



Binding and Quantification in Monolingual and Bilingual Language Acquisition
M.J.H. van Koert

Summary

Binding and quantification in monolingual and bilingual language acquisition

Although children acquire languages easily, sometimes they still encounter difficulties with interpreting words correctly. Examples of these words are reflexives (cf. *himself*), pronouns (cf. *him*) and quantifiers (cf. *every*). Children acquiring languages such as Dutch and English have been shown to incorrectly interpret these words (Chien & Wexler, 1990; Crain, Thornton, Boster, Conway, Lillo-Martin & Woodams, 1996; Hendriks, Koops van 't Jagt & Hoeks, 2012; Koster, 1993; Philip & Coopmans, 1996; *inter alios*). The present dissertation reinvestigates these issues and focusses on the interaction between quantifiers and reflexives or pronouns from a (bilingual) first language acquisition perspective.

Chapter 2 reports that children acquiring languages such as Dutch and English have often been found to experience difficulties with correctly interpreting sentences containing local NP antecedents and object pronouns, as in (1).

- (1) The kangaroo says the sheep is scratching him.

The local NP antecedent is *the sheep* and the object pronoun is *him* in (1). What happens in about half of the time is that children think *him* refers to *the sheep* instead of to *the kangaroo*. Thus, in a comprehension task they will incorrectly accept this sentence as a description of a scene where the sheep is scratching itself. This behaviour has been labelled the delay of Principle B effect. The term *Principle B* refers to the standard binding theory, in which the distribution of pronouns was captured by Principle B, whereas the distribution of reflexives was described by Principle A (Chomsky, 1981). The delay in *the delay of Principle B effect* refers to children's less target-like performance on (1) as compared to their performance on sentences containing object reflexives, as in (2).

- (2) The horse says the rabbit is scratching himself.

Children know that (2) cannot mean that the rabbit is scratching the horse; hence, they correctly reject (2) for such a scene in a comprehension task.

Interestingly, English children have been shown to perform more target-like on sentences containing object pronouns when the local antecedent is a QP (Chien & Wexler, 1990; Marinis & Chondrogianni, 2011; van der Lely & Stollwerck, 1997). Thus, they do not show the delay of Principle B effect (DPBE) in sentences such as (3), where the QP antecedent is *every sheep*.

- (3) The kangaroo says every sheep is scratching him.

English children find it relatively easy to correctly reject a scene where three sheep are scratching themselves for (3) in a comprehension task. The difference between English children's non-target-like performance on (1) and their target-like behaviour on (3) has been labelled the quantificational asymmetry (QA) (Elbourne, 2005). Chapter 2 asks whether Dutch children also display this QA, since previous research found mixed results for Dutch (Drozd & Koster, 1999; Philip & Coopmans, 1996).

Local QP antecedents do not only influence English children's behaviour on object pronouns, they also affect their performance on object reflexives. However, English children do not perform more target-like when a QP antecedent precedes the object reflexive, as in (4); rather, they perform less target-like.

- (4) The horse says every rabbit is scratching himself.

Since English children perform less well on (4) than on (2) and since this is the reverse effect from the QA, this phenomenon has been termed the inverted quantificational asymmetry (IQA) (Marinis & Chondrogianni, 2011). Despite the lack of attention given to this, studies including QP antecedents and object reflexives found this effect (Chien & Wexler, 1990; Marinis & Chondrogianni, 2011; van der Lely & Stollwerck, 1997). Hence, Chapter 2 asks whether Dutch children display the IQA, too.

Chapter 2 reports on a picture verification task in which 29 monolingual Dutch children between the ages of six and ten participated. The task entailed that children saw a picture, heard a sentence and then had to judge whether these sentence-picture pairs matched each other *yes* or *no*. Sentences were of the type (1) – (4). The results reveal that monolingual Dutch children do show a DPBE but do not show a QA and IQA. Thus, the only difference between Dutch and English children is on the QP conditions. To account for this difference, Chapter 2 hypothesises that Dutch children have different quantifier interpretation preferences from English children; this hypothesis is tested in Chapter 3.

The QA has been taken as evidence that children know Principle B. It has been suggested that children err on sentences like (1), because they are confused between the co-referential interpretation of pronouns and the interpretation that is yielded by Principle B. In special discourse circumstances, pronouns may co-refer with their local antecedents, such as in (5).

- (5) (You know what Mary, Sue and John have in common? Mary admires John, Sue admires him,) and John admires him too.

