Overcoming Performance Issues:

Preschoolers Know When to Use *The*-Expressions in Production

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Abstract: Elicited production studies have suggested that children up to the age of 5 sometimes use singular definite descriptions, with *the* as the determiner, in non-adult-like ways, i.e., when the referent is not mutually known or not unique in the domain of reference. These production errors have often been attributed to children's deficiency in knowledge. Here, we assess whether this is correct. Across four studies, we show that children produce singular definites in an adult-like manner, both in natural and elicited speech. In natural speech, they use *the* at rates comparable to their mothers overall and across contexts (Study 1), with minimal referential failures (Study 2); Adults presented with conversational snippets are equally successful in guessing determiners (*the* vs. *a*) used by children (2;0-5;0) and mothers (Study 3), suggesting that children use these determiners in an adult-like way. In elicited speech, 3- to 4-year-olds are adult-like in producing definite descriptions when provided with a better controlled task and a clearer domain of reference than in previous studies—they only use *the* when the referent is mutually known and uniquely identifiable in the context (Study 4). These results suggest that children's production errors reported in the literature likely stem from performance issues with certain task setups. There is little reason to believe that children have the wrong meanings for *the* or lack the pragmatic capacity to use it properly.

Keywords: definite descriptions, natural production, elicited production, pragmatic competence

1. Introduction

Adult English speakers use singular definite descriptions like *the*-phrases in a way that reflects their understanding of conversational dynamics. For instance, when they use *the mug* in the sentence *Give me the mug*, their choice implies the existence of a unique mug (Russell 1905), within a contextually restricted domain that makes the mug familiar or identifiable in the discourse or speech situation (Gundel et al. 1993; Heim 1982; Roberts 2003; Strawson 1950).

For children learning to produce these singular definites, this means acquiring the ability to assess how identifiable an intended referent is within the shared knowledge and tailoring their language accordingly. The emergence of this ability can be reflected in whether they know when to use definite forms in production.

Studies on English-learning children's acquisition of *the*-definites seem to show a puzzling asymmetry between production and comprehension. On the one hand, children aged 3 to 5 are claimed to overuse *the* in contexts expecting indefinites during elicited production, where the intended referent is either unfamiliar or non-unique (Emslie & Stevenson 1981; van Hout et al. 2010; Maratsos 1976; Schaeffer & Matthewson 2005, 2005; Schafer & de Villiers 2000; Warden 1976; Wexler 2011). On the other hand, they demonstrate adult-like comprehension of *the*-definites (Aravind et al. 2023; Syrett et al. 2010), even before they turn two (Choi et al. 2018; Saylor & Ganea 2007). For example, children aged 3 to 5 understand that definite descriptions are inappropriate when the intended referent is not unique (Syrett et al. 2010). Furthermore, toddlers as young as 19 months exhibit looking responses that presumably indicate an early grasp of the distinction between *the* and *a*—they are aware of the speaker's visual perspective when interpreting singular definites like *the ball* (Choi et al. 2018). These findings imply that children have the correct meanings for *the* and are sensitive to the listener's knowledge—they seem to have the ingredients for correctly producing definite descriptions, despite the reported production errors.

However, there are potential issues with prior elicited production tasks. While the previous literature suggests that children systematically overuse definites in production, their rates of misuse vary widely depending on the experimental setup (van Hout et al. 2010). Additionally, many production studies lack adult control groups for comparison. Without a clear

baseline, it is unclear whether children are truly overusing *the*. Moreover, the misuse of definites in elicited production may result from experimental artifacts. In fact, some studies that include adult control groups show that even adults who presumably have target knowledge of definites produce them in certain contexts where they might be considered inappropriate (van Hout et al. 2010; Maratsos 1976; Schafer & de Villiers 2000).

Assuming that children do overuse definite descriptions, there are two possible explanations. On the one hand, their performance in production may be a direct reflection of their linguistic knowledge, indicating that they have not acquired the correct meaning for *the*-phrases. Alternatively, it could be that their production reflects not their linguistic knowledge, but their ability to put that knowledge to appropriate use. This hypothesis would imply either that something about previous tasks biased children away from correct performance, or that other nonlinguistic factors might intervene between linguistic knowledge and its use in production.

In this paper we set out to test whether young children do systematically overuse *the*-definites in production, as previous literature suggests, and whether their production errors indeed reflect deficient knowledge. We examine children's use of singular definites across both natural and elicited production contexts, drawing on two corpus studies (Study 1 and Study 2), one human simulation study with adults (Study 3), and one elicited production study with children (Study 4). We find no conclusive evidence of systematic overuse of *the* by children. When considered alongside studies that reported overuse, our findings point to two key conclusions. First, like adults, preschoolers distinguish, in choosing determiners, whether the intended referent is familiar or unique. Second, higher rates of misuse of definites in prior production studies likely stem from unnatural experimental setups and unclear domains of reference.

2. Background

Generally, speakers use *the N* when they presuppose the existence of a relevant domain of *N*s, inferrable by the audience, and refer to all its members. Thus *the mugs*, where *N* is plural, is used to refer to all the mugs in the contextually inferrable domain. When *N* is singular, as in *the mug*, the domain is taken to have a single member, and the speaker then refers to that unique *N*.

Strawson (1950) provides a useful perspective. He remarks that *the N* is used either anaphorically, when an *N* has been mentioned in prior discourse, and the speaker wishes to signal reference to that same *N*, or when the context allows the listener to identify the referent, even without a prior introduction. One common theory is that such contexts are ones that exhibit uniqueness: only a single thing satisfies the noun *N* (Russell 1905). This view implies that (1), for example, is acceptable only if the context of use provides a domain in which there is exactly one ball.

(1) The ball is missing.

But this conclusion is debatable. It can be correct only with a specialized notion of 'context'. Consider (2).

(2) Mick grabbed a pebble from his collection. Then he put the pebble in a jar.

A collection of pebbles includes more than one pebble. Nevertheless, *the pebble* can be used appropriately in the second sentence of the discourse, to refer to the pebble Mick was said to have grabbed. So 'the context' that would satisfy uniqueness is not the overall situation in which the sentence is used, since this contains a collection of many pebbles; it is rather the state of

discourse created by the prior sentence. Sentences like (3) refine the required notion of 'context' even further.

(3) At the gold medal match, the Russian voted for the Russian. (Neale 2004)

Here the 'context' must change within a single clause. For the subject it must be the judge, and for the object it must be the contestant. This level of subtlety has led some to say that uniqueness is not analytically relevant. What matters is just that the intended satisfiers of *N* be familiar or identifiable in the discourse. We refer to all of these, which are many when *N* is plural, and one when it is singular (Heim 1982; Roberts 2003). Moreover, the understood domain for the description may be given only by way of defeasible inferences based on specific practical knowledge. For example, (4) is acceptable only if we assume that John's murder was plausibly committed with a knife.

(4) John was murdered yesterday. The knife lay nearby. (Roberts 2003)

What is clear, in view of this debate, is that acquiring the correct understanding of when to use *the* may not be a trivial task. Learners must infer the conditions for using *the* from rather subtle data, tracking a speaker's referential intentions through discourse. This requires sensitivity to how the plausible domains for reference may be shaped both by previous utterances (i.e., linguistic contexts), and by pertinent practical knowledge (i.e., pragmatic contexts)—perhaps a challenging task for young children.

Decades of production studies suggest that this challenge is reflected in children's errors. A common finding is that children overuse *the*-definites up to age 5 (van Hout et al. 2010; Maratsos 1974; Schaeffer & Matthewson 2005; Schafer & de Villiers 2000). These studies generally identify two broad types of errors: children misuse singular *the*-definites either when the referent is unfamiliar to the listener or when it is non-unique in context. Table 1 summarizes findings from representative studies for both error types (studies using similar methods are grouped together and separated by horizontal dashed lines).

Table 1. Misuse of definite NPs for unfamiliar or non-unique referents in the literature

Study	2 y.o.	3 y.o.	4 y.o.	5 y.o.	Adults
Unfamiliar referent					
Warden (1976)		54%		38%	0%
Emslie & Stevenson (1981)	10%	8%	14%		18%
Schafer & de Villiers (2000)		0%	0%	0%	3%
Schaeffer & Matthewson (2005)	25%				2%
Non-unique referent					
Maratsos (1974)		17%	58%		
Schafer & de Villiers (2000)		49%	53%/41%	56%	30%
van Hout et al. (2010)		50%			17%
van Hout et al. (2010)		26%			24%

One critical pattern emerges from these studies: children's overuse of *the* for unfamiliar referents is inflated in tasks where children must introduce referents, not previously known to the audience, with visual context. For instance, children often misuse *the*-definites when describing a

cartoon story to a listener without visual access to the storybook (Emslie & Stevenson 1981; Warden 1976) or answering a puppet's questions about a scene he has not witnessed (Schaeffer & Matthewson 2005). However, in the absence of visual prompts, such errors disappear entirely, as seen when children referred to objects in their own homes (Schafer & de Villiers 2000). In contrast, errors with non-unique referents are inflated in tasks without visual support, where children must track types and tokens of referents solely through a verbal story (van Hout et al. 2010; Maratsos 1974; Schafer & de Villiers 2000). These errors diminish but persist when pictures accompany the narrative (van Hout et al. 2010).

These findings suggest that previous studies may have overestimated children's overuse of *the* due to artifacts of task design. For instance, errors with unfamiliar referents indicate children's reliance on visual over discourse context (De Cat 2015), which is possibly due to unnatural task setups that obscure the need for perspective-taking. Meanwhile, errors with non-unique referents suggest children's difficulty in evaluating referent uniqueness without visual cues, potentially reflecting working memory constraints. Given these confounds, a reassessment of the overuse claim is necessary to clarify what previous results reveal about children's understanding of *the*-definites.

Indeed, recent comprehension studies suggest a more nuanced picture of children's competence. They behave adult-like in comprehending *the*-definites (Aravind et al. 2023; Syrett et al. 2010), even at 19 months of age (Choi et al. 2018). This notable asymmetry between findings from elicited production and those from comprehension prompts us to reassess hypotheses about children's knowledge of definite descriptions.

2.1 ***Hypotheses about children's knowledge of definite descriptions***

The apparent production-comprehension discrepancy can be understood in two ways. Either children's understanding of *the* is immature, and revealed in production studies, or it is adult-like, but masked in production studies.

According to the deficient-knowledge hypothesis, children's misuse in production reveals their immature or deficient understanding. Their production errors may reflect an underdeveloped mind, in that children are egocentric (Karmiloff-Smith 1979; Maratsos 1976) or immature in conversational reasoning (van Hout et al. 2010; Schaeffer & Matthewson 2005); or their errors may be due to linguistic incompetence, in that they represent the wrong meaning of *the* that lacks the uniqueness presupposition (Wexler 2011). Given these deficiencies, children's success is limited to certain comprehension tasks, which mask their developmental state, and their true, flawed understanding can only be exposed in production tasks targeting specific referential scenarios.

According to the task-performance hypothesis, children's production errors are due to performance issues with particular production setups. Unnatural task setups do not provide natural motivations for perspective-taking, while unclear referential domains lead to failed evaluation of referent uniqueness. Both of these factors may have increased children's inappropriate uses of *the*-definites and eclipsed their adult-like knowledge.

To tease apart these hypotheses, it is crucial to examine children's use of definite and indefinite descriptions in both natural and elicited production. The deficient-knowledge hypothesis predicts that children will consistently overuse *the* in both settings, as production will expose their fundamentally immature understanding. The task-performance hypothesis predicts that production errors should decrease significantly in more natural settings where extraneous

demands are removed, both in natural production and in elicited production with natural setups and clear domains of reference.

2.2 *Reconsidering prior studies*

A careful examination of previous elicited production studies gives us reason to question whether they truly point to a non-adult-like grasp of definites. Indeed, when we compare children's rates of misusing *the* with those of adult control groups across different studies (Table 1), two key findings emerge. First, children do not exhibit consistent rates of misuse. Second, the baseline established by adult control groups is highly variable, and hence may indicate the unreliability of previous measures. Additionally, there is significant variability in misuse rates among both children and adults. To illustrate this, we plot the misuse data in Figure 1, which clearly shows wide variance in both groups.

