

Allemaal Trouble in the Acquisition of Dutch Quantifiers

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The interpretation of the Dutch quantifier *allemaal* ('all') is affected by its syntactic position. To illustrate, *allemaal* receives a weak and non-exhaustive interpretation when it is combined with a noun, and a strong and exhaustive interpretation when used in floated position. Previous work by Hollebrandse and Smits (2005) has shown that children consistently resort to the strong, exhaustive interpretation of *allemaal*, even in contexts where adults allow a weaker reading. The goal of this paper is to contribute additional data and sketch possible approaches to the observed delay.

The paper is structured as follows. Section 1 briefly reviews the distinction between weak and strong quantifiers. Section 2 discusses the distribution and interpretation of *allemaal* in adult Dutch. Section 3 reviews and extends the experimental evidence on children's interpretation of *allemaal* by Hollebrandse and Smits (2005). Their interpretation of the findings is presented in Section 5 after a short digression into the universal quantifier *every* in child language. Our own alternative interpretation of the experimental findings is presented in Section 6. Section 7 concludes the paper, by mentioning possible directions for further research.

1. Quantifiers and the weak-strong distinction

An important distinction among quantifiers is that between weak and strong quantifiers. One of the diagnostics for distinguishing weak quantifiers from strong ones is the possibility of occurring in existential *there*-constructions (Milsark, 1974). Weak quantifiers (e.g., *no*, *many*, *some* and numerals) can occur in such sentences (see (1)), whereas strong quantifiers like *every*, *each* or *most* cannot (see (2) and (3)).

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- (1) There are no/many/some/two dogs in the garden.
- (2) *There is every/each dog in the garden.
- (3) *There are most dogs in the garden.

The weak-strong distinction can be recast in terms of intersective properties (see Barwise & Cooper, 1981; Keenan, 2002). Weak quantifiers are intersective determiners, and strong quantifiers are co-intersective determiners. This difference relates to the way in which the truth value of the relevant sentence is determined. Consider the following sentences.

- (4) No/many/some/two dogs are barking.
- (5) Every/each dog is barking.
- (6) Most dogs are barking.

To evaluate the truth of a sentence with a weak quantifier, such as (4), one only needs to look at the intersection between the set of dogs and the set of barkers. For instance, when the determiner *no* is used, such intersection must be empty. In the case of sentences containing a strong quantifier, the intersection of the set of dogs and the set of barkers does not provide all the necessary information, and the entire set of dogs needs to be considered. To illustrate, (5) demands that this set be identical to the intersection set, while (6) requires that its cardinality be smaller than the one of the intersection set.

As our description suggests, the strength of a quantifier is closely related to its meaning, which tends to be stable across its different uses. Consequently, if a quantifier can occur in floated position (i.e., without a noun phrase in its proximity), the meaning of the sentence does not change. To illustrate, consider the examples in (7) - (9) from Slim, Tobyn and Rowland (2025).

- (7) Each beaver is building a dam.
- (8) The beavers are each building a dam.
- (9) The beavers are building a dam each.

While there might be subtle differences among these sentences, *each* always expresses exhaustive quantification.

A different pattern emerges once we look at specific uses involving the English quantifier *all*. In particular, one can find examples in which *all* does not trigger exhaustive quantification (see de Vries, 2019).

(10) There were all these people trying to sell me stuff.

(11) I saw all kinds of weirdly dressed people at the station.

To illustrate, it is not necessary for all the relevant people to be trying to sell anything for (10) to be true. All that is needed is that a sizable number of people are trying to sell something.

The alternation between a weak (non-exhaustive) and a strong (exhaustive) version of the very same lexical item is even clearer in Dutch, to which we now turn.

2. Dutch *allemaal*

Dutch *allemaal* ('all') arguably provides a prototypical case of a single quantificational element alternating between a weak and a strong interpretation (see Hollebrandse & Smits, 2005; de Vries, 2019). Consider the contrast below.

(12) De jongens fietsen allemaal.
 The boys bike.3PL all
 'The boys are all biking.'

(13) Er fietsen allemaal jongens.
 There bike.3PL all boys
 'There are all these boys biking.'¹

The interpretation of *allemaal* covaries systematically with its syntactic position. When *allemaal* appears in a position that resembles the floated position of quantifiers, as in (12), it receives a strong, exhaustive interpretation comparable to that of English *all*. Sentence (12) is false in a context in which one or more of the boys are not biking. By contrast, when *allemaal* occurs in combination with a noun, as in (13), it receives an intersective (non-exhaustive) interpretation. Sentence (13) can therefore be used to describe a context in which one or more boys are not biking, provided that a sufficiently large number of boys are.

