

## Of Musical Hand Chairs and Linguistic Swing

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### 1. Introduction

In the past, there has been extensive research on compounding, beginning with Gleitman and Gleitman (1970), which studied the productivity of different types of compounding in English. Clark (1993) reviewed the acquisition of productive compounding across languages and found that in languages with productive compounding, children produce novel compounds, while in languages without productive compounding, children do not produce such novel compounds. For example, French does not allow productive compounding, and Snyder and Chen (1997) found that children acquiring French do not produce novel compounds.

In this paper, we focus on cross-linguistic variation in the semantics of productive nominal compounding. By “productive” and “novel”, we are referring to the creative and innovative aspect of language. We are concerned with the unconscious production and understanding of compounds, and not with conscious coinages.

If we take a look at English, we find that nominal compounding is rather free, with fully productive, novel compounding. Some examples of nominal compounding from spontaneous speech data are shown in (1).

- (1) a. animal cup (cup with animals) Allison (2.33)  
b. Big+Bird book (book about Big Bird) Nathaniel (2.47)  
c. bunny+rabbit record (record with song about rabbits) Shem (2.25)  
d. ribbon hat (hat with ribbons on it) Sarah (2.59)

French, on the other hand, does not allow productive nominal compounding. In order to describe a spider from the swamp, French requires the use of a preposition, as shown in (2a). The presence of two nouns, *spider* and *swamp*, in either order, is not possible.

- (2) a. araignée \*(de/du) marais [French]  
SPIDER \*(OF/OFF THE) SWAMP  
b. \*marais araignée  
SWAMP SPIDER

Although French does not allow novel nominal compounds, there are lexicalized compounds, as shown in (3).

- (3) homme grenouille [French]  
MAN FROG

In English, the compound *frog man* may refer to a man who looks like a frog, or a man who collects frogs. However, the nominal compound in (3) in French can only refer to an undersea diver.

Other languages such as Estonian and Hungarian exhibit fully productive nominal compounding, yet disallow shape/appearance modifiers. Estonian has productive nominal compounds, as in (4a), but does not allow nominal compounds with shape/appearance modifiers, as in (4). A chair shaped like a hand can be called a *hand chair* in English, but not in Estonian.

- (4) ESTONIAN  
a. talunik aadel  
FARMER ARISTOCRAT  
  
b. \*kasi tool  
HAND CHAIR

Similarly in Hungarian, there is productive nominal compounding, as in (5a), but there is no nominal compounding with shape/appearance modifiers. *Banana box* can only refer to a container for bananas, and not a box in the shape of a banana. A box in the shape of bananas can only be referred to as in (5b): 'banana-shaped box'. Likewise, a chair shaped like a hand would be called a 'hand-shaped chair', as in (5c).

- (5) HUNGARIAN  
a. banan fiok  
BANANA BOX  
  
b. bananalaku fiok/doboz  
BANANA-SHAPED BOX (box in shape of bananas)  
  
c. kézalaku/kézformaju szék  
HAND-SHAPED/HAND-FORMED CHAIR

## 2. Elicited production

One question that arises from the difference in the type of modifiers allowed for compounding is how children would distinguish English from an Estonian/Hungarian-type language. Children first have to set the compounding

parameter. If their language allows compounding, they then have to determine which subtypes of compounding are allowed in their language.

In order to answer this question, we conducted an elicitation study with seven children, ranging in age from 3;11 to 4;11 (mean 4;8), attending the Child Development Laboratories at the University of Connecticut. We used a new methodology which involved singing in order to elicit novel compounds.<sup>1</sup> The experimenter manipulated a dinosaur puppet named Silve, who likes to explore the magic forest near his house. He finds new things in the forest and needs help naming the objects. He sings a song describing each new object, and asks the child to come up with a name for it. Sample song lyrics are given below.

- (6) Oh, look we found a chair,  
that looks like a hand.  
It's got five fingers,  
and even fingernails.  
What should we call this chair,  
that looks like a hand?  
What should we call this chair,  
that looks like a hand?

Each session consisted of two practice items and six experimental items, shown below.

- 7) Practice items
- |            |                                 |
|------------|---------------------------------|
| a. Purpose | tent where we can keep our toys |
| b. Pronoun | treasure that's only for us     |
- (8) Experimental items
- |                     |                                  |
|---------------------|----------------------------------|
| a. Material         | hat made out of rocks            |
| b. Quantificational | sweater that fits everyone       |
| c. Place of origin  | spider that came from the swamp  |
| d. Negation         | car that doesn't have any wheels |
| e. Proper name      | bike that only Fred can ride     |
| f. Shape/Appearance | chair that looks like a hand     |

The stimuli elicited compounds possible only in English, possible in both English and Estonian/Hungarian, and disallowed in both English and Estonian/Hungarian. Material and place of origin modifiers are allowed in both English and Estonian/Hungarian-type languages. We used these compounds to test whether children had set the compound parameter. We used shape/appearance modifiers, which are allowed in English but not in Estonian/Hungarian-type languages, to determine whether children had set the additional parameter for which subtypes are allowed in English. Quantificational and "privation"/negation modifiers are not allowed in either language type, nor (to the best of our knowledge) in any of the world's other

languages. We tested these universally disallowed compound types to determine whether children were sensitive to UG constraints in their responses to our task. The availability of modifier types is summarized in (9).

