains, including narrow syntax and the syntax-morphology interface (e.g., Argyri & Sorace, 2007; Austin, 2007; Pérez-Leroux, Cuza, & Thomas, 2011); the question of whether crosslinguistic influence also occurs at the syntax-semantics interface remains unanswered, however.

There are only a few studies which examine the acquisition of syntax-semantics in bilingual children, and the results of these studies are conflicting with respect to crosslinguistic influence and exposure effects. Thus, whilst Lee et al. (2010) and O'Grady et al. (2011) find evidence of crosslinguistic evidence in their study of scope preferences in Korean/English bilingual children, Mykhalyk and Ko (2010) observe developmental patterns similar to monolinguals in their study on the acquisition of scrambling in English/Ukrainian bilinguals. In a study on plural DPs in specific and generic contexts, Serratrice et al. (2009) find that English/Italian bilinguals living in Italy are less likely to show crosslinguistic influence, suggesting a general effect of amount of exposure, but Lee et al. (2010) observe that even after lengthy exposure to English, crosslinguistic influence from Korean persists.

The goal of the present study is to explore crosslinguistic influence and exposure effects at the syntax-semantics interface by investigating the acquisition of specific indefinite objects by English/Dutch simultaneous bilingual children.

3. Specific indefinite objects

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]

(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 DPs in the scrambled position, as in (2)-b, are interpreted specifically, whereas those which remain in their non-scrambled, or 'base' position within the VP, receive a non-specific interpretation (e.g., de Hoop 1992).

In monolingual first language (L1) acquisition, it has been found for Dutch 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 to 7 (Unsworth, Gualmini, & Helder, 2008). Furthermore, children pass through a stage where the scrambled form is interpreted ambiguously (Unsworth et al., 2008) and where it is produced optionally in contexts where a specific interpretation is intended (Schaeffer, 2000). For English, it has also been observed that children show an initial preference for the non-specific interpretation and that the specific interpretation is acquired around age 4 to 5 (Gualmini, 2003; Lidz & Musolino, 2002; Musolino, Crain, & Thornton, 2000; Su, 2001). Even though sentences such as (1) are ambiguous in English, in certain experimental contexts, children and adults demonstrate a clear – and in some cases, categorical – preference for a specific interpretation (Gualmini, 2004; Miller & Schmitt, 2004).

To sum up, in the acquisition of indefinite objects in negative sentences, monolingual Dutch- and English-speaking children have been observed to pass through the same developmental sequence, acquiring the non-specific interpretation before the specific. The acquisition of the specific interpretation appears to take slightly longer for children acquiring Dutch, which is quite likely due to the fact that Dutch-speaking children also have to acquire an additional (scrambled) form.

[1] The terms 'specific' and 'wide scope' are used in a non-technical sense here.

4. A study on specific indefinite objects in bilingual acquisition

4.1 Research questions and predictions

This study addresses three research questions. First, it examines whether simultaneous bilingual children converge on target within the same timeframe as monolingual children, or whether they are delayed. On Gathercole's (2007) constructivist (or usage-based) approach to bilingual acquisition, a delay is expected in both languages due to reduced input in each, i.e., 'enough' exposure is needed to acquire the relevant form-meaning mappings, and in Dutch, to acquire the option of scrambling (with indefinite DPs).

Second, we consider whether there is evidence for crosslinguistic influence. Two predictions are made here. We first consider the possibility of crosslinguistic influence from English to Dutch. At the stage where the child's developing grammar in Dutch allows the scrambled form to be associated with both a specific and non-specific interpretation, and in English, indefinite objects are interpreted non-specifically and – depending on the child's age – specifically, it is predicted that there will be influence from English to Dutch. In other words, the non-specific interpretation (always available in English) is expected in the early stages of development to reinforce the non-specific interpretation of the scrambled form in Dutch, as has been previously found for English-speaking successive bilingual children (and adults) (Unsworth, 2005, 2007). The second prediction concerns crosslinguistic influence from Dutch to English, and is relevant to later stages of development when in Dtuch children have the target specific interpretation for the scrambled order (at least some of the time) and the non-specific interpretation for the non-scrambled order. On the assumption that the similarity in linear ordering of the negator and object between the non-scrambled order in Dutch (cf. (2)-a) and the English order (cf. (1)) means that the condition of surface overlap is fulfilled, it is predicted that the non-specific interpretation associated with the non-scrambled order in Dutch will reinforce the non-specific interpretation for English.