These examples show that the interpretation of *allemaal* is linked to surface syntax and is not determined by pragmatic or contextual factors alone. This observation led Smits (2010: p. 51) to conclude that the two uses of *allemaal* are "not related to each other." A different approach is proposed by de Vries (2019), who argues that the complementary distribution of the two uses of *allemaal* calls for a unified analysis. On de Vries (2019)'s approach, *allemaal* is underspecified for quantificational force, with weak and strong interpretations determined by the syntactic environment in which it appears.

¹ In the remainder of the paper, we will omit glosses and we will resort to 'all these' and 'all sorts of' to render the weak (non-exhaustive) use of Dutch *allemaal*.

According to de Vries (2019), Dutch *allemaal* enforces semantic plurality by blocking atomization of its argument. Whether this results in maximal or non-maximal interpretations depends on how plurality interacts with syntactic position and predicate type. When *allemaal* is floated, it applies at the DP level to plural individuals; true plural predication over individuals is inherently exhaustive, and maximality follows as a side effect. By contrast, prenominal (unfloated) *allemaal* applies at the NP level and yields a plural kind. In this case, episodic predication over kinds proceeds via existential quantification over instantiations (see Chierchia, 1998), resulting in systematically non-maximal interpretations. On this view, *allemaal* itself is neither strong nor weak: strength or weakness arises from the level at which plurality is enforced and from the semantic properties of the predicate.

Crucially, de Vries (2019)'s account leads to a different approach to the language acquisition process from the one of Smits (2010) in that it allows us to distinguish between the acquisition of the underlying contribution of *allemaal* and the acquisition of the factors that make its interpretation exhaustive or non-exhaustive. Next section turns to Dutch-speaking children's interpretation of *allemaal*.

3. The acquisition of Dutch *allemaal*

Children's interpretation of *allemaal* was investigated by Hollebrandse and Smits (2005) and Smits (2010), which sought to determine whether *allemaal* in child Dutch shows the same alternation between weak and strong interpretations that is observed in adult Dutch. Assuming that children start from one of the interpretations available to adults (see Slim, Tobyn, & Rowland, 2025 for data about the input), two possibilities can be distinguished. First, children might consistently assign a weak interpretation to *allemaal*, including in the floated contexts where adults would select a strong, exhaustive interpretation. This option can be referred to as the weak-*allemaal* overgeneralization. Second, children might overgeneralize the interpretation that adults reserve for floated *allemaal* and apply it to all uses of *allemaal*. This is the strong-*allemaal* overgeneralization. Under this scenario, children would consistently assign a universal interpretation to *allemaal*, even in contexts where adults would allow a weak reading.

This second option is the one defended by Hollebrandse and Smits (2005). They report the results of an experiment with 39 children (age from 4;1 to 6;7). In the relevant condition, children had to evaluate sentences like (14) in the context provided by a picture with four donkeys, of which three were crying.

(14) Er huilen allemaal ezels.

'Here all sorts of donkeys are crying.'

Children accepted the target sentence only 15% of the time, whereas adult speakers accepted it 86% of the time. The results suggest that children consistently interpret *allemaal* as exhaustive, regardless of its syntactic position.

Before we comment on Hollebrandse and Smits' account of their findings, we would like to present the results of an experiment aimed at replicating and extending their results.

3.1. Experiment 1

Sixty monolingual Dutch children participated in the experiment. Table 1 presents an overview of the participants across the different age groups.

Table 1
Participants and mean age (and standard deviation) in (years;months) per age group in Experiment 1

Group	<i>N</i>	Mean age (<i>SD</i>)
7-year-olds	13	7;6 (0;2)
8-year-olds	15	8;5 (0;3)
9-year-olds	10	9;6 (0;4)
10-year-olds	11	10;8 (0;3)
11-year-olds	11	11;4 (0;3)
Total	60	9;4 (1;5)

The experimental design followed the one of Smits (2010). The interpretation of the quantifier *allemaal* was tested with a Truth Value Judgment task with pictures (Crain & Thornton, 1998). The experiment consisted of 18 test items, each presenting a colored illustration described by a spoken sentence. All sentences were pre-recorded to ensure consistency in intonation across the items and trials. Each item would start with *Kijk!* ('Look!'), to capture the attention of the participants. Each sentence then started with the word *Hier* ('Here'), which established a consistent locative and presentational frame across all conditions. The illustrations portrayed a set of characters, animals, or objects involved in an action or having a particular property that either applied to all members of the set or only to some of them.

