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ARTICLE

Individual differences in structural priming in bilingual and monolingual children: the influence of perspective-taking

Joyce L. van Zwet and Sharon Unsworth

Centre for Language Studies, Radboud University, Nijmegen, Netherlands
Corresponding author: Joyce L. van Zwet; Email: joyce.vanzwet@ru.nl

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Abstract
When speaking or writing, people tend to re-use the syntactic structures they recently encountered (*structural priming*). Individuals differ in the extent to which they are primed (*primeability*). Previous research has suggested that perspective-taking, that is, the ability to imagine the feelings, thoughts and perceptions of others, predicts the magnitude of priming in adults. The present study investigates if this also holds for monolingual and bilingual children. We primed the possessive structure in monolingual Dutch children and bilingual children with varying L2s. There was individual variation in children's primeability in both groups. For both monolinguals and bilinguals, we found that the better children were at perspective-taking, the more likely they were to be primed. Dutch language proficiency also influenced children's primeability: higher language proficiency resulted in more priming in both groups. The findings suggest that structural priming serves a social function which is mediated by perspective-taking abilities.

Keywords: child bilingualism; individual differences; perspective-taking; structural priming; language development; multilingualism

1. Introduction

When speaking or writing, people tend to re-use the syntactic structures they recently encountered. For example, speakers are more likely to produce a passive sentence after having encountered a passive in previous discourse (Bock, 1986). This phenomenon, known as *structural priming*, is subject to considerable individual variation: while some speakers re-use the syntactic structures of the interlocutor almost constantly, others are hardly ever primed. Previous research has investigated individual differences in primeability in adults (e.g., Abrahams et al., 2018) and children (e.g., Kidd, 2012a), but the precise causes of this variation are not yet fully understood. The present study aims to contribute to our understanding of individual variation in structural priming in children by investigating the influence of *perspective-taking*, that is, the ability to imagine the feelings, thoughts and perceptions of others (McDonald & Messinger, 2011). Perspective-taking has previously been shown to influence structural priming in adults (Horton, 2014). The present study investigated whether perspective-taking abilities also influence primeability in monolingual and bilingual children.

1.1. Structural priming

Structural priming was first demonstrated experimentally by Bock (1986). She found that after repeating a passive sentence (e.g., *The man has been bitten by the dog*), participants were more likely to use a passive (e.g., *The woman has been robbed by the burglar*) rather than an active sentence (e.g., *The burglar robbed the woman*) when subsequently asked to describe a picture. Structural priming has since been observed for a wide array of structures in English, including dative alternation (Bock et al., 1992) and verb-particle movement (Konopka & Bock, 2009). Moreover, structural priming effects have been established in a range of languages, including Dutch (Hartsuiker & Kolk, 1998), Turkish (Mercan & Hohenberger, 2019), and German (Scheepers, 2003). In short, structural priming is a widespread phenomenon that occurs for different language structures and in a variety of languages (Messenger, 2022).

Structural priming is not solely a method used in experimental research, however. Repeating the structure used by an interlocutor – often referred to as 'persistence' – also characterises spontaneous discourse (Pickering & Ferreira, 2008). The robustness of priming in both experimental and spontaneous contexts suggests that priming has important cognitive and communicative functions. Indeed, humans not only engage in such structural persistence, they also unconsciously copy or mimic the behaviour of others more generally (e.g., by mimicking the body posture of the interlocutor; Chartrand & Bargh, 1999). Structural priming is in many ways similar to such behavioural mimicry: individuals who engage in structural priming unconsciously copy the verbal behaviour of the interlocutor, thereby contributing to successful communication (Abrahams et al., 2019). This similarity will be of importance when we discuss the causes of individual variation in structural priming in adults and children.

Most of the work on children has used structural priming as a means to determine the nature of children's early syntactic knowledge and more specifically, whether this is abstract (e.g., Shimpi et al., 2007; see Messenger, 2022 for a recent review on structural priming in children). A growing number of studies have shown that like adults, children can be primed without lexical overlap. Priming without lexical overlap – that is, repetition of the structure but not the lexical content of a sentence (Messenger, 2022) – is generally assumed to signal the presence of abstract syntactic representations: children have knowledge of syntactic structures not tied to the specific lexical items they have previously encountered (Shimpi et al., 2007). Structural priming in children is subject to considerable individual variation. For example, Bencini and Valian (2008) primed passives in 3-year-old children. There was group-level priming, but only half of the children produced a passive after a passive prime. Such findings are not uncommon in structural priming research. Several studies (e.g., Kidd, 2012a; Rowland et al., 2012) have demonstrated individual differences in children's primeability. These findings emphasise the importance of studying the causes that lead to individual variation in children's likelihood to be primed.

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A number of possible causes for individual differences in structural priming in children have already been put forward. These include language proficiency (Kidd, 2012a; Unsworth, 2023), working memory (Foltz et al., 2015), statistical learning (Kidd, 2012b) and nonverbal intelligence (Kidd, 2012a). For example, Kidd (2012a) primed monolingual children with passive structures. The tendency to be primed correlated with children's nonverbal ability and the magnitude of the priming effect was predicted by their language skills. In contrast, Foltz et al. (2015) did not find any effect of language proficiency on children's primeability. They did however find that higher levels of working memory were related to higher production of the dispreferred syntactic structure, that is, a relative clause (e.g., the cup that is yellow) instead of a simple prenominal structure (e.g., the yellow cup). In one of the few studies on structural priming in bilingual children, Unsworth (2023) used possessive structures to examine individual variability in priming within and between languages in bilingual English–Dutch and Spanish–Dutch children. Dutch has prenominal (e.g., *de dokter z'n hond* 'the doctor's dog') and postnominal (e.g., *de hond van de dokter* 'the dog of the doctor') possessives. English also has both structures (e.g., 'the doctor's dog' vs. 'the dog of the doctor') but the prenominal is preferred, whereas Spanish only allows the postnominal structure with non-pronominal possessives (e.g., *el perro del medico* 'the dog of the doctor'). Within-language priming in Dutch was observed in all three groups, but there was considerable individual variation. None of the individual difference variables (i.e., language proficiency, exposure or use) predicted the magnitude of any within-language priming effects. There was however a general effect of bilingual language proficiency, operationalised as the average of the lexical proficiency score in children's two languages: with increasing bilingual proficiency, bilingual children were more likely to produce the structure that corresponded to the dominant structure in their other language. In the between-language experiment (bilingual English–Dutch children only), bilingual proficiency was related to priming: with increasing proficiency in their two languages, children were more likely to be primed from English to Dutch.

In sum, then, research on individual variation in structural priming in children has primarily focused on language proficiency, working memory and nonverbal intelligence, and results thus far are mixed. In adults, individual differences in structural priming have been studied more extensively and from a variety of angles. These include perspective-taking as a predictor for structural priming.

1.2. Perspective-taking

Perspective-taking refers to the ability to imagine thoughts, feelings and perceptions of others (McDonald & Messinger, 2011). It is a multi-componential construct characterised by three components: visual perspective-taking, cognitive perspective-taking and affective perspective-taking (Cigala et al., 2015). Visual perspective-taking refers to the ability to understand how a visual array can be seen from a different point of view (Moll & Meltzoff, 2011), affective perspective-taking is the ability to understand the emotions of others (Mori & Cigala, 2016), and cognitive perspective-taking – or theory of mind[1] – is the ability to infer

[1]Throughout this article, we use cognitive perspective-taking to define the human capacity of reasoning about the mental state of others, following Birch et al. (2017). In the literature on bilingual advantages in perspective-taking, this is often referred to as the Theory of Mind.

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motivations, thoughts and intentions of others (Birch et al., 2017). The characteristic shared by all three components is the ability to put aside an egocentric perspective to take a different point of view (Mori & Cigala, 2016). Children develop perspective-taking throughout infancy and childhood, age four to five being a crucial period for its development (Wellman et al., 2001).

There are strong indications that perspective-taking skills are linked to several types of mimicry (e.g., Chartrand & Bargh, 1999; Drimalla et al., 2019). For example, Chartrand and Bargh (1999) examined the relationship between subconscious imitation of behaviour and levels of perspective-taking in adults. Participants interacted with a researcher who, throughout the interaction, performed certain actions (e.g., shaking their foot). The higher participants scored on perspective-taking, the more likely they were to imitate the researcher. Chartrand and Bargh (1999) suggested that individuals who are better at perspective-taking might be better at guiding smooth interactions. Another type of mimicry that has been shown to correlate with perspective-taking is syntactic mimicry, that is, structural priming (Abrahams et al., 2018; Horton, 2014).

Horton (2014) investigated how individual differences in structural priming relate to levels of perspective-taking. The higher participants scored on perspective-taking, the more likely they were to re-use the syntactic structure of the interlocutor. Horton (2014) therefore suggested that perspective-taking abilities reflect one's sensitivity to the linguistic contribution of others: individuals with higher levels of perspective-taking attend more to what others say. In turn, this leads to more unconscious imitation of the syntactic structures of the interlocutor.