The third research question concerns the role played by amount of exposure and asks whether the magnitude of any crosslinguistic influence can be predicted by this variable, as suggested by previous literature.

4.2 Participants and method

The participants were 142 simultaneous bilingual children aged 3 to 17 years old who were exposed to both languages from birth. The vast majority were being raised using the 'one parent, one language' principle. All were resident in the Netherlands at time of testing, and most attended a daycare or school where Dutch was the primary or only language of communication/instruction. In addition, data were also collected from 25

monolingual Dutch-speaking children, aged 4 to 6, and 50 monolingual English-speaking children, aged 3 to 6.

To ascertain how much exposure the children has to each language, background information was collected using a detailed parental questionnaire (see Unsworth, under revision for detail). In addition, children also completed standardised vocabulary tasks in each language (PPVT-III-NL for Dutch and PPVT-4 or BPVS-2 for English, depending on variety); this is assumed to provide a general indicator for the children's proficiency level.

Truth value judgement tasks were used to evaluate children's interpretative knowledge of indefinite object DPs in negative sentences. These were identical to those used in previous literature (Miller & Schmitt, 2004 for English; Unsworth et al., 2008 for Dutch) and the set up was in essence the same for both languages. Children were presented with a story where the protagonist was for some stipulated reason expected to manipulate all of a series of objects, e.g., to win a competition, a boy had to catch all of the fish in a pond; subsequently, the protagonist manipulates all but one of the objects, e.g., catches all but one fish, and then leaves. At the end of the story, thus, one object out of a set of three is left untouched. A puppet subsequently utters the test sentence, which was as in (1) for English, and the scrambled form (2)-b for Dutch, and the child is asked to evaluate whether the puppet 'got it right'. On a specific interpretation, the test sentence is consistent with the story presented, i.e., there is a fish which has not been caught, namely the one left behind, whereas on a non-specific interpretation, the test sentence is incorrect on the scenario presented because it is not the case that the boy did not catch a fish – he *did* catch a fish, and in fact, he caught two. There were 5 test items and 8 fillers in each language, plus an additional 3 control items in English (to make the task completely comparable with the original in Miller & Schmitt, 2004).

4.3 Results

Children who demonstrated a response bias or who failed on more than 2 fillers were excluded from the analysis (none for Dutch, 5 for English). For both languages, children's responses were analysed as the percentage of yes-responses, i.e., (scrambled) indefinites which were correctly interpreted specifically. Figure 1 presents the average score per age group for Dutch.

We first focus on those children for whom we have monolingual comparison data: a two-way ANOVA was conducted with age (3 and 4 vs. 5 vs. 6 years) and group (bilingual vs. monolingual) as between-subjects factors. There was neither a significant effect of age ($F(2,67) = 2.55$, $p = .09$) or group ($F(1,67) = 2.23$, $p = .14$). Turning now to all the bilingual children, a one-way ANOVA revealed a significant effect of age ($F(9,141) = 6.04$, $p < .001$). Post-hoc (Games-Howell) tests reveal that this effect is due to marginally significant differences ($p < .07$) between the 5 year olds and each group aged 8 and older.

Children's individual response patterns were characterised as specific (4/5 or 5/5 items accepted), non-specific (4/5 or 5/5 items rejected) or mixed (2/5 or 3/5 accepted). Most of the monolingual children demonstrated the adult specific pattern (60% (3/5) of the 4 year olds, 80% (8/10) of the 5 year olds, and 100% (9/9) of the 6 year olds). The relative distribution of the individual bilingual children's response patterns is given per group in Figure 2; the raw numbers are superimposed on the relevant part of each bar. By age 7, virtually all (95% (20/21)) of children have the adult specific pattern. A Fisher's exact test reveals that for the 5 year olds (the only group with more or less comparable numbers in each language group), there are however significantly more monolingual children with the specific interpretation than the bilingual group ($p < .05$).