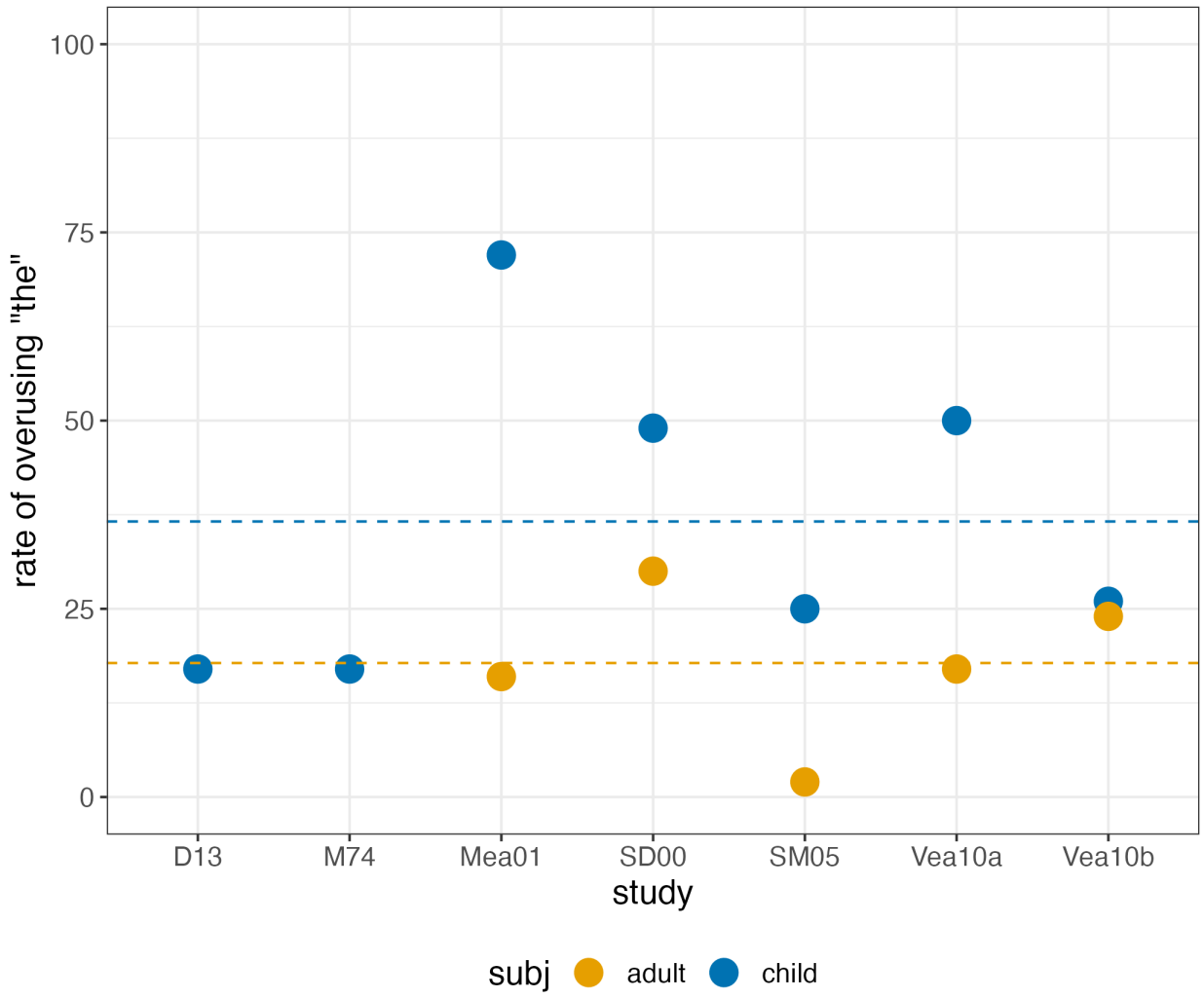

Figure 1. Rates of misusing *the* in previous elicited production studies (blue dotted line for children's mean and orange for adults')

The wide variability in performance across both children and adults suggests that different task demands might significantly influence their referential choice. Children's inflated rates of misuse may be tied to specific task demands, including unnatural setups for perspective-taking and unclear domains of reference.

Focusing exclusively on production studies with preschoolers may obscure the broader picture of how children's understanding of definite descriptions evolves over time. Recent work using comprehension tasks suggest that children have an adult-like understanding of *the* from

early on. For example, Syrett et al. (2010) found that when presented with two identical red balls, 3- to 5-year-old children consistently rejected or questioned an inappropriate request like *Give me the red one*, which violated the uniqueness presupposition of *the*. This indicates that children associate singular *the* with some notion of uniqueness of an object within a restricted domain. Similarly, Choi et al. (2018) demonstrated that by 19 months, children are considering the speaker's knowledge when interpreting *the*. At a scene that naturally called for visual perspective-taking, 19-month-olds, but not 14-month-olds, looked significantly longer when a listener who heard *Give me the ball* grabbed a ball hidden from the speaker, rather than one that was visible to the speaker. This was not the case when the listener heard *Give me a ball*. Additional evidence indicates that before age two, children have exhibited perspective-taking skills necessary for interpreting referring expressions (Luo & Baillargeon 2007; Moll et al. 2008; Saylor & Ganea 2007) and by age three, they can consider the listener's perspective in producing referring expressions (Matthews et al. 2006).

It is important to note, however, that there is a tension between performance on comprehension and production tasks. The processes involved in comprehending *the*-definites may differ from those required for producing appropriate referring expressions, so different measures may point to different conclusions. Children might correctly respond to definites without fully considering the presuppositions associated with *the*. For instance, they might understand that a speaker can use singular *the N* to refer to some specific object (see Rozendaal & Baker 2008)—and be puzzled if they don't understand which—without understanding that the referent should be the unique *N* in the relevant 'context'. Therefore, we need more tightly controlled studies from different angles to identify which parts of the prior literature are more indicative of what children know about definite descriptions.

2.3 *This paper*

In this paper, we present new evidence supporting children's adult-like knowledge for *the*-definites. We show that children use them appropriately in natural speech as well as natural elicited production. This suggests that they have an adult-like understanding of *the*, and that it is masked by unnatural setups in prior production tasks.

Across four studies, we demonstrate that children do not systematically overuse *the* in natural speech or in elicited production. Through two corpus studies, we show that in natural speech, children follow their mothers' patterns of determiner use overall and across different clause types and syntactic environments, and their rate of miscommunications due to inappropriate use of *the* is low and comparable to that in adult-adult interactions. Additionally, through an experiment using a variant of the Human Simulation Paradigm (Dieuleveut et al. 2022; Gillette et al. 1999), we further show that when naïve adults are given only limited linguistic context, they are equally accurate at guessing determiners (*the* vs. *a*) used by children as those used by their mothers in conversation, suggesting that children's use of determiners is adult-like. Finally, in a new elicited production task designed to minimize extraneous demands in production setups, children consistently produced appropriate referring expressions based on whether the intended referent was uniquely identifiable within the context.

3. Study 1: Overall distribution of *the*-definites in natural production

In this section, we present a corpus study comparing the frequency of singular *the*-definites produced by children and their mothers in natural speech. This coarse analysis helps us assess whether there are obvious signs of children misunderstanding the meaning of *the*. Specifically, we look at the distribution of singular definites of the form *the N* used by children vs. their

mothers. Do children produce singular definites more frequently than their mothers? Do children and mothers produce these definites in the same linguistic environments?

3.1 *Method*

We based our distributional analysis of singular definites on several CHILDES corpora, including Brown (1973), Soderstrom et al. (2008), Suppes (1974), and Valian (1991). These corpora provide a large sample of data, with 27 children from a broad age range (1;0-3;11), consisting of a total of 912,530 words and 254,753 sentences.

In our analysis, we focus specifically on singular definites produced by children and their mothers, as these require a choice between a definite or an indefinite determiner. We analyze instances of singular definites in the form of *the* N_{SG}, while excluding plural definites, since plurals either require *the* for definite referents or no determiner for indefinite referents.

To determine whether children overuse singular definites, we use mothers' input as a baseline and compare the proportion of *the N* used by the two groups. The proportion of *the N* is calculated by dividing the count of *the* N_{SG} by the combined count of *a/an* N_{SG} and *the* N_{SG}. We exclude other determiner alternatives (e.g., demonstratives like *this* and *that*) from the denominator, given that *the* and *a* are typically contrasted in elicited production studies. This analysis helps us examine whether the overuse of *the* observed in previous elicited production studies is also present in natural speech.

3.2 *Results*

In general, children use a lower proportion of singular definites than their mothers across all age groups, as shown in Figure 2.

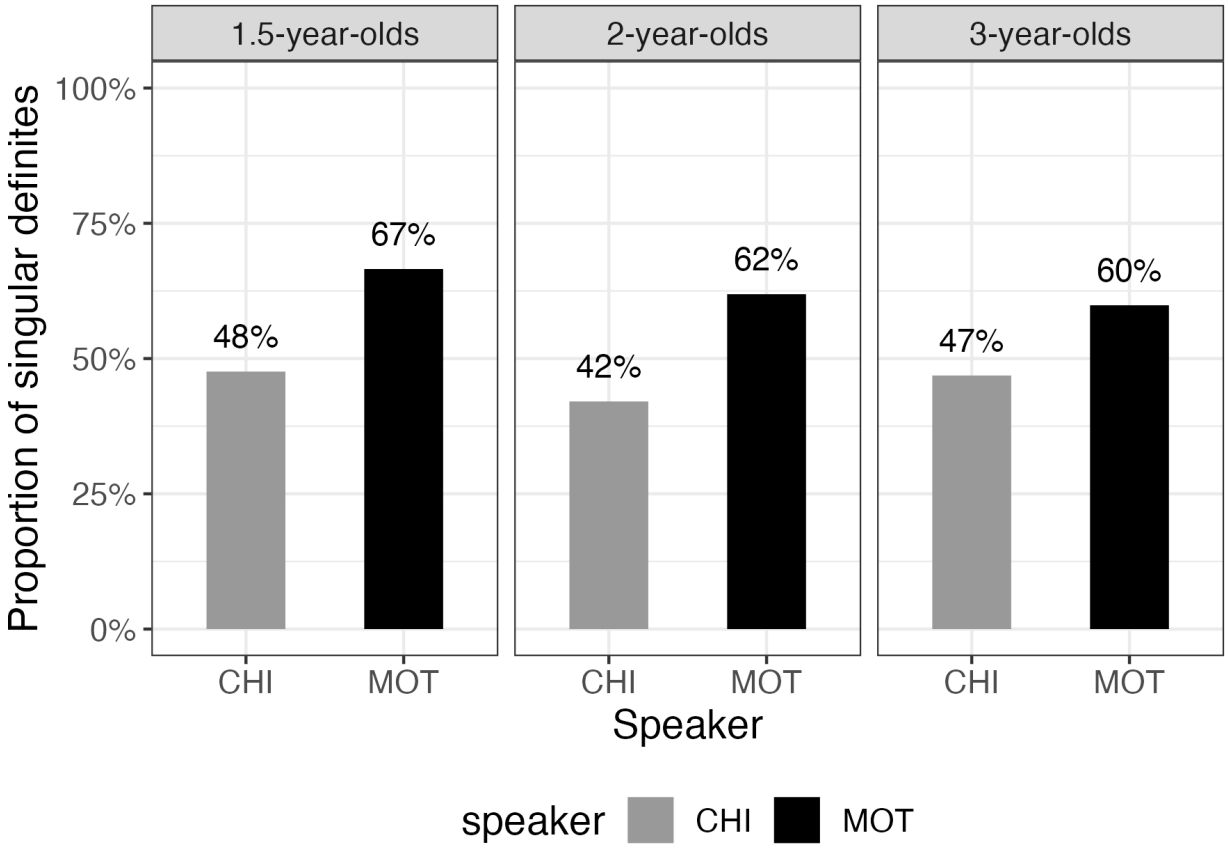

Figure 2. Study 1. Overall proportion of singular *the*-definites by age

Specifically, children use the definite determiner (as opposed to the indefinite one) about half of the time, whereas mothers use it more frequently, in over 60% of their utterances. This higher usage of *the N* by mothers may reflect their more dominant role in the relevant environments in directing the child's attention to previously mentioned or familiar entities during conversations. The absence of overuse in children is also evident when we examine individual data from our two-year-old corpora, as depicted in Figure 3.

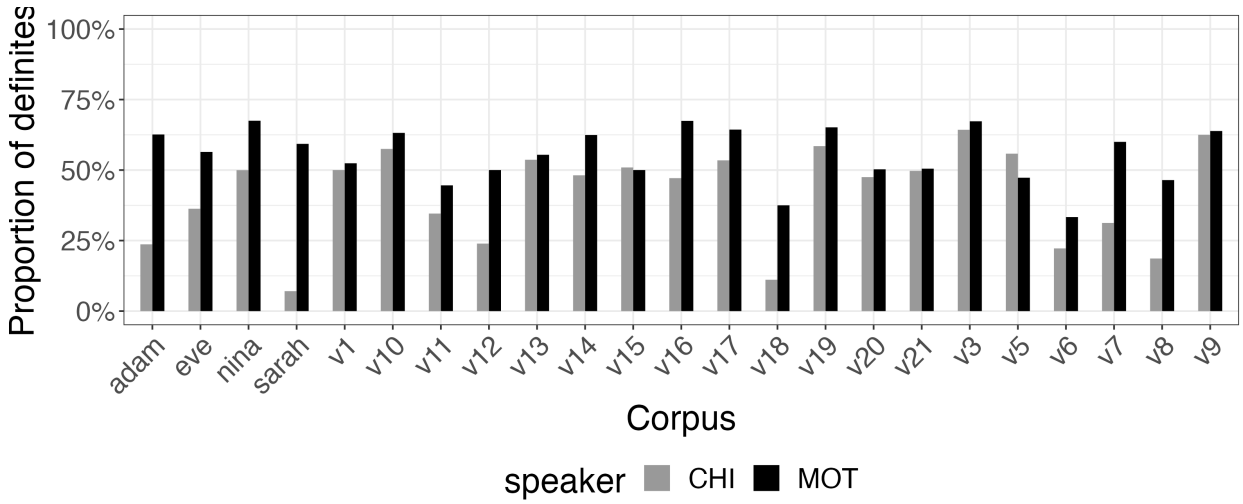

Figure 3. Study 1. Overall proportion of singular *the*-definites by 2-year-old corpus

In short, this data does not provide evidence for overuse. However, the overall proportion of singular definites may be too coarse as a measure, as these differences may reflect broader differences in how adults and children participate in conversations. Given this potential lack of sensitivity, we need more specific measures to probe for potential overuse.