The experiment included eight experimental conditions. The first six conditions were identical to the ones used by Smits (2010). In the *Allemaal*-weak-yes condition, children were presented with sentences like (15) in a context in which all birds but one were flying.

- (15) Hier vliegen allemaal vogels
'Here all sorts of birds are flying.'

This is arguably the most important condition as the context makes the sentence true on the weak interpretation of *allemaal* but false on its strong and exhaustive

interpretation.² The *Allemaal*-weak-no condition included contexts that made (15) false, i.e., only one bird was flying.

The *Allemaal*-strong-no condition included sentences like (16), in which *allemaal* occurs in combination with a noun phrase, in a context in which all boys but one were in the water.

(16) Hier zijn de jongens allemaal in het water.

‘Here all the boys are in the water.’

Here too, the sentence is true on the weak interpretation of *allemaal* but false on its strong interpretation in the context provided by the picture. In the *Allemaal*-strong-yes condition, all boys were in the water.

The experiment included four additional conditions, to ensure children's understanding of the strong and weak quantifiers *alle* (‘all’) and *sommige* (‘some’). In the *Alle*-strong-yes condition, children were presented with a sentence containing the universal quantifier *alle* (‘all’) in a context in which all cats were indeed running (see (17)). The *Alle*-strong-no condition included a context in which not all cats were running.

(17) Hier rennen alle katten.

‘Here all cats are running.’

As an extension to Smits (2010), children were also asked to evaluate sentences with *sommige* (‘some’) like (18) in a context in which only some of the shirts were red (*Sommige*-weak-yes) or none were (*Sommige*-weak-no).

(18) Hier zijn sommige shirts rood.

‘Here some shirts are red.’

An overview of the number of trials per condition is provided in Table 2.

² Hanna de Vries (personal communication) points out that sentences like (15) could also be tested in contexts where all birds are flying but additional flying events involve non-birds, which would allow one to disentangle subject-based exhaustivity from event-based ‘symmetry’ effects. We leave this point for further research.

Table 2
Number of trials per condition

Condition	Number of trials
<i>Allemaal-weak-yes</i>	8
<i>Allemaal-weak-no</i>	2
<i>Allemaal-strong-yes</i>	2
<i>Allemaal-strong-no</i>	2
<i>Alle-strong-yes</i>	1
<i>Alle-strong-no</i>	1
<i>Sommige-weak-yes</i>	1
<i>Sommige-weak-no</i>	1

For purposes of statistical analysis, each participant's average accuracy score was calculated by averaging across trials within each condition, where responses were coded as correct (1) or incorrect (0). These averages are reported in Table 3, together with the number of correct and incorrect responses per condition.

Table 3
Number of correct and incorrect responses and mean participant accuracy scores (and standard deviation) by condition

Condition	Correct	Incorrect	Mean accuracy (<i>SD</i>)
<i>Allemaal-weak-yes</i>	170	310	0.35 (0.38)
<i>Allemaal-weak-no</i>	116	4	0.97 (0.14)
<i>Allemaal-strong-yes</i>	120	0	1.00 (0.00)
<i>Allemaal-strong-no</i>	114	6	0.95 (0.15)
<i>Alle-strong-yes</i>	59	1	0.98 (0.13)
<i>Alle-strong-no</i>	59	1	0.98 (0.13)
<i>Sommige-weak-yes</i>	56	4	0.93 (0.25)
<i>Sommige-weak-no</i>	60	0	1.00 (0.00)

All statistical analyses were performed with Jasp Team (2025). A one-way repeated-measures ANOVA on the mean participant accuracy scores revealed a significant effect of Condition [$F(7, 413)=89.66$, $p<.001$, $\omega^2=.55$]. Bonferroni-corrected pairwise comparisons showed that the *Allemaal-weak-yes* condition differed significantly from all other conditions (all p 's $<.001$), which otherwise showed uniformly high accuracy and did not differ from one another.

