Comprehension of reflexives and pronouns in sequential bilingual children: Do they pattern similarly to L1 children, L2 adults, or children with specific language impairment?

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A B S T R A C T

This paper investigates how sequential bilingual (L2) Turkish-English children comprehend English reflexives and pronouns and tests whether they pattern similarly to monolingual (L1) children, L2 adults, or children with Specific Language Impairment (SLI).

Thirty nine 6- to 9-year-old L2 children with an age of onset of 30−48 months and exposure to English of 30−72 months and 33 L1 age-matched control children completed the Advanced Syntactic Test of Pronominal Reference-Revised (van der Lely, 1997). The L2 children's performance was compared to L2 adults from Demirci (2001) and children with SLI from van der Lely and Stollwerck (1997).

The L2 children's performance in the comprehension of reflexives was almost identical to their age-matched controls, and differed from L2 adults and children with SLI. In the comprehension of pronouns, L2 children showed an asymmetry between referential and quantificational NPs, a pattern attested in younger L1 children and children with SLI. Our study provides evidence that the development of comprehension of reflexives and pronouns in these children resembles monolingual L1 acquisition and not adult L2 acquisition or acquisition of children with SLI.

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1. Introduction

A recent debate in child second language (L2) acquisition research surrounds whether or not language development in L2 children resembles monolingual child (L1) acquisition or adult L2 acquisition (Schwartz, 2004; Weerman, Bisschop, & Punt, 2006). Some studies have shown that at the domain of inflectional morphology L2 children follow similar development to L1 children (Weerman et al., 2006), whereas at the domain of syntax, at an early stage of development they transfer properties from their L1 to their L2 (Haznedar, 1997). However, other studies have shown less clear-cut findings with L2 children performing similarly to L2 adults in inflectional morphology (Chondrogianni, 2008), others showing similarities between all three groups in the domain of syntax (Unsworth, 2005), and others showing differences between L2 children and L2 adults in both inflectional morphology and syntax (Blom, 2008). The debate is still on and it seems that several external and internal factors (age of onset, years of exposure, proficiency in the quantity and quality of input, properties of the L1 and the L2) affect the findings of the studies above and may cause the different patterns attested. The present paper addresses this issue by investigating the comprehension of English reflexives and pronouns by typically developing (TD) L2 children in comparison to age-matched L1 controls. The L2 children in our study had Turkish as L1 and English as L2. We chose this language combination because Turkish has a quasi-reflexive element that does not exist in English and seems to cause transfer effects in adult L2 acquisition (Demirci, 2001). The Turkish-English combination allows us to investigate effects of transfer from the L1 Turkish to the L2 English and compare our findings on L2 children to previous research on L2 adults.

A second line of research has compared the language abilities of L2 children with children with Specific Language Impairment (SLI) and has found similarities between the two groups (Hakansson & Nettelbladt, 1996; Paradis, 2005, 2008). However, with very few exceptions (e.g., Marinis and Chondrogianni, 2010), this line of research has focused on production tasks with children that had less than two years of exposure to the L2. To date only three studies tested off-line (Grüter, 2005) and on-line comprehension (Marinis, 2007, 2008) and showed that L2 children pattern more similarly to L1 children than to children with SLI and differences between L2 and L1 children could be attributed to transfer effects. To address the issue of similarity between L2 children and children with SLI, we compare our findings on the comprehension of reflexives and pronouns in L2 children to results from previous studies on monolingual children with SLI (van der Lely & Stollwerck, 1997). This is of particular interest because reflexives and pronouns have been claimed to be vulnerable in monolingual children with SLI (Montgomery & Evans, 2009; van der Lely & Stollwerck, 1997).

2. Asymmetries in the comprehension of reflexives and pronouns

A large number of studies has investigated the comprehension of English reflexives and pronouns, as in (1) and (2), in TD L1 children − for a review see Thornton and Wexler (1999) −, and adults with aphasia − for a review, see Edwards and Varlokosta (2007).

(1) The horse$_j$ says the rabbit$_i$ is scratching *himself*$_i$
(2) The horse$_j$ says the rabbit$_i$ is scratching *him*$_{j/k}$

The interpretation of reflexives is regulated by Principle A, according to which reflexives must be bound by a local antecedent, in example (1) *the rabbit*. The interpretation of pronouns, on the other hand, is regulated either syntactically by Principle B or at the discourse level through co-reference. According to Principle B, pronouns may not be bound by a local antecedent. In (2), this disallows *him* to be bound by *the rabbit* and allows it to be bound by the subject of the main clause *the horse* or an exophoric antecedent, i.e., an antecedent outside the sentence, e.g. *a cat*. Co-reference, on the other hand, relates to discourse/pragmatics allowing two expressions to co-refer or refer to the same individual.