One way we can refine our measure is to examine whether children adjust their definite usage in response to pragmatic differences across clause types: declaratives vs. interrogatives. Declaratives are typically used to assert information, whereas interrogatives are used to seek information. This pragmatic difference might correlate with different probabilities for the use of definites, as well as with the different roles children and their caregivers take in conversations. So if children do overuse definites, we might expect this to be manifested differently in declaratives vs. interrogatives.

Across clause types, we did not find evidence that children overuse definites compared to their mothers' baseline usage (declaratives/statements vs. interrogatives/questions; see Figure 4).

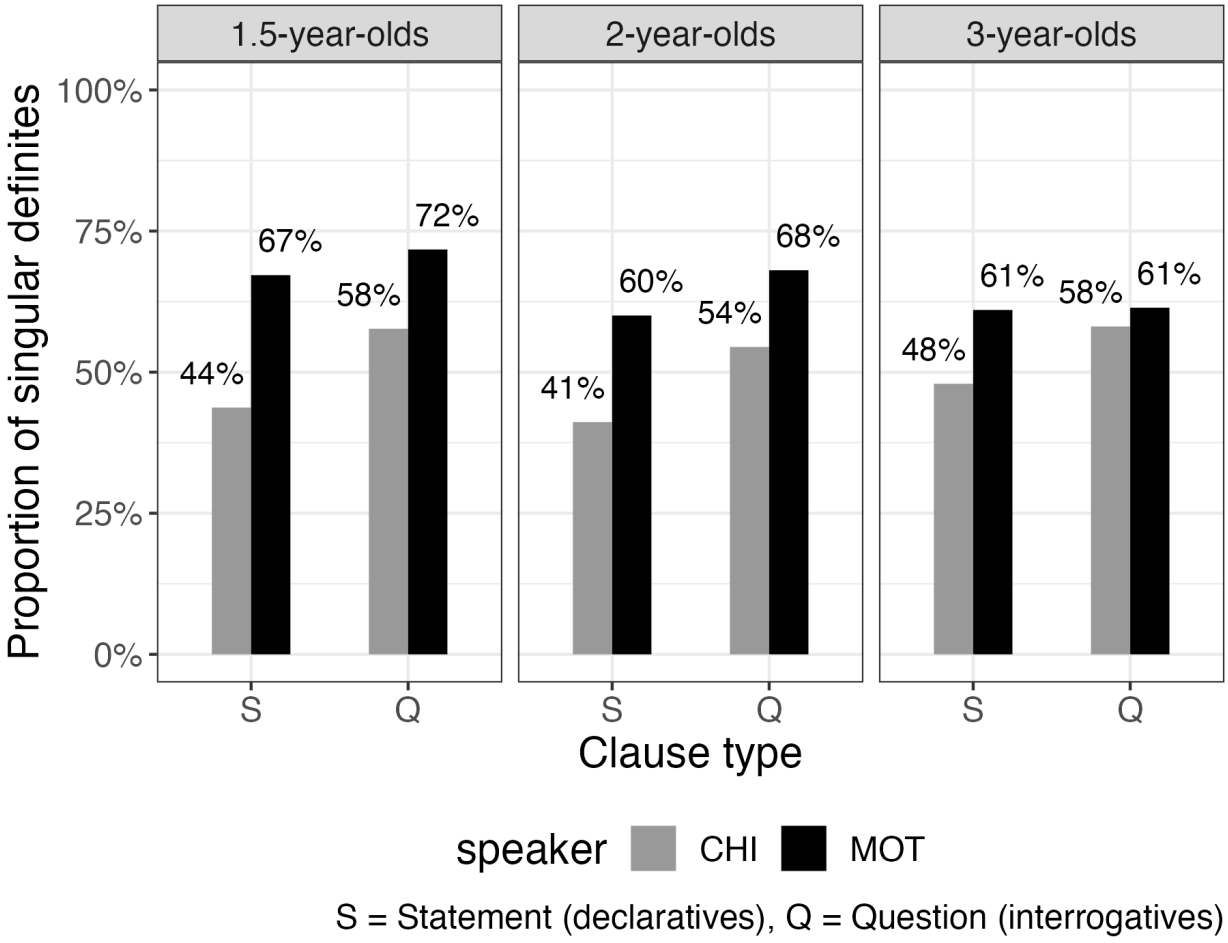

Figure 4. Study 1. Proportion of singular *the*-definites across clause types (S for statements/declaratives vs. Q for questions/interrogatives) by age

In fact, children use fewer definites than their mothers, both in declaratives and in interrogatives. This means that even when asserting information, where a referent is often already known or inferable within the discourse, children do not overuse definites in referring to established entities.

Another way we can refine our measure is to examine whether children adjust their definite usage in response to pragmatic differences across syntactic environments within a single clause type: namely, subjects vs. objects vs. fragments within a declarative clause. In English, subjects tend to refer to entities mentioned earlier in the discourse (Prince 1992), so we expect

caregivers to use more definites in subject positions. If children were truly overusing definites, we might expect their proportion of definite usage to be insensitive to such distinctions. To test this, we conducted further analyses to examine whether this finer-grained measure would reveal children's overuse of definites.

Across syntactic positions (i.e., subjects vs. objects vs. fragments) in declarative clauses, we again find no evidence of overuse when examining children's determiner use (see Figure 5).

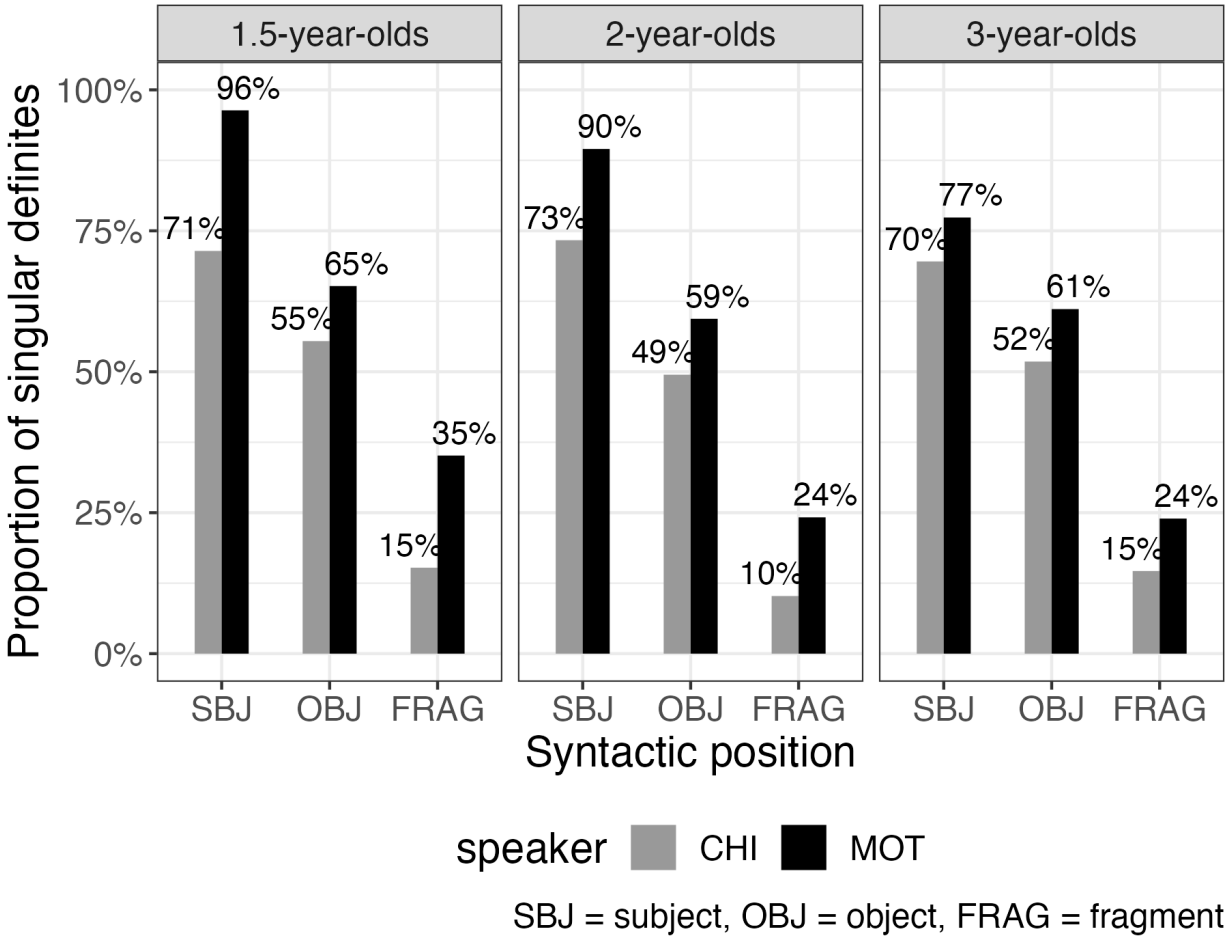

Figure 5. Study 1. Proportion of singular *the*-definites across syntactic positions

Moreover, children use more singular definites for subjects than for objects, mirroring their mothers' patterns. That is, children's usage patterns align with the general observation that in English, subjects typically refer to entities mentioned earlier in the discourse (Prince 1992).

One concern is that children's rate of definites might be underestimated relative to their mothers' due to young children frequently producing noun phrases (NPs) without determiners (e.g., Hyams 1996). If children tend to drop determiners more often for definites than for indefinites, excluding these null determiners could significantly impact their overall rate of definites. To explore this, we calculated the instances of null determiners in children's speech (see Table 2).

Table 2. Study 1. Revised rate of definites (excluding fragment NPs)

Age (year)	#Def	#Ind	#Null	(Def+Null)%
1	209	166	550	82.1
2	1,364	1,342	2,599	74.7

If we consider all null determiners as potential definites, the revised rates of definites for 1-year-olds and 2-year-olds increase to 82.1% and 74.7%, respectively—higher than their mothers' rates of 66.5% and 60.2% in the same corpora. However, this assumption would lead us to overestimate children's definite usage, as some of these null determiners are clearly used as indefinites, whether grammatically (5) or not (6).

(5) I want coffee. (Valian, 1991: 01;09;25)

(6) I take walk. (Brown, 1973: Eve, 01;09;00)

To obtain a more accurate estimate of potential definites among children's null determiners, we factored in their distribution of definites across different syntactic environments. We recalculated children's revised rates of definites by including in the numerator null determiners that could have been definites ($N_{null\ as\ def}$) probabilistically (8), i.e., based on the rates of definites produced in subject ($rate_{def\text{-}sub}$) and object ($rate_{def\text{-}obj}$) positions (7).

(7) $N_{null\ as\ def} = N_{null\text{-}sub} \times rate_{def\text{-}subj} + N_{null\text{-}obj} \times rate_{def\text{-}obj}$

(8) $rate_{revised\ def} = (N_{def} + \mathbf{N_{null\ as\ def}}) / (N_{def} + N_{ind} + N_{null})$

The revised rates of definites for 1- and 2-year-olds then become 58.2% and 52.1%, respectively, both lower than their mothers' rates of 66.5% and 60.2% in the respective corpora. Therefore, when using this finer-grained estimate, children do not appear to overuse definites in their natural production.

In summary, we find no clear evidence of overuse in children's natural speech. Across different clause types and syntactic positions, children's distribution of singular definites aligns closely with that of their mothers. However, these broad measures may overlook more subtle patterns of overuse. To gain a clearer picture, we turn to the discourse contexts in which definites are used, as overuse may only become apparent when considering how children's definites function in communication. In the next section, we focus on miscommunications in specific discourses to probe for potential overuse of definites in children.

4. Study 2: Rate of *the*-driven miscommunications in natural production

In this study, we evaluate the quality of children's use of *the*-definites. If children misunderstand the meaning of *the*, we would expect them to use it inappropriately, leading to communication

breakdowns. Specifically, if children use *the* in contexts where its presuppositions were not satisfied or could not be accommodated, their listeners would likely be confused about the referent or seek clarification.

To assess whether miscommunications induced by *the* are common in natural speech, we compare the rates of such miscommunications in mother-child interactions with those in adult-adult interactions. We calculate the rates of misuse of *the* by 1- and 2-year-olds and compare them to that of adults. If children's understanding of *the* is non-adult-like, we would expect to see a higher rate of miscommunications, with children's misuse of *the* frequently causing listener confusion or prompting requests for clarification.

