From Pseudopartitive to Partitive

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1. Introduction

This article is a first look at children’s acquisition of the syntax of the English partitive. I claim that children start out building a pseudopartitive structure until they gain evidence that the more complex partitive structure is needed. The partitive (1) is a complex noun, but the pseudopartitive (2) is a single nominal projection (Alexiadou, Haegeman & Stavrou forthcoming, Stickney 2004).

(1) a slice of John’s pie
(2) a slice of pie

Diachronic evidence suggests that the pseudopartitive emerges in languages as a simplified version of the partitive (Rutkowski forthcoming, Koptjevskaja-Tamm 2001). If we assume that both diachronic language change and first language acquisition are governed by the principles of Universal Grammar (UG), then it follows that children may initially prefer to treat partitives as if they were pseudopartitive.

The syntax of the partitive and the pseudopartitive has not previously been investigated from the prospective of L1 acquisition. This paper provides a first look at children’s acquisition of partitive syntax, showing that children initially treat partitives as pseudopartitives. This preference for structural simplification has far reaching implications for the acquisition of complex nouns and the emergence of DP.

Section 2 discusses the syntactic differences between the partitive and the pseudopartitive, briefly discusses the diachronic account of these two structures and proposes hypotheses for acquisition. Section 3 presents an experiment looking at the interaction of adjectives with the partitive and the pseudopartitive as evidence for a simplified partitive stage. Section 4 discusses the implications of this result and suggests paths for future research.

2. Theoretical Background

2.1 The Partitive-Pseudopartitive Contrast

The partitive (3) and the pseudopartitive (4) differ on the surface only in the existence of a definite determiner.

(3) a box of those chocolates
(4) a box of chocolates

Despite this similarity, these two constructions differ greatly in their syntax. The partitive is a head-complement structure (5), one DP inside another. The pseudopartitive is a single nominal projection (6). What is a noun in the partitive is a measure phrase in the pseudopartitive and what is a preposition in the partitive is a functional projection in the pseudopartitive (Stickney 2004). For ease of reference I will henceforth refer to the Measure Phrase in the pseudopartitive and the head noun in the partitive, “box,” as N1. I will refer to the head noun the pseudopartitive and the complement in the partitive, “chocolates,” as N2. This does not, however, imply that the pseudopartitive contains two nouns.
The difference in syntactic structures between these two constructions is evidenced in differences in syntactic behavior in many areas including extraposition, fronting of “of,” and adjectival modification (Stickney 2004). N2 in the pseudopartitive can only be a mass noun or a bare plural. N2 in the partitive can be any type of DP. In addition to the syntactic differences, the partitive and the pseudopartitive also differ semantically. The pseudopartitive denotes a measured amount of an entity. It is nonspecific. The partitive denotes a particular measured amount of a specific (and usually discourse-linked) entity.

This paper focuses on the syntactic difference evident in the interaction of adjectival modification with the partitive and pseudopartitive. An adjective preceding the pseudopartitive can modify the head (N2), ‘chocolates’ (7). An adjective modifying the partitive is blocked from doing so (8).

(7) a moldy box of chocolates
(8) a moldy box of those chocolates

The DP in the partitive creates a barrier to the adjectival modification of N2. Thus, in (8) only the box can be moldy. The Measure Phrase in the pseudopartitive, however, is a semi-lexical projection (Alexiadou, Haegeman & Stavrou forthcoming). It has enough nominal features to be modified by the adjective, but it is not lexical enough to head the construction. Being partially functional, the MP allows the adjective to reach through it to modify the head noun, regardless of whether it, itself, is modified by the adjective or not. The phrase in (7) can be used in situations where the box is moldy, the chocolates are moldy, or both.