(example from Heim, 1994, p. 216; emphasis in the original;
derived from Evans, 1980, p. 356)

A co-referential interpretation of pronouns can only occur with NP antecedents, as they refer to a certain referent, e.g. *John* in (5). Quantifiers have no reference, because they do not pick out a specific referent, but rather refer to a set in a particular context. As such, quantified expressions can never co-refer with pronouns. If quantified expressions cannot co-refer, then children can only rely on their knowledge of Principle B to correctly reject a reflexive meaning for (1). Thus, tasks that reveal a QA have been taken to show that English children know Principle B; their knowledge is only clouded because of the additional co-referential interpretations of pronouns. When such an additional interpretation is removed, English children perform as target-like on object pronouns as on object reflexives.

The results of the monolingual Dutch children, nevertheless, seem to defy this explanation. They perform as non-target-like on the Dutch translation equivalent of (1) as on (3); thus they do not differentiate between sentences in which pronouns have an additional co-referential interpretation, as in (1), and those in which pronouns only have their Principle B interpretation, as in (3). Therefore, this line of reasoning cannot be maintained cross-linguistically. Another problem is the IQA: if English children have Principle A – i.e. they know what reflexives may and may not refer to – why do they perform less target-like on QP antecedents than on NP antecedents?

To answer these questions more straightforwardly, Chapter 2 hypothesises that monolingual Dutch children prefer a distributive interpretation of the quantifier *elk*, whereas monolingual English children prefer a collective interpretation of the quantifier *every*. To test this hypothesis, we carried out a picture selection task in Chapter 3. Ambiguous predicates, such as *tickling a turtle* in (6), give rise to two possible interpretations: a distributive and a collective one.

(6) Every bear is tickling a turtle.

The distributive interpretation comes about when the quantified subject, *every bear*, has wide scope and, thus, ranges over the indefinite object, *a turtle*. In that case, the predicate, such as *tickling a turtle* in (6), is applied to each of the individuals denoted by the quantified subject: each of the individual bears in the set has the property of tickling a turtle. The indefinite object is distributed. In other words, for a picture to match this interpretation, it should show three bears, each tickling their own turtle. The collective reading, by contrast, arises when the indefinite object, *a turtle*, has wide scope and, hence, ranges over the quantified subject, *every bear*. The indefinite object receives a singleton reading. In that case, the predicate is applied to the set as a whole: the whole set has the property of tickling the turtle. A picture that matches this reading should display three bears together tickling one turtle.

We tested 77 monolingual Dutch children and 75 monolingual English children between the ages of five and ten on a picture selection task in Chapter 3. Children saw two pictures: a distributive situation and a collective situation. Then they heard sentences such as (6) and were asked to point to the picture

that best matched the sentence they heard. The results show that the Dutch children consistently choose the distributive picture for sentences starting with *elk*-subjects. The English children, however, choose the distributive picture as frequently as they choose the collective picture for sentences beginning with *every*-subjects.

It is clear that Dutch children prefer a distributive interpretation of *elk*-subjects and this preference explains their performance on sentences such as (3) and (4). A distributive interpretation entails that the quantified subject receives wide scope, causing the object to be distributed. In other words, for each sheep in (3), there should be a *him* that this sheep is scratching. This is exactly what children see in the mismatching pictures: three sheep each scratching itself. Therefore, Dutch children perform as poorly on (3) as they do on (1) and show no QA. This explanation holds for reflexives, too. For each rabbit in (4), there should be a *himself* that this rabbit is scratching. This is what children see in the matching pictures, but not what they see in the mismatching pictures, as those display three rabbits together scratching the horse. Thus, they correctly reject the mismatching pictures for (4) and they show no IQA.

Although English children show no preference for either interpretation, it is clear that *every* has much more collective potential than *elk* has for Dutch children – *elk* has no collective potential at all. Whenever English children give a collective interpretation to *every*-subjects, the object receives wide scope and, hence, it gets a singleton interpretation. There is a *him* such that every sheep is scratching *him*. In other words, the object *him* in (3) receives a singleton reading; therefore, there should be a set of several sheep scratching one other character. This is what English children see in the matching pictures: there are three sheep who are together scratching one kangaroo. By contrast, the mismatching pictures show three sheep each scratching itself and this does not correspond to the collective interpretation, which is why English children correctly reject the mismatching picture much more frequently than their Dutch peers. Therefore, English children show a QA.

The same holds for the reflexive condition. When (4) receives a collective interpretation, the object *himself* receives a singleton interpretation, which forbids it to be bound to the local QP antecedent, as a group cannot together perform a reflexive action. This is the reason why English children incorrectly accept the mismatching picture, showing three rabbits scratching the horse, much more frequently than Dutch children. Thus, English children show an IQA. In addition, it explains why they incorrectly reject the matching picture, which displays three rabbits each scratching itself, more frequently than the Dutch children, who hardly reject the matching picture for (4).

Chapters 2 and 3 describe the interaction between quantifiers and reflexives or pronouns in monolingual Dutch and English acquisition. What happens in a bilingual setting? Chapter 4 investigates Turkish-Dutch bilingual children and compares their performance to that of Turkish-English bilingual children, tested by Marinis and Chondrogianni (2011). Turkish has, in addition to reflexives and pronouns, a quasi-reflexive element *kendisi* ('self.3SG') that can either refer to the local or to the distant antecedent, as illustrated in (7).