4.1 *Method*

The rate of *the*-driven miscommunications was analyzed using CHILDES corpora, including Brown (1973), Soderstrom et al. (2008), Suppes (1974), and Valian (1991), while the rate for adult-adult interactions was calculated using the CALLHOME corpus (Kingsbury et al. 1997).[1]

For children, we focused on miscommunications involving singular definites, where the choice of determiner is between *the* and *a*/*an*. For adults, we expanded the scope to include both singular and plural definites to capture a more comprehensive view of their miscommunication scenarios. In the analysis of mother-child interactions from CHILDES, sentences containing *a/an* N_{SG} or *the* N_{SG} were extracted using CLAN commands and functions. For the analysis of adult-adult interactions in the CALLHOME corpus, sentences with referring expressions were extracted using a Python script[2].

[1] The CALLHOME corpus consists of 120 unscripted, 30-minute telephone conversations between native English speakers, primarily involving family members or close friends. This is particularly relevant because the corpora we selected for analyzing children's miscommunication rates also involve interactions between mothers and their children, who are familiar with each other. The CALLHOME corpus includes a total of 301,805 words and 28,967 sentences.

[2] Many thanks to Weihang Wang and Sathvik Nair for helping with the script.

To identify cases of miscommunications, we searched for question marks, as a sign for clarification, within 1 to 3 lines following the target line containing the definite description. We then manually reviewed these cases to confirm that they were true instances of miscommunication. To do so, we expanded the context and checked if they genuinely involved clarification questions.

4.2 *Results*

We first analyzed the use of *the N* by 1-year-olds and found only 1 instance of misuse out of 205 cases (0.49%), with no instances of miscommunication. Many of the uses of *the N* by 1-year-olds were repetitions of their mothers' utterances or followed the mothers' initial mention of *N*. After excluding these 14 repeated cases from the total, the misuse rate remained low at 0.52% (1 out of 191).

Next, we examined the use of *the* by 2-year-olds and found 0.39% (10 out of 2,575) instances of miscommunication driven by *the*. We identified two types of misuse: unfamiliar reference (8 cases) and non-unique reference (2 cases). (9) shows a case of unfamiliar reference, and (10) a case of non-unique reference.

(9) CHILD: I wanna go on **the platform**.
MOTHER: What platform?
CHILD: The platform at the circus.
(Valian, 1991: 02;04;26)

(10) CHILD: Hey, where's **the truck**? I need …
INVESTIGATOR: Where's the what?
MOTHER: The truck?

CHILD: Yeah.

MOTHER: There's two trucks.

(Brown, 1973: Eve, 02;02;00)

In order to assess whether these cases reflect a semantic or pragmatic deficit, we further examined adult-adult miscommunications to determiner whether this rate of miscommunication or the kinds of miscommunications differ between children and adults.

In adult-adult interactions, we found 0.13% (4 out of 3,121) instances where definite descriptions led to miscommunications. All these cases were due to unfamiliar reference. (11) is one example of this type of case.

(11) A: You know, spent panting and spending every second of the day, w- with him only. You know what I'm saying and that probably part of the reason that it would be nice to actually stay with him is that you could also go and visit **the sights** or whatever and g- and...

B: Where? What are you talking about?

A: In Japan.

In summary, Study 2 provides no evidence that children overuse *the* in natural production. The rate of miscommunication driven by definites in mother-child interactions is low and comparable to that in adult-adult interactions, both being well below 1%. This low rate of miscommunication contradicts the deficient-knowledge hypothesis, which predicts that children should overuse *the* in natural production. However, the conversations in our corpus involve

children's parents, who share much common ground with their child, and may thus accommodate their use of definites. To evaluate children's use of determiners more objectively, we need to involve adults who were not part of the conversations and thus are less likely to accommodate the presuppositions.

5. Study 3: Guessing determiners

In Study 3, we aim to determine whether children's use of determiners is adult-like by conducting a determiner-guessing experiment, using Dieuleveut et al.'s (2022) adaptation of the Human Simulation Paradigm (Gillette et al. 1999). Dieuleveut et al. show that this method is sensitive to whether children are adult-like in choosing between a necessity modal (like *must*) or a possibility modal (like *might*). We use the method here, supposing it will be likewise sensitive to the choice between a definite and an indefinite description.

We presented adult participants with excerpts from mother-child conversations and asked them to select either definite *the* or indefinite *a* for a missing determiner used by either a child or a mother. Our first goal is to determine if adults can accurately guess the definites used by mothers. If they can correctly predict mothers' use of definites, it indicates that the context, combined with adults' understanding of determiners, provides sufficient information for accurate identification of the determiners that mothers used. Conversely, if children misuse definites, adults should perform worse at predicting children's determiners. Assuming that children's overuse is characterized by using definites in indefinite contexts, then the contexts in which children use definites would likely elicit indefinite choices by adults.

5.1 *Predictions*

If children overuse definites, we expect adults to be less accurate in predicting children's use of them compared to predicting mothers'. On the other hand, if children do not overuse definite

determiners, we expect no significant difference in adults' accuracy of guessing for children's versus mothers' use of definites.

5.2 *Method and Materials*

Participants were recruited via Amazon Mechanical Turk (AMT), and the experiment was conducted using PCIbex farm (Zehr & Schwarz 2018). The task took approximately 15 to 20 minutes. Each participant completed 40 trials, including 10 trials with definites, 10 with indefinites, and 20 fillers. To ensure participants were engaged, one-fifth of the trials (8 trials) were followed by comprehension questions (i.e., simple memory questions).

The materials consisted of snippets from mother-child conversations involving 23 pairs (children aged 2;1;4 to 4;11;2). These snippets were randomly selected from Gleason's corpora in CHILDES (80,347 words; Menn & Gleason 1986).[3] To better capture cases of misusing *the* if any, we ensured that both *the* and *a* were viable options for their subsequent noun so that the participants' choice of either determiner would be based solely on contextual information. To do this, we excluded items biased toward either determiner. Items were removed if they included: 1) repetitions, such as echoing, speaker disfluency, and finishing another speaker's sentence; 2) idiomatic expressions (e.g., *wait a minute*) or collocations; or 3) plural or uncountable nouns.

5.3 *Procedure*

Before starting the experiment, participants received two practice trials to familiarize themselves with the process. They learned that: 1) they needed to press the spacebar to reveal each line of conversation in progression, 2) they would choose between two options for the blank at the end of each conversation, and 3) they would occasionally answer comprehension questions to ensure

[3] The conversations took place in recorded lab sessions, where children and mothers interacted with new objects. This type of interaction provides a nice setup to probe participants' use of definites, as we are interested in exploring how children register new referents in a dynamic common ground.

they understood the context. Figure 6 shows a sample test trial, where participants chose a determiner from options including target determiners (e.g., *the* vs. *a*), filler determiners (e.g., *this* vs. *that*), or mixed determiners (e.g., *the* vs. *this*).

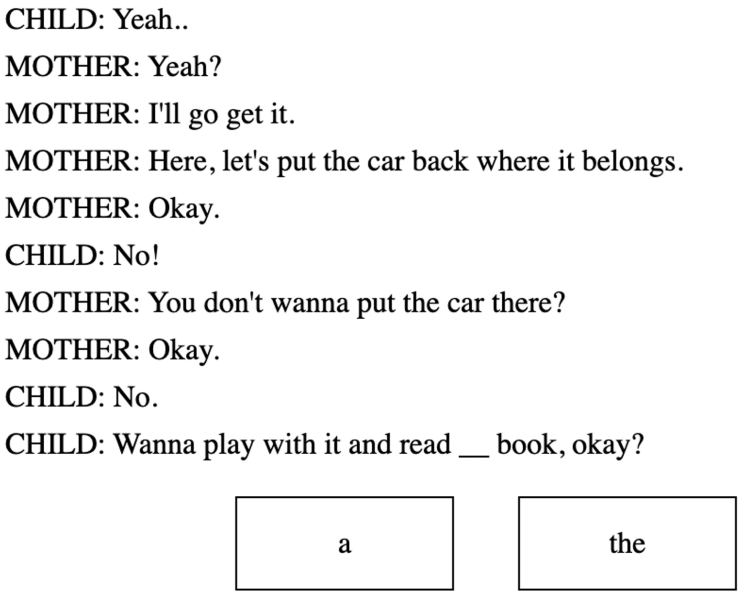

Figure 6. Study 3. A sample test trial

5.4 ***Participants***

240 participants (127 males and 105 females; mean age: 41.3) were recruited via AMT. Data from 211 participants (109 males, 94 females, and 2 unspecified; mean age: 41.9) were included in the analysis. Participants who scored below 75% on the comprehension questions were excluded from the final dataset.

5.5 ***Results***

We analyzed the rate of correct guesses for mothers' use of definites as a baseline to evaluate children's use of definites. Adults predicted mothers' definites above chance for conversations from all age groups (2-year-olds: $V = 666$, $p < .001$; 3-year-olds: $V = 780$, $p < .001$; 4-year-olds:

$V = 389$, $p < .001$).[4] Their accuracy rates were 0.9 ($N = 36$, $SD = .096$) for conversations with 2-year-olds, 0.895 ($N = 39$, $SD = .102$) with 3-year-olds, and with 4-year-olds, 0.765 ($N = 31$, $SD = .236$).

Adults also predicted children's definites above chance for conversations from all age groups (2-year-olds: $V = 595$, $p < .001$; 3-year-olds: $V = 595$, $p < .001$; 4-year-olds: $V = 595$, $p < .001$). Their accuracy rates were 0.844 ($N = 36$, $SD = .144$) for 2-year-olds, 0.857 ($N = 35$, $SD = .127$) for 3-year-olds, and 0.894 ($N = 34$, $SD = .110$) for 4-year-olds. Crucially, in no age group were adults significantly better at predicting mothers' definites than children's (2-year-olds: $W = 516$, $p = .124$; 3-year-olds: $W = 571.5$, $p = .212$; 4-year-olds: $W = 726.5$, $p = .007$**) (Figure 7).[5]

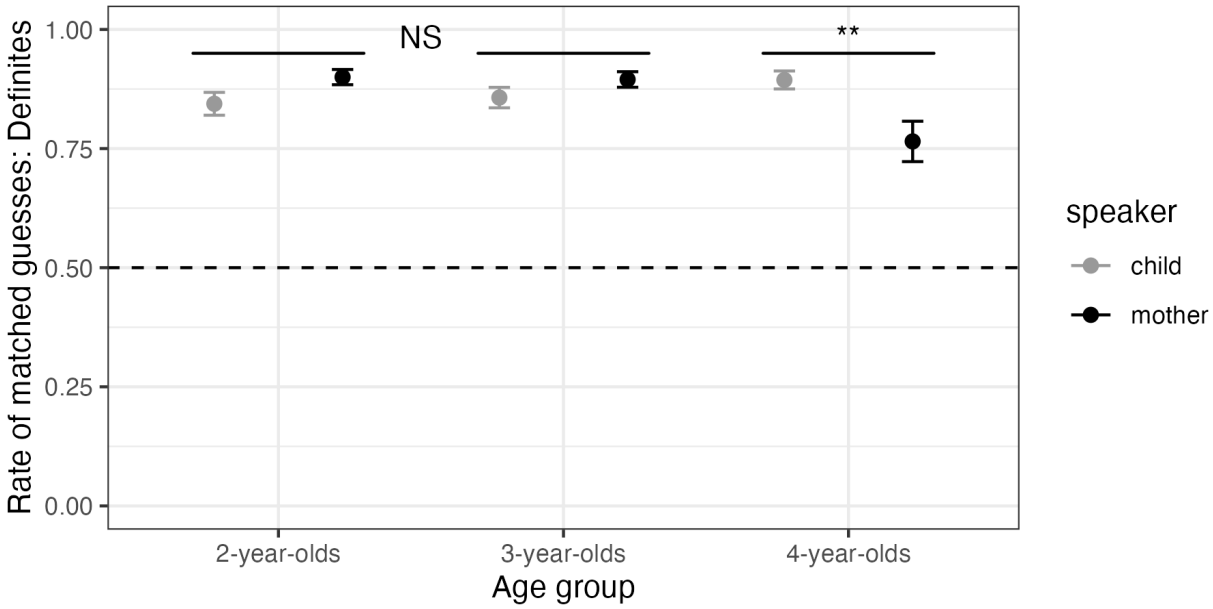

Figure 7. Study 3. Rate of correct guesses for definites by speakers and child age

[4] Here, V represents the sum of ranks for one group in a Mann-Whitney U test (also known as the Wilcoxon rank-sum test) often used to compare differences between two independent groups. It is a non-parametric test, without assuming normality.

[5] The Wilcoxon test was used to test whether adults were above chance at guessing definites for each condition, and the Mann-Whitney U test was for testing whether adults performed better with either child or mother utterances. These non-parametric tests were used, as the data did not follow a normal distribution.

One might suspect that adults' accurate predictions could be due to a general bias toward choosing definites, which would suggest poorer performance with indefinites. However, this is not supported by our data (Figure 8).