2.2 Pseudopartitives - A Diachronic Account

Roberts & Roussou (1999) claim that diachronic change is based on the fact that the “parameter-setting device” (UG) is computationally conservative, with a preference for simpler representations. They claim that functional projections are more economical than lexical ones. Rutkowski (forthcoming) claims that the pseudopartitive structure is the result of diachronic grammaticalization of
the partitive. He claims that over time the reduced structure of the pseudopartitive is preferred for partitives in which reference to a specific set is not needed by the discourse. The pseudopartitive is preferential because it involves a single noun dominated by functional material. The partitive is bi-phrasal, containing two DPs, and is, as a result, more costly. If diachronic development is guided by the principles of UG, then it follows that first language acquisition, which is governed by UG, will exhibit similar processes. Based on the claims that the language faculty prefers economical structures and that the pseudopartitive is more economical than the partitive, it is logical to assume that children will start out building only pseudopartitive structures until they gain evidence that the more costly partitive structure is needed.

From this we can predict an acquisition path. Children’s preference for economy will cause them to initially project only pseudopartitive structures. Then, as the need for more complex meaning arises, as children begin to refer to (and measure) specific sets and as they use quantifiers, they will begin to project the partitive structure. Only when they have completely mastered quantification and the use of the Determiner Phrase will they use the partitive consistently in contexts where it is required. This paper focuses on the initial stage, in which all partitives are treated as pseudopartitive.

2.3 Hypotheses

As mentioned in Section 2.1, the partitive and the pseudopartitive differ in how they interact with adjectival modification (7&8). The claim that children initially build pseudopartitive structures gives rise to several hypotheses regarding the partitive/pseudopartitive contrast with respect to adjectival modification.

H₀: Children are able to differentiate between partitive and pseudopartitive from the beginning, and they build adult-like structures for each.
H₁: UG prefers functional projections to complex/multiple lexical projections. Hence, children’s initial treatment of partitives will be as pseudopartitives.
H₂: UG prefers lexical projections to functional projections, hence children will initially prefer to build partitives rather than pseudopartitives.

These hypotheses make predictions that bear on the interaction of adjectives with the partitive and the pseudopartitive. Remember that, for adults, an adjective preceding the partitive can only modify N₁ and is blocked from modifying N₂. An adjective preceding the pseudopartitive can modify N₁, N₂ or both. H₀ claims that children are adult-like in their interpretation of partitive and pseudopartitive. This predicts that they will not allow the adjective in the partitive to modify N₂. H₁ claims that children treat all partitives as pseudopartitives. This predicts that they will allow modification of N₂ in both the partitive and the pseudopartitive. H₂ claims that children treat all pseudopartitives as partitives. This predicts that they will never allow modification of N₂, regardless of whether the adjective precedes a partitive or a pseudopartitive structure.

The following experiment tests these hypotheses contrasting adjectival modification of the partitive and the pseudopartitive.

3. Adjectival Modification Experiment

3.1 Subjects

The subjects were 42 normally developing children aged 2;11 - 6;2 (mean age 4;11) from preschools in Amherst and Northampton, Massachusetts, and 12 adult controls (undergraduate students at the University of Massachusetts, Amherst).

3.2 Procedure

The contrast between partitive and pseudopartitive (with respect to adjectival modification) had never been tested experimentally before. Thus it was necessary to find a contrast that was clear for adults. To this end, the experiment contained three different types of tasks, an act out task, a coloring
task and a story comprehension task, and it was assumed that any particular task that did not provide a clear contrast would be excluded from the final analysis. It also became clear during the design phase of this experiment that particular adjectives seem to be able to pragmatically cross barriers. Adjectives were chosen which seemed, to the author, to best conform to the partitive/pseudopartitive parameters; however it was clear that these adjectives would need to be tested experimentally with adults as well.