Imitating or – more broadly speaking – *accommodating* to the speech of an interlocutor is central to Giles et al.'s (1991)) Communication Accommodation Theory. In this approach, accommodation is defined as modifying one's language and communication behaviour to fit the social environment and to obtain a certain communicative goal (e.g., to facilitate comprehension; Gasiorek, 2015; Gasiorek et al., 2022; Zhang & Giles, 2018). Speakers can accommodate their speech by *converging* to the interlocutor, that is, adapting their speech to match that of the dialogue partner (Kootstra & Muysken, 2019). It has previously been argued that accommodation in the form of convergence is related to priming in conversation: both accommodation and priming suppose the adoption of linguistic elements of the interlocutor by the speaker (Kootstra & Muysken, 2019). Pickering and Garrod's (2004) Interactive Alignment Model matches the Communication Accommodation Theory particularly well. The Interactive Alignment Model – like the Communication Accommodation Theory – focusses on language in dialogue and predicts that residual activation of encountered linguistic structures increases the likelihood that this structure will be used in subsequent production. Similarly, like convergence in the Communication Accommodation Theory, aligning speech is thought to encourage successful dialogue.

To further enhance conversational success, speakers are thought to simulate how others will understand what they say and adapt their speech accordingly. Perspective-taking might be of importance in this simulation process: individuals who attend more to the linguistic contributions of others might be more likely to align their speech. Indeed, perspective-taking has been argued to influence accommodation in communication: to be able to accommodate their speech appropriately, speakers must be aware of the interlocutor's thoughts, perceptions and needs (Gasiorek et al., 2022). Galinsky et al. (2005) even consider the increased self-other overlap that results from perspective-taking to be 'a critical mechanism behind its ability to facilitate social coordination and foster social bonds' (p. 110). As such, perspective-taking is thought to create an overlap between the self and the other which facilitates behavioural imitation (Giles & Gasiorek, 2013).

There is no previous research examining the relation between structural priming and perspective-taking skills in children. Children vary in the extent to which they are able to put themselves into someone else's shoes (Goetz, 2003). The extant literature suggests that some of this variation can be explained by the number of languages children are exposed to. More specifically, the development of perspective-taking abilities has been claimed to benefit from exposure to more than one language (e.g., Goetz, 2003; Gordon, 2016). Indeed, there is evidence for such a bilingual advantage in all three components of perspective-taking: bilingual children have been shown to develop cognitive perspective-taking earlier than their monolingual peers (Goetz, 2003; Kovács, 2009), to show superior affective perspective-taking than monolinguals (Han & Lee, 2013), and to perform better on advanced visual perspective-taking (Greenberg et al., 2013; see also Javor, 2016; Wimmer & Marx, 2014). The question of whether there is a 'bilingual advantage' remains subject to considerable debate. There are numerous studies questioning the existence of a bilingual advantage for cognitive functioning (e.g., De Bruin et al., 2015; Duñabeitia et al., 2014; Fan et al., 2015), suggesting for example a publication bias towards studies reporting positive rather than mixed or null results (De Bruin et al., 2015).

In sum, previous research shows a link between perspective-taking skills and (both structural and behavioural) primeability in adults. It is as yet unknown whether this is also the case for children. Bilingual children might benefit from their experience with multiple languages in the development of perspective-taking. The present study aims to contribute to our understanding of this potential advantage by investigating perspective-taking skills in monolingual and bilingual children.

1.3. Present study

Previous research using structural priming indicates that young children, like adults, possess abstract structural representations. However, not all children appear to be primeable, and when they are, the extent to which they are primed varies considerably. These differences in children's primeability have yet to be fully explained. The few available studies show mixed results and have focused on language skills and cognitive abilities only. The goal of the present study was thus to further improve our understanding of individual differences in primeability in children by investigating the social aspect of structural priming and in particular, the relation between priming and perspective-taking skills in bilingual and monolingual children. Our research questions were as follows:

(1) What is the influence of perspective-taking on the primeability of monolingual children?
(2) What is the influence of perspective-taking on the primeability of bilingual children?
(3) Is there a difference between monolingual and bilingual children's primeability and if so, can this difference be explained by differences in perspective-taking skills?

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We predicted that, as for adults (Horton, 2014), children would be more likely to reuse the syntactic structure of the interlocutor as their perspective-taking skills increased. We expected this to be the case for both bilingual and monolingual children. In addition, we expected bilingual children to have better-developed perspective-taking skills than their monolingual peers and to therefore show higher rates of priming.

Our priming task targeted possessive structures in Dutch. Dutch has three different possessive structures, two of which are used with common nouns: the postnominal structure (*de broer van de piloot* 'the brother of the pilot') and the prenominal structure (*de piloot z'n broer* 'the pilot's brother'). The third possessive structure in Dutch is also prenominal, whereby the possessive relation is marked with the morpheme *-s*. This structure can only be used with proper nouns (e.g., *Lisa's broer* 'Lisa's brother'). Preference for the type of possessive structure for common nouns is influenced by animacy: for animate common nouns – as targeted in the present study – the postnominal possessive is the preferred structure (Van Bergen, 2011). Van Bergen's (2011) corpus study also shows that it is more frequently used than the prenominal possessive in spontaneous dialogue (35:65; Van Bergen, 2011). It is furthermore the first type of possessive to be acquired by children, although all three types of possessives are acquired before age four (Van Kampen & Corver, 2006). The bilingual children included in the present study spoke a number of different languages alongside Dutch. These languages varied as to whether the preferred – or only – possessive structure was prenominal (e.g., English) or postnominal (e.g., French).

2. Method

2.1. Participants

Participants were 50 monolingual and 50 bilingual 4- to 5-year-old children growing up in the Netherlands. The monolingual children (M_{age} = 60.5 months; SD = 6.58; 28 girls) were born in the Netherlands to highly educated parents. For the majority of the children (n = 39), at least one parent obtained a university degree. The parents of the remaining children finished vocational education.

The bilingual children (M_{age} = 61.6 months; SD = 6.8, 29 girls) were acquiring at least one other language alongside Dutch. Almost all (n = 44) of the bilingual children were born in the Netherlands. Most (n = 39) were exposed to both languages from birth, and otherwise before age three. Almost all (n = 45) had at least one parent holding a university degree. The parents of the remaining children finished vocational education. One bilingual child did not produce any useable response during the priming experiment. Therefore, this child was excluded from the analyses, resulting in a total of 49 children in the bilingual group.

There were no differences between the two groups in terms of age, $t(97) = -0.87$, $p = .39$, or gender, $X^2(1, N = 99) = 0.08$, $p = .78$. Monolingual and bilingual children did however differ with respect to socioeconomic background: bilingual children's parents were more highly educated than monolingual children's parents, $X^2(1, N = 198) = 31.68$, $p < .001$.

Our sample included 21 different languages: English (n = 5), French (n = 5), Spanish (n = 4), German (n = 4), Russian (n = 4), Polish (n = 3), Greek (n = 3), Turkish (n = 3), Mandarin (n = 2), Italian (n = 2), Syrian Arabic (n = 2), Tigrinya (n = 2), Hindi (n = 2), Japanese (n = 1), Berber (n = 1), Farsi (n = 1), Romanian (n = 1), Croatian

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(*n* = 1), Malay (*n* = 1), Malayalam (*n* = 1), and Frisian (*n* = 1). Half of the children were growing up in a family where one parent spoke Dutch and the second parent spoke the heritage language. In a quarter of the families, both parents spoke the heritage language most of the time (i.e., minimally 75%). Children in these families were thus all first exposed to Dutch in preschool. In the remaining families, either one or both parents spoke Dutch and the other language, with the second parent speaking Dutch. This information, and other information on children's linguistic background, was gathered using the Q-BEx questionnaire (De Cat et al., 2022). In addition to the questionnaire's obligatory modules on background and risk factors, we included the modules 'Language exposure and use', measuring children's everyday language exposure in their languages, and 'Language proficiency', measuring estimations of children's language proficiency in their languages.

2.2. Materials and design

2.2.1. Elicitation task and structural priming task

The materials were taken from Unsworth (2023). They consisted of an elicitation task designed to establish whether children preferred the prenominal (e.g., *de dokter z'n moeder* 'the doctor's mother') or the postnominal (e.g., *de moeder van de dokter* 'the mother of the doctor') possessive structure, and a priming task using the card game 'Snap' (Branigan et al., 2005). This and all other tasks in the test battery were conducted in Dutch. Children were first told that they were going to play a card game about eight characters and their family members. The characters (i.e., *astronaut* 'astronaut', *brandweerman* 'fireman', *dokter* 'doctor', *piloot* 'pilot', *schilder* 'painter', *boer* 'farmer', *tandarts* 'dentist', and *piraat* 'pirate') and their family members (i.e., *moeder* 'mother', *vader* 'father', *oma* 'grandma', *opa* 'grandpa', *broer* 'brother', *zus* 'sister', *hond* 'dog', *kat* 'cat', and *vis* 'fish') were presented in a book and children were asked to name them to make sure they used the correct labels throughout the task. An emblem was used to identify the professional to which each family member belonged (e.g., a rocket for the astronaut).