In TD L1 English children, there is a well-documented asymmetry in the development of the interpretation of reflexives and pronouns. By the age of 3−4 years, children's interpretation of

reflexives, as in (1), is target-like, i.e. they accept a local antecedent (*the rabbit*) and reject a non-local antecedent (*the horse*). On the other hand, in pronouns, as in (2), children of the same age and even until the age of 6 years accept a non-local antecedent (*the horse*) or an exophoric antecedent (e.g., *a cat*), but at the same time they fail to reject a local antecedent when it is a referential NP (*the rabbit*). This has been dubbed, the *Delay of Principle B Effect*, and has been attested also in adults with aphasia (Edwards & Varlokosta, 2007).

Errors in the interpretation of pronouns in TD children and adults with aphasia seem to drop when the antecedent is a quantified NP, as in (3).

(3) The horse$_j$ says every rabbit$_i$ is scratching him$_{j/k}$

The difference between the interpretation of pronouns with referential vs. quantificational NPs has been claimed to be due to different mechanisms involved. Referential NPs, such as *the rabbit* in (2), can be interpreted as antecedents of pronouns through syntactic binding or co-reference at the discourse level, whereas quantified NPs, such as *every rabbit* in (3), can be interpreted as antecedents of pronouns only through syntactic binding. Children have been argued to acquire syntactic binding very early on, but to have difficulties with co-reference until very late.

Two types of accounts have been put forward to explain the children's difficulties with co-reference when there are two competing interpretations. According to one set of accounts, children's errors are due to lack of discourse-pragmatic knowledge (Avrutin & Wexler, 1993; Chien & Wexler, 1990; Thornton & Wexler, 1999), whereas according to another set of accounts, the errors are caused by working memory limitations (Grodzinsky & Reinhart, 1993; Reinhart, 2006). The idea here is that to reject the co-reference interpretation in (2), in which *him* co-refers with the local antecedent, children have to build up both interpretations (binding and co-reference) and hold them in their working memory. Due to immature working memory in children and impaired working memory in adults with aphasia, these populations sometimes fail to keep both interpretations in working memory, and this is why they sometimes accept a local antecedent.

To date, only two studies have investigated the comprehension of pronouns and reflexives in children with SLI (Montgomery & Evans, 2009; van der Lely & Stollwerck, 1997). The Montgomery & Evans study used a sentence-picture matching task to investigate the interpretation of pronouns, reflexives, and passives and reported that children with SLI were less accurate than age-matched controls, and performed similarly to language controls in this task, but they did not report the children's accuracy for each sentence-type separately. Therefore, it is unclear whether or not children with SLI had difficulties with both pronouns and reflexives.

The study by van der Lely & Stollwerck used an older version of the picture verification task we used in our study and found that 9- to 12-year-old children with SLI performed at chance in the comprehension of bi-clausal sentences involving pronouns with referential NPs (*Baloo Bear says Mowgli is tickling him*) when there was a mismatch between the sentence and the picture (picture showing Mowgli tickling himself) (mean score: 3.83 out of 6), but their comprehension improved with quantificational NPs (*Mowgli says every monkey is tickling him;* picture showing every monkey tickling every monkey) (mean score: 5.33 out of 6), a pattern similar to younger TD children, as we saw earlier. On the other hand, their comprehension of bi-clausal sentences involving reflexives was at chance level in the Mismatch-syntax condition with referential NPs (*Mowgli says Baloo Bear is tickling himself;* picture showing Mowgli tickling Mowgli) (mean score: 3 out of 6), and quantificational NPs (*Every monkey says Mowgli is tickling himself;* picture showing every monkey tickling every monkey) (mean score: 3.75 out of 6), and also in the Mismatch condition with quantificational NPs (*Mowgli says every monkey is tickling himself;* picture showing every monkey tickling Mowgli) (mean score: 2.75 out of 6). Thus, it seems that children with SLI have difficulties with both pronouns and reflexives. Their performance on pronouns may reflect an earlier stage of development, but their performance on reflexives has not been attested in any study on TD L1 children.

Studies on adult L2 acquisition of pronouns and reflexives have revealed effects of transfer for reflexive pronouns when the L1 grammar is the superset, i.e. when the reflexive allows local and non-local binding, and the L2 the subset grammar, i.e. allows only local binding (e.g., Hiragawa, 1990; Yip &

Tang, 1998). In addition, White (1998) showed that the interpretation of pronouns in Japanese inter-mediate learners of English is affected by finiteness, i.e. they reject local antecedents in bi-clausal finite contexts, but accept local antecedents in bi-clausal non-finite contexts. Importantly for our study, Demirci (2001) investigated how 170 adult Turkish L2 learners of English from five proficiency levels interpret English reflexives in the object position in bi-clausal constructions using a paper and pencil interpretation task. Participants were University students in Turkey who have acquired English in a classroom setting and attended English classes at a Turkish University. They read sentences, as in (4), and they had to choose whether *himself* refers to Ahmet or Cem by circling either yes or no next to each name.