In order to compare partitive and pseudopartitive, items had to be found that differed only with respect to the definite determiner. Pseudopartitives tend to contain measure phrases that refer to containers (9a) or collections (9b) (Koptjevskaja-Tamm 2001).

\[(9)\]
\[\begin{align*}
    \text{a.} & \quad \text{a carton of milk} \\
    \text{b.} & \quad \text{a herd of elephants}
\end{align*}\]

This property of pseudopartitives necessarily excluded the study of partitives containing quantifiers (10a) or numbers (10b) because there are no pseudopartitive counterparts (11).

\[(10)\]
\[\begin{align*}
    \text{a.} & \quad \text{most of the milk} \\
    \text{b.} & \quad \text{three of the bears}
\end{align*}\]

\[(11)\]
\[\begin{align*}
    \text{a.} & \quad \ast \text{most of milk} \\
    \text{b.} & \quad \ast \text{three of bears}
\end{align*}\]

Additionally, partitives and pseudopartitives had to be chosen whose N1 and N2 could be modified by similar adjectives. Thus, all items in the experiment contained some sort of container (N1) and some sort of substance (or large amount of small items) (N2).

Below are examples of each type of task. Each experimental item began with a story and was followed by a partitive or a pseudopartitive prompt (preceded by an adjective). The children received one of two versions of this experiment containing seven experimental items (2 act out, 2 coloring, and 3 story comprehension). The two versions were counterbalanced so that items that were partitive in one version were pseudopartitive in the other. So each child either got 3 partitives and 4 pseudopartitives or 4 partitives and 3 pseudopartitives. The stories were identical for each prompt type (partitive or pseudopartitive). Each story contained wording that made the definite determiner in the partitive items felicitous. All partitive prompts contained the definite determiner ‘the.’

\[3.2.1 \text{ Act Out}\]

The act out tasks required the child to put substances into containers. For the particular property of the adjective to be presented there were substances and containers that matched that property and ones that didn’t. For example, in one item the child was presented with beads and pots. Half of the beads were sparkly and half were not. One of the pots was sparkly and two of the pots were not sparkly. The child was prompted to put beads in a pot so that we’d have a:

\[(12)\]
\[\begin{align*}
    \text{a.} & \quad \text{sparkly pot of beads} & \quad \text{[pseudopartitive]} \\
    \text{b.} & \quad \text{sparkly pot of the beads} & \quad \text{[partitive]}
\end{align*}\]

If the child was given a pseudopartitive prompt, either the pot (container) or the beads (substance) could be sparkly. If the child was given a partitive prompt and he correctly represented the partitive structure, then he would only allow the pot to be sparkly and not the beads.

\[1\] After the experiment was run it was determined that one of the act out items did not give useful results (see section 3.3). The results were analyzed without this item, leaving each subject with three partitive and three pseudopartitive prompts.
3.2.2 Coloring

In the coloring task, the child was presented with a drawing of a container filled with a substance and the child was instructed to color the picture. Each act out prompt contained an adjective followed by a partitive or pseudopartitive “can you make this an ADJ N of (the) N?” In one item the child was showed how to put prickers on a cactus with a stamp marker and then was presented with a picture of a plate with cookies on it. She was then asked to make:

(9) a. a prickly plate of cookies        [pseudopartitive]
b. a prickly plate of the cookies                  [partitive]

If the child was given a pseudopartitive prompt, then coloring either the plate (container) or the cookies (substance) was acceptable. If the child was given a partitive prompt, then only the plate (N1) would be available for coloring if she knew that the partitive was a bi-phrasal structure with a barrier to modifying N2.

3.2.3 Story Comprehension

The story comprehension items required the child to either choose a picture or answer a yes/no question. Again, the child was presented with either a partitive or pseudopartitive prompt. His answers would differ depending on whether he allowed the adjective preceding the structure to modify N2 (the substance). In one item the child was told a story about a witch who has a special chicken soup recipe that she always uses. She makes the soup and then does different things with it. The child was presented with four pictures: an old pot with new soup in it, a new pot with old soup in it, and two foils. The child was then prompted to hand the witch each picture. The relevant prompt asked the child to hand the witch either (10a) or (10b).

(10) a. an old pot of soup       [pseudopartitive]
b. an old pot of the soup                  [partitive]

The key diagnostic for barriers in all of the above cases is whether the child allows the adjective to modify N2 (the substance) in the partitive. This should be disallowed if the child recognizes that the partitive is bi-phrasal and contains a barrier to adjectival modification. In other words, a child who correctly builds a partitive structure should allow an adjective to modify either container or substance for the pseudopartitive, but should disallow the adjective to modify the substance when faced with a partitive construction. Table 1 sums up the various predictions made by the hypotheses in Section 2.3.