In the elicitation task, children were shown eight cards depicting a family member and they were asked to describe the image. This was done without guidance from the experimenter.

In the priming task, the experimenter and child took turns to describe cards from two pre-ordered piles, placing the cards in the middle of the table. When two following cards on the communal pile were identical, the first person to put their hand on the pile and shout *hetzelfde* 'the same', won the cards. The description of the card by the experimenter was the prime and consisted of either a prenominal (*de dokter z'n moeder* 'the doctor's mother') or a postnominal (*de moeder van de dokter* 'the mother of the dokter') description of the character (Figure 1). The two types of possessive (i.e., prenominal or postnominal) were presented in separate blocks. The postnominal construction is the preferred structure in Dutch (van Bergen, 2011). Therefore, to maximise the potential for priming, the relative order of postnominal and prenominal blocks was kept constant across all participants with the prenominal (i.e., dispreferred) structure presented first. Keeping the order of blocks constant across children is furthermore recommended (Goodhew & Edwards, 2019) for experimental paradigms investigating individual differences.

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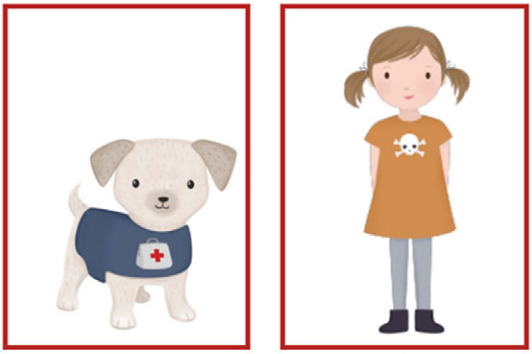

Figure 1. Example of priming task. First, the experimenter would describe a picture (prime, here: the doctor's dog OR the dog of the doctor). Then, the child describes a different picture (target, here: the pirate's sister OR the sister of the pirate).

There was no lexical overlap in the critical items. The game element was therefore implemented by filler items. The fillers consisted of the characters in different colours (e.g., *de groene dokter* 'the green doctor'). Each block contained 12 test items and 12 fillers. A total of four different experimental lists were used and counterbalanced across children to account for potential order effects.

Children's responses were coded on a strict and on a lenient coding scheme. The strict coding scheme included full possessive structures only. Responses were coded as *prenominal* if they contained the possessive morpheme 'z'n / zijn / 's' and the possessor preceded the possessum (e.g., *de boer z'n hond* 'the farmer's dog', *de dokter's moeder* 'the doctor's mother'). Responses were coded as *postnominal* if they contained the possessive morphology 'van de' and the possessum preceded the possessor (e.g., *de hond van de boer* 'the dog of the farmer'). All other responses (e.g., responses without appropriate morphology or responses with only the possessor or the possessum) were coded as *other* and excluded from the analysis.

The lenient coding scheme included both full possessive structures and responses without possessive morphology. Responses were coded as *prenominal* if the possessor preceded the possessum (e.g., *piraat mama* 'pirate mummy', *piraat z'n moeder* 'pirate's mother') and as *postnominal* if the possessum preceded the possessor (e.g., *mama piraat* 'mummy pirate', *moeder van de piraat* 'mother of the pirate'). Other responses (i.e., responses containing only the possessor or the possessum, or responses which used a completely different structure to express the relation of possession) were coded as *other* and excluded from analysis.

2.2.2. Perspective-taking test

To measure children's perspective-taking abilities, we used a Dutch translation of the Perspective-Taking Test for Children (PTC; Aslan & Köksal-Akyol, 2016). The PTC was tested for validity and reliability and has been used in several studies (e.g., Aslan & Köksal Akyol, 2020; Şahin & Aslan, 2018). It consists of three sets of items that test the three components of perspective-taking. For the items on visual perspective-taking, the experimenter showed the child an image and the child was then asked to describe what can be seen from the viewpoint of the protagonist. This task requires

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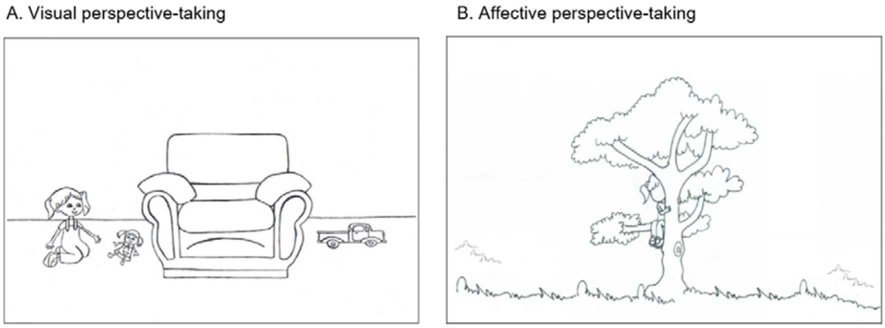

Figure 2. Test items on visual perspective-taking and affective perspective-taking. Images are accompanied by a question from the experimenter: (A) 'What does the girl see?' and (B) 'How does the girl feel?'

the child to inhibit their own visual observations to take the perspective of the protagonist. For example, the item in Figure 2A requires the child to reason from the girl's perspective, thereby realising that the girl can see the doll and the armchair but not the truck, while the child *can* see this.

Affective perspective-taking was measured using illustrations of a person in a specific situation and asking the child to describe how that person might feel. For example, the correct answer for the item given in Figure 2B, where a child is stuck in a tree, would be 'scared'.

The final set of items in this task measured cognitive perspective-taking. The experimenter told the child short stories with matching images. After hearing the whole story, one critical image was removed. The child was then asked what someone else would think has happened in the story if they had not seen the critical image. The child is thus asked to inhibit their own knowledge of the story and take the point of view of someone else. For example, the experimenter would show the child the images in Figure 3 and tell the following story: 'Lisa is playing with her friends (image 1), when all of a sudden, she sees some ants that attract her attention. She gets closer to have a good look (image 2). When she looks up, her friends are no longer at the playground (image 3), so she starts looking for them. After looking for a while, she eventually finds them at the circus (image 4)'. After telling the complete story, the experimenter removed the critical image 4 and asked the child the question: 'Where does your mother/sibling/friend[2] think Lisa's friends went?'. An incorrect answer would be if the child said that the friends were at the circus, whereas a correct answer would be any other location (e.g., at home).

Items were scored following the procedure given by Aslan and Köksal-Akyol (2016). Children received a score of 1 for a correct answer and 0 for all other answers. The maximum score was therefore 24 points.

2.2.3. *Cross-linguistic lexical task*

As a measure of children's vocabulary, we used the production part of the LITMUS-NL Cross-linguistic lexical task (CLT; Haman et al., 2015; van Wonderen &

[2]This varied between children, it was always someone who was not in the room at the time of testing.

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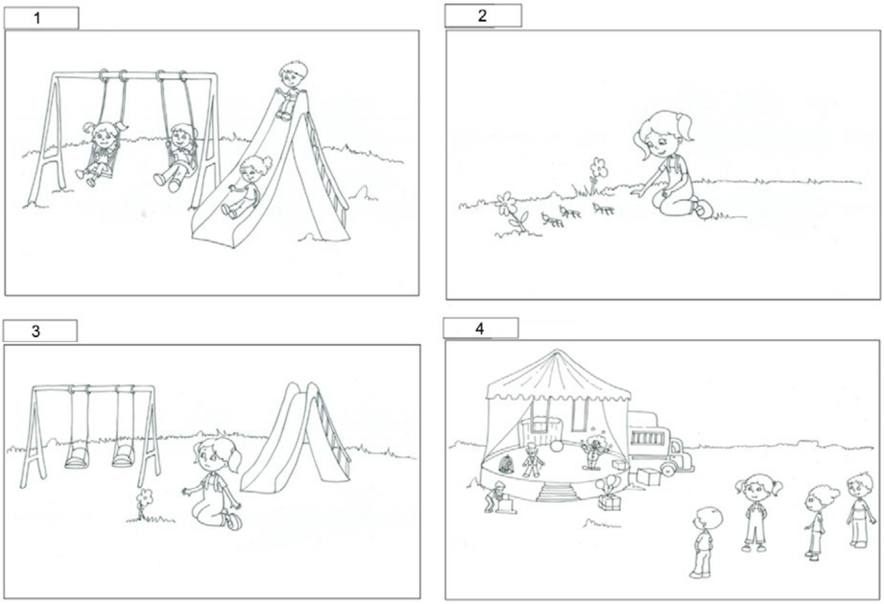

Figure 3. Test item on cognitive perspective-taking.