(4) Ahmet said that Cem always criticized himself.

Sentences were either pragmatically biased for the non-local antecedent (*Ahmet*), or pragmatically biased for the local antecedent (*Cem*), or neutral. The results showed that participants were affected by the pragmatic bias. Importantly, in neutral sentences 69% of the responses favoured the local ante-cedent with the reflexive interpretation and 31% the non-local antecedent with the pronominal interpretation. There was no effect of proficiency as estimated by the number of years taught English at the University. This was significantly different from English controls who had 94% preference for the local antecedent. These findings show that Turkish learners of English with classroom exposure interpret *himself* as a reflexive or as a pronoun, as it is in Turkish, as we will see in the next section. This provides evidence for transfer from the L1 to the L2.

The present paper investigates the interpretation of pronouns and reflexives in the object position in Turkish-English L2 children addressing transfer effects from Turkish to English. Therefore, the next section will present the properties of pronouns and reflexives in the object position in Turkish compared to English.

3. Properties of reflexives and pronouns in Turkish

Turkish has null pronouns, the overt pronoun *o*, the reflexive pronoun *kendi*, and the quasi-reflexive element *kendisi/kendileri* (Gürel, 2002). The overt pronoun *o* is a strong, deictic element which cannot be bound by a local antecedent in the object position, and thus, obeys Principle B, as shown in (5), and in that sense resembles English pronouns. The reflexive element *kendi* is inflected for person and number and can only refer to a local antecedent, as shown in (6). Thus, it is subject to Principle A and is similar to English reflexives. The binding domain for the pronoun *o* and reflexive *kendi* in the object position in Turkish is similar to English. The quasi-reflexive element *kendisi/kendileri* is morpho-phonologically similar to the third person singular or plural of the true reflexive *kendi* (kendi-si.3SG/-leri.3PL), but it is indeterminate with respect to its binding properties and domain; it can have a local or a non-local antecedent, as shown in (7). With a local antecedent, *kendisi/kendileri* has a reflexive interpretation, whereas with a non-local antecedent, it has a pronominal interpretation (Gürel, p.c.).

(5) Elif$_i$ Mehmet'in$_j$ o-nu $_{i/*j/k}$ beğendigini   söyledi.
    Elif Mehmet.GEN   s/he.ACC   like.3SG.POSS.ACC   say.3SG.PAST
    'Elif$_i$ said that Mehmet$_j$ likes her$_i$/him$_{*j}$.'

(6) Elif$_i$ Mehmet'in$_j$ kendi-ni$_{*i/j/*k}$ beğendigini   söyledi.
    Elif Mehmet.GEN   himself.ACC   like.3SG.POSS.ACC   say.3SG.PAST
    'Elif$_i$ said that Mehmet$_j$ likes herself$_{*i}$/himself$_j$.'

(7) Elif$_i$ Mehmet'in$_j$ kendi-si-ni$_{i/j/k}$ beğendigini   söyledi.
    Elif Mehmet.GEN herself/himself.3SG.ACC   like.3SG.POSS.ACC   say.3SG.PAST
    'Elif$_i$ said that Mehmet$_j$ likes her$_i$/himself$_j$.'
    (examples adapted from Gürel, 2002)

4. Research questions and predictions

Against this background, our study investigates the interpretation of pronouns and reflexives in object position in bi-clausal sentences in a group of Turkish-English L2 children compared to L1 age-matched children, and indirectly to L2 adults from the Demirci (2001) study, and children with SLI from the van der Lely and Stollwerck (1997) study. The main questions we are addressing are: 1) whether the L2 children's pattern of interpretation of pronouns and reflexives is similar to the L1 children in our study or the L2 adults in the study by Demirci, 2) whether it resembles the pattern of children with SLI from van der Lely & Stollwerck, and 3) whether the length of exposure to English affects the L2 children's performance.

Evidence for a similarity between L2 children and L2 adults would be provided if the L2 children allow a non-local antecedent in English reflexives, as shown in Demirci (2001), whereas evidence for a similarity between L2 and L1 children would be manifested if L2 children's error pattern resembles that of L1 children, such as the asymmetry between referential and quantificational NPs in the interpretation of English pronouns. Chance performance in the mismatch conditions of both pronouns and reflexives (van der Lely & Stollwerck, 1997) would provide evidence for a similarity between L2 children and children with SLI.

5. Methodology

5.1. Participants

Thirty nine TD successive bilingual Turkish-speaking children from the Turkish community in London and thirty three TD monolingual English-speaking children from Reading participated in the study. The two groups were matched on age and socio-economic status. The L2 children had a mean age of 7;8 (SD: 12 months; range: 6;2−9;9), and the L1 children a mean age of 7;5 (SD: 9 months; range: 6;0−9;0) ($t(70) = -1.402, p > 1$). Both groups of children attended schools whose percentage of free school meals was well above the national average.