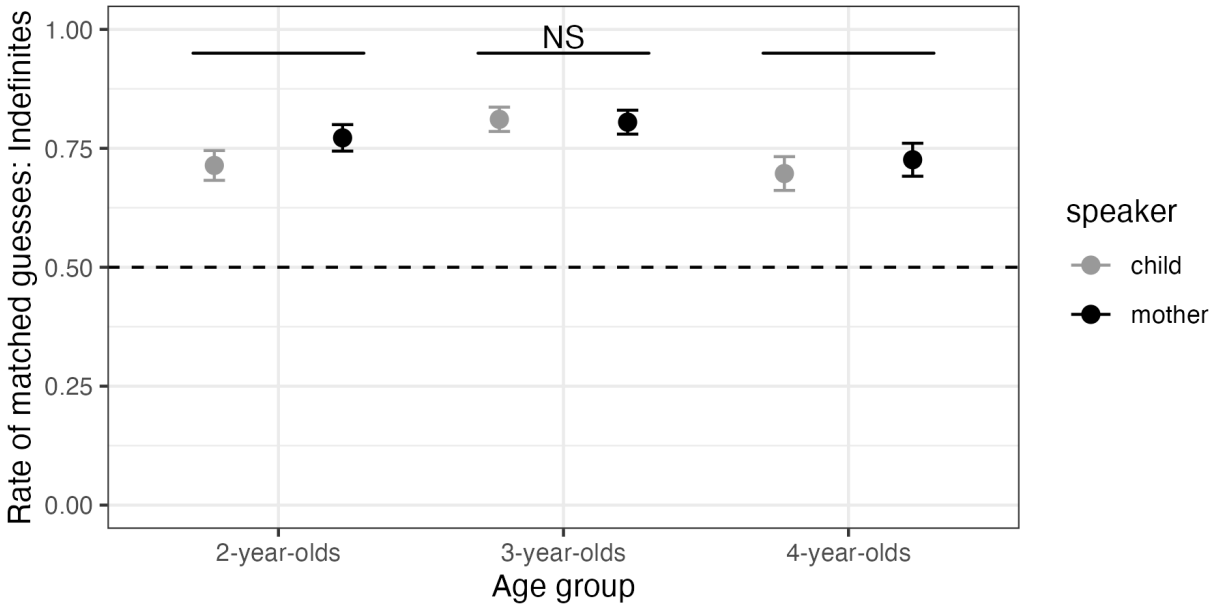

Figure 8. Study 3. Rate of correct guesses for indefinites by speakers and child age

Adults were also above chance in predicting indefinites used by both children (2-year-olds: $V = 593.5$, $p < .001$; 3-year-olds: $V = 527$, $p < .001$; 4-year-olds: $V = 511.5$, $p < .001$) and mothers (2-year-olds: $V = 587$, $p < .001$; 3-year-olds: $V = 768$, $p < .001$; 4-year-olds: $V = 385$, $p < .001$). Furthermore, adults were not significantly better at predicting mothers' indefinites compared to children's (2-year-olds: $W = 526$, $p = .163$; 3-year-olds: $W = 703.5$, $p = .819$; 4-year-olds: $W = 498$, $p = .704$).

Additionally, participants generally showed agreement in their determiner choices for most test items, whether the determiners were used by children or mothers (Figure 9).

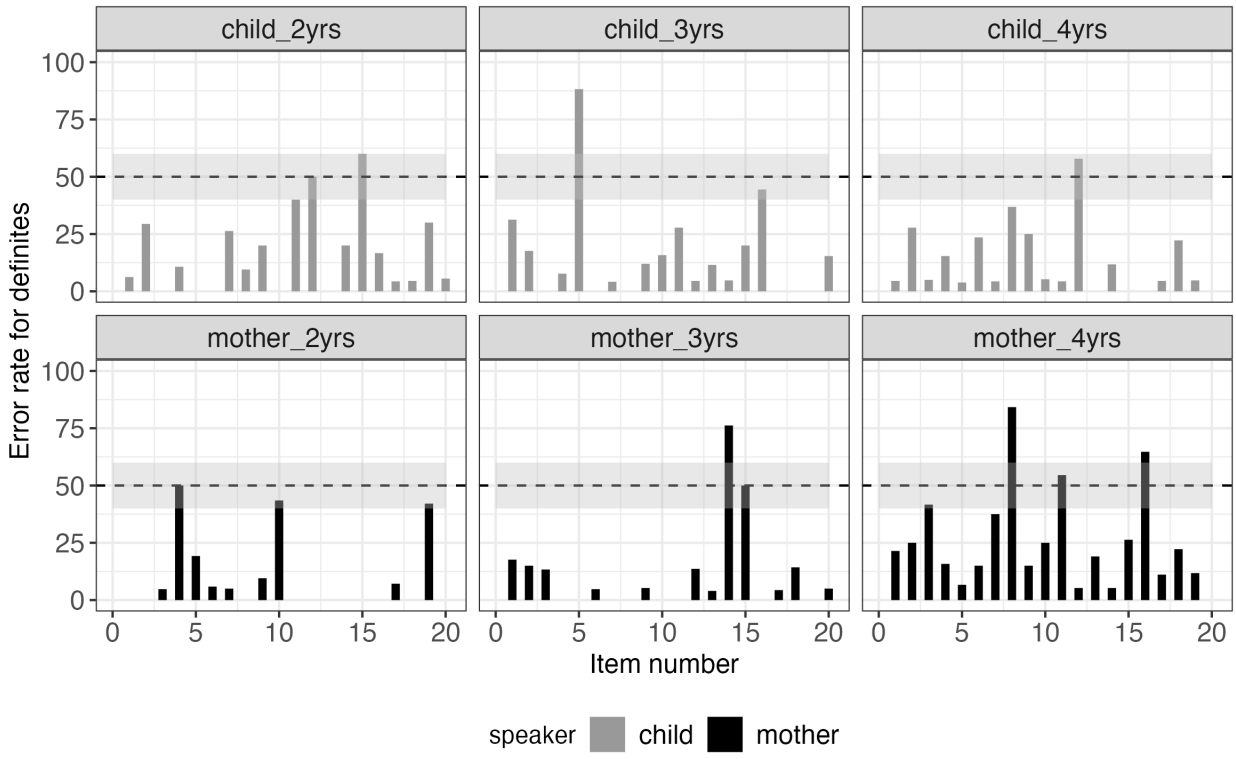

Figure 9. Study 3. Adults' error rates for definites by item, speaker, and child age

We used gray to mark regions with an accuracy range between 40% and 60% to highlight items with significant disagreement (i.e., a near 50-50 split among participants). The figure shows very few items with such wide disagreement. Our examination of items with the highest mismatch rates revealed only one potential case of misusing *the* by children.

In summary, our results suggest that children use singular definites in a manner consistent with adult usage in natural production, as evidenced by adults' high accuracy in identifying definites used by both children and their mothers.

6. Study 4: Use of *the*-definites in conversational elicited production

In the first three studies, we observed that in natural production, children often use *the*-definites in ways similar to adults. While natural production provides valuable insights into children's language use, it has certain limitations. During mother-child interactions, the common ground

tends to be less dynamic and more predictable than during an experimental setting, which might make it easier for children to assess what their listener knows. In other words, children's adult-like usages might be limited to mostly easy cases in natural production, so natural production scenarios might be insufficient to expose underlyingly deficient knowledge.

As we saw, previous elicited production studies indicate that children seem to overproduce definites. However, unnatural setups may be responsible for overuse in prior production studies. As discussed in the background section, we suspect that two factors might contribute to children's inappropriate use of *the*-definites in prior studies: 1) unnatural setups for perspective-taking, and 2) unclear domains of reference.

The task-performance hypothesis predicts that children's misuse of *the*-definites will decrease significantly in a production task where the abovementioned task demands are controlled for. To test this prediction, we conducted Study 4, in which we adopt a conversational elicited production paradigm, aiming to create a more natural setup and a clear domain of reference.

6.1 ***Method***

Participants in this task need to consider the perspective of the listener and assess whether the intended referent is uniquely identifiable within the domain of mutually known referents. The task setup involves Kermit the frog, who cannot see objects on the other side of a wall, while the participants can, so Kermit needs some help from participants to tell him what's behind the wall (Figure 10). Sometimes, two identical objects are behind the wall, which should lead participants to refer to one of them using an indefinite. Sometimes, two distinct objects are behind the wall, which should lead participants to use a definite to refer to one of the objects.

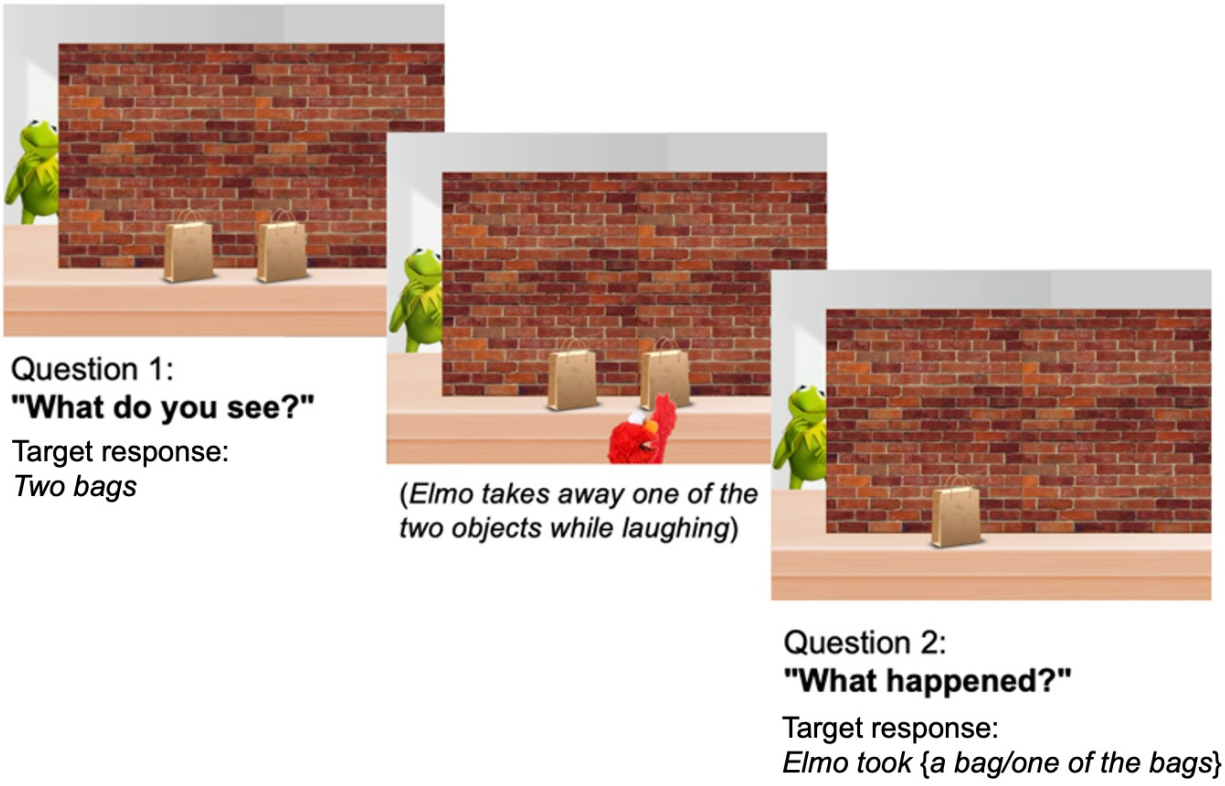

Figure 10. Study 4. Experimental setup

Before the task starts, the experimenter and the participant sit in front of a laptop. The experimenter explains that Kermit the frog needs some help from the participant and will be very happy if the participant can help him. This serves to motivate the participant to be a cooperative interlocutor. Throughout the task, the experimenter uses a presentation remote clicker to control the slides on the screen, thereby reinforcing the impression that the conversation is spontaneous and natural.

To ensure that participants understand the procedure and are comfortable with the setup, the experimenter begins with three practice trials before the main task, each involving just one object behind the wall. In the first two trials, Kermit only asks Question 1, *What do you see*. After the participant responds, Kermit says *Okay, thanks*. The third trial differs from the previous two in that after the participant answers Question 1, Elmo appears, takes away the object, and

laughs. Kermit then asks, *Wait. Did you hear something? It sounded like someone's behind the wall. Who was it*. This question ensures participants understand the situation. Finally, Kermit asks Question 2, *What happened*, so that the participant knows what question to expect during the test trials. Once the practice trials are over, the experimenter explains that he has work to do and will not join the conversation, and then he turns sideways to prevent the participant from being distracted. This is to ensure that during production, the participant will solely engage with Kermit and consider Kermit's perspective.

The test trials include two trial types, where participants see two objects, either unique (e.g., a bottle and a mug) or non-unique (e.g., two identical bags). Kermit first asks, *What do you see* (Question 1). We expect this to elicit indefinite responses (e.g., *a bottle and a mug* or *two bags*) regardless of the trial type (i.e., unique vs. non-unique trial), since the referents are unfamiliar to the listener (Kermit), and not within the shared visual common ground between Kermit and the participant. Next, Elmo appears on the other side of the wall and takes away one of the objects, while laughing. Kermit then asks *What happened* (Question 2). Here, we expect participants to respond with definites for unique referents (e.g., *Elmo took the mug*, if there's only one mug) but indefinites for non-unique referents (e.g., *Elmo took a bag/one of the bags*, if there are two bags). Two orders of test trials are created, with the unique and the non-unique test trials pseudo-randomized (for the full list of referential contexts, see Appendix).