(9) **Types of modifiers**

	English	Estonian
material	✓	✓
place of origin	✓	✓
quantificational	*	*
“privation”, negation	*	*
shape/appearance	✓	*

The results from the study are given below in (10). We found that children generally behave adult-like, producing either a compound with modifier+head order (or a paraphrase) when compounds are allowed (material, place of origin, shape). This shows that the children have set the compound parameter to allow novel compounding. Even though these children know that English allows novel compounding, they also know that some cases are excluded by UG: children produced a paraphrase in cases where compounding is not allowed (quantificational, privation/negation).<sup>2</sup>

(10) **Results from experimental study**

	modifier+head	head+modifier	paraphrase
material	5	0	2
place of origin	4	0	3
quantificational	0	0	7
“privation”, negation	1	0	6
shape/appearance	4	2	1

No child chose the non-adult head+modifier order for the modifiers that are allowed/disallowed in both English and Estonian/Hungarian. Two children behaved non-adult-like on just the shape/appearance modifiers, and produced a compound with head+modifier order.<sup>3</sup> Given these preliminary results, there seems to be a period where children learning English have the more restrictive, Estonian/Hungarian-type grammar for nominal compounding. Some English speaking children may think that English is an Estonian/Hungarian-type language, and hence does not allow nominal compounding with a shape/appearance modifier. They may be producing a nominal compound with a purpose modifier as an alternative. Given that a compound such as *chair hand* is possible in both the English-type and the Estonian/Hungarian-type languages as an instance of purpose modification ('a hand serving as a chair'), children who produced such forms plausibly had a grammar of the Estonian/Hungarian-type, and were seeking a grammatical alternative to appearance modification.

### 3. Spontaneous speech study

If we assume children are adopting a subset principle strategy, we would expect children acquiring English to show a delay in producing nominal compounding with shape/appearance modifiers. In order to determine whether there is such a delay in the production of novel nominal compounds with shape/appearance modifiers, we studied the spontaneous speech of ten corpora from the CHILDES database (MacWhinney and Snow (1990)).

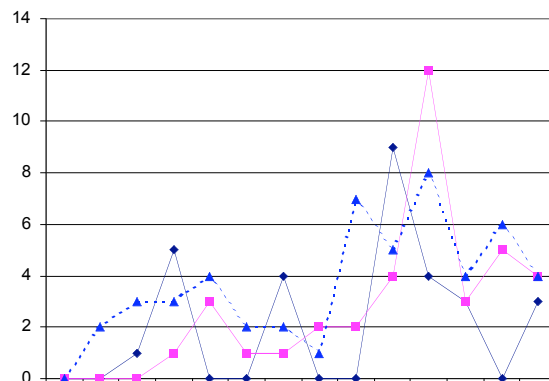
We also examined spontaneous speech data to investigate the question of how children learn whether compounding is productive in their language. Namiki (1994) proposed using recursive nominal compounds as a diagnostic of fully productive compounding, and Snyder (1999) found that recursive compounds were well-attested in the early adult input to every child he examined. If recursive compounds with shape/appearance modifiers are a trigger for the production of novel nominal compounds with shape/appearance modifiers, we would expect children with a low frequency of recursive shape/appearance compounds in their input to show a delay in their production of novel shape/appearance nominal compounds.

To answer the first question about the possible delay of shape/appearance nominal compounds, we searched the Nina corpus for novel nominal compounds and classified them by modifier type: shape/appearance, purpose, other. An example of each type of nominal compound is given in (11) and all of Nina's nominal compounds broken down by age is given in the graph in (12).

- (11) a. Appearance      circle flower      [=flower shaped like a circle]  
       b. Purpose        doggy ribbon      [=ribbon for dogs]  
       c. Other         zoo book            [=book about the zoo]

(12)

NINA's NNC by age



The probability of getting seven non-appearance novel nominal compounds by chance before the first clear use of shape/appearance nominal compound is not significant ( $p=.234$ , NS) by one-tailed modified sign test.

We also examined nine other children for age of their first clear use of a shape/appearance nominal compound; the first clear use of a shape/appearance nominal compound for each child is given in (13). There is an apparent delay of novel nominal compounding with shape/appearance modifiers for Shem, but it is not significant by one-tailed modified sign test ( $p=.230$ , NS). Overall, we found no significant delay between novel nominal compound with shape/appearance modifier and other types of modifiers.