All L2 children were growing up in families with Turkish spoken at home and with systematic exposure to English starting when the children went to the nursery. Information about the L2 children's entry to the nursery, quantity and quality of input was collected through a parental and child questionnaire. The L2 children had an age of onset (AoO) around three years (mean: 38.8 months; SD: 5 months; range: 30−48 months). The children's mean exposure to English was around 4 years (mean: 48.3 months; SD: 13 months; range: 30−72 months). None of the children had any history of speech and/or language delay or impairment and their parents were not concerned about their language development.

5.2. Material and procedures

The two groups participated in a battery of standardised and non-standardised assessments and experimental tasks examining various linguistic phenomena. The present paper reports data from the Advanced Syntactic Test of Pronominal Reference-Revised (A-STOP-R), a revised version of the A-STOP (van der Lely, 1997). This is a sentence-picture judgment task involving a yes/no judgment. The A-STOP-R consists of two practice and ninety six test sentences. All action verbs are the same as in the A-STOP (pinch, point, tickle, touch, scratch, wash), but the pictures and sentences have been revised. The two practice sentences are simple transitive sentences depicting an action between two animals to which the children had to say 'yes', if the pictured matched the sentence or 'no', if it did not. All children were successful at providing the correct response to the practice items.

The test sentences are bi-clausal containing a matrix clause with the verb 'say' and a subordinate clause with a finite action verb. Two sets of characters are introduced, one as the subject NP of the matrix and one as the subject NP of the subordinate clause, as well as a reflexive or pronoun as the object NP of the subordinate clause, as in (1) and (2). The participants in the actions are all animals apart from four human characters (granny, the girl, the boy, the dancer).

Table 1
Examples of the A-STOP-R material for each condition.

	Conditions	Sentence	Picture
1	Reflexive match referential NP	The horse says the rabbit is scratching himself	Rabbit scratching self
2	Reflexive mismatch referential NP	The horse says the rabbit is scratching himself	Rabbit scratching horse
3	Reflexive mismatch-syntax referential NP	The rabbit says the horse is scratching himself	Rabbit scratching self
4	Reflexive match quantificational NP	The horse says every rabbit is scratching himself	3 rabbits scratching self horse looking
5	Reflexive mismatch quantificational NP	The horse says every rabbit is scratching himself	3 rabbits scratching horse
6	Reflexive mismatch-syntax quantificational NP	Every rabbit says the horse is scratching himself	3 rabbits scratching self horse looking
7	Pronoun match referential NP	The kangaroo says the sheep is scratching him	sheep scratching kangaroo
8	Pronoun mismatch referential NP	The kangaroo says the sheep is scratching him	Sheep scratching self
9	Pronoun mismatch-syntax referential NP	The sheep says the kangaroo is scratching him	sheep scratching kangaroo
10	Pronoun match quantificational NP	The kangaroo says every sheep is scratching him	3 sheep scratching kangaroo
11	Pronoun mismatch quantificational NP	The kangaroo says every sheep is scratching him	3 sheep scratching self kangaroo looking
12	Pronoun mismatch-syntax quantificational NP	Every sheep says the kangaroo is scratching him	3 sheep scratching kangaroo

The test sentences consist of twelve experimental, as shown in Table 1, and four control conditions,[1] with six sentences per condition. Half of the experimental conditions have a referential, definite NP in the subject position of the subordinate clause and half have a quantified NP. The object NP in the subordinate clause is either a pronoun or a reflexive. In four experimental conditions, the picture matches the sentence, whereas in the remaining eight conditions, there is a mismatch between the picture and the sentence. The test sentences of the A-STOP-R are randomised and presented in a set order.

The *Reflexive Mismatch* condition tests whether children will allow a non-local antecedent and give a pronoun interpretation for the reflexive, which would be similar to the interpretation of the quasi-reflexive element *kendisi*. The *Reflexive Mismatch-syntax* condition tests whether children will allow non-local binding of the reflexive giving a reflexive interpretation which is not allowed in either English or Turkish. In the *Pronoun Mismatch* condition, the mismatch involves local binding, which is not attested in either of the languages, but can provide evidence for the Delay of Principle B Effect in L2 children. In the *Pronoun Mismatch-syntax* condition, the mismatch involves reversal of thematic roles and tests whether children will adopt a liner strategy NP1 = subject, NP2 = object.

6. Results

The children's performance on reflexives and pronouns was analysed separately using repeated measures ANOVAs with the between factor Group (L1, L2), and the within factors NP type (referential, quantificational), and Matching (match, mismatch, mismatch-syntax). Interactions were followed up using pairwise comparisons with Bonferroni correction. One-sample t-tests were used to ascertain chance level performance.