Our design reduces task demands in the following aspects. First of all, our task involves turn-taking in elicitation, which mimicks natural conversations and helps maintain the natural flow of speech. Additionally, as Kermit cannot see what's behind the wall and there are no referents in the visual common ground, it's clear to participants that the task requires visual pespective-taking, which has been proven to work even with infants (Brezack et al. 2021; Choi et

al. 2018; Luo & Baillargeon 2007). Moreover, we create a clear domain of reference (the area behind the wall) and provide visual support for the referents, so the memory load is minimized. Furthermore, we control for the saliency of the intended referent. When Question 2 (*What happened*) is asked, Elmo has already taken the intended referent away, so it's not visually salient, and discourse-wise, *What happened* also serves as a neutral prompt from an ignorant listener (Kermit), targeting the broader context (i.e., what occurred behind the wall) rather than the specific identity of the stolen object.

We employ a 2 (Trial type: unique vs. non-unique) × 2 (Question: 1 vs. 2) × 2 (Age: adult vs. children) within-subjects design. If children's knowledge of *the* is adult-like, we expect their use of definites to vary based on Trial Type and Question, without any interaction effect with Age. Responses coded as definites include pronoun *it*, *the N* (e.g., *the box*), *the Adj N* (e.g., *the left box*), and *the N PP* (e.g., *the box on the left*), and responses coded as indefinites include *a/an N* (e.g., *a box*), *one N* (e.g., *one box*), and *one of the Ns* (e.g., *one of the boxes*).

6.2 *Participants*

The participants involved 34 children (15 males) between the ages of 3;4;15 and 5;0;23 (mean: 4;4;17). They were recruited from preschools in the greater Washington, DC, area and were included in the final sample only if they heard English during at least 80% of their waking hours. We analyzed data from trials where children responded to both questions, *What do you see* and *What happened*. We recruited another 23 undergraduate students at the University of Maryland, College Park, as adult controls.

6.3 *Results*

Our results indicate that children (N = 34), just like adults (N = 23), respect the presuppositions of *the*. For Question 1, *What do you see*, both adults and children never used definites in their responses when the intended referents were unfamiliar to the listener (Figure 11).

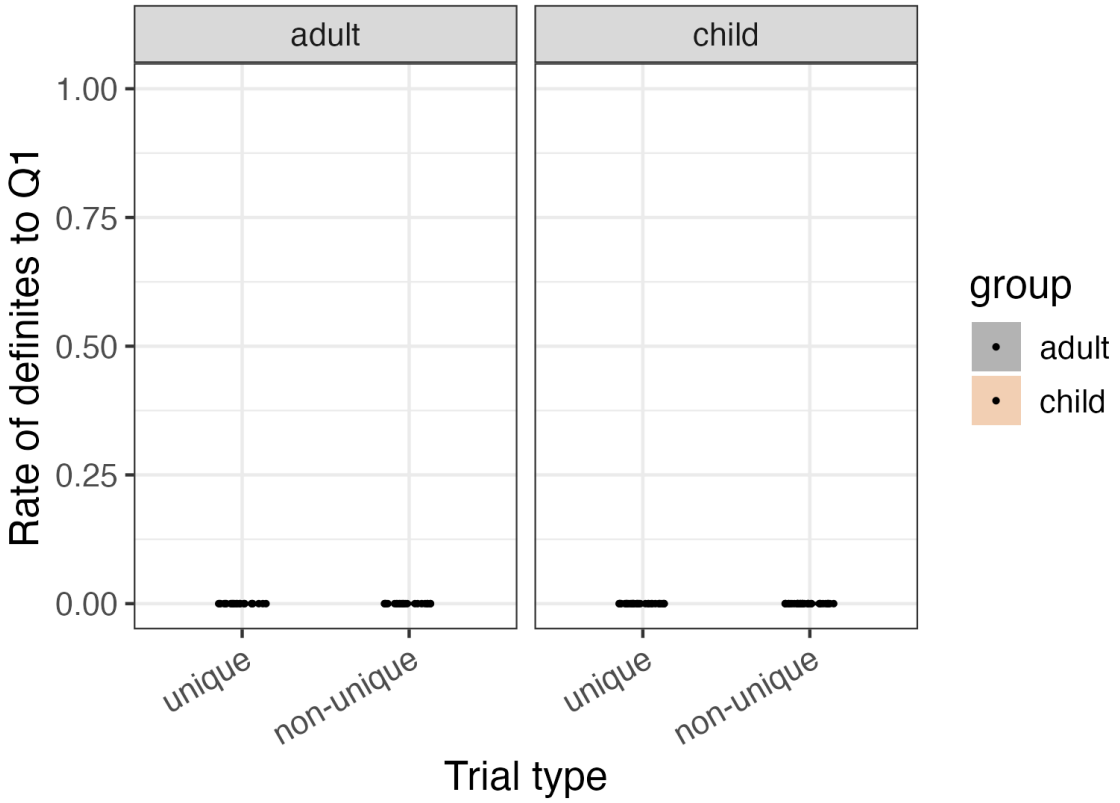

Figure 11. Study 4. Rate of definites for Question 1 (adults vs. children)

For Question 2, *What happened*, they mostly used definites (89.2%, *SD* = .262; adult control: 99.3%, *SD* = .035) to refer to a unique referent and much less so (28.3%, *SD* = .368; adult control: 27.5%, *SD* = .416) for a non-unique one (Figure 12).

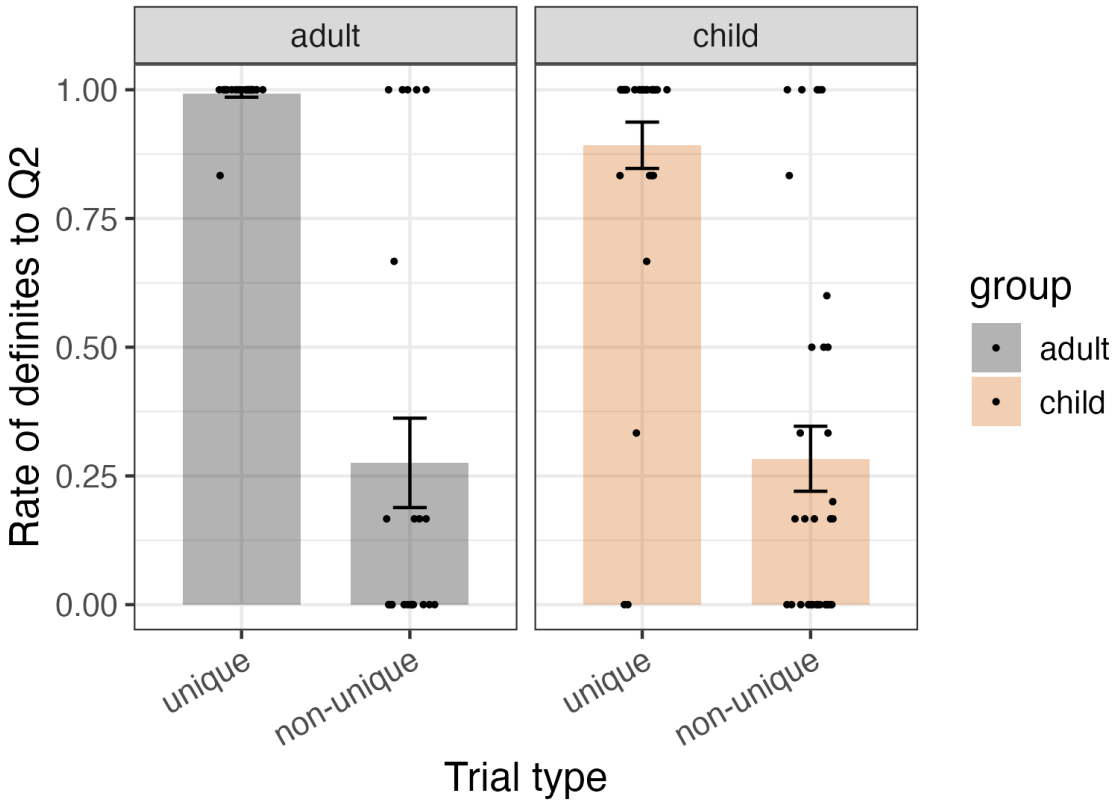

Figure 12. Study 4. Rate of definites for Question 2 (adults vs. children)

A 2×2×2 mixed ANOVA confirms that children as a group behave as adults in their rate of definite responses. We find significant main effects of Trial Type ($F(1, 55) = 59.8$, $p < .001$) and Question ($F(1, 55) = 154.365$, $p < .001$) but not Age. The interaction is significant between Trial Type and Question ($F(1, 55) = 59.8$, $p < .001$) but not with Age. To check whether there is an age difference among children, we test whether children's rates of definite responses correlate with their age in days. Our results suggest no such correlation for either unique referents (Figure 13), $r = 0.19$, $p = .27$, or non-unique referents, $r = -0.24$, $p = .168$ (Figure 14).

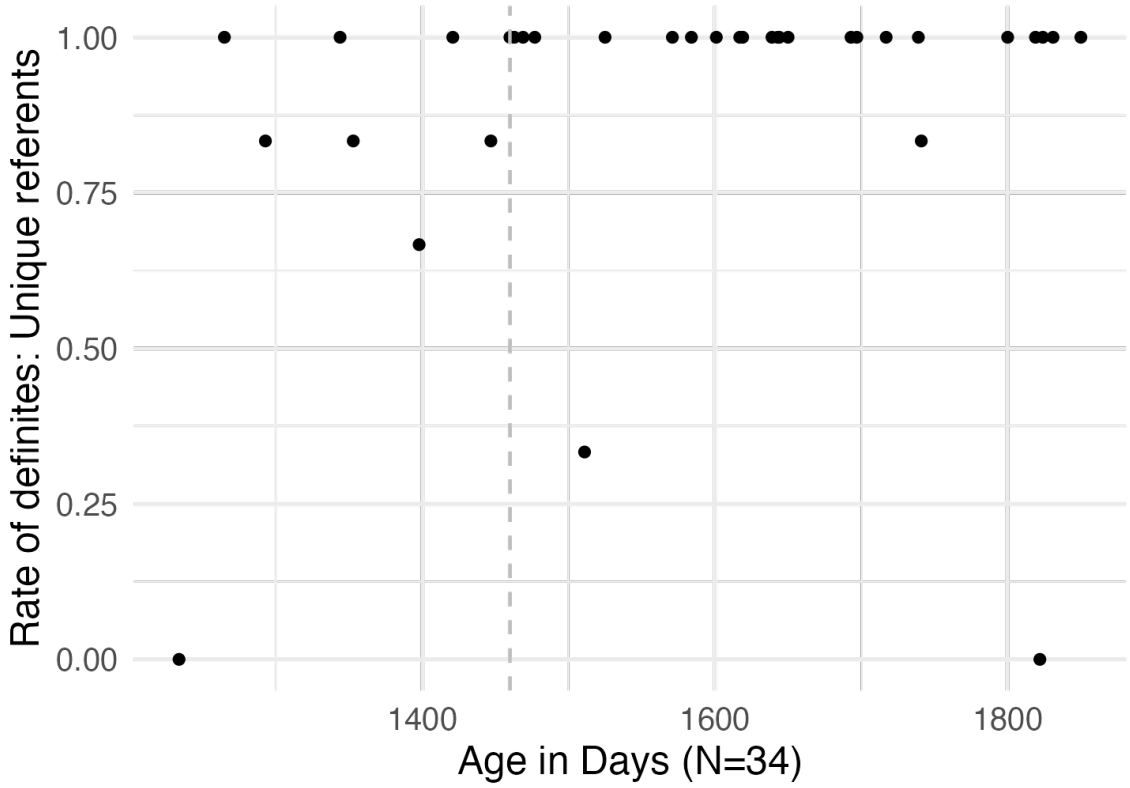

Figure 13. Study 4. Rate of definites for unique referents by age in days (dashed line separates the data points for 3-year-olds and 4-year-olds to indicate group distinction)