(13) **First clear use of an Appearance NNC**

CHILD	AGE	NOVEL NNC WITH APPEARANCE MODIFIER
Adam	2;3.4	horse dress [=shirt with a picture of a horse on it]
Allison	2;10.0	flower dress [=dress with picture of flower(s)]
April	> 2;11.0	
Eve	2;0.0	motorboat duck [=squeak toy (“duck”) that looks like a motorboat]
June	>1;9.0	
Naomi	1;11.3	bunny girl [=girl that looks like a bunny]
Nina	2;1.22	circle flower [=flower shaped like a circle]
Peter	1;11.5	book box [=audio tape box that opens like a book]
Sarah	> 2;10.11	
Shem	2;5.9	smile shirt [=shirt with a smile on it]

To answer the second question about whether there is a correlation between frequency of recursive nominal compounding in child-directed speech and age of first novel nominal compound with a shape/appearance modifier, we searched for recursive compounding in child-directed speech in ten corpora. We found six instances of recursive compounds with shape/appearance modifiers, which are given in (14).

(14) Recursive compounds with appearance modifiers in child-directed speech

- a. EVE corpus: Christmas tree cookies (4 times)  
[=cookies in shape of Christmas trees]
- b. APRIL corpus: Apple dumpling cup  
[=cup with picture of Apple Dumpling]
- c. SHEM corpus: Cookie Monster shirt  
[=shirt with picture of Cookie Monster]

The input frequency of recursive compounds in child-directed speech for each of the ten children is summarized in the table in (15). There was no significant

correlation between input frequency and age of first novel nominal compound with shape/appearance modifier ( $R = -.127$ ,  $t(8) = .361$ ,  $p = .727$  (NS)).

**(15) Input frequency**

Children (N=10)	Sample of Child-directed Speech (Utterances)	Recursive Shape/Appearance Compounds	Recursive Compounds (Other Types)	Recursive Shape Compounds (Per Thousand Adult Utterances)
Adam	1,486	0	3	< 0.673
Allison	1,275	0	3	< 0.784
April	1,542	1	2	0.649
Eve	3,796	4	14	1.054
June	1,379	0	1	< 0.725
Naomi	2,541	0	8	< 0.394
Nina	1,853	0	2	< 0.540
Peter	4,100	0	4	< 0.244
Sarah	6,318	0	10	< 0.158
Shem	2,207	1	4	0.420
Totals	26,497	6	51	Range: < 0.158 to 1.054

**4. Concluding remarks**

In this paper, we presented nominal compounding data from an experimental study as well as from spontaneous speech. Our experimental findings are consistent with the existence of a stage during which children learning English have the more restrictive, Estonian/Hungarian-type grammar for nominal compounding. If we assume children are adopting a subset principle strategy, we would expect children acquiring English to show a delay in producing nominal compounding with shape/appearance modifiers. However, an examination of spontaneous speech data from ten children revealed that no child had a significant delay between non-appearance and appearance novel nominal compounding. In addition, we found that there is no evidence that recursive compounds with appearance modifiers are a trigger for children's novel nominal compounding with appearance/shape modifiers. We are now left with a learnability puzzle: How does a child learn the more restrictive, Estonian/Hungarian-type language? We leave this for further research.

## Endnotes

\* This research was supported in part by National Institutes of Health Grant DCD00183 to Diane Lillo-Martin and William Snyder, and by National Institutes of Health Grant R01DH32442 to Jill DeVilliers and Thomas Roeper.

<sup>1</sup> Stephanie Storrs and Matthew Saccoman were instrumental in the development of this methodology.

<sup>2</sup> There was one instance of a non-adult compound *wheel car* for the privation/negation case. This is surprising since privation/negation modifiers seem to be disallowed universally. We leave this for further investigation.

<sup>3</sup> See Nicoladis (1999). She observed some head+modifier order reversals in her monolingual English-speaking children, and was eliciting appearance-modifier compounds.

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HAND CHAIR. Similarly in Hungarian, there is productive nominal compounding, as in (5a), but there is no nominal compounding with shape/appearance modifiers. Banana box can only refer to a container for bananas, and not a box in the shape of a banana. A box in the shape of bananas can only be referred to as in (5b): "banana-shaped box". Likewise, a chair shaped like a hand would be called a "hand-shaped chair", as in (5c). (5) HUNGARIAN a. banan fiok. BANANA BOX. b. bananalaku fiok/doboz BANANA-SHAPED BOX (box in shape of bananas). c. kezalak/zformaju szék HAND-SHAPED/HAND-FORMED CHAIR. 2. Musical chairs is a fun game to play with a group of friends. This traditional game is easy to play with a few simple supplies. You can play musical chairs at school, a birthday party, a club meeting, or just for fun with some of your friends. Once you learn the basics of musical chairs, you can try adding some variations to the traditional game for a fun, modern approach. Steps. Part 1. In addition, musical expertise facilitates the learning of both linguistic and musical structures. Finally, an electrophysiological approach, which directly measures brain activity, appears to be more sensitive than a behavioral one. This similarity between speech and music acquisition, along with the extensive periods of musical training undergone by musicians allow us make several predictions. Firstly, that the learning of linguistic and musical structures may be similar. Secondly, that the learning of linguistic structures may be influenced by musical structures, and vice versa. And thirdly, that musical expertise may transfer to language learning. Statistical Learning and Speech Segmentation.