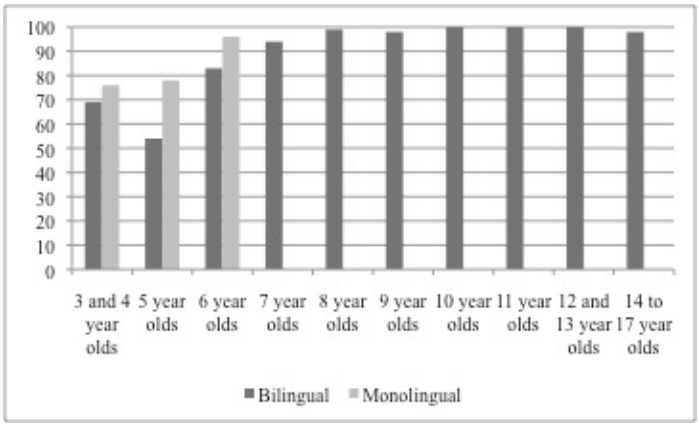

Figure 1. Dutch: Average percentage of scrambled indefinites interpreted as specific

The bilingual children's scores correlate significantly with their age ($r(142) = .39$, $p < .001$), their (cumulative) length of exposure ($r(132) = .37$, $p < .001$), and their Dutch vocabulary score ($r(142) = .18$, $p < .05$).

The group results for the English task are presented in Figure 3. A two-way ANOVA was first conducted for the younger children with age (3 vs. 4 vs. 5 vs. 6 years) and group (bilingual vs. monolingual) as between-subjects factors. There was neither a significant effect of age ($F(3,77) = .93$, $p = .43$) or group ($F(1,77) = .92$, $p = .60$). There was also no significant effect of age for all the bilingual children analysed together ($F(9,137) = 1.10$, $p = .37$). Nevertheless, the individual response patterns (using the same classification as for Dutch and given in Figure 4) reveal variation within each group. The results for the monolingual children are as follows: 45% (13/29) of the 4 year olds, 63% (5/8) of the 5 year olds and 88% of the 6 year olds (7/8) show a specific pattern. In other words, by age 6, all but one of the children demonstrate the same

preference as the adult controls reported for (exactly) the same task (Miller & Schmitt, 2004).

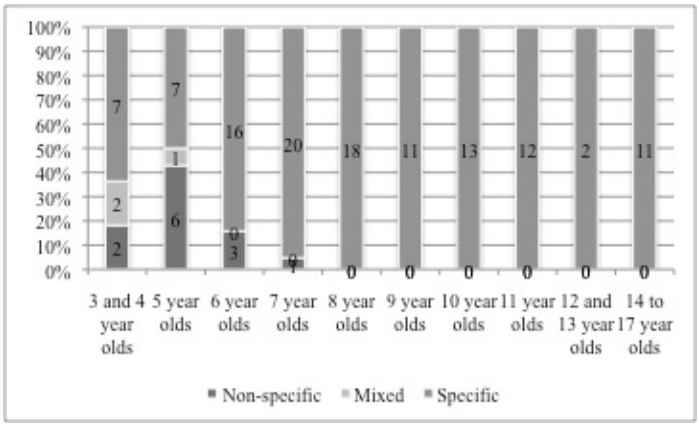

Figure 2. Dutch: Proportion of children with given response patterns

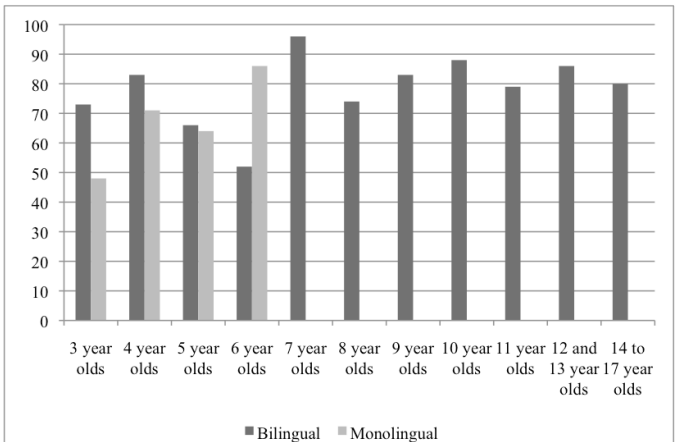

Figure 3. English: Average percentage of indefinites interpreted as specific

When we compare the proportion of non-specific/mixed patterns for the oldest monolingual children with the data from bilinguals of the same age or older, we see there are proportionally more bilinguals with a non-specific or mixed pattern.

The only independent variable to significantly correlate – albeit weakly ($r(137) = .19$, $p = .03$) – with the bilingual children's scores is their English vocabulary score.