Unsworth, 2021). The children were shown 80 coloured images on a computer screen, 40 verbs and 40 nouns. For each image, the children were asked to name the object (nouns) or the action (verbs). The verbs and nouns were presented separately. The order of the subparts (nouns and verbs) was counterbalanced. Children's scores on the CLT were checked for correctness following a standardised protocol developed by Ute Bohnacker at Uppsala University and converted into percentages by dividing the number of correct responses by the total number of responses (excluding missing items).

2.2.4. Sentence repetition task

Morphosyntactic language proficiency was measured with the LITMUS-NL sentence repetition task (SRT; de Jong et al., 2021). Repeating a sentence requires the child to process the sentence and to analyse and reconstruct its meaning using their own grammatical system. It is generally assumed that children are able to repeat a structure only if they have already acquired it (Marinis & Armon-Lotem, 2015). Therefore, SRT scores are considered a good indicator of children's morphosyntactic abilities. The SRT consisted of 30 sentences which were presented auditorily through headphones. Target sentences varied in complexity, from less (short sentences in present simple) to more (object relative clauses) complex. The sentences were presented in a fixed order. Responses were given 1 point if they included a verbatim repetition of the target sentence and 0 points for incorrect repetitions.

2.2.5. Nonverbal intelligence

Nonverbal intelligence (NVI) was measured using the Wechsler Nonverbal Scale of Ability (Wechsler & Naglieri, 2006). One out of the four subtasks – Matrix Reasoning

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– was conducted due to time constraints. This subtask consists of matrices made up of geometric figures. One part of the matrix is always missing. The child is asked to select the figure out of five that completes the matrix. Responses were scored for correctness: a score of 1 was given for a correct response and a score of 0 for an incorrect response. The test ended when children gave four incorrect responses on five consecutive items.

2.3. Procedure

Informed consent was obtained from all parents. Children were tested individually in a quiet room in their home or at their school by the first author. During the test session, the experimenter and the child spoke Dutch only. Children's responses were recorded using an audio recorder and checked afterwards. Language background information was gathered before the test session via an online parental questionnaire (Q-BEx; De Cat et al., 2022).

Children completed the tasks in the following order: elicitation task, priming phase (prenominal), SRT, priming phase (postnominal), Perspective-Taking test, Nonverbal Intelligence, CLT. Each priming block was followed by a theory of mind task. These tasks were used to check the reliability of the Perspective-Taking test. The results of the Theory of Mind tasks confirm the reliability of the Perspective-Taking test. Given that the Perspective-Taking test measures the construct we are interested in, we only report this task in the analyses. A description of the Theory of Mind tasks and the outcome of the Pearson's correlation are in the Supplementary Material.

2.4. Analysis

Mixed-effect logistic regression analyses were used to fit children's responses on the priming task to predict the likelihood of a prenominal possessive using R's lme4-package (Bates et al., 2015). Prenominal responses were coded as 1 because they are the dispreferred structure in Dutch (Van Bergen, 2011). Analyses were run separately for monolingual and bilingual children. Convergence issues were addressed with the default optimizer (bobyqa; Powell, 2009). We first fitted the model for our critical manipulation (i.e., fixed effect) *Prime*, alongside random intercepts for *Participant* and *Item,* and random slopes for *Item.* We did not include random slopes for *Participant* initially, because we wanted to account for individual variation in structural priming (following Gullifer et al., 2018; Peter et al., 2015). In case of singularity or convergence issues, random slopes and intercepts were removed from the model until issues were resolved. We applied sum-to-zero coding to the categorical fixed effect of *Prime* and *Group.* For *Prime*, the prenominal priming condition (coded as −0.5) was contrasted with the postnominal priming condition (coded as 0.5). For *Group*, the monolingual group (coded as −0.5) was contrasted with the bilingual group (coded as 0.5). All continuous variables were centred and standardised.

To explore whether children's primeability was predicted by perspective-taking abilities, we added *Perspective-Taking* to our model in interaction with *Prime.* Subsequently, we also added our background variables (i.e., *SRT* and *Nonverbal Intelligence*) to the model: first in interaction with *Prime*, later in interaction with *Prime* and *Perspective-Taking.* There were no issues of multicollinearity between the

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relevant background variables ($r < 0.45$) and hence these were added to the same model. Models were compared on the goodness of fit by means of likelihood ratio tests using the anova function in R base package (R Core Team, 2023). Background variables that did not reach significance were eliminated only if they did not improve model fit. Influential cases were detected using the Influence.ME function in R (Nieuwenhuis et al., 2012). Cases were considered influential if the Cook's Distance was more than three times larger than the mean. Whenever influential cases were found, the model was re-run without these cases to determine if this changed the model's results. This was never the case. Significant interactions of the best-fitting models were plotted using the sjPlot package (Lüdecke, 2021).

3. Results

We report the background measures for monolingual and bilingual children, and separate analyses of the priming data for monolingual and bilingual children, before comparing groups.

3.1. Background measures

Children's scores on the background measures are depicted in Table 1 and correlations between these background measures are described in Tables 2 and 3.

Monolingual and bilingual children differed significantly on language proficiency: the Dutch language proficiency of monolingual children was significantly higher than the Dutch language proficiency of bilingual children. This difference was significant for CLT scores (Figure 4) and marginally significant for SRT scores (Figure 5).

Table 1. *T*-tests on background measures between monolingual and bilingual children

Task	Monolinguals	Bilinguals	Comparison
Perspective-taking test (max. 24)	14.28 (4.33)	14.14 (4.47)	$t(97) = 0.16$, $p = .88$
Sentence repetition task (max. 30)	13.96 (7.54)	10.78 (9.14)	$t(97) = 1.89$, $p = .06$+
Cross-linguistic lexical task (%)	70.95 (11.67)	56.78 (17.41)	$t(97) = 4.77$, $p = <.001$**
Matrix reasoning (max. 41)	13.00 (4.08)	13.33 (4.29)	$t(97) = -0.39$, $p = .70$

Table 2. Pearson's *R* correlations between background variables for monolingual children

	PTC	SRT	CLT	NVI
PTC	1.00, $p < .001$	0.44, $p = .001$	0.53, $p < .001$	0.34, $p = .017$
SRT	0.44, $p = .001$	1.00, $p < .001$	0.72, $p < .001$	0.28, $p = .045$
CLT	0.53, $p < .001$	0.72, $p < .001$	1.00, $p < .001$	0.41, $p = .003$
NVI	0.34, $p = .017$	0.28, $p = .045$	0.41, $p = .003$	1.00, $p < .001$

Table 3. Pearson's *R* correlations between background variables for bilingual children

	PTC	SRT	CLT	NVI
PTC	1.00, $p < .001$	0.44, $p = .001$	0.49, $p < .001$	0.39, $p = .009$
SRT	0.44, $p = .001$	1.00, $p < .001$	0.74, $p < .001$	0.29, $p = .040$
CLT	0.49, $p < .001$	0.74, $p < .001$	1.00, $p < .001$	0.27, $p = .057$
NVI	0.39, $p = .009$	0.29, $p = .040$	0.27, $p = .057$	1.00, $p < .001$

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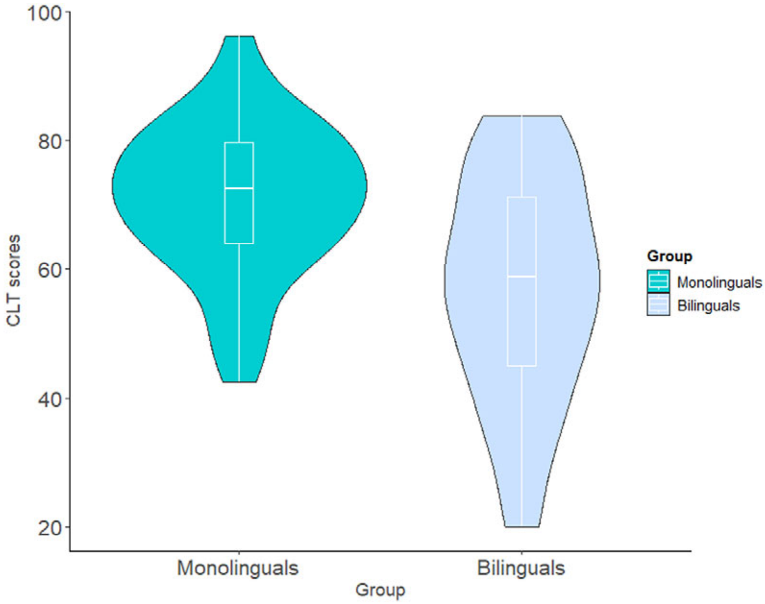

Figure 4. Violin plot of the distribution of CLT scores per group (monolingual vs. bilingual) and corresponding boxplots.