<table>
<thead>
<tr>
<th>Partitive items</th>
<th>Pseudopartitive Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance (N2)</td>
<td>Container (N1)</td>
</tr>
<tr>
<td>H₀ (adult)</td>
<td>N</td>
</tr>
<tr>
<td>H₁</td>
<td>Y</td>
</tr>
<tr>
<td>H₂</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Y</td>
</tr>
</tbody>
</table>

Table 1 Predictions based on prompt type

3.3 Results

As mentioned in Section 3.2, there were no precedents for experimentally testing the interaction of adjectives with the partitive and the pseudopartitive and three types of task were used to investigate this contrast. There was no significant difference between subjects’ performance on the various task types, so the results for each task are collapsed in the data below.

However, one difficulty did arise for the coding of the results. It became clear that interpretation of a “both” response, when given for a partitive prompt, was difficult to code. If the subject allowed the adjective to modify both N1 and N2 did he ignore the barrier in the partitive and allow N2 to be modified? Or did he recognize that the adjective referred only to the container (N1), but let the
adjective modify the substance for some other reason (say, matching for instance). For this reason, all “both” responses were removed from the data analysis. The majority of “both” responses were on pseudopartitive items, so this removal did not skew the data toward any of the predictions in Table 1. One act out item did elicit a large proportion of “both” responses and was removed from the data analysis.2

<table>
<thead>
<tr>
<th>Age</th>
<th>Partitive Items</th>
<th>Pseudopartitive Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Substance (N2)</td>
<td>Container (N1)</td>
</tr>
<tr>
<td>3 (n = 9)</td>
<td>57.14%</td>
<td>42.86%</td>
</tr>
<tr>
<td>4 (n = 12)</td>
<td>48.57%</td>
<td>51.43%</td>
</tr>
<tr>
<td>5 (n = 11)</td>
<td>53.33%</td>
<td>46.67%</td>
</tr>
<tr>
<td>6 (n = 10)</td>
<td>37.03%</td>
<td>62.96%</td>
</tr>
<tr>
<td>Adult (n = 12)</td>
<td>25.00%</td>
<td>75.00%</td>
</tr>
</tbody>
</table>

Table 2 percentage of substance and container responses for each prompt type.3

Subjects were analyzed based on the performance of individual age groups (Table 2) and there was no significant difference between the performance of three, four and five year olds. These responses are collapsed for the analysis below.

The crucial responses for all hypotheses are the substance responses—which represent an error in the partitive. All age groups gave more substance than container responses for the pseudopartitive. Only the 6 year olds and the adults clearly preferred container responses to substance responses in the partitive.

FIGURE 1 percentage of response types per age group for partitive items

2 This act out item required the subject to put colored pompoms into colored boxes. Both adults and children had a tendency to match the color for container and substance.

3 These results are based on 324 responses to six experimental items.
The proportion of partitive errors was analyzed with a univariate analysis of variance, with the average number of partitive errors at three levels of age (3-5, 6 & adult). The dependent variable was the proportion of partitive errors. There was a main effect of age $F(2,53)=3.673, p=.032$. A pairwise comparison showed significance between the partitive error scores of adults and 3-5 year olds at $p=.013$.

![Substance Responses Partitive vs. Pseudopartitive](image.png)

**FIGURE 2** Substance responses for partitive and pseudopartitive based on age group

The proportion of substance responses were analyzed with a 2X3 mixed analysis of variance, with the average numbers of substance answers at two levels of prompt type (pseudopartitive and partitive) and three levels of age (3-5, 6 & adult). The dependent variable was the proportion of substance responses. There was a main effect of prompt type $F(1,51)=16.609, p=.000$ and a main effect of age $F(2,51)=3.278, p=.046$. There was not a significant interaction between age and prompt type $F(2,51)=1.036, p=.362$. However, looking at the effects of prompt type for each age group individually reveals that adults are significant $F(1,11)=7.05, p=.02$ and six year olds are significant $F(1,9)=9.256, p=.014$.

