

# Maximality and Plurality in Children's Interpretation of Definites

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## 1. Introduction

Children's use of determiners is not always adult-like. In the context of 3 identical balls, adults must use the indefinite determiner (*Give me a ball!*), whereas young children will often use a definite. (*Give me the ball!*). The classic account of this behaviour is that it is a deictic or egocentric use of the determiner (Maratsos 1976, Karmiloff-Smith 1979). Recently, Wexler 2003 has argued instead that children's *linguistic* representation of the definite is different: adults have a presupposition of uniqueness (expressed in terms of maximality) on the definite; children have only a presupposition of existence. For Wexler, this difference is a difference in the child's competence, and therefore is predicted to appear in both production and comprehension tasks. In this paper we test the Maximality hypothesis by comparing children's comprehension of singular and plural definites. We show in both Spanish and English speaking children, that children observe maximality with plurals but fail to observe it with singulars in identical contexts.

## 2. The meaning of the definite determiner

The definite determiner usually picks out a unique or maximal object in the discourse (see e.g. Heim 1991, Kadmon 1990, Roberts 2003). Consider the examples in (1). In (1a) the definite *the man* is felicitous, because it picks out a unique man (the one who came in with the woman.) In (1b), however, the definite is not felicitous: there is not a unique singleton man in the discourse that can be referred to, since two men came in. In (1c), however, the plural definite *the men* is felicitous but it crucially refers to all three of the men, and not, for example, just two of them. In the case of plurals then, the equivalent of uniqueness is *maximality*, i.e., the maximal plurality of men in the discourse.

- (1) a. A man and woman came in. The man sat down.  
b. Two men came in. #The man sat down.  
c. Three men came in. The men sat down.

The definite does not always refer to discourse referents. So long as uniqueness/maximality is satisfied, the definite can also be used to refer to things that are by their semantics definite as in the examples in (2).

- (2) a. John climbed the highest mountain in Tibet.
- b. John met with the Pope.

Definites can also be used in so-called ‘bridging’ contexts like (3). In (3a) there is a unique saddle that can be inferred as being a part of the bicycle. In (3c), since there is no unique tire, the definite is infelicitous.

- (3) John bought a bicycle.
- a. The saddle was missing.
- b. #The tire was flat.

Maximality/uniqueness is considered to be a presupposition of the definite determiner, and not part of the asserted content. Evidence for this comes from the fact that uniqueness is preserved under negation, for example, a standard test for presuppositions. Thus in the sentence *John didn't eat the apple* we still assume there is a unique apple that John didn't eat.

### 3. Children's (mis)use of definites

Ever since the seminal work of Maratsos 1976 and Karmiloff-Smith 1979, it has been known that children's use of the definite is not always like that of adults. In a series of experiments Karmiloff-Smith showed that French children overuse the definite in contexts where adult speakers would use an indefinite. In one experiment, for example, the child would be shown two doll's playrooms, one boy's playroom and one girl's playroom. Each playroom would have various objects, in quantities of either one or three, for example, one blue book, 3 multicolored balls and a baby-bottle. The experimenter would touch one of the objects, and then tell the child “Ask the girl to lend you that”. In this context, if the book is pointed to, the correct adult response is “Lend me the blue book”; if one of the balls is pointed to, the correct adult response is “Lend me a ball/one of the balls.” In this context, but not in the singular context, young children (up to age 6) give *definite* responses, as shown in (4).

- (4) Context: 1 blue book, 3 multicolored balls, one baby-bottle
- a. Pointing to the book.
- b. Pointing to one of the balls.

#### **Adults**

- a. Lend me the blue book.
- b. Lend me a ball.

#### **Children**

- a. Lend me the blue book.
- b. Lend me the ball.

Crucially, the same children *do* use the indefinite in other contexts, so their behavior is not due to a lack of knowledge of the indefinite.

### 3.1. Accounting for the misuse of definites

Various different accounts have been proposed for why children might overuse the definite in contexts such as (4). Karmiloff-Smith and Maratsos's explanations were similar: Maratsos claimed that of the two components of the definite, specificity of reference, and specificity of reference with respect to the hearer, the second component was slow to develop, and children who overuse the definite have an 'egocentric' use of it: they understand the specificity of reference, but only relative to themselves. Karmiloff-Smith hypothesized that the children's use of the determiner was more deictic than that of the adults, and that the definite 'draw[s] attention to the referent he has under focus of attention' (Karmiloff-Smith 1979:216). In this sense, the child's meaning of the definite is not presumed to be substantially different from the adult, since adults can also have such deictic uses. She specifically questioned the egocentric hypothesis by noting that several of her experiments show that young children attempt to cooperate with their interlocutor by adding extra referential material to NPs in the form of modifiers and locations, which suggest that the child is not being purely egocentric.