- (7) Elif_i Mehmet'in_j kendi-si-ni_{i/j/k} beğendigini söyledi.
 Elif Mehmet.GEN self.3SG.ACC like.3SG.POSS.ACC say.3SG.PAST
 'Elif_i said that Mehmet_j likes her_{i/k}/himself_j.'
 (example from Marinis & Chondrogianni, 2011, p. 205;
 adapted from Gürel, 2002, pp. 27-28)

Kendisi ('self.3SG') is inflected for accusative case in (7). This quasi-reflexive element may cause Turkish-Dutch bilingual children to transfer its characteristics to Dutch reflexives. If they do so, they are expected to incorrectly accept distant antecedents for object reflexives in the Dutch comprehension task. The same picture verification task as in Chapter 2 was used to test 33 Turkish-Dutch bilingual children between the ages of six and ten. It is found that the Turkish-Dutch bilingual children do not transfer the characteristics of the quasi-reflexive to the Dutch reflexives. Likewise the Turkish-English bilingual children had been found to perform similarly to their monolingual English peers on the reflexives. By contrast, the results show that the Turkish-Dutch bilingual children behave differently from their Turkish-English peers on the QP conditions.

The next step is to compare the Turkish-Dutch bilingual children's performance to that of the monolingual Dutch children. The bilingual children were first exposed to Dutch between the ages of one and four. Since they have had less exposure to Dutch input than their monolingual Dutch peers, the question is whether they show a (greater) delay. The results show that the Turkish-Dutch bilingual children behave exactly like the monolingual Dutch children: they display a DPBE, no QA and no IQA. Since the Turkish-English bilingual children also perform similarly to their monolingual English peers on the QP conditions, the conclusion is drawn that Turkish has no cross-linguistic influence on these bilingual children's Dutch or English.

Chapter 5 also examines Turkish-Dutch bilingual children but differs from Chapter 4 in three respects. Firstly, Chapter 5 investigates the comprehension of Dutch reflexives and pronouns by younger bilingual children than those reported on in Chapter 4. Secondly, Chapter 5 includes a Dutch production task. Thirdly, Chapter 5 explores the comprehension of Turkish reflexives and pronouns by Turkish-Dutch bilingual children.

The comprehension task consisted of a picture selection task, which was used to test 21 Turkish-Dutch bilingual children between the ages of four and seven. They were compared to 24 monolingual Dutch children between the ages of four and seven. These children were significantly younger than the ones reported on in Chapters 2 and 4. The picture selection task contained two pictures for each test sentence: one picture displayed a reflexive action and the other showed a non-reflexive action. Test sentences were of the type given in (8) and (9).

- (8) This is the prince. This is the farmer. The prince is pinching himself.
- (9) This is the pirate. This is the wizard. The pirate is biting him.
 (based on Spenader, Smits & Hendriks, 2009)

The test sentences in (8) and (9) are monoclausal, which are more appropriate for younger children than the biclausal sentences in (1) and (2). In addition, this new task did not measure children's understanding of QP antecedents. The results from the comprehension task show that the Turkish-Dutch bilingual children perform exactly like the monolingual Dutch children. Therefore, quantity of input seems to have little effect on the Turkish-Dutch bilingual children's knowledge of reflexives and pronouns.

The production task consisted of elicitation of reflexives and pronouns. Children saw a picture of the protagonists performing some kind of action and were then asked to finish the sentence uttered by the experimenter. Examples are given in (10) and (11).

- (10) Experimenter: 'This is the princess. This is granny.'
 Experimenter: 'And what is the princess doing? (She's?)'
 Target answer: '(The princess/she's) biting herself.'
- (11) Experimenter: 'This is grandpa. This is the pirate.'
 Experimenter: 'And what is grandpa doing to the pirate? (He's?)'
 Target answer: '(Grandpa/he's) hitting him.'

The results show that the Turkish-Dutch bilingual children as well the monolingual Dutch children produce more correct reflexives than correct pronouns. Thus, they show a DPBE in their production. Furthermore, the Turkish-Dutch bilingual children omit more objects in the reflexive and especially in the pronoun condition. We suggest that this can be due to cross-linguistic influence from Turkish, as Turkish allows null objects. It could be that these Turkish-Dutch bilingual children remain for a longer period of time in the object drop stage, which monolingual Dutch children also experience.