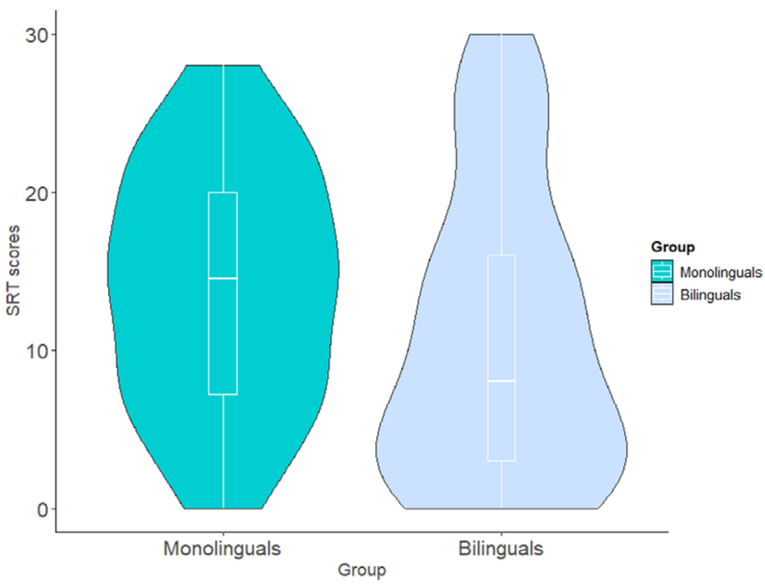

Figure 5. Violin plot of the distribution of SRT scores per group (monolingual vs. bilingual) and corresponding boxplots.

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Children's scores on the SRT and CLT were highly correlated ($r(97) = 0.73$, $p < .001$). For this reason, we decided to include only one of the two as a measure of language proficiency in our analyses. Given the morphosyntactic nature of our priming task, we opted for the SRT.

3.2. Monolingual children

The priming data were analysed for the separate groups, starting with monolingual children's responses on the elicitation task and priming task. The elicitation task was used to determine which structure (prenominal or postnominal possessive) was preferred by the children. Monolingual children produced 59 responses containing a full possessive structure (15%) in the elicitation phase. Of the responses containing a full possessive structure (i.e., 'Other' responses excluded), the majority (98%, $n = 58$)) contained a postnominal possessive. Children produced a large number of 'Other' responses. Closer inspection of these responses revealed that there were many responses which included the possessor and the possessum but no morphology (e.g., 'piloot mama' *pilot mommy*; 54% of all 'Other' responses). These responses were included in the lenient coding scheme.

Strictly coded, almost all children ($n = 49$) produced at least one target response, that is, a response containing a full prenominal or postnominal possessive structure. In total, these children produced 683 target responses in the priming phrase of the experiment which were included in the analyses. Other responses ($n = 517$; 43% of the total number of responses) were excluded. Using the lenient coding scheme, children produced 964 responses that fitted the criteria throughout the priming task (i.e., 80% of the total number of responses).

Figure 6 shows the proportion of prenominal responses out of all responses containing a possessive ('Other' responses excluded). On a strict coding scheme, 60% ($n = 30$) of the children produced at least one full prenominal possessive

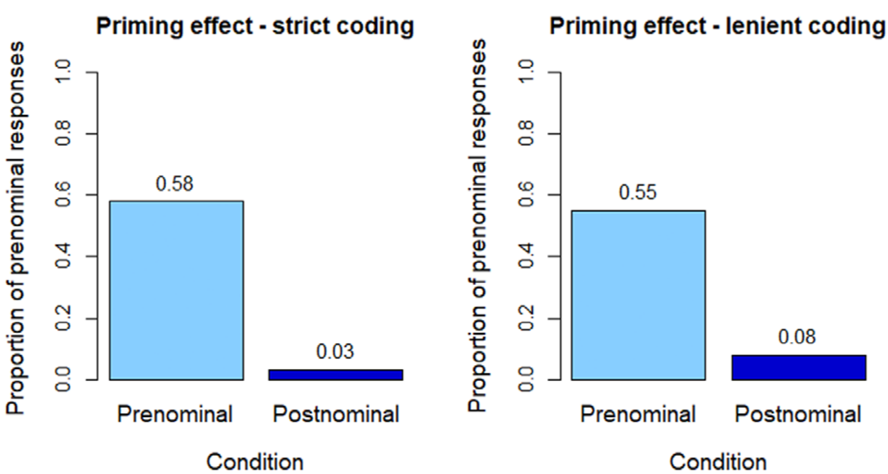

Figure 6. Proportion of prenominal possessives out of all responses containing a possessive ('other' responses excluded) in the two priming conditions (prenominal vs. postnominal) in monolingual Dutch children.

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structure. On a lenient coding scheme, 90% ($n = 45$) of the children produced at least one prenominal possessive.

We first explored the relation between the production of full possessive structures (containing the possessor and the possessum *and* the appropriate morphology) in the priming phase and relevant background variables in order to better understand which children produced such structures. A mixed-effect logistic regression revealed no effect of age on the production of full structures ($ß = 0.0008$, $SE = 0.044$, $|z| = 0.017$, $p = .99$), but there was a significant effect of language proficiency ($ß = 0.012$, $SE = 0.033$, $|z| = 3.65$, $p < .001$). In other words, it was the children with better Dutch language proficiency who produced more full possessive structures. Lower proficient children may not yet have fully acquired the possessive morphology or they may not have the full syntactic structures as readily available as the more proficient children.

On the strict coding scheme (allowing full possessives only), the best-fitting model revealed a significant main effect of *Prime* ($ß = -8.66$, $SE = 2.06$, $|z| = -4.20$, $p < .001$), *Perspective-Taking* ($ß = 2.82$, $SE = 1.15$, $|z| = 2.45$, $p = .01$) and *SRT* ($ß = 2.21$, $SE = 0.97$, $|z| = 2.28$, $p = .02$). Additionally, there was a three-way interaction between *Prime, Perspective-Taking* and *SRT* ($ß = -5.98$, $SE = 2.07$, $|z| = -2.90$, $p = .004$). This three-way interaction entailed that the influence of *Perspective-Taking* on children's primeability differed depending on children's language proficiency. This is illustrated in Figure 7. For the most proficient children (i.e., those in the right-most panels with language proficiency score one standard deviation above the mean), the influence of

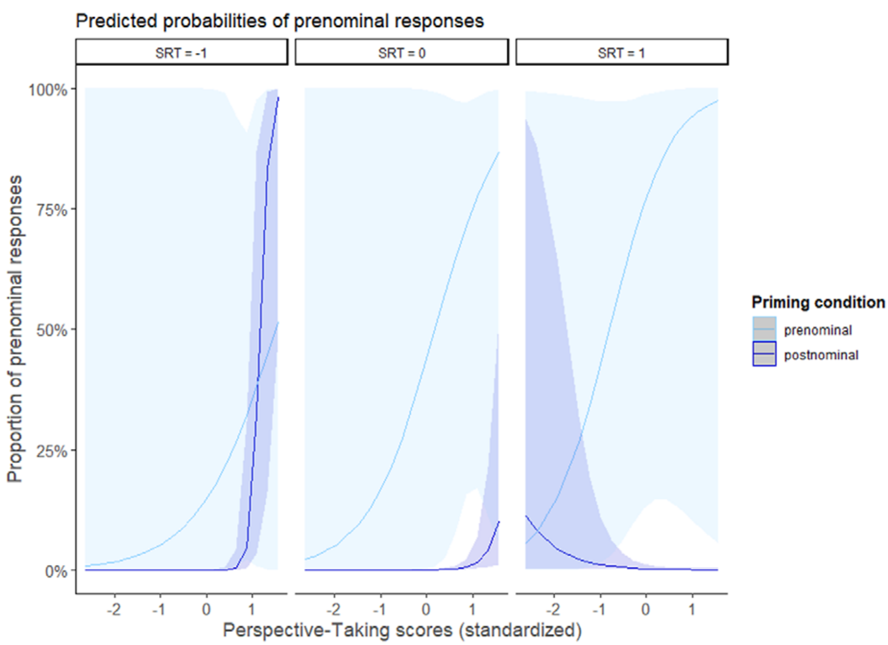

Figure 7. Three-way interaction between Prime, Perspective-Taking and SRT on a strict coding scheme in monolingual Dutch children. SRT and PTC scores are *Z*-transformed: the mean has a value of zero and a one-unit difference is a difference of one standard deviation. Shaded areas represent confidence intervals (the leftmost panel in this figure shows that prenominal possessives were produced after a postnominal prime. This may give the impression that prenominal possessives are acquired before postnominal possessives. This is not the case, however (van Kampen & Corver, 2006). Further investigation revealed that the increase in prenominal responses in the postnominal priming condition was caused by one individual who consistently produced prenominal possessives across the board).