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[1] Due to space limitations, the results from the control conditions will not be presented in this paper.
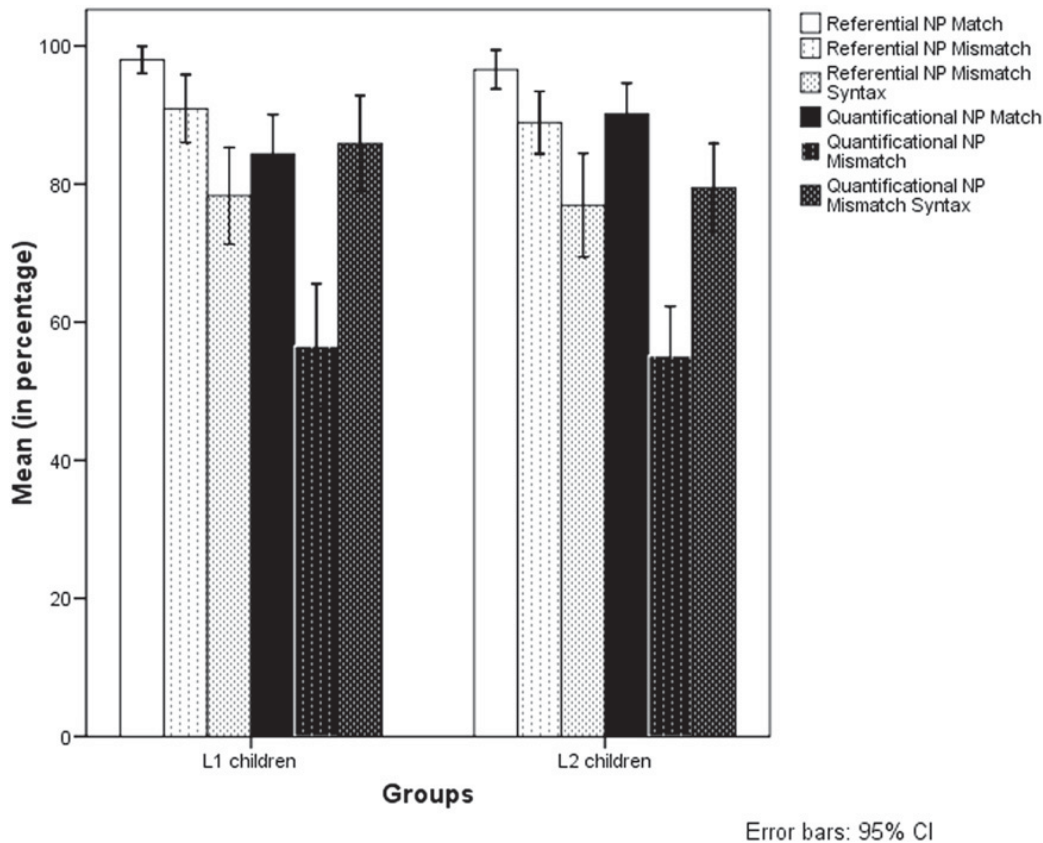
Fig. 1. Accuracy in the comprehension of reflexives (in percentage).

Fig. 1 shows the L1 and L2 children's performance in the interpretation of reflexives.

The ANOVA revealed a main effect of NP Type ($F(1, 70) = 100.28$, $p < 0.001$, $\eta^2 = 0.59$), a main effect of Matching ($F(2, 140) = 38.44$, $p < 0.001$, $\eta^2 = 0.35$), and an interaction between NP Type and Matching ($F(2, 140) = 92.85$, $p < 0.001$, $\eta^2 = 0.57$). There was no main effect of Group and no interactions with Group indicating that both groups performed in a similar way in the interpretation of reflexives. Pairwise comparisons showed better performance in sentences with referential compared to quantificational NPs in the matching (mean accuracy: 97.2% vs. 87.5%; $p < 0.001$) and mismatch conditions (mean accuracy: 89.8% vs. 55.8%; $p < 0.001$), but the opposite was attested in the Mismatch-syntax condition (mean accuracy: 77.5% vs. 82.4%; $p < 0.05$). In addition, in sentences with referential NPs, children performed significantly better in the Matching (97.2%) compared to the two Mismatch conditions (mean accuracy: 89.8%, 77.5%; $p < 0.001$) and children performed also better in the Mismatch compared to the Mismatch-syntax condition ($p < 0.001$). In sentences with quantificational NPs, children performed better in the Matching (mean accuracy: 87.5%) and the Mismatch-syntax (mean accuracy: 82.4%) compared to the Mismatch condition (mean accuracy: 55.8%; $p < 0.001$), but there was no difference between the Matching and the Mismatch-syntax conditions. Finally, one-sample t-tests showed chance performance in both groups only in the Quantificational NP-Mismatch condition (L1: $t(32) = 1.49$, $p > 0.1$; L2: $t(38) = 1.46$, $p > 0.1$).