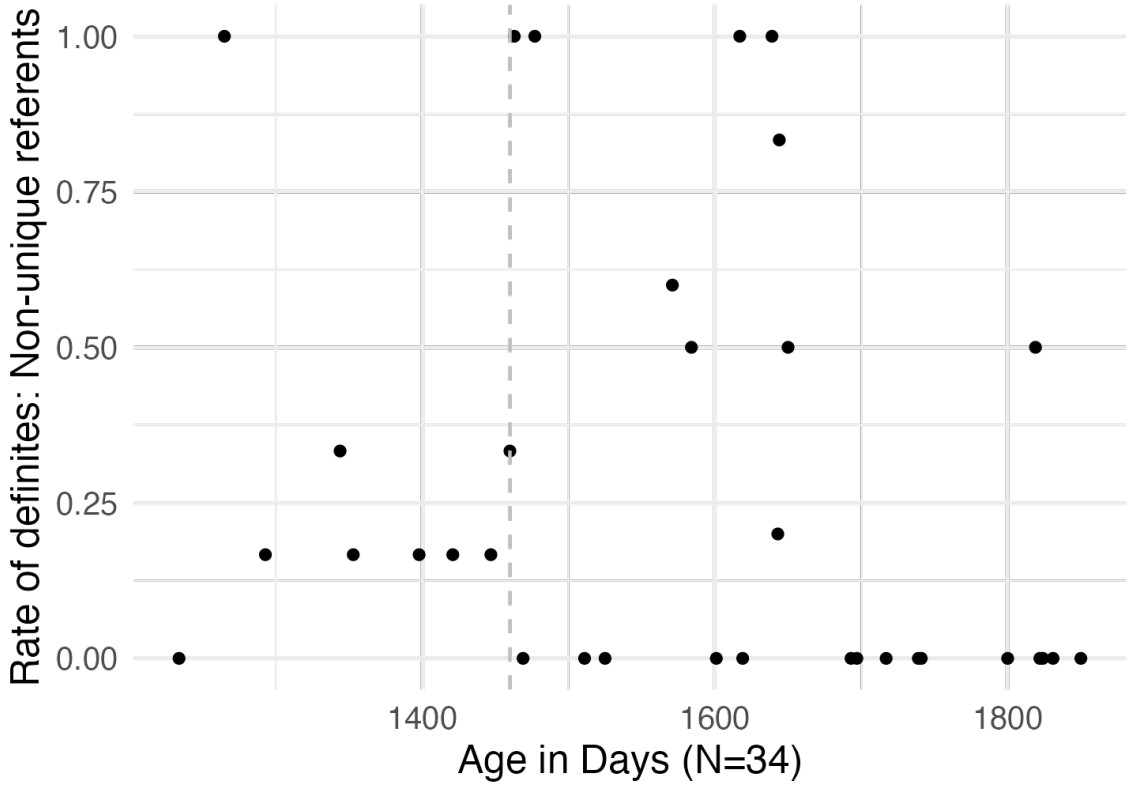

Figure 14. Study 4. Rate of definites for non-unique referents by age in days (dashed line separates the data points for 3-year-olds and 4-year-olds to indicate group distinction)

Children's specific responses to Question 1 and 2 confirm that their choice of referring expressions depends on both the type of the question and the uniqueness of the referent. For Question 1, *What do you see*, which asked children to introduce two unfamiliar referents, they predominantly used singular forms for unique referents but plural forms for non-unique ones (Figure 15).

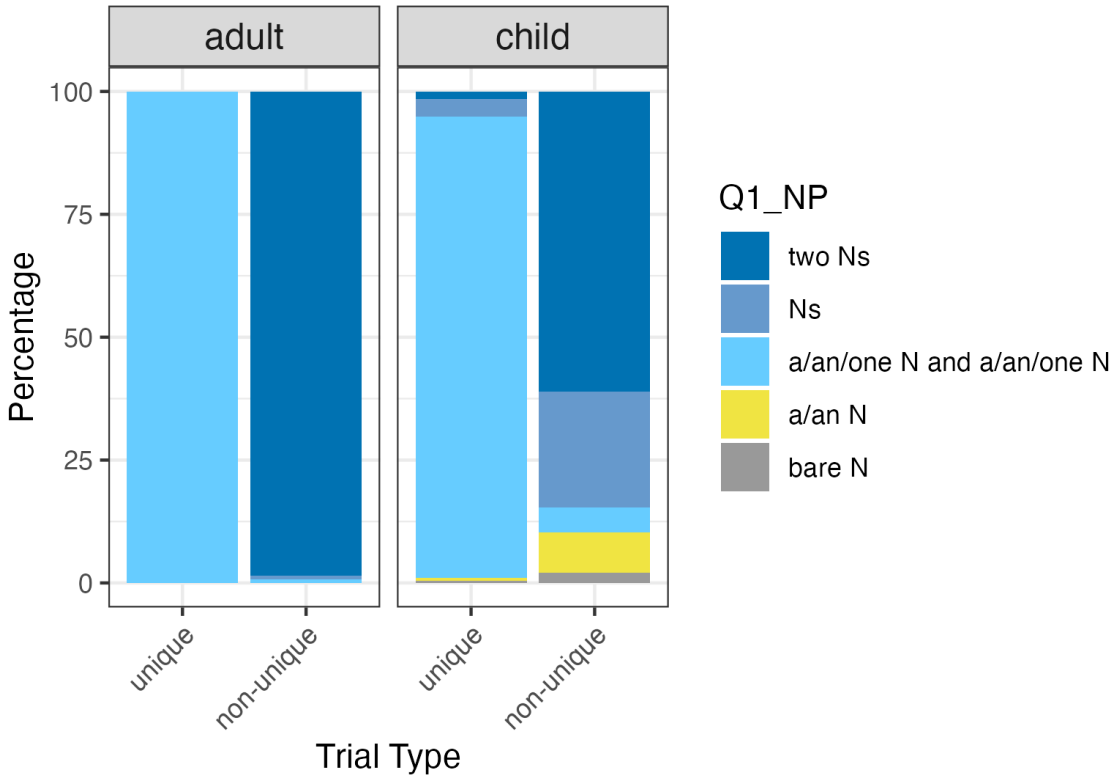

Figure 15. Study 4. Percentage of NP forms to Question 1 by Group and Trial Type

For Question 2, *What happened*, which asked children to refer to one of the two referents, children used *the*-definites 82.2% of the time (162 out of 197 utterances) for unique referents and 13.8% (27 out of 195 utterances) for non-unique ones (Figure 16).

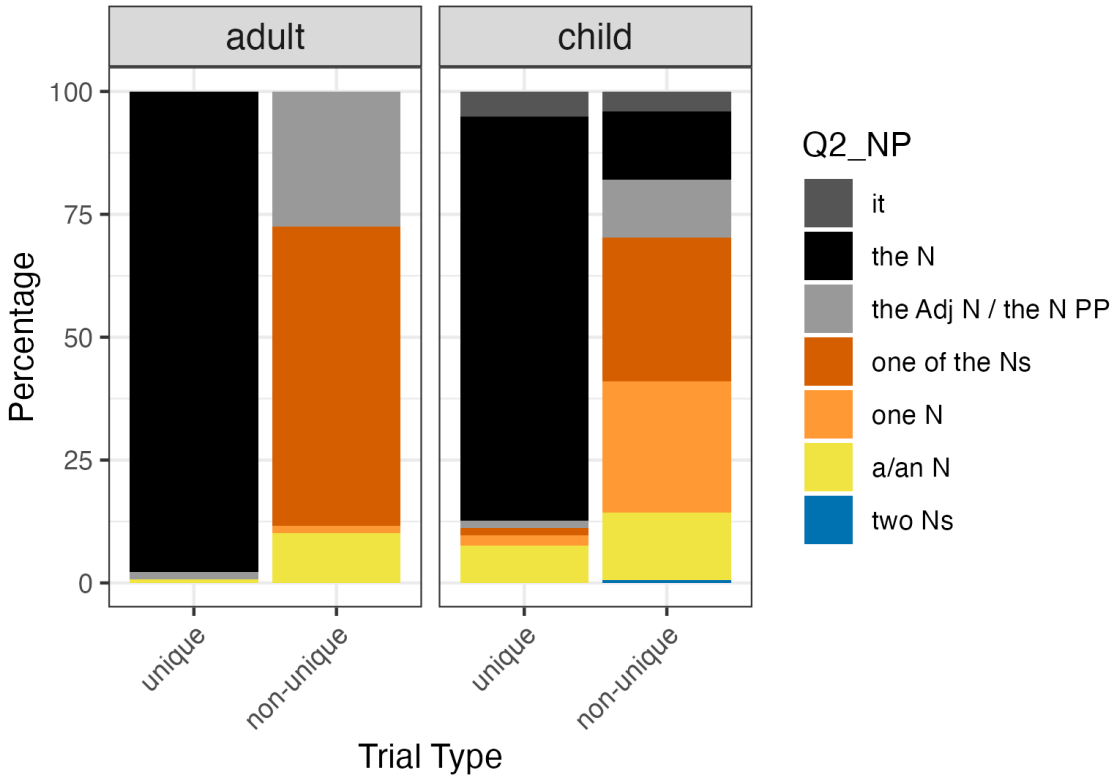

Figure 16. Study 4. Percentage of NP forms to Question 2 by Group and Trial Type

When we look closer at individual data, systematic misuse of *the N* was limited only to 3 children (out of 34) in the sample (Figure 17).[6] This suggests that most children know that using *the N* is inappropriate to pick out non-unique items.

[6] Unlike other children who produced much fewer errors, the three children showing systematic overuse of *the*-definites seemed to represent narrower domains of reference already in the initial setup. This is indicated by their responses to Question 1 in scenarios with two non-unique referents (e.g., *two boxes*), in which they used either a singular NP (e.g., *a box*) or conjoined NPs (e.g., *a box and a box*). This is consistent with the idea that failure in identifying the target domain may be responsible for children's overuse of *the*-expressions in prior studies.

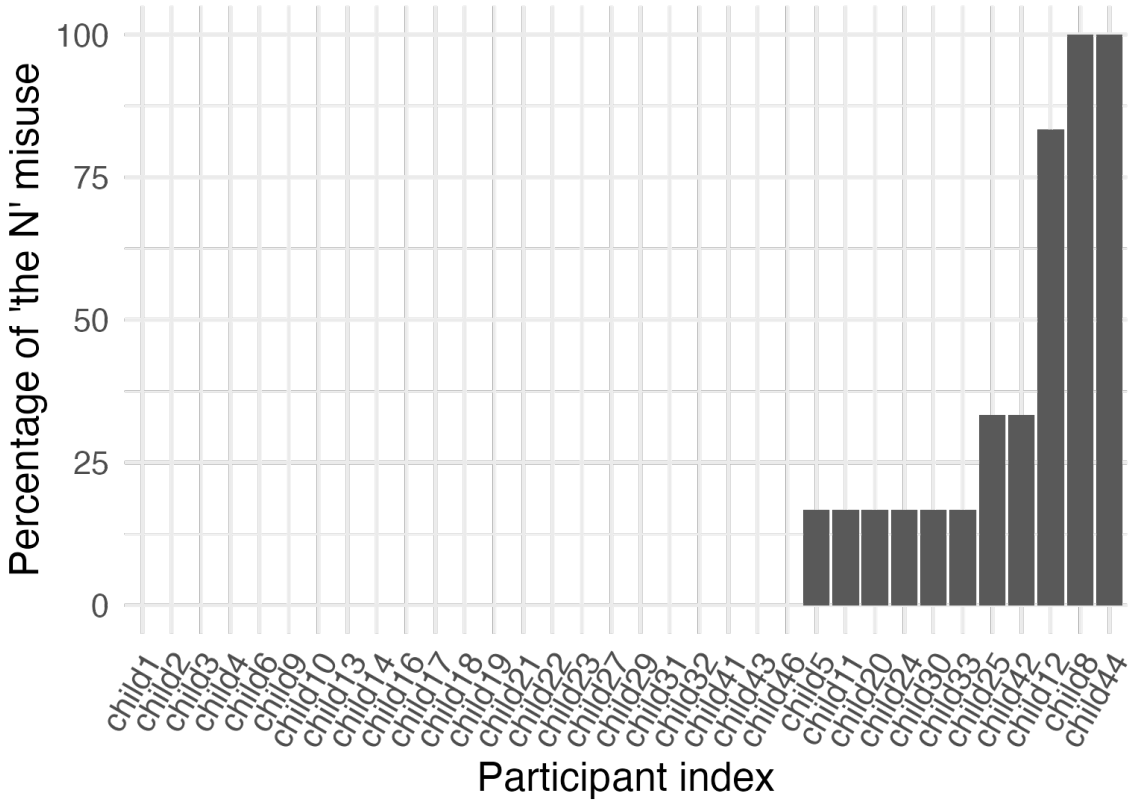

Figure 17. Study 4. Percentage of misuse of *the N* by individuals for non-unique referents

In sum, our results suggest that like adults, children respect the presuppositions of *the*-definites and use them appropriately in an elicited production task with better controlled setup and domain of reference than in previous studies. They consistently use indefinites to introduce two unfamiliar referents to a conversation, and when referring to one of the two referents, they use *the*-definites only when the intended referent is uniquely identifiable within the domain of reference.

7. Discussion

Our findings across four studies offer converging evidence that children consistently use *the*-definites in an adult-like manner. Despite our best efforts, we found no systematic misuse in children's production in either natural or elicited settings, contrary to previous claims about *the*-overuse (Emslie & Stevenson 1981; van Hout et al. 2010; Maratsos 1976; Schaeffer &

Matthewson 2005; Schafer & de Villiers 2000; Warden 1976; Wexler 2011). In natural speech, children generally do not use singular definites more frequently than their mothers; instead, their use of definites and indefinites aligns closely with their mothers' across various clause types and syntactic environments. Notably, the rate of miscommunication driven by definites in child-mother interactions is extremely low, comparable to that observed in adult-adult conversations. Additionally, naïve adults are equally accurate in guessing *the* or *a* used by children and their mothers, given snippets of mother-child conversations. Finally, in an elicited production task with a better controlled setup and domain of reference, even 3- and 4-year-olds behave adult-like in producing referring expressions, using *the*-definites only when the intended referent was uniquely identifiable within the domain of reference.

Our findings support the task-performance hypothesis and caution against over-interpreting production errors observed in children as evidence of flawed knowledge. When comparing the rates of misusing *the*-definites in our study to those in the literature, we found that our rates of misuse were the lowest both for unfamiliar referents (Figure 18) and for non-unique referents (Figure 19).