The comprehension of Turkish reflexives and pronouns is measured using the same picture verification task that was described in Chapters 2 and 4. The test sentences were translated to Turkish and the control conditions were altered, so that the preferred interpretation of the quasi-reflexive element could be measured. A group of 22 Turkish-Dutch bilingual children were tested by a native speaker of Turkish. The results show that these Turkish-Dutch bilingual children display no DPBE in their Turkish; in other words, they perform equally well on reflexives and pronouns. The results of the control conditions reveal that they prefer to interpret the quasi-reflexive element *kendisi* ('self.3SG') as a reflexive rather than as a pronoun. This is different from monolingual Turkish adults, who show no preference in unbiased contexts (Demirci, 2001).

We conclude from the studies conducted in Chapter 5 that there is no cross-linguistic influence from Turkish on Dutch in the comprehension of Dutch reflexives and pronouns. For the production of Dutch reflexives and pronouns, it seems that Turkish-Dutch bilingual children remain for a longer period of time than their monolingual Dutch peers in a stage where the object can be optionally dropped. Whether Turkish-Dutch bilingual children show cross-linguistic influence from Dutch to Turkish is difficult to conclude, as the only study that investigated monolingual Turkish children on their comprehension of reflexives and pronouns used a very different methodology. Since those monolingual Turkish children showed less target-like behaviour on the reflexives than on the pronouns (Aarssen & Bos, 1999), it might be that these Turkish-Dutch bilingual children are influenced by their Dutch and, hence, show more target-like behaviour on the reflexives in comparison to their monolingual Turkish peers.

Chapter 6 dives into another language pair: English-Dutch bilingual children. Since Dutch and English differ from each other on the quantifier interpretation preferences and on binding, the question is whether these English-Dutch bilingual children also show an interaction between quantifiers and reflexives or pronouns, just like their monolingual peers. To determine the English-Dutch bilingual children's quantifier interpretation preferences we used the same picture selection task as in Chapter 3. We employed the same picture verification task as in Chapters 2 and 4 in order to measure the bilingual children's performance on sentences containing QP antecedents and object reflexives and pronouns. A group of 29 English-Dutch bilingual children participated. They were aged between six and ten. All the children had been exposed to English from birth onwards. Most of them had been exposed to Dutch from birth onwards but for some of them their first exposure to Dutch occurred between nine months and four years of age. All of them lived in the Netherlands and attended Dutch primary schools at the time of testing. Their performance is compared to the monolingual children's performance reported on in Chapters 2 and 3.

The results of the picture selection task measuring the children's quantifier interpretation preferences reveal that the bilingual children select fewer distributive situations for *elk*-subjects than their monolingual Dutch peers. In addition, the bilingual children opt for the collective picture for *every*-subjects in fewer instances than their monolingual English peers. Moreover, the bilingual children perform similarly in both languages, meaning that they do not differentiate their languages with regard to their quantifier interpretation preferences. We find the same for the results of the picture verification task. The bilingual children do not distinguish between their Dutch and their English, as their results show an IQA but no QA in Dutch and in English.

Chapter 6 reveals two important findings: (i) the bilingual children show convergence, in the sense that their quantifier interpretation preferences in Dutch and English are more similar to each other than to those of monolingual Dutch and English children; (ii) the bilingual children show an interaction between their quantifier interpretation preferences and their behaviour on

sentences containing QP antecedents and object reflexives and pronouns, just like their monolingual Dutch and English peers. The first finding was unexpected, as unidirectional cross-linguistic influence is typically found. The second finding supports our hypothesis that there is an interaction between children's quantifier interpretation preferences and their interpretation of sentences with QP antecedents and object reflexives and pronouns. This holds for monolingual as well as for bilingual children.

A remaining issue is why the English-Dutch bilingual children show convergence, whereas the Turkish-Dutch (and Turkish-English) bilingual children do not show signs of cross-linguistic influence in their comprehension of sentences with QP antecedents and object reflexives and pronouns. It is suggested that the Turkish quantifier system on the one hand supports the child English interpretations, because it has two collective quantifiers and one distributive quantifier. On the other hand, the Turkish quantifier system may support the child Dutch interpretations, as the distributive quantifier can only receive distributive interpretations, just like the Dutch *elk*.

An important theoretical consequence of these acquisition findings is that the standard binding theory cannot account for children's behaviour on QP conditions. Dutch children do not improve on the QP conditions. Our explanation comprises that the distributive preference causes the object pronoun to be understood as a variable, which can be locally bound. A collective interpretation entails that the object pronoun cannot be interpreted as a variable. It is not the case that English children cannot have a locally bound pronoun because the co-referential interpretation is blocked; rather, their preference for a collective interpretation forbids a locally bound interpretation of the pronoun. To justify children's behaviour on QP conditions, their quantifier interpretation preferences should therefore be taken into consideration. This holds for monolingual as well as for bilingual children. Depending on their languages' quantifier systems, bilingual children may show convergence in their quantifier interpretation preferences, which permeate their behaviour on sentences containing QP antecedents and object reflexives and pronouns.