The results are consistent with $H_1$. In contrast to the adults, who make a clear distinction between partitive and pseudopartitive, children aged 3-5 are not respecting the barrier to adjectival modification that is present in the partitive. This is consistent with the claim that children initially project only pseudopartitives, even when hearing a partitive structure.

$H_2$, which suggested that children prefer to project lexical items and hence treat both partitives and pseudopartitives as partitive, is not supported. All children preferred to modify N2 in the pseudopartitive. Additionally 3-5 years olds showed no significant preference for modifying the first noun in the partitive. This also rules out $H_0$, which predicted that children would modify only the first noun in the partitive and be free to modify either nominal element in the pseudopartitive.

The results show us that children aged 3-5 are not respecting the barrier in the partitive that prevents the adjective from modifying N2 and that they do not distinguish between partitive and pseudopartitive structures. 6 year olds and adults clearly distinguish between partitive and pseudopartitive structures, but the 6 year olds are not yet adult-like in their representation of the partitive.
4. Discussion

The results of the adjectival modification experiment clearly show that children aged 3-5 are not distinguishing between the partitive and the pseudopartitive with respect to adjectival modification. This supports the claim that UG promotes a preference for economy—in this case a preference for functional projections over lexical/bi-phrasal representations. This preference for economy causes children’s grammars to represent partitive as pseudopartitive. By age six, children are able to distinguish partitive from pseudopartitive, but they are not reliably able to project an adult-like partitive structure. This is consistent with the gradual acquisition path proposed in Section 2.2.

If children have a preference for functional material over bi-phrasal structure, this would have broad implications for language acquisition. In the case of NPs, we should be able to see this trend in all complex nouns. Children will initially attempt to represent all complex nouns with simplified nominal structures. It predicts that partitives containing quantifiers will be simplified. The material in QP may instead show up in MP or NumP. This predicts a simplified quantifier interpretation, which has in fact been attested (e.g. Smits, Roeper & Hollebrandse forthcoming). However, structural simplification will only occur if a functional projection is a possibility (like a Measure Phrase is available via UG). Phrases like ‘a girl from Spain,’ may require alternative strategies for structural simplification because ‘girl’ cannot be easily translated into a function.

4.1 Accounting for Syntactic Structure

These results are interesting, but they do not provide specifics regarding syntactic representation. I suggest that children start out building only pseudopartitives and then transition to a somehow defective partitive structure before acquiring adult-like partitives. The difference between 3-5 year olds and 6 year olds in this study suggests that children’s syntactic representations gradually improve, but the experiment does not distinguish between a child who errs because he is building a pseudopartitive and a child who errs because his partitive structure is deviant. In order to tease these two possibilities apart, a structure for the defective partitive must be proposed.

What might a defective partitive structure look like? As mentioned in Section 2.1, mastery of the partitive requires both the ability to build complex nouns and the knowledge of complex semantic information. The child may begin projecting partitives when he is given evidence that a more complex structure is needed, but he may not be able to consistently project the partitive until he has mastered the syntax of quantification and DP. Difficulties with quantification have been shown to extend well beyond age 6 (Roeper, Strauss & Pearson 2006), and difficulties with DP often extend at least until age 6 (Wexler 2006). Future research will need to carefully compare children’s acquisition of quantifiers and the definite determiner with the emergence of mastery of the partitive.

It has also been shown that children have difficulty recognizing that DP is a barrier to extraction (Otsu 1981, de Villiers & Roeper 1995, Coles 1998). It is possible that children who allow the adjective to modify N2 in the partitive are projecting the correct syntactic structure, but do not yet recognize that DP is a barrier.

Future research will have to take into account the properties of various structures for a defective partitive and test them experimentally in contrast to the pseudopartitive. This may be done with diagnostics of headedness for partitive and pseudopartitive concurrent with investigations of the child’s interpretation of other complex nouns and the syntax of DP.