Fig. 2 shows the children's performance in the interpretation of pronouns.

The ANOVA revealed a main effect of Group ($F(1, 70) = 17.01$, $p < 0.001$, $\eta^2 = 0.2$), a main effect of NP Type ($F(1, 70) = 16.01$, $p < 0.001$, $\eta^2 = 0.19$), a main effect of Matching ($F(2, 140) = 55.62$, $p < 0.001$, $\eta^2 = 0.44$), an interaction between Group and Matching ($F(2, 140) = 11.66$, $p < 0.001$, $\eta^2 = 0.14$), and an interaction between NP Type and Matching ($F(2, 140) = 7.67$, $p = 0.001$, $\eta^2 = 0.1$).

To trace the source of the two interactions we conducted separate ANOVAs for each group. In L1 children this showed a main effect of NP Type ($F(1, 32) = 4.39$, $p < 0.05$, $\eta^2 = 0.1$) reflecting better performance in quantificational compared to referential NPs (mean accuracy: 88.1% vs. 83.5%), and a main effect of Matching ($F(2, 64) = 16.21$, $p < 0.001$, $\eta^2 = 0.3$) reflecting better performance in the match (mean accuracy: 97%) compared to the mismatch (mean accuracy: 82.6%; $p = 0.001$) and the
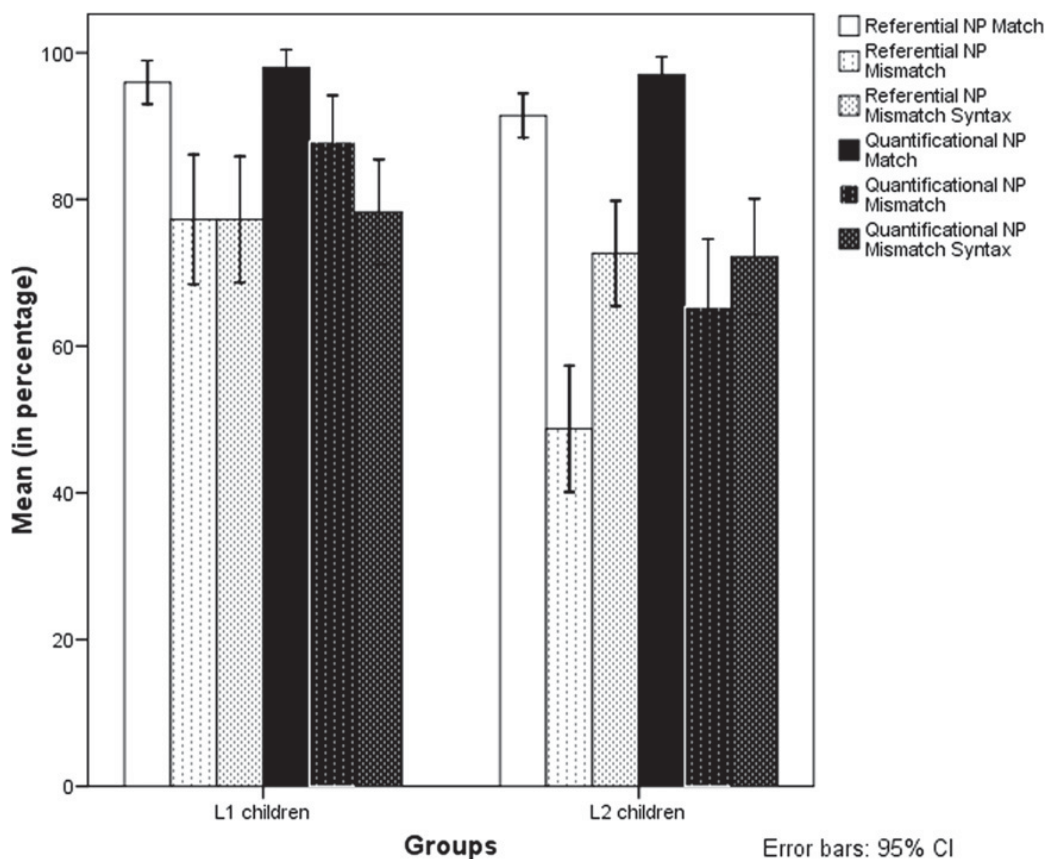
Fig. 2. Accuracy in the comprehension of pronouns (in percentage).