More recently, Wexler 2003 has proposed an alternative explanation for the misuse of the definite. Wexler notes that although the deictic or egocentric explanation can account for many of the experimental results of Maratsos and Karmiloff-Smith, there are some situations in which it seems unlikely that the element referred to by the definite is 'in focus' for the child. Maratsos and Karmiloff-Smith both used an story task of the sort shown in (5) (from Maratsos 1976:51):

(5) *Making Noise*

Once there was a lady. She had (Indef. Version: lots of boys and girls/about four girls and three boys; Def. Version: a boy and a girl). They were very noisy, and they kept her awake all the time. One night she went to bed. She told them to be very quiet. She said 'If anyone makes any noise they won't get any breakfast tomorrow.' Then she went to bed. But do you know what happened? One of them started laughing and giggling. (If the Indef. Version was being told, the experimenter would say 'Now let's see, there were four girls and three boys.'. Who was laughing and giggling like that?

In the indefinite condition, the correct (adult) response to the question is 'one of the children' or perhaps 'one of the boys/girls'. However, even in this situation, young children gave a substantial number of 'the' responses to the indefinite condition. Wexler (following observations of Irene Heim) argues that in the story in (5), there is no obvious way in which any particular boy or girl

has even been individuated, and therefore it seems very unlikely that the child has a particular boy or girl 'in focus'.

Wexler proposes an alternative account for the definite error. He claims that the younger children lack the Maximality presupposition of the definite, and that this difference is a difference in the linguistic *competence* of the child, i.e., the child at this stage has a different lexical entry for 'the' than the adult. The child has the existential presupposition, but not maximality/uniqueness. This would account for both the use of the definite in both the playroom type experiments in (4) and the stories experiments in (5). It should be noted that Wexler, by attributing the problem to the linguistic competence of the child makes a strong prediction: children at this age should manifest Maximality errors in both comprehension and production.

There is a third possible account for the definite errors. In recent work, various researchers (Drozd 2001; Drozd and Van Loosbroek 2004; Guerts 2003; Krämer 2004; Miller and Schmitt 2004; Roeper et al. 2004) have argued that young children have problems with setting implicit domain restrictions on determiners. All natural language quantifiers are restricted to some set of elements in the discourse. This restriction can be set either implicitly or explicitly. For example, Miller and Schmitt 2004 showed that young children are able to access wide scope interpretations of indefinites when there is a contextually salient set that restricts the quantifier. Thus, more wide scope interpretations were possible for the children in examples such as (6a), than in examples such as (6b).

- (6) a. Mary didn't blow out a candle. (In the context of candles on a cake.)  
b. Mary didn't catch a fish. (In a simple fishing context.)

Bridging (as in (3)) is a classic case of implicit domain restriction, as are examples like (7), which presumably requires one's spouse to pick up just the relevant kids, not all of the kids at the school.

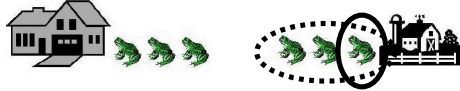
- (7) Honey, pick up the kids from school.

### 3.2. Testing maximality vs. domain restriction

As we noted above, Wexler's hypothesis is that young children have a different definite determiner than the adult, and this difference should manifest itself in both production and comprehension tasks. Furthermore, if children lack the maximality presupposition of the definite, then maximality errors should manifest themselves in both singular and plural contexts. If children have difficulty with domain restriction, then implicit vs. explicit restrictions should yield higher and lower definite errors respectively. In order to test this, we need a context in which the definite plural and definite singular are both equally felicitous. Notice, given the data in (1), that this is usually not the case: if there is a plurality of identical objects in the discourse, reference to just one of them with the definite is usually not possible. However, there is at least one such context.

Consider the situation in Figure 1 below: In this context, both the plural (8) and the singular (9) definite can be felicitous, as the dotted and solid circles show respectively.

**Figure 1**



- (8) Give me the frogs next to the barn.
  - a. The maximal set of frogs next to the barn.
  - b. Explicit restriction on *the*: ‘next to the barn’
  
- (9) Give me the frog next to the barn.
  - a. The maximal single frog next to the barn.
  - b. Implicit restriction on *the*: ‘the frog closest to the barn’

#### **4. Experimental design**

Based on the context in Fig. 1, we designed an act-out task to test children’s knowledge of maximality and/or domain restriction. We used two separate but similar experiments, one on English speaking children and the other on Mexican Spanish speaking children.<sup>1</sup> Since the results are similar for both, we will combine the discussion of both experiments noting differences as we go along.