4.2 Other Explanations

Along with accounting for the behavior of the 6 year olds future experimentation must look closer at adult processing of partitives. One of the most striking things about the data is that, despite the fact that adults show a statistically significant distinction between partitive and pseudopartitive, they still have a 25% error rate. What could account for adults allowing the adjective to modify the partitive N2 25% of the time? There are several possibilities. The first is that adult subjects tend to over-think child
language experiments, looking for “the catch,” and often giving different responses than they would otherwise. Barring that, there are three other logical possibilities.

The first is that adults have some pragmatic knowledge that allows them to apply the adjective to N2 even though the syntax won’t allow it. For instance, the syntax of the partitive should disallow the modification of ‘coffee’ in the phrase ‘a hot cup of that coffee.’ However, our world knowledge lets us know that if the cup is hot, the coffee is probably hot, too, even though the adjective+partitive gives us no information about the state of the coffee.

The second possibility is that adults are occasionally able to interpret the partitive as pseudopartitive. Rutkowski (forthcoming) suggests that when languages begin changing partitives to pseudopartitives, there is a period of time in interpretation where a partitive can be ambiguous between partitive and pseudopartitive structure. Indeed, Selkirk (1977) in her groundbreaking work portraying the syntax of the pseudopartitive, ultimately suggests that the partitive is normally headed by N1, but can sometimes be represented with a pseudopartitive-like N2-headed structure. The adults in this study may have been able to access an alternative structure.

The third possibility is that the determiner ‘the’ is ambiguous between a full DP, which causes a barrier to modification and extraction, and some other phrase such as NumP. In English, DP creates a barrier. I assume that DP is what creates the barrier in the partitive. However, the determiner ‘the’ is sometimes interpreted as light. de Villiers & Roeper (1995) discuss children’s difficulty with DP. They look at light verb constructions such as ‘make the decision’ in which the determiner is not a barrier to extraction.

(12) a. How i did the boy make the decision to play t?
   b. * How i did the boy like the decision to play t?

[de Villiers & Roeper 1995, 82:25]

de Villiers & Roeper claim that in adult English the ‘the’ in ‘make the decision’ is located in spec,NP and that no DP is projected to create a barrier. They show that children’s grammars treat ‘like the decision’ like ‘make the decision,’ allowing ‘how’ to be extracted across a barrier. The fact that for adults the ‘the’ in ‘make the decision’ does not create a barrier presents an interesting point: English ‘the’ is ambiguous in what features it contains. The partitives in this study all contained ‘the.’ Perhaps the adults in this study were able to access this light ‘the’ and allow the adjective to modify N2 without obstruction.

All three of the above possibilities for adults are also possible explanations for the behavior of the 6 year olds in this study. If processing ‘the’ as light is the cause of the problem, then a study contrasting partitives with ‘the’ versus ones containing genitives and demonstratives will be able to discern this.

4.3 Where is DP?

In this paper I have claimed that children initially represent partitive as pseudopartitive. If children do indeed hear partitives and represent them structurally as pseudopartitives another question arises. What do the children do with the determiner? Do they ignore it entirely? Do they represent it in a non-standard syntactic position like spec,NP (de Villiers & Roeper 1995)? In Rutkowski’s (forthcoming) diachronic account the DP is dropped when the partitive is reduced. Is the child able to simply leave out a piece of phonological material in his syntactic representation? Careful analysis of the child’s production of partitives and pseudopartitives may shed some light on this question.

5. Conclusion

This is the first look at children’s acquisition of the syntax of the partitive. Diachronic evidence suggests that Universal Grammar prefers single nominal projections over complex nouns and functional material over lexical material. The same principles that govern language change govern language acquisition. Pseudopartitives are structurally simpler than partitives. I have shown experimental evidence to support the claim that children initially build a pseudopartitive structural
representation for the partitive. The evidence also points to an intermediary stage in the child’s grammar where he recognizes a difference between partitive and pseudopartitive, but builds a defective partitive structure.

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