Mismatch-syntax (mean accuracy: 77.8%; $p < 0.001$) conditions. L2 children also showed a main effect of NP Type ($F (1, 38) = 13.18$, $p = 0.001$, $\eta^2 = 0.3$) and a main effect of Matching ($F (2, 76) = 50.75$, $p < 0.001$, $\eta^2 = 0.6$), but they also showed an interaction between NP Type and Matching ($F (2, 76) = 7.33$, $p = 0.001$, $\eta^2 = 0.2$). Pairwise comparisons showed that L2 children performed better in sentences with quantificational compared to referential NPs in the matching (mean accuracy: 97% vs. 91.4%; $p < 0.01$) and mismatch conditions (mean accuracy: 65.4% vs. 48.7%; $p < 0.001$), but there was no significant difference between referential and quantificational NPs in the Mismatch-syntax condition (mean accuracy: 72.2% vs. 72.7%; $p > 0.1$). In sentences with referential NPs, children performed significantly better in the Matching (mean accuracy: 91.4%) compared to the two Mismatch conditions (mean accuracy: 48.7%, 72.6%; $p < 0.001$) and children performed also better in the Mismatch-syntax compared to the Mismatch condition ($p < 0.001$). In sentences with quantificational NPs, children performed better in the Matching (mean accuracy: 97%) compared to the Mismatch (mean accuracy: 65.4%) and the Mismatch-syntax conditions (mean accuracy: 72.2%; $p < 0.001$), but there was no difference between the Mismatch and the Mismatch-syntax conditions ($p > 0.1$). One-sample t-tests showed chance performance in the L2 children only in the Referential NP-Mismatch condition ($t (38) = 0.3$, $p > 0.1$).

Finally, to investigate whether or not Months of Exposure (MoE) affected the L2 children's performance, we conducted Pearson correlations between MoE and the children's performance in each condition. These showed positive correlations between MoE and the L2 children's performance on reflexives in the Mismatch-syntax conditions with referential ($r (39) = 0.451$, $p < 0.01$) and quantificational NPs ($r (39) = 0.484$, $p < 0.01$). There were also positive correlations between MoE and the L2 children's performance on pronouns in the Mismatch conditions with referential ($r (39) = 0.356$, $p < 0.05$) and quantificational NPs ($r (39) = 0.565$, $p < 0.001$) and between MoE and the L2 children's performance on pronouns in the Mismatch-syntax conditions with referential ($r (39) = 0.408$, $p = 0.01$) and quantificational NPs ($r (39) = 0.539$, $p < 0.001$).

7. Discussion

The present study is the first to investigate the interpretation of reflexives and pronouns in sequential bilingual children compared to monolingual children of the same age and to indirectly compare their performance to L2 adults and L1 children with SLI.

The study aimed to find out: 1) whether L2 children interpret pronouns and reflexives similarly to the age-matched L1 children in our study or to the L2 adults from the Demirci study, 2) whether the L2 children's pattern resembles the pattern of children with SLI from the study by van der Lely & Stollwerck, and 3) whether the L2 children's performance was affected by their length of exposure to English.

The results showed that the L2 children were less accurate than the age-matched L1 children only in the interpretation of pronouns, but their interpretation of reflexives was almost identical to the age-matched L1 children. L1 and L2 children performed above chance in the *Reflexive Mismatch-syntax* condition which tests whether children allow non-local binding of the English reflexive. Crucially the two groups did not differ from each other in the *Reflexive Mismatch* conditions. In the condition involving quantificational NPs, both groups performed at chance, whereas in the condition involving referential NPs, both groups did not allow a non-local antecedent for the reflexive with a pronoun interpretation and performed close to 90% correct. The asymmetry between referential and quantification NPs in the *Reflexive Mismatch* conditions replicates van der Lely & Stollwerck's (1997) findings in 5- to 6-year-old TD children and children with SLI and has been argued to result from the complexity of constructing a distributed reading in combination with task effects (Grimshaw & Rosen, 1990).[2] Crucially, high accuracy in the *Reflexive Mismatch* condition with referential NPs provides evidence that the L2 children in our study did not transfer properties of the quasi-reflexive *kendisi* to the English reflexive *himself/herself*. This is in contrast to the L2 learners in the Demirci study.[3]