Subsequent analyses focus on the *Allemaal-weak-yes* condition, the only condition in which children's responses diverged from the adult pattern. The mean accuracy scores for this condition per age group are presented in Table 4.

Table 4
Mean percentage accuracy scores (and standard deviation) for the *Allemaal*-weak-yes condition per age group (N=60)

Age group	Mean accuracy (SD)
7	0.24 (0.38)
8	0.15 (0.26)
9	0.19 (0.28)
10	0.64 (0.33)
11	0.64 (0.36)

A one-way between-subjects ANOVA was conducted on the mean accuracy scores for the *Allemaal*-weak-yes condition across the five age groups. This analysis revealed a significant main effect of age group [$F(4, 55)=7.07, p<.001, \omega^2=.29$].

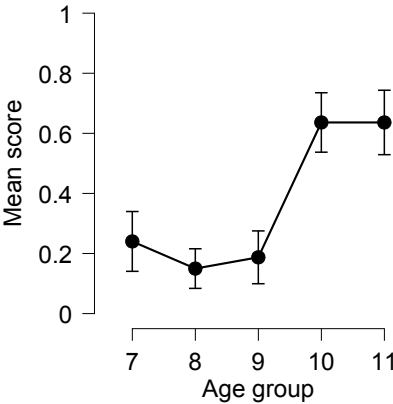


Figure 1: Mean accuracy scores (and standard error) for the *Allemaal*-weak-yes condition per age group in Experiment 1 (N=60)

Post Hoc Tukey HSD comparisons revealed that the 7-, 8-, and 9-year-olds did not differ significantly from each (for all comparisons, $p_{\text{TUKEY}} \geq .94$). However, each of these age groups performed significantly lower than the 10- and 11-year-olds (7-year-olds compared to 10- and 11-year-olds: $p_{\text{TUKEY}} = .03$, 8-year-olds compared to 10- and 11-year-olds: $p_{\text{TUKEY}} = .003$, 9-year-olds compared to 10- and 11-year-olds: $p_{\text{TUKEY}} = .02$). There was no difference between the 10- and 11-year-olds ($p_{\text{TUKEY}} = 1$).

The results of our own experiment replicate the pattern found by Hollebrandse and Smits (2005) and Smits (2010), which was based on children up to 6 years of age. In addition, the present data, which extends the age window under investigation into later childhood, show that children start acquiring the weak reading of *allemaal* at age 10. Before offering our own interpretation of the findings, we would like to review Hollebrandse and Smits’ account. Since this account is closely tied to a widely discussed issue in the acquisition literature,

namely the interpretation of universal quantifiers, we start by reviewing the relevant debate.

4. Symmetrical responses and floated quantifiers

A frequently discussed finding in language acquisition research is the so-called symmetrical response (Inhelder & Piaget, 1964). This refers to children's rejection of sentences like (19) in a context in which three boys are riding a horse, but the context also includes a fourth horse that nobody is riding.

(19) Every boy is riding a horse.

Several accounts have sought to explain children's behavior by appealing to properties of children's linguistic competence (e.g., Roeper & de Villiers, 1993; Philip, 1995). The investigation of *allemaal* by Hollebrandse and Smits (2005) is grounded in this linguistic view of the symmetrical response and draws upon the proposal by Roeper, Strauss and Zurer Pearson (2006).

According to Roeper et al. (2006), children's non-adult interpretation of sentences like (19) arises because children analyze determiners such as *every* as adverbial quantifiers with sentential scope. On this view, quantification ranges over events, and the domain of quantification is determined by the structure of the event and its participants, rather than by the noun phrase associated with the quantifier. In the case of (19), this allows the extra horse in the scene to be taken into account. Since the extra horse is not involved in a riding event, children reject the sentence in the experimental context.

5. The strong-*allemaal* hypothesis

Having summarized the relevant background, we can now turn to the analysis of *allemaal* in child Dutch by Hollebrandse and Smits (2005) and Smits (2010). Applying the proposal by Roeper et al. (2006) to *allemaal* has far-reaching consequences. In adult Dutch, floated and unfloated *allemaal* differ in quantificational force. However, if children fail to distinguish between them, they are expected to assign the same interpretation to *allemaal* across contexts, consistent with the data discussed above.