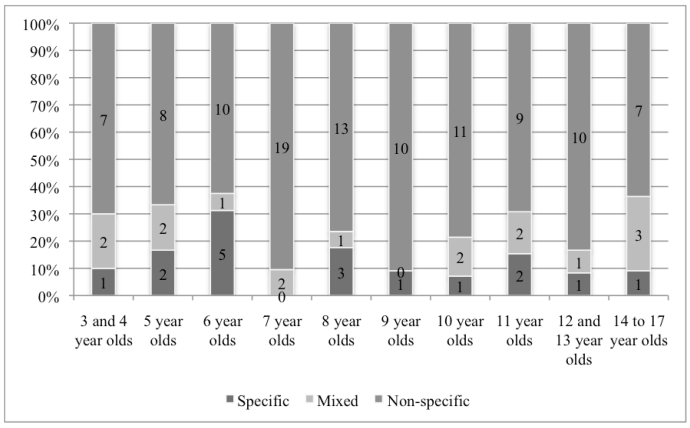

Figure 4. English: Proportion of children with given response patterns

Finally, children's responses on each language are directly compared with each other for all children with data on both tasks (n=132). A mixed-design ANOVA was conducted with age as between-subjects factor and language as within-subjects factor. There was a main effect of language ($F(1,122) = 10.5$, $p = .002$, $\eta^2_p = .08$) and of group ($F(9,122) = 2.74$, $p = .006$, $\eta^2_p = .17$) but no interaction between the two ($F(9,122) = 1.63$, $p = .12$).

5. Discussion

This paper investigated the acquisition of specific indefinites by simultaneous bilingual children across a large age range (3 to 17 years) acquiring Dutch and English. For Dutch, it was found that, consistent with previous literature (Krämer, 2000; Unsworth, 2007; Unsworth et al., 2008), the younger children allowed a non-specific interpretation of the scrambled object, with consistent targetlike performance from age 6 for the monolinguals and age 7 for the bilinguals. At the group level, the bilinguals were not significantly different from the monolinguals, and the individual response patterns were in line with this. However, for the 5 year olds, significantly more target (specific) response patterns were observed amongst the monolinguals than the bilinguals.

In the English task, the younger children preferred the non-specific interpretation and the older children the specific interpretation, which – as noted above – is the adult response in this particular (experimental) context. The older bilingual groups, however, to varying degrees also allowed the non-specific

interpretation of the object. At the group level, the bilinguals were not significantly different from the monolinguals, but at the individual level, there was considerably more variation amongst the bilinguals, that is, there was a non-negligible number of older individuals with mixed and non-specific response patterns.

We now return to our predictions. Our first prediction concerned the possibility of a bilingual delay due to a reduction in input. This prediction was not borne out in the sense that there were no overall differences between bilinguals and monolinguals for either language. However, for the 5 year olds, a significant difference was observed in the individual response patterns for Dutch; this could indeed be due to an initial delay in the acquisition of the scrambled form as a result of reduced input (in line with Gathercole, 2007). If this is the case, though, we also need to explain why a similar – if not more noteworthy – delay was not observed for the 3 and 4 year olds.

With respect to crosslinguistic influence, we made two predictions. First, we predicted that there may be influence from English to Dutch in the early stages of development, i.e., the availability of the non-specific interpretation for English may reinforce this interpretation for Dutch, resulting in a delay in convergence on the target specific interpretation for scrambled indefinites. In general, this prediction is not confirmed, although – as discussed in the preceding paragraph – it may be true of the 5 year olds. Second, we predicted that there may be influence in the other direction i.e., from Dutch to English, in the later stages of development. More in particular, we suggested that once children have restricted the non-specific interpretation to the non-scrambled order, the surface order similarity between this order and the English order may reinforce the non-specific interpretation for English. This prediction was confirmed, but only for a limited number of individual children.

Our final prediction concerned the extent of crosslinguistic influence and whether this could be predicted by the amount of exposure to which children are exposed in the two languages. This prediction was not confirmed in the sense that for English, we failed to observe a correlation between children's acceptance of the specific interpretation and the specific measure which we used to estimate relative exposure. It is however possible that there is a general effect of language of the community (as observed in e.g., Argyri & Sorace, 2007; Austin, 2009; Sorace & Serratrice, 2009) in the sense that all the children in the present study were resident in The Netherlands and so generally had more exposure to Dutch than to English. If this explanation is along the right lines, then we would predict that English/Dutch-speaking bilingual children who are resident in an English-speaking country should exhibit the opposite pattern from the children tested here, i.e., crosslinguistic influence from English to Dutch, but not the other way round.