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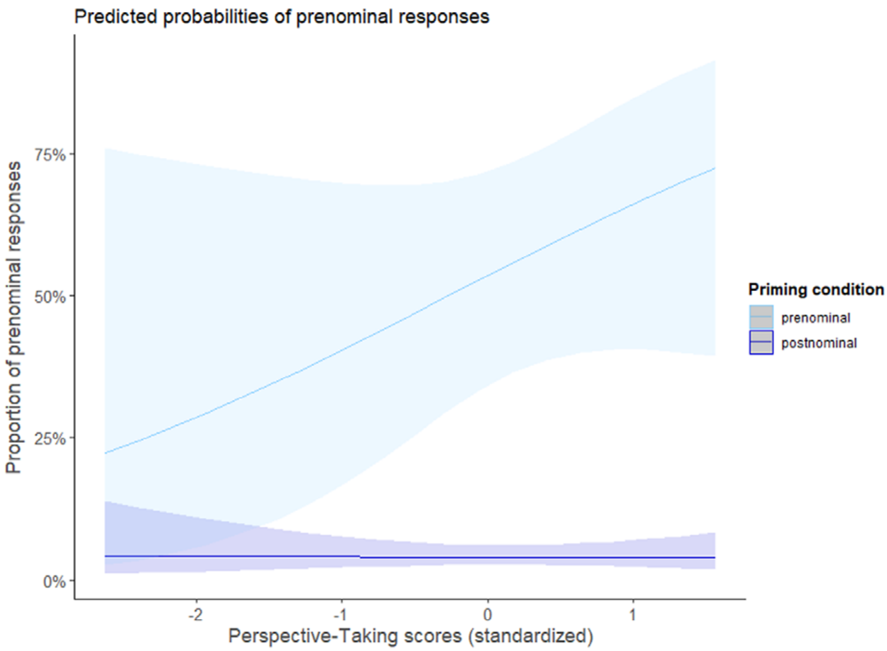

Figure 8. Two-way interaction between Prime and Perspective-Taking on a lenient coding scheme in monolingual Dutch children. PTC scores are *Z*-transformed: the mean has a value of zero and a one-unit difference is a difference of one standard deviation. Shaded areas represent confidence intervals.

perspective-taking on structural priming was stronger than for children with average language proficiency (middle panel) and even more so for children with lower proficiency (left-most panel). In other words, the effect of perspective-taking on structural priming was stronger for children with higher language proficiency.

On the lenient coding scheme, the best-fitting model revealed a significant main effect of *Prime* ($ß = -3.27$, $SE = 0.27$, $|z| = -12.01$, $p < .001$), a significant two-way interaction between *Prime* and *SRT* ($ß = -1.07$, $SE = 0.27$, $|z| = -3.95$, $p < .001$), and a marginally significant interaction between *Prime* and *Perspective-Taking* ($ß = -0.53$, $SE = 0.28$, $|z| = -1.90$, $p = .058$). The higher children scored at perspective-taking, the greater the tendency to use the prenominal possessive structure of the interlocutor (Figure 8). Furthermore, higher primeability was associated with higher levels of language proficiency (Figure 9).

3.3. Bilingual children

Like monolingual children, bilingual children also preferred the postnominal possessive structure: all responses containing a possessive structure used the postnominal possessive in the elicitation task.

Almost all children (n = 46) produced at least one target response, that is, a response containing a full prenominal or postnominal possessive structure. In total, these children produced 529 responses containing a possessive structure throughout the experiment. Other responses ($n = 647$; 55% of the total number of responses) were

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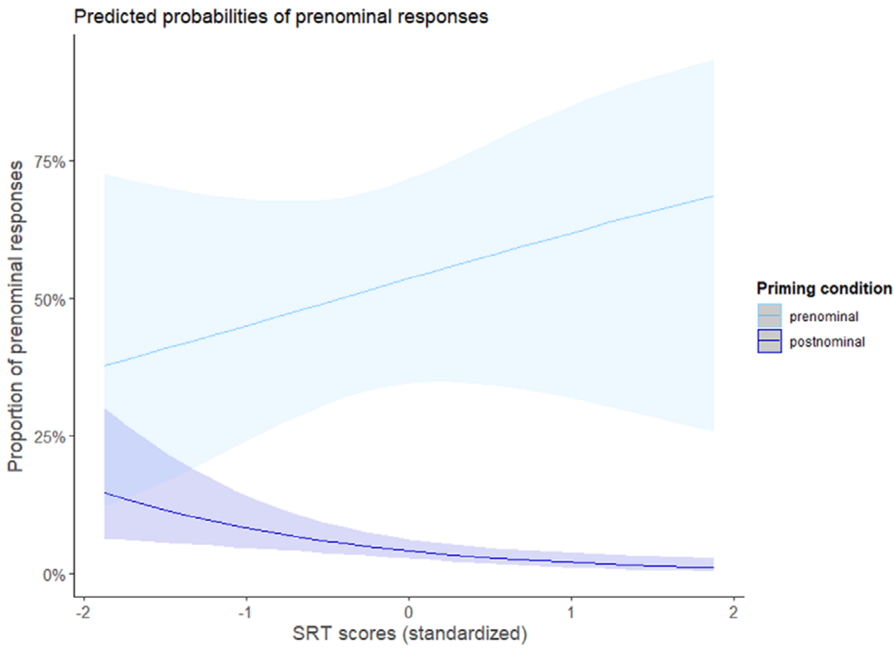

Figure 9. Two-way interaction between Prime and SRT on a lenient coding scheme in monolingual Dutch children. SRT scores are *Z*-transformed: the mean has a value of zero and a one-unit difference is a difference of one standard deviation. Shaded areas represent confidence intervals.

excluded from the analyses. Similar to what we found for monolingual children, the number of 'Other' responses was high. We therefore ran the same analyses as for monolinguals to better understand which children produced the full structures in the priming phase. Once again, there was no effect of age on the production of full structures ($ß = 0.58$, $SE = 0.36$, $|z| = 1.61$, $p = .11$), but we did find an effect of Dutch language proficiency ($ß = 1.47$, $SE = 0.31$, $|z| = 4.78$, $p < .001$). Further inspection of 'Other' responses revealed that 399 (62%) of the 'Other' responses included the possessor and possessum without morphology. These responses were included in the lenient coding scheme.

Figure 10 provides the proportions of prenominal responses out of all responses containing a possessive ('Other' responses excluded). This includes proportions of both the strict and lenient coding scheme. On a strict coding scheme, 54% ($n = 27$) of the children produced at least one full prenominal possessive structure. On a lenient coding scheme, all children produced at least one response that fitted the criteria.

On the strict coding scheme, the best-fitting model revealed a main effect of *Prime* ($ß = -6.84$, $SE = 0.88$, $|z| = -7.75$, $p < .001$) only. Children produced significantly more prenominal possessives in the prenominal priming phase than in the postnominal priming phase. None of the background variables further improved the model's fit.

On the lenient coding scheme, the best-fitting model revealed a main effect of *Prime* ($ß = -2.81$, $SE = 0.27$, $|z| = -10.47$, $p < .001$), and a two-way interaction between *Prime* and *Perspective-Taking* ($ß = -0.86$, $SE = 0.23$, $|z| = -3.80$, $p < .001$). Children who scored higher at perspective-taking produced more prenominal possessives in the prenominal condition than in the postnominal condition (Figure 11).

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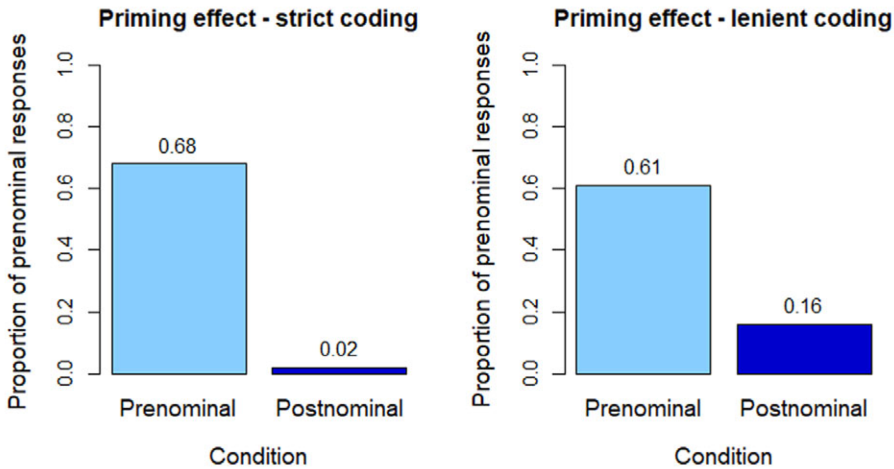

Figure 10. The proportion of prenominal possessives out of all responses containing a possessive ('other' responses excluded) in the two priming conditions (prenominal vs. postnominal) in bilingual children.