In addition to accounting for the available evidence, two considerations make the strong-*allemaal* overgeneralization appear initially reasonable. First, it can be viewed as a natural extension of Roeper et al. (2006)'s account of the symmetrical response. On that account, children's non-adult responses arise from a liberal selection of restrictors for universal quantifiers. In the case of unfloated quantifiers, restrictor selection is normally straightforward, since the restrictor is provided by the noun phrase accompanying the quantifier. A problem arises if an unfloated quantifier is treated as if it were floated, however: in this case the restrictor may be sought elsewhere.

A second observation concerns the quantificational force associated with floated *allemaal*, which is universally exhaustive. Drawing on Brooks and Braine

(1996), Smits (2010) argues that children have early mastery of exhaustive universal quantification, as instantiated by quantifiers such as *each* and *all*. On this basis, Smits (2010) predicts that Dutch learning children will resort to the strong, exhaustive interpretation that adults associate with floated *allemaal*, even when interpreting unfloated uses.

Despite these observations, the strong-*allemaal* hypothesis is not unproblematic. First, Roeper et al.'s proposal rests on the assumption that children's symmetrical responses require a linguistic explanation, which has been questioned by Crain, Thornton, Boster, Conway, Lillo-Martin, and Woodams (1996), as well as by later research. Without the need for a linguistic account such as Roeper et al.'s account, Hollebrandse and Smits' proposal lacks independent motivation.

Setting aside the issue of symmetrical responses, it is important to distinguish between two independent questions: how children determine the domain of quantification of quantifiers, and the quantificational force of the quantifier. Roeper et al.'s claim that children treat floated and unfloated quantifiers alike might bear on the former question, but it does not in itself justify the prediction that unfloated quantifiers will necessarily be assigned the same universal quantificational force as their floated counterparts.

To motivate this prediction, Smits (2010) appeals to the finding that children master exhaustive universal quantification. However, children have also been shown to master the intersective and non-exhaustive interpretation of other quantifiers. Thus, one could equally predict that children would treat floated uses of *allemaal* as weak and non-exhaustive. In fact, Smits (2010)'s own data on the acquisition of *veel* ('many') and our *Sommige*-weak conditions show that children do not treat such quantifiers as exhaustive. This suggests that children's strong interpretation of *allemaal* cannot straightforwardly be attributed to a general bias toward exhaustivity.

An additional problem for the claim that children interpret weak occurrences of *allemaal* based on its strong uses is that it calls into question the distinction between strong and weak quantifiers in child language (see Geurts (2003) and Drozd and van Loosbroek (2003) for two proposals and Meroni, Gualmini & Crain (2004, 2007) for experimental evidence).

6. A novel account of *allemaal* in child Dutch

Given the questions that remain open under Hollebrandse and Smits' account, we would like to offer an alternative explanation of the findings. Our proposal draws on the account of *allemaal* proposed by de Vries (2019) described in Section 2. According to that account, *allemaal* uniformly enforces semantic plurality, while maximal (exhaustive) or non-maximal interpretations arise derivationally, depending on whether plurality is resolved at the (DP) level of individuals or at the (NP) level of kinds respectively.

From this perspective, children's non-adult behavior can be characterized as a tendency toward overgeneralized maximality: plural expressions are more often interpreted as if plurality were resolved at the individual (DP) level, even in

configurations where the adult grammar allows kind-level construals and non-maximal readings.

This raises the question of where, within the adult derivation, children diverge. One possibility is that children's access to plural kind representations is fragile, such that NP-level occurrences of *allemaal* do not reliably yield kind-based interpretations and instead default to individual-level readings. A second possibility is that children rely on predicate-conditioned interpretive defaults that bias them toward DP-level construals of *allemaal*, particularly with predicates that invite individual-level verification. On this view, maximal interpretations arise not because *allemaal* is misanalyzed, but because pluralities are preferentially mapped onto individuals. At present, we are unable to adjudicate between these two hypotheses. In our view, however, two observations make the second option more promising.

First, while a generalized difficulty with kinds might capture children's tendency to provide exhaustive responses, it faces a potential challenge from the developmental timeline: independent work on generics and kind reasoning suggests robust acquisition by around 6–7 years of age (Gelman, 2006; Leslie, 2008), whereas the present data only show early signs of acquisition around age 10, and no signs of fully adult behavior even at age 11. However, since bare plurals also support episodic interpretations, and NP-level *allemaal* is licensed precisely in episodic contexts, these findings do not directly bear on the acquisition of the relevant structure.