The well-documented asymmetry between referential and quantificational NPs in the interpretation of pronouns in L1 children was attested in the L1 children of our study who performed better in the quantificational compared to the referential NP conditions. This asymmetry was also present in the interpretation of English pronouns in L2 children, in fact it was even more pronounced in the L2 children. The L2 children's performance in the *Pronoun Mismatch* condition involving referential NPs which according to Grodzinsky & Reinhart involves co-reference was at chance level, whereas their performance in the *Pronoun Mismatch* condition involving quantificational NPs that involves binding was above chance. We speculate that the larger magnitude of the effect in L2 children could be attributed to two possible reasons. First, if Grodzinsky & Reinhart are on the right track, the low performance in the *Pronoun Mismatch* condition could be attributed to working memory limitations in children. This is based on the idea that in the pronoun mismatch condition of a picture verification task, in which children hear the sentence 'the kangaroo says the sheep in scratching him' and see a picture of a sheep scratching himself, to reject the co-reference interpretation they will have to build a binding and co-reference interpretation, hold them in working memory and then make a decision. In contrast, to reject a pronoun mismatch condition with a quantificational NP, only syntactic binding is necessary; children do not need to build up two interpretations and decide which one is the correct one. This difference between referential and quantificational NPs could explain the asymmetry between the two in young TD children whose working memory is immature and children with SLI who have working memory limitations (Montgomery, 2000; Montgomery & Evans, 2009). L2 acquisition research has revealed a relationship between L2 learners' working memory capacity and proficiency in their L2 (Harrington & Sawyer, 1992). This implies that L2 learners who are not as proficient as native speakers will have inferior working memory capacity in their L2 compared to their L1 and also compared to native speakers (Birdsong, 2006). To date, there are no studies on the development of working memory in L2 children and its relationship to the children's proficiency in their L2. Therefore, we cannot make

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[2] Due to space limitations, we are not able to discuss this issue in more detail. For an in-depth discussion, see, Thornton & Wexler (1999).

[3] However, it should be noted that the design of the Demirci study differed from our task; it included only reflexives and some sentences were pragmatically biased for the local or non-local antecedent which may have influenced the L2 learners' performance.

a strong claim that the L2 children's strong asymmetry between referential vs. quantificational NPs is due to limited working memory capacity in their L2 compared to L1 children. An alternative explanation is that the L2 children's performance reflects an earlier stage of development of L1 children. These possibilities clearly need to be tested in future research by comparing the working memory of the L2 children to the L1 children, and by comparing the L2 children's performance to L1 children with similar language abilities.

Importantly, in neither of the two groups did we find a low performance in the interpretation of pronouns with referential NPs in the *Pronoun Mismatch-syntax* condition that involves reversal of thematic roles. This provides evidence that L1 and L2 children did not adopt a linear strategy NP1 = subject, NP2 = object.

Turning to the comparison between the L2 children in our study and the children with SLI from van der Lely & Stollwerck, both groups showed an asymmetry between referential and quantificational NPs in the interpretation of pronouns in the mismatch conditions. L2 children had a mean accuracy of 2.92 in referential NPs and 3.92 in quantificational NPs and L1 children 4.64 and 5.27 respectively. The children with SLI from van der Lely & Stollwerck study showed a mean accuracy of 3.83 in referential NPs and 5.33 in quantificational NPs. However, the two groups differed in the interpretation of reflexives. L2 children patterned similarly to their age-matched controls, but children with SLI showed chance performance in the Mismatch-syntax conditions with referential (SLI: 3.00; L2 children: 4.62; L1 children: 4.70) and quantificational NPs (SLI: 3.75; L2 children: 4.77; L1 children: 5.15) that test whether or not children allow non-local binding of the English reflexive and violate its binding domain. This shows clearly that L2 children do not show the same patterns of performance with children with SLI. It should be noted that the children with SLI in the van der Lely & Stollwerck study were older (9;3−12;10) than the L2 children (6;2−9;9), thus, the difference between the two groups could not be attributed to age differences.

Finally, correlations between the L2 children's performance in each condition and their exposure to English revealed a relationship between their exposure to English and their performance in the *Mismatch-syntax* conditions with referential and quantificational NPs in both reflexives and pronouns. This shows that their accuracy in interpreting reflexives increased with more exposure to English in the condition tapping the binding domain of reflexives and in the condition related to thematic role assignment in pronouns. The positive correlation between exposure to English and accuracy in the *Pronoun Mismatch* conditions with referential and quantificational NPs shows that the length of exposure to English affects the L2 children's performance in the conditions that involve co-reference at the discourse level, but also syntactic binding.

To conclude, this study has shown that L2 children with an AoO between 30 and 48 months and 30−72 months of exposure to English do not perform similarly to L2 adults or children with SLI. Their patterns of performance in the interpretation of reflexives are almost identical to their age-matched controls, even though their L1 is in a subset−superset relation to their L2. The L2 children's performance in the interpretation of pronouns shows an asymmetry between referential and quantificational NPs attested in younger L1 TD children. Thus, our study provides evidence that the development of comprehension of reflexives and pronouns in L2 children which involves the domains of syntax (reflexives, pronouns) and discourse (pronouns) resembles monolingual L1 acquisition and not adult L2 acquisition (Schwartz, 2004), or acquisition in children with SLI. This needs to be further substantiated by future research using the same material with two additional groups: 1) a group of L2 adults living in an English-speaking country, having naturalistic exposure to English, and the same level of proficiency with the L2 children in our study. This would determine whether the observed differences between L2 children and adults are due to differences in type of exposure and proficiency in English; 2) a group of L2 children with less exposure to English. This would test whether L2 children at an earlier stage of development show transfer from their L1 to their L2.

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