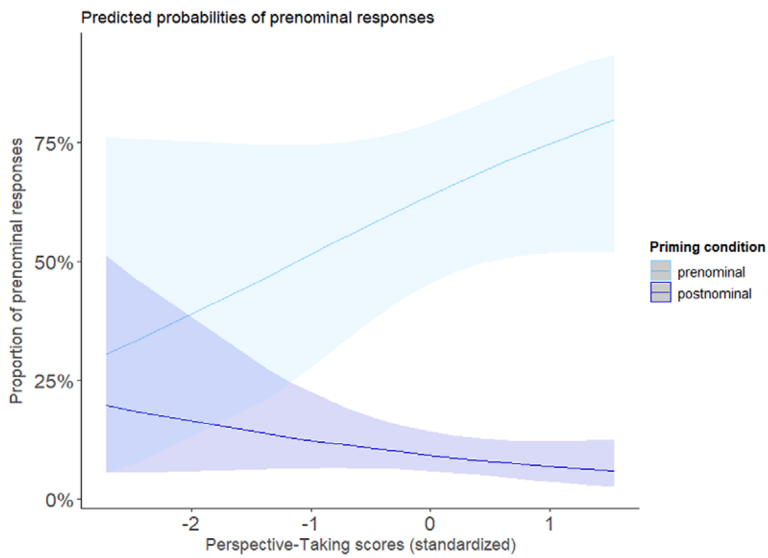

Figure 11. Two-way interaction between Prime and Perspective-Taking on a lenient coding scheme in bilingual children. PTC scores are *Z*-transformed: the mean has a value of zero and a one-unit difference is a difference of one standard deviation. Shaded areas represent confidence intervals.

The two-way interaction between *Prime* and *SRT* approached significance ($ß = -0.42$, $SE = 0.23$, $|z| = -1.87$, $p = .06$).

3.4. Group comparison

Further analyses were conducted to explore if the effect of perspective-taking on primeability was different for monolingual and bilingual children. To that end, we

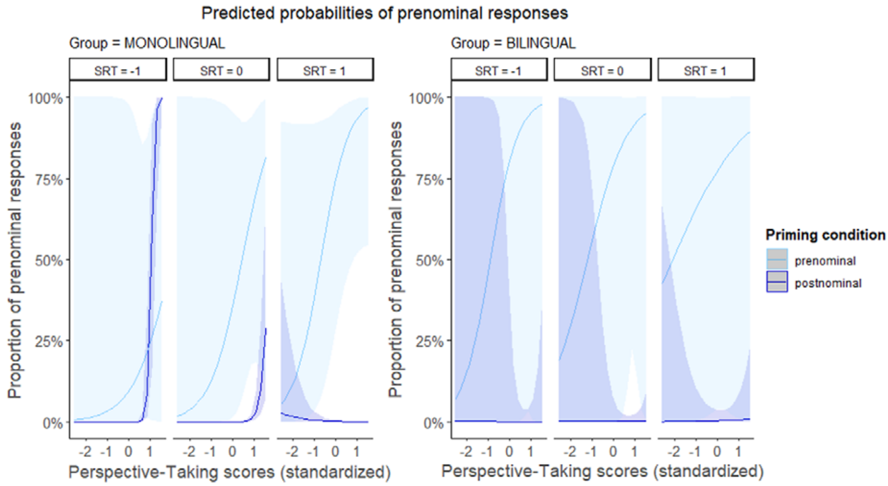

Figure 12. Four-way interaction between Prime, Perspective-Taking and SRT on a strict coding scheme in monolingual and bilingual children. SRT and PTC scores are *Z*-transformed: the mean has a value of zero and a one-unit difference is a difference of one standard deviation. Shaded areas represent confidence intervals.

compared the effect of *Group* (monolingual vs. bilingual) in interaction with *Prime, Perspective-Taking* and *SRT.*

On a strict coding scheme, the best-fitting model revealed a main effect of *Prime* ($ß = -8.22$, $SE = 1.26$, $|z| = -6.50$, $p < .001$) and *Perspective-taking* ($ß = 1.99$, $SE = 0.74$, $|z| = 2.69$, $p < .01$), a three-way interaction between *Prime*, *Perspective-taking* and *Group* ($ß = 5.35$, $SE = 2.59$, $|z| = 2.06$, $p = .040$) and a four-way interaction between *Prime*, *Perspective-taking, SRT* and *Group* ($ß = -7.77$, $SE = 2.35$, $|z| = -3.30$, $p < 0.001$). The latter is driven by an influence of language proficiency modulating the interaction between *Prime* and *Perspective-taking* for monolingual children but not for bilingual children (Figure 12). See Supplementary Material for other relevant figures.

On a lenient coding scheme, the best-fitting model revealed a main effect of *Prime* ($ß = -2.96$, $SE = 0.18$, $|z| = -16.55$, $p < .001$) and *Group* ($ß = -0.68$, $SE = 0.30$, $|z| = -2.26$, $p = .02$). As in the separate group analyses, there was also a significant two-way interaction between *Prime* and *Perspective-Taking* ($ß = -0.60$, $SE = 0.16$, $|z| = -3.65$, $p < .001$) and between *Prime* and *SRT* ($ß = -0.80$, $SE = 0.19$, $|z| = -4.33$, $p < .001$). See Supplementary Material for the relevant figures. The three-way interaction between *Prime*, *Perspective-Taking* and *Group* was not significant ($ß = 0.46$, $SE = 0.33$, $|z| = 1.41$, $p = .16$). In other words, on the lenient coding scheme there was no difference in the way perspective-taking abilities influenced monolingual and bilingual children's primeability.

4. Discussion

The present study used a structural priming paradigm targeting possessive structures in Dutch to investigate the influence of perspective-taking on the primeability of children. Our first research question asked whether there was an effect of perspective-

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taking on the primeability of monolingual children. We predicted that, as for adults (Horton, 2014), children would be more likely to reuse the syntactic structure of the interlocutor as their perspective-taking skills increased. We found that this was indeed the case. Monolingual children were more likely to produce a prenominal possessive (e.g., *de dokter z'n moeder* 'the doctor's mother') than a postnominal possessive (e.g., *de moeder van de dokter* 'the mother of the doctor') upon hearing a prenominal possessive. The existence of this priming effect was predicted by children's perspective-taking abilities: children with better perspective-taking abilities engaged more in re-using the syntactic structure of the interlocutor than children with lower perspective-taking abilities. Furthermore, language proficiency interacted with perspective-taking abilities (when responses were scored on a strict coding scheme).

Our second research question asked whether there was an effect of perspective-taking on the primeability of bilingual children. We found no effect of perspective-taking on structural priming when we considered full possessive responses only. None of our background variables (i.e., perspective-taking, Dutch language proficiency, non-verbal intelligence) were related to priming behaviour either. However, structural priming was predicted by perspective-taking abilities when responses where coded on a lenient coding scheme, that is, when we considered the relative order of the possessor and the possessee without requiring children to produce the appropriate morphology. The higher children's perspective-taking skills, the more likely they were to re-use the relative order of the syntactic structure of the interlocutor. On this lenient coding scheme, language proficiency also influenced children's primeability, although this effect was only marginally significant.

Our third and final research questions asked whether monolingual and bilingual children differed in their primeability and if so, whether this difference could be explained by differences in perspective-taking skills. We predicted that bilingual children would have better-developed perspective-taking skills than their monolingual peers and would therefore show higher rates of priming. This prediction was only partly borne out. We found no significant difference between monolingual and bilingual children's perspective-taking abilities, but we did find that bilingual children were primed more consistently than monolingual children. However, given that monolingual and bilingual children did not differ in measured perspective-taking abilities, this could not be explained by differences in perspective-taking abilities.

The aim of this study was to explore the interpersonal nature of structural priming in children. Synchronising syntactic structures with the interlocutor is a well-known characteristic of spontaneous interaction, thereby suggesting that structural priming has important social functions. Both the Interactive Alignment Model (Pickering & Garrod, 2004) and the Speech Accommodation Theory (Giles et al., 1991) argue that speakers *align* or *converge* their speech to reach communicative goals. Perspective-taking has been put forward as an important mediator for such adaptations (Gasiorek et al., 2022; Horton, 2014). For speakers to be able to adapt their speech to their interlocutor's needs, they need to be aware of the thoughts, feelings and perceptions of others. Previous research with adults has indeed established an effect of perspective-taking on structural priming (e.g., Horton, 2014) and our findings show that perspective-taking may also influence structural priming in children. For monolingual children, we found that children with better perspective-taking abilities were more likely to re-use the syntactic structure of the interlocutor. In line with the Interactive Alignment Theory, the higher developed perspective-taking skills aid

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them to – unconsciously – grasp the interlocutors needs and adapt their speech accordingly. For bilingual children, this effect obtained on the lenient coding scheme only. Despite these differences, our findings emphasise the importance of studying the communicative mechanisms that underly structural priming in order to arrive at a more complete picture of this phenomenon.