The results of the present study offer evidence for the existence of crosslinguistic influence (albeit limited) at the syntax-semantics interface. This

is in line with O'Grady and colleagues' studies on the acquisition of scope by bilingual/L2 English/Korean children, which also demonstrated transfer of scope preferences even after considerable exposure. The data are furthermore consistent with the claim that crosslinguistic influence is conditioned by surface overlap (Hulk & Müller, 2000). However, crosslinguistic influence was only observed for a limited number of children. This is expected if surface overlap is a necessary but not a sufficient condition (Gathercole, 2007; Hulk & Müller, 2000).

Crosslinguistic influence was observed in one direction only, i.e., from Dutch to English. It is possible that no influence was observed from English to Dutch because Dutch is the 'dominant' language for most children (cf. Yip & Matthews, 2007). Thtis could then also explain the observed influence from Dutch to English. The question of how to determine dominance in bilingual children is controversial. For present purposes, we will assume that relative vocabulary score can be used as an indicator of general proficiency level, and this in some sense provides an indirect barometer of children's dominance. Recall that vocabulary score was the only factor which significantly correlated with children's scores on the English task. It turns out that the children (n=33) who had mixed or non-specific response patterns have a significantly lower vocabulary score on English (M = 89, SD = 10) than the children (n=104) who have the specific pattern (M = 99, SD = 14) ($t(74) = -3.37$, $p = .001$, $d = .62$). In this sense, then, it seems that proficiency level – which might reflect dominance – might explain which children exhibit crosslinguistic influence, and possibly also the direction of influence. More detailed analyses are required to confirm this, however.

So at what level might this influence be taking place? This could be at the level of representation or processing. There are (at least) two reasons why it is unlikely that what we are seeing here is crosslinguistic influence is at the representational level, that is that children are opting for the non-specific interpretation because the specific interpretation is unavailable. First, the children with mixed response patterns are able to access the specific interpretation some of the time, and second, the children who have been argued to demonstrate crosslinguistic influence in English consistently access the specific interpretation for Dutch. It is unclear why if this is available in one language it in principle cannot be available for the other. It is more likely that in the current study, crosslinguistic influence is taking place at the level of processing: first, because we are concerned with preferences rather than grammaticality, and second, – as noted above – for some (if not all older) children, the specific interpretation is in principle available. The idea that crosslinguistic influence at the syntax-semantics interface may result from processing considerations is broadly in line with recent work on heritage learners by O'Grady and colleagues (Lee, Kwak, Lee, & O'Grady, 2010; O'Grady, Kwak, Lee, & Lee, 2011).

The observation that the bilingual children reach target at more or less the same age in Dutch as the monolingual children is all the more remarkable when we take into account the lack of evidence in the input for the possibility of scrambling with indefinite objects: 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. On an input-driven account of (bilingual) acquisition, such as Gathercole (2007), one might thus expect children to follow a long and protracted development for this particular property of Dutch; as discussed above, this is not what we observe, however.

In this regard, it is interesting to note that the interpretive constraints on scrambled indefinite objects has been argued to constitute a poverty of the stimulus problem (Unsworth, 2005). In other words, the input underestimates the knowledge to be acquired in that it does not provide evidence that the non-specific interpretation is not possible with the scrambled order. If this is the case, no amount of input will lead to successful acquisition. Assuming bilingual children have the same language acquisition mechanisms at their disposal as monolingual children, one would therefore expect more or less similar patterns of development for both groups for a linguistic property such as this; this is indeed what has been found for the acquisition of scrambling by English/Ukrainian-speaking bilingual children (Mykhaylyk & Ko, 2010).

6. Conclusion

The present study examined the as yet largely under-researched area of the acquisition of syntax-semantics in bilingual acquisition. For some children, evidence was found for crosslinguistic influence from Dutch to English, and the magnitude of this influence was only very generally predicted by amount of exposure. It was shown that in the domain of scrambling, simultaneous bilingual English/Dutch children on the whole performed remarkably similarly to monolingual children.

To completely assess the role of input/exposure in bilingual acquisition, it is important to investigate different linguistic domains, including target language properties at the syntax-semantics interface, such as the interpretation of (scrambled) indefinite objects, which are argued to form a poverty of the stimulus problem. It is only by contrasting these with areas of language where input effects are expected, e.g., vocabulary, that we can come to a complete understanding of how input and the mechanisms driving language acquisition interact. Furthermore, in order to better understand bilingual acquisition at the syntax-semantics interface, other child-internal and child-external factors in addition to amount of exposure and knowledge of another language should be taken into account.

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