Second, the hypothesis that children's behavior is due to their failure to rely on the existential force of episodic predication leaves open the possibility that their behavior be influenced by individual predicates. Importantly, a post-hoc examination of children's responses to the experiment described in Section 3 suggests that such differences might indeed exist. To illustrate, (20) and (21) correspond to the two sentences with the lowest number of correct responses across the entire population of sixty children (i.e., respectively 12 and 11 correct responses out of 60 trials).

(20) Kijk, hier zijn allemaal zwarte honden.

'Look, here are all these black dogs.'

(21) Kijk, hier zijn allemaal groene schildpadden.

'Look, here are all these green turtles.'

Crucially, predicates such as green or black invite per-individual evaluation and render counterexamples particularly salient, which may make weak, non-maximal descriptions less felicitous even when they are truth-conditionally satisfied. This raises the possibility that children's responses reflect not only the semantic interpretation of *allemaal*, but also sensitivity to predicate-dependent pragmatic felicity. We leave it for further research to investigate the extent to which differences can be drawn among different predicates. For the time being, we note that if this was the case, de Vries (2019)'s proposal would allow us to explain

children's behavior more naturally than a generalized difficulty with generic noun phrases.

7. Conclusion

The experimental results reported in this paper confirm the delay in the acquisition of the weak reading of *allemaal* in child Dutch first documented by Hollebrandse and Smits (2005) and Smits (2010). Additionally, we provided evidence that the weak reading starts being acquired at age 10, while still not being fully acquired by age 11. Moreover, we discussed post-hoc evidence suggesting that once the weak reading of *allemaal* emerges, children might experience lingering problems with the episodic use of predicates that typically figure in generic contexts.

We would like to conclude by mentioning a different line of research related to the study *allemaal* in child language, namely its acquisition in young bilinguals (Byers-Heinlein & Lew-Williams, 2013). According to most current approaches, the two languages in a bilingual child mostly develop independently from each other, but interaction between the two languages can occur (Genesee, 1989). As a result, much recent research on bilingual language acquisition has focused on the degree of influence from one language to the other, also referred to as “cross-linguistic influence” (CLI) (Van Dijk, Van Wonderen, Koutamanis, Kootstra, Dijkstra & Unsworth, 2022). Early studies on bilingual acquisition showed that the syntax-pragmatics interface is a particularly vulnerable area (Hulk & Müller, 2000; Müller & Hulk, 2001). More recently, however, CLI effects have also been observed in other domains (e.g., see Argyri & Sorace (2007) for (morpho-) syntactic properties).

Taken together, these findings highlight the variability in cross-linguistic influence, as well as the diversity of factors that can lead to it. Starting from the difficulty of the weak reading of *allemaal* in first language acquisition, it is possible that *allemaal* will be delayed to an even higher extent in bilingual children who are acquiring Dutch and any language which does not show the alternation in meaning shown by *allemaal*.

Relevant evidence is provided by Buijx (2025), which includes experimental data from Hungarian-Dutch bilingual children. Hungarian uses the universal quantifiers *minden*, *mindegyik*, and *az összes* to express *every*, *each*, and *all*, respectively (Csirmaz & Szabolcsi, 2012). When these quantifiers appear in a postverbal position, their semantic interpretation remains the same (Kiss, 2010). Moreover, these quantifiers cannot appear in existential sentences (Csirmaz & Szabolcsi, 2012) and cannot receive a weak, intersective interpretation. This is in contrast with what we observed in the case of the Dutch quantifier *allemaal*.

The experiment conducted by Buijx (2025) was identical to the one described in Section 3.1. Participants consisted of 35 simultaneous bilingual Hungarian-Dutch children (Mean age: 8;11, *SD*: 1;5), recruited from a school for Dutch-speaking children living in Hungary. All bilingual participants had been receiving Dutch language input from one of their parents since birth and were dominant in Hungarian, the societal language used most often around them. The

same age groups of Experiment 1 were considered, ranging from a group age of 7;3 ($SD=0;3$) to 11;6 ($SD=0;3$). The results show that, just like their monolingual peers, bilingual children showed the lowest proportion of correct responses in the *Allemaal*-weak-yes condition: 23 out of 257 trials (8.21%). Furthermore, their performance was lower than that of monolinguals and showed no evidence of the weak reading of *allemaal*, even at age 11. We leave it for further research to provide an explanation for this additional delay and to determine how it fits in the debate on the domains in which CLI can be observed (see White (2011) for an overview).

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