##### **4.1. Experimental Setup**

For both experiments, a toy house and a toy barn was used, along with 6 toys of each type. In the English study, the toys were frogs, rabbits, cats and monkeys, and in the Spanish study, the toys were cats (‘gatas’), cows (‘vacas’), dolls (‘munecas’) and spiders (arañas). Three toys of each type were set up in a line

**Figure 2**



<sup>1</sup> There are no relevant differences between the two language’s definite determiners with respect to maximality/uniqueness. For a more detailed description of similarities and differences in the acquisition of the definite in English and Spanish, see Pérez-Leroux et. al 2003; Pérez-Leroux, Munn and Schmitt 2006.

either beside the house or barn (English study) or in front of the house or barn (Spanish study). Figure 2 shows the setup for the English experiment.

#### 4.2. Subjects

For the English experiment, we tested 15 pre-school children ages 3;0 to 5;5, mean 4;1. 44 Michigan State University undergraduates performed a pencil and paper version of the task as a control. For the Spanish study, 20 pre-school children from Mexico City were tested, ages 3;2 to 4;11, mean 4;3.

#### 4.3. Experimental Sentences

There were two experimental conditions: definite singular and definite plural. In the English study there were two control conditions: *all the* (plural) and *a* (singular). Each condition had 4 sentences for a total of 16. Example sentences are given in (10):

(10) *Experimental Sentences*

- |   |          |
|---|----------|
| a. Give me the frog next to the house.  | Singular |
| b. Give me the frogs next to the house. | Plural   |

*Controls*

- |   |          |
|---|----------|
| c. Give me a frog next to the house.        | Singular |
| d. Give me all the frogs next to the house. | Plural   |

Because the translations of the English sentences did not sound natural to native speakers, the Spanish examples used a participial modifier instead of just a PP modifier. Since Spanish also has an indefinite plural determiner, there was also an extra control condition. Each condition had 4 sentences, for a total of 32. Example Spanish sentences are given in (11).

(11) *Experimental sentences*

- |   |          |
|---|----------|
| a. Dame la gata dormida al lado de la granja.<br>Give-me the.SG cat.SG asleep.SG next to the barn     | Singular |
| b. Dame las gatas dormidas al lado de la granja.<br>Give-me the.PL cats.PL asleep.PL next to the barn | Plural   |

*Controls*

- |  |          |
|--|----------|
| c. Dame una gatas dormidas al lado de la granja.<br>Give-me a.SG cat.SG asleep.SG next to the barn                   | Singular |
| d. Dame unas gatas dormidas al lado de la granja. <sup>2</sup><br>Give-me some.PL cats.PL asleep.PL next to the barn | Plural   |

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<sup>2</sup> Some Spanish speakers have reported this sentence to be odd. Our Mexican speakers seemed to accept it, however.

- e. Dame todas las gatas dormidas al lado de la granja.  
 Give-me all.PL the.PL cats.PL asleep.PL next to the barn Plural

#### 4.4. Procedure

Each child was asked to name the house and the barn as it was introduced. Some children used ‘farm’ instead of ‘barn’ and were corrected by the tester. Each animal was shown, and the child was asked to name it. Some of the English speaking children called the monkeys gorillas, and if so, this term was used in the experiment. As a pretest, comprehension of *next to* was tested. To do this, 4 of the toys were lined up in front of the child, and the child was asked what was next to one of them. All the children passed the pretest. Upon choosing one, they would be asked if anything else was next to the same toy. In the English study, the test was split into 2 parts, separated by a different act out task not involving the house and barn.

#### 5. Predictions

The following predictions can be made based on either the Maximality Hypothesis or the Domain Restriction hypothesis. If children have problems with maximality, they should sometimes fail to give maximal answers in both the Plural condition and the Singular condition. If children have problems with implicit restrictions on determiners, they should give maximal answers in the Plural, but not in the Singular condition.

#### 6. Results

##### 6.1. Control Sentences

Table 1 gives the percentage correct responses to the control sentences. Definite plural responses were coded for both maximality and plurality. As can be seen, children performed like adults on all control conditions.

**Table 1: Percentage correct responses to Control Sentences**

	Indefinite		All	
	Singular	Plural	Maximal	Plural
English children	93.8	–	91.4	89.1
Spanish children	98.8	87.5	100.0	100.0
English adults	100.0	–	100.0	100.0

## 6.2. Experimental Sentences

Table 2 shows the percentage correct responses to the experimental conditions. We will first deal with the plural results and then the maximality results.

**Table 2: Percentage correct responses to Experimental sentences**

	Def Plural		Def Singular	
	Maximal	Plural	Maximal	Singular
English children	92.5	81.3	69.8	82.8
Spanish children	97.4	95.0	64.9	90.0
English adults	100.0	100.0	98.2	94.3

### 6.2.1. Plurality

Both Spanish ( $t(1,15)=3.727$ ,  $p<0.01$ ) and English children ( $t(1,19)=19.615$ ,  $p<0.01$ ) treated the plural morpheme on plural definites as indicating ‘more than one’ significantly more than chance (= 50%). The two groups did not behave significantly differently from each other ( $t(1,34)=-1.740$ ,  $p=.132$ ). Although all children had above chance behavior on the definite plural, younger children (Spanish and English combined) gave singular responses to the definite plural more than older children ( $t(1,34)=-2.673$ ,  $p<0.05$ ).