Perspective-taking is as a multi-componential construct involving three components: visual, affective and cognitive perspective-taking. Although all three components share the characteristics of having to put aside an egocentric perspective to take a different point of view, it is plausible that they might affect structural priming differentially. We were unable to test for this in the present study because our perspective-taking test was designed to be used as a whole. We furthermore decided not to generate a separate score for each component because the limited number of items per component would drastically reduce the variation between participants and consequently limit our ability to detect a relation between perspective-taking and structural priming. Investigating how the different components of perspective-taking influence individual variation in structural priming is an area for future research.

In line with previous literature (Foltz et al., 2015; Kidd, 2012a), our findings suggest that not only perspective-taking abilities influence primeability, language proficiency does, too. Children with higher language proficiency were more likely to re-use the possessive structure of the interlocutor. Additionally, we found that language proficiency predicted the likelihood of children producing full possessive structures as opposed to responses without possessive morphology. This further suggests that the proficiency effect we observed for structural priming may in part reflect children's mastery of the possessive structure (i.e., children need to possess an abstract representation of a structure in order to be able to re-use it; Wolleb et al., 2018). Arguably, children with lower language proficiency are less likely to re-use full structures, independent of perspective-taking abilities, because they have not yet fully mastered the morphology of the structure. This is in line with research on spontaneous speech data for the acquisition of possessives in Dutch. Van Kampen and Corver (2006) discovered a staged process of acquisition in Dutch possessives: the first expressions of possession were marked by omission of possessive morphology (e.g., *Laura oor* 'Laura ear'). This stage was followed by the acquisition of postnominal morphology (i.e., *van de*) and only later did children acquire the correct morphology for the prenominal possessive (i.e., *z'n*). As a group, children in our sample produced all three types of responses, suggesting that some – that is, children who produced possessives without morphology only – were still in the earlier stages of acquiring the possessive structure. Whilst these differences in mastery of the possessive structure may have reduced the number of full possessive structures produced (cf. Unsworth, 2023, who tested slightly older children), this younger age range was necessary because it allowed us to capture variation in perspective-taking, which we could then in turn relate to syntactic priming.

Because children differed in the extent to which they mastered the possessive structure, we used an additional coding scheme which included responses that lacked the possessive morphology (e.g., *mama piloot* 'mummy pilot'). In doing so, we found that not only the full structure but also the relative ordering of possessor and possessum was primeable. This suggests that children can be primed at a developmental stage where the target structure in question is not fully acquired yet. This is in line with previous research. In a study on the acquisition of passives, Messenger et al. (2012) hypothesised that the constituent structure of the passive is acquired *before* the

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acquisition of thematic role mapping. They indeed found that both younger and older children produced passives with well-formed constituent structures, but that the young children produced incorrect thematic role mapping. Nevertheless, the constituent structure – an earlier stage in the acquisition process of the passive – was primeable in these children. Similarly, in our analysis, using the lenient coding scheme, it was the relative order rather than the full structure which was primed. Such an approach to analysing possessive data was also adopted by Nicoladis (2012), who also included responses without possessive morphology in her study on bilingual English–French children. In the present study, the benefit of this decision was twofold: first, it provided new insights into how priming of full structures relates to priming of incomplete structures, that is, our results suggest that structures can be primed even in early stages of acquisition, and second, it meant that we could include children who would otherwise have been excluded from our analyses, thereby substantially increasing the number of datapoints.

As a group, bilingual children were less proficient in Dutch than their monolingual peers. Given that language proficiency predicted the production of full structures in children, this difference in language proficiency may have influenced the number of full structures produced by the bilingual children, which was considerably lower than for monolingual children. The comparatively lower proficiency of bilinguals might also explain why, on a strict coding scheme, we found no effect of our background variables for bilingual children. Exploratory analyses indeed showed that the production of full structures was predicted by language proficiency. The number of target responses in bilingual children was lower than in monolingual children, arguably due to bilingual children's lower language proficiency. For this reason, we might not have had sufficient statistical power to reliably show an effect of our background variables.

In monolingual but not in bilingual children, we found language proficiency to modulate the influence of perspective-taking on structural priming (on the strict coding scheme). The influence of perspective-taking abilities on structural priming was stronger for monolingual children with higher language proficiency. For bilingual children, the effect of perspective-taking was in the same direction (i.e., the better children were at perspective-taking, the more likely they were to re-use the prenominal possessive structure) but the effect was not significant when the bilingual children's responses were analysed separately. Despite bilingual children's lower language proficiency, there was no interaction between group and language proficiency in the group analysis. We did however find a stronger priming effect in bilingual than in monolingual children. It is possible that the stronger priming effect in bilingual children potentially masks any effect of language proficiency.

As suggested by an anonymous reviewer, the difference in the strength of the priming might also reflect an inverse preference effect. Inverse preference effects refer to stronger priming effects in unexpected or infrequent structures (e.g., Jaeger & Snider, 2013). Inverse priming occurs when there is a mismatch between the predicted structure and what the listener hears (Chang, 2002; Chang et al., 2006). In bilinguals, the frequency of a certain structure may depend on both languages (e.g., Montero-Melis & Jaeger, 2020; Unsworth, 2023). It is likely that the bilingual children in our study encountered prenominal possessives in Dutch less frequently than monolingual children and as such, it is plausible that for them, the surprisal effect was indeed greater. However, given that children varied in their home languages, with some preferring the prenominal possessive (e.g., English) and others allowing the

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postnominal structure only (e.g., Spanish), the cumulative frequency of occurrence of prenominal possessives – and hence children's predictions – may have varied considerably between children. In a recent study with bilingual English–Dutch and Spanish–Dutch children, Unsworth (2023) found that inverse preference effects in within-language priming were modulated by properties of the bilingual children's other language, but only to a certain degree. Further research is needed to disentangle the role of (inherited) frequency in priming effects in bilinguals.

The bilingual children in our study did not exhibit an advantage over monolingual children with respect to perspective-taking abilities. This could be because there is no such advantage in perspective-taking, as also found for executive processing and attention (Antón et al., 2014; Paap & Greenberg, 2013). This contrasts, however, with other work on perspective-taking or Theory of Mind suggesting that such an advantage does exist (including a recent meta-analysis reporting a small to medium bilingual advantage; Schroeder, 2018). There are at least two (not mutually exclusive) reasons for why we did not observe such an advantage. First, the monolingual children might have had better perspective-taking skills than expected because, as suggested by Fan et al. (2015), monolingual children who are frequently exposed to a multilingual environment without being multilingual themselves may have an equal communicative advantage as bilingual children. The monolingual children in our study were born and raised in the Netherlands by parents who only spoke Dutch to them, but it is not unlikely that they have experienced multilingualism. Some parents of monolingual children indicated that their child watched cartoons in another language or that they sometimes overheard speech in a different language. These children were included in the monolingual group as long as the exposure to the other language did not exceed 4 hours per week. Unfortunately, we did not collect any further information about the degree of any such exposure to other languages and so we cannot investigate this possibility for this sample, but this is an area for further study, and this may have contributed to the lack of difference between the bilingual and monolingual children here. A second reason why our results may deviate from other studies investigating a bilingual advantage in perspective-taking lies in the nature of our task. Perspective-taking scores for the bilingual children might have been depressed because of the language of the task (Dutch). Most studies measuring perspective-taking skills in bilingual children perform the perspective-taking task in the child's dominant language (e.g., Diaz & Farrar, 2018). In our study, this was not possible given the large variety in bilingual children's home languages. Given that some of the younger bilingual children were likely (still) dominant in their home language, we cannot rule out that their perspective-taking scores are in part a reflection of their language proficiency. Future research would benefit from either including a nonverbal measure of perspective-taking or from allowing children to do the task in their dominant language. Not having provided children with this option might have influenced our results such that they were not able to show their full potential. Our goal, however, was not necessarily to take a position in the debate on 'the bilingual advantage' in certain cognitive abilities. Rather, our aim was to explore the relation between one of those abilities – perspective-taking – and structural priming in children.

In conclusion, this study is one of few to investigate individual differences in structural priming in monolingual and bilingual children. Furthermore, it is the first study to explore the role of perspective-taking abilities on primeability in children. Our results suggest that (monolingual) children who are better at perspective-taking are more likely to engage in structural priming. This is in accordance with previous research on structural priming in adults and on behavioural mimicry. Our findings are consistent with the idea that structural priming is a mechanism of social interaction, which is more complex than simply reflecting the absence or presence of abstract syntactic representations in children.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/langcog.2023.71.

Data availability statement. The data that support the findings of this study are openly available on OSF at https://osf.io/a64xj/?view_only=c04d4bab7bcc46aeacc1556e9c7ad7fa.

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Competing interest. The authors declare none.

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