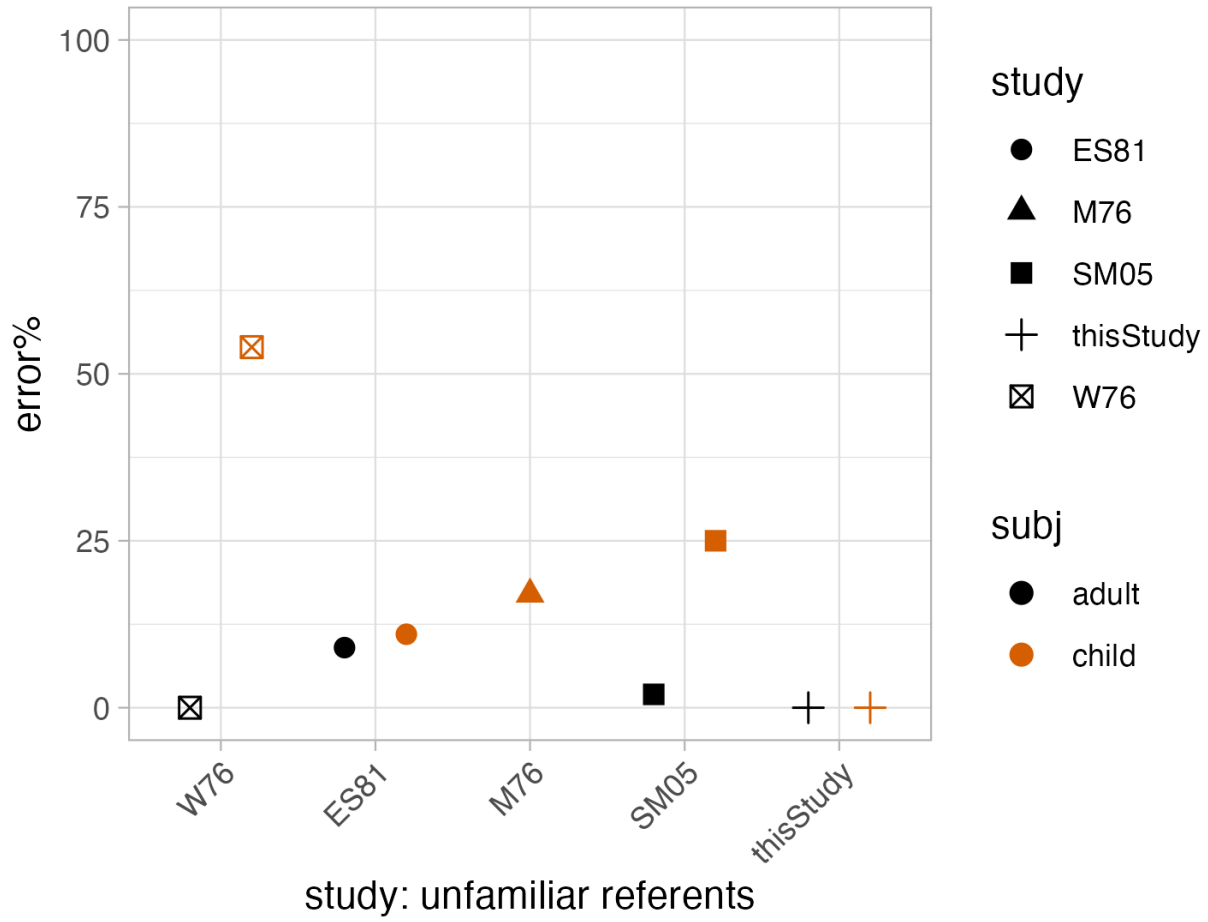

Figure 18. Percentages of *the N* errors across studies for unfamiliar referents

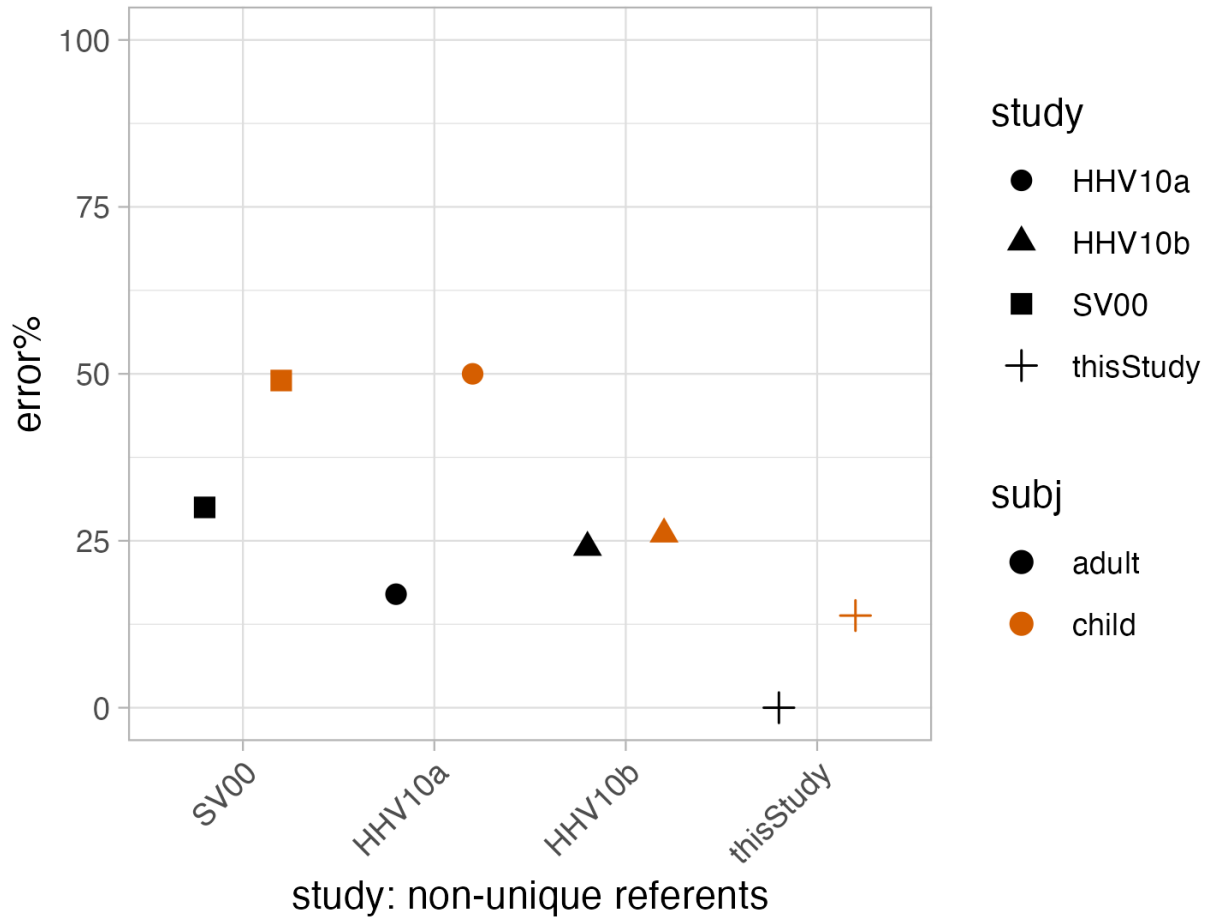

Figure 19. Percentages of *the N* errors across studies for non-unique referents

Previous research has often attributed children's misuse of definites across studies to systematic immaturity, suggesting that children are egocentric (Karmiloff-Smith 1979; Maratsos 1976), linguistically immature (van Hout et al. 2010; Matthewson et al. 2001; Schafer & de Villiers 2000; Wexler 2011), or pragmatically incompetent in differentiating between interlocutors' knowledge states or integrating shared knowledge into their use of referring expressions (Schaeffer & Matthewson 2005). However, what has been largely overlooked is the influence of task demands (De Cat 2015), which might have caused children to behave differently than they would in more natural setups and even led to variable performance in adult control groups.

Our findings highlight the importance of natural setups and clear referential domains in assessing children's competence with definite descriptions. Tasks such as story telling (Emslie & Stevenson 1981; Warden 1976) and story completion (Maratsos 1974) may have inflated error rates for unfamiliar referents, as they lack a natural conversational structure and do not explicitly require perspective-taking. In contrast, our task is designed to encourage perspective-taking by establishing a clear and consistent speaker-hearer dynamic, with visual perspective as an integral component. With these factors controlled for, we find that even 3-year-olds successfully consider the listener's perspective when selecting determiners. Similarly, tasks like question-after-story without visual support (Schafer & de Villiers 2000) or story completion with pictures (van Hout et al. 2010) may have contributed to children's errors with non-unique referents. These errors could stem from a disrupted referential domain—children may have difficulties maintaining types and tokens of referents in discourse due to limitations in verbal memory (van Rij 2012) or correcting an attentional state skewed towards irrelevant visual elements (Trueswell et al. 2011). To reduce these potential demands, our task provides a clear and reliable referential domain (i.e., the area in front of a wall), ensuring that children focus on the relevant referents. Moreover, by restricting visual access to just two objects (e.g., two identical boxes) within that domain, we minimize memory demands and prevent distractions for children. With these concerns addressed, our results suggest that like adults, 3- to 4-year-olds consider the unique identifiability of the intended referent when producing definite descriptions.

When considered more broadly, our findings underscore an important lesson: while children have the necessary pragmatic competence, their ability to demonstrate it can be hindered by the demands of a given task. When key elements of genuine communication—such as a clear addressee or a motivation to be a cooperative speaker—are absent, children might be less

inclined to fine-tune their referring expressions to the listener's needs, as doing so requires additional effort. However, Study 4 shows that their performance improves significantly in natural communicative contexts. This pattern is not unique to definite descriptions. In comprehension, 2-year-olds exhibit adult-like understanding of pronouns when engaged in a conversational context (Moyer et al. 2015). In production, children could adjust the informativeness of their event descriptions based on what their listener could see, but only when both the child and the listener were actively engaged in a collaborative game (Grigoroglou & Papafragou 2019). Similarly, improving the pragmatics of a task has been shown to bring out preschoolers' competence with complex structures like relative clauses in both comprehension (Hamburger & Crain 1982) and production (Crain et al. 1990). Furthermore, this boost in performance with pragmatically sensible contexts also extends beyond language to cognitive abilities such as Theory of Mind (Buttelmann et al. 2009) and altruism (Warneken & Tomasello 2006; Warneken 2016) during infancy. Together, these findings highlight the critical role of task design in assessing children's pragmatic competence, emphasizing the need for interactive and socially meaningful contexts to reveal their full knowledge.

Our research also provides new insights into the development of the functional vocabulary in children, particularly in relation to their cognitive abilities. Children's understanding of determiners develops quickly, even though this requires some understanding of conversational dynamics. By 11 months, they have perceived the forms of determiners (Shi et al. 2006) and are sensitive to their co-occurrence with nouns (Babineau & Christophe 2022); shortly after, they use determiners to categorize novel nouns (Mintz 2006); by 19 months, they have learned to use speaker knowledge to restrict the domain of reference (Choi et al. 2018; for earlier evidence with 15-month-old multilinguals, see Liberman et al. 2017). Our work adds another

piece to the puzzle, showing that by age two, children demonstrate adult-like usage of *the* and *a* in natural production, and by age three, they show adult-like use of referring expressions in elicited production. They are capable of considering the knowledge state of their listeners and adapting their referential choices accordingly across various contexts. Unlike previous studies that report frequent misuse of *the*-definites by children, we observe a very low incidence of such misuse in our production study. Even when examining individual data, these errors were confined to very few participants. This suggests that the pragmatic competence required to navigate presuppositions triggered by *the*-definites, often subtle and backgrounded, is present from an early age for most children, consistent with what was found in other domains of language such as belief verbs (Dudley 2017) and belief reports (Lewis et al. 2017). This also aligns with other research indicating children's early ability to engage in perspective-taking, both in non-linguistic (Luo & Baillargeon 2007) and linguistic contexts (Saylor & Ganea 2007).

Taken together, our work provides consistent evidence that children produce singular *the*-definites in an adult-like manner, both in natural and elicited speech. To do so successfully, they must assess the knowledge states of their listeners and select an appropriate referential form for listeners to identify the intended referent within a specific context. By creating a natural setup and a clear domain of reference, we find that even 3- to 4-year-old children demonstrate an adult-like understanding of *the*-definites. This implies, contrary to prior overuse claims in the literature, that there is little reason to believe that children have the wrong meanings for *the*-definites or lack the pragmatic capacity to use it properly.

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Disclosure statement

The authors report there are no competing interests to declare.

Data availability statement

The data that support the findings of this study are openly available on the OSF (Open Science Framework) at this link: https://osf.io/65ps7/?view_only=44643c82d51043fb83164892277dbfca.

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Appendix: List of referential contexts

Unique referent contexts (the object taken away in bold)	**Non-unique referent contexts** (one of the two objects taken away)
A bottle and **a mug**	Two bags
A ball and **a car**	Two boxes
An orange and **an apple**	Two bananas
A bear and **a duck**	Two books
A carrot and a hat	Two boats
A truck and **a cake**	Two bowls