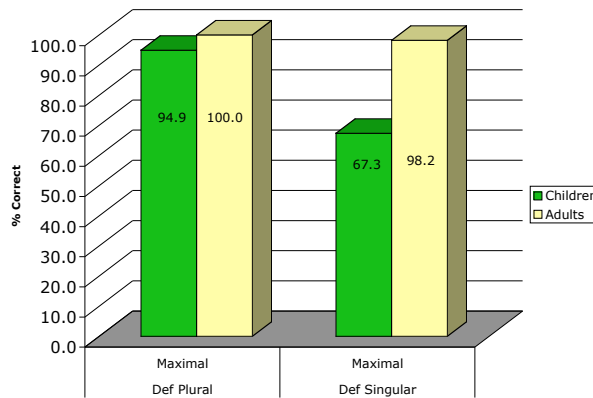
**Table 3: Age effect in plural responses**

Younger	Older	Adults
82.8	97.4	100.0

### 6.2.2. Maximality

The percentage correct for maximal responses was based only on those trials that were correct for singular or plural. Thus if a subject got the plural or singular wrong, their response on that trial was not counted for maximality. The overall results for maximality are given in Table 2, above and illustrated in Figure 3. A mixed de-

**Figure 3: % Correct Maximality (Combined Results)**





sign ANOVA showed that children (English and Spanish combined) treated the definite plural as maximal significantly more often than the definite singular ( $F(1,33) = 14.976, p < 0.001$ ). There was no significant interaction ( $F(1,33) = 0.010, p = 0.921$ ) and there were no significant differences between Spanish and English children ( $F(1,33) = 0.042, p = 0.839$ ).

It might be argued that our task is biased in the plural to the maximal interpretation. We think that the Spanish results of the indefinite plural provide evidence against this view. Recall that because Spanish has an indefinite plural determiner it was added as an extra control condition. If the task itself was biased toward a maximal reading, we should expect maximal readings in the indefinite condition as well, but this was not the case. The results of the indefinite plural condition are shown in Table 4. As can be seen, in the indefinite plural condition, there were significantly fewer maximal responses ( $t(1,19) = -3.959, p < 0.01$ ) compared to the definite plural. Note that the Maximal response is not ruled out with the indefinite plural, especially if the domain of the determiner is taken to be the entire set of toys in the task at the time.

**Table 4: Percentage of Maximal readings for plural (Spanish)**

Definite (las)	Indefinite (unas)
97.4	74.3

## 7. General Discussion

Overall, children performed well on the task. Younger children did not do as well on the plurals as older children, but both groups interpreted the plural correctly significantly better than chance. Maximality errors were restricted to the singular condition, and did not arise in the plural condition. Consider again the contexts in Figure 4. In the singular condition, the definite is only *implicitly* restricted: in order to satisfy both maximality and singularity, the child must figure out an appropriate restrictor for the determiner. The adult restrictor is to take the frog closest to the barn. An alternative restriction might be to take the *first* frog next to the barn, which would result in the child picking the frog furthest away from the barn as indicated by the solid circle. The most unlikely restriction would be to pick the middle frog. Thus the children's responses can be characterized as in (12) and (13): adult-like in the plural, but with a different implicit restrictor in the singular.

**Figure 4**



- (12) Give me the frogs next to the barn.
  - a. The maximal set of frogs next to the barn.
  - b. Explicit restriction on *the*: ‘next to the barn’
  
- (13) Give me the frog next to the barn.
  - a. The maximal single frog next to the barn.
  - b. Implicit restriction on *the*: ‘the first frog next to the barn’

An examination of the maximality errors that children made shows exactly this pattern. In the English and Spanish children, there was a single instance each of the middle toy being picked in the definite singular condition (1/60; 1/80). Admittedly, there seemed to be a bias against picking the middle toy in general, since there were a total of six instances where the middle toy was chosen in the indefinite singular as well (2/60; 4/80).

The results of this experiment seem to support the domain restriction hypothesis and not the Maximality hypothesis. If children were not respecting maximality, then we would predict at least some instances where the children picked 2 of the 3 toys, but this almost never happened. The fact that the indefinite plural condition in Spanish elicited such non-maximal responses is evidence that the children were not picking all of the toys in the definite condition simply as a bias of the task. Since this is only one experiment, further research is clearly needed to show that Maximality is respected in other contexts as well.

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