The Syntax-Lexicon Interface in the Acquisition of English Comparative Morphology

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1. Introduction

English has two types of comparative adjectives, synthetic (S-comparatives, with *-er*) and periphrastic (P-comparatives, with *more*), as illustrated in (1a) and (1b), respectively.

(1) a. John is bigger than Bill. [S-comparatives]
b. Mary is more beautiful than Sue. [P-comparatives]

In this paper I propose that the lexicon of English-speaking children around age four lacks the adults' abstract comparative morpheme (`CMPR`), contrary to Graziano-King's (1999) claim that adult-like P-comparatives are the default option for these children.

2. Graziano-King (1999)

Graziano-King (1999) argues that a) P-comparatives emerge as a default, and b) S-comparatives are listed in the lexicon and block P-comparatives. Evidence for the latter comes from the following fact: when adults are asked to choose the comparative form that is appropriate for a certain adjective, the choice is strongly affected by frequency of the adjective. In her experiment, she used a relative judgment task: the subjects (English-speaking adults) were presented with a pair of sentences that differed only in the comparative form (for example, 'My aunt is older than yours' and 'My aunt is more old than yours'), and were then asked to choose the more natural one. The results are given in (2).

(2) Relative judgment task: Adults (% preferring S-comparatives)

	HF	LF
monosyllabic	99.2	15.3
di-syllabic *-le*	84.7	16.9
di-syllabic *-y*	96	73.4
di-syllabic *-some*	21	3.2

HF: High-frequency adjectives
e.g.) *old, little, handsome*
LF: Low-frequency adjectives
e.g.) *lax, brittle, irksome*

(Graziano-King 1999)

The results show that frequency of adjectives strongly affects adults' choice of comparative forms: high frequency adjectives prefer S-comparatives, but low frequency ones prefer P-comparatives. Based

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on these results, Graziano-King concludes that a general rule forming P-comparatives operates as the default; exceptions (S-comparatives) must be learned individually. Since S-comparatives must be learned from the input, they are expected to occur primarily with high-frequency adjectives.[1]

Evidence for the default status of P-comparatives comes from the acquisition of comparative forms. The subjects in her experiment were English-speaking children around the ages of four and seven. The children were given the same type of relative judgment task as the adults. Results are shown in (3).

(3) Relative judgment task: Children (% favoring S-comparatives)

	4-year-olds	7-year-olds
monosyllabic SC	38.9	87.5
monosyllabic SI	41.7	38.2
di-syllabic *-le*	81.9	69.4
di-syllabic *-y*	30.5	66.7
di-syllabic *-some*	19.4	27.8

SC: Semantically compatible adjectives
= Gradable adjectives
SI: Semantically incompatible adjectives
= Non-gradable adjectives

(Graziano-King 1999)

All of the test items were high frequency adjectives (for example, *old, cold, short,* and *long*, for monosyllabic SC). Compared with the results from adults, four-year-olds tended to prefer P-comparatives over S-comparatives.[2] Based on this, Graziano-King concludes that P-comparatives are the default: unless S-comparatives are listed in the lexicon, P-comparatives emerge as the default.

3. Grammatical Conservatism

Snyder (2007) argues that children are "grammatically conservative" in that at least in their natural, spontaneous speech, they do not begin using a new construction until they have both determined that the construction is permitted in the adult language, and identified the adults' grammatical basis for it. More specifically, Snyder shows that errors of 'co-mission' (where children put words or morphemes together in an ungrammatical way like *comed* for the past tense form of the verb *come*) are extremely rare in their spontaneous speech. Instead, the vast majority of errors are errors of omission (where they simply omit required words or morphemes from their utterance). Of course, children are known to make over-regularization errors like *comed* and *foots* in their spontaneous speech. Yet, the frequency of such errors is much lower than one might expect. For example Marcus et al. (1992), on the basis of spontaneous speech data from 83 children in the CHILDES database, report that the children had a median frequency of only 2.5% over-regularization errors in utterances containing an irregular verb. They go on to show that adults produce over-regularization errors in their spontaneous speech as well, although with a substantially lower frequency. From these findings, they draw the conclusion that children have the same grammatical basis for inflectional morphology as adults. The difference between children and adults lies in the fact that adults are faster than children at retrieving irregular forms from the lexicon.

If children are grammatically conservative, it is surprising that they would use P-comparatives as the default option for adjectives that take S-comparative forms in the adult grammar. In fact, Snyder notes that errors of co-mission are extremely rare only in children's spontaneous speech; in

[1] Actually, Graziano-King (1999) does not exclude the existence of lexical rules, in addition to lexically listed forms. For example, she suggests that the choice of S-comparatives for the di-syllabic adjectives ending with *–y* and the choice of P-comparatives for the di-syllabic adjectives ending with *–some* could be due to some sort of lexical rules.

[2] Four-year-olds preferred S-comparatives for the di-syllabic adjectives ending with *–le* (*little* and *simple*). If P-comparatives are the default option, it is not clear why they preferred S-comparatives only in this case.

experimental situations, such errors are observed much more frequently. Since Graziano-King's data are not from spontaneous speech, it is unclear whether her findings go against grammatical conservatism. However, her claim that P-comparatives are the default option predicts that children should produce a large number of P-comparative forms, possibly with over-regularization errors (at least around 2.5% as in the case of the irregular past tense formation) in their spontaneous speech.

4. Data from Spontaneous Speech

To check whether English-speaking children produce over-regularized P-comparative forms in their spontaneous speech, I analyzed spontaneous-speech data from four English-speaking children in the CHILDES database (MacWhinney 2000). The corpora I analyzed are summarized in (4).

(4) Corpora analyzed

Child	Collected by	Age span	# of child utterances
Abe	Kuczaj (1976)	2;04-5;00	22,633
Adam	Brown (1973)	2;03-4;10	45,555
Naomi	Sachs (1973)	1;02-4;09	15,960
Sarah	Brown (1973)	2;03-5;01	37,012

First, I located all of the comparative forms children produced.[3] Then, I classified them into five categories, as shown in (5).

(5)

Name		Adult	
		S-comparative	P-comparative
Child	S-comparative	bigger	beautifuler
	P-comparative	more big	more beautiful

Double-marking: more bigger

When a child produced an S-comparative where an adult would too (e.g. *bigger*), it was counted in the upper left cell. When the child produced a P-comparative where an adult would use an S-comparative (e.g. *more big*), it was counted in the lower left cell. Likewise, when the child produced an over-regularized S-comparative form like *beautifuler*, it was counted in the upper right cell, and a P-comparative form like *more beautiful* was counted in the lower right cell. Finally, when a double-marking error like *more bigger* occurred, it was counted separately in the cell labeled 'double-marking'.

The results are summarized in (6) to (9).

[3] For S-comparatives the CLAN program Freq was used to generate a list of all the words that a given child produced, and then the words in the S-comparative form (including over-regularization errors, if any) were isolated. These forms were checked against the original transcripts by hand to exclude imitations, repetitions, and formulaic routines. For P-comparatives the CLAN program Combo was used to identify child utterances containing the word *more*, and then imitations, repetitions, and formulaic routines, as well as irrelevant uses of *more* such as *more apples*, were excluded manually.

(6)

Abe		Adult	
		S-comparative	P-comparative
Child	S-comparative	105	0
	P-comparative	0	0
	Double-marking:	5	

(7)

Adam		Adult	
		S-comparative	P-comparative
Child	S-comparative	67	0
	P-comparative	0	0
	Double-marking:	1	

(8)

Naomi		Adult	
		S-comparative	P-comparative
Child	S-comparative	18	0
	P-comparative	0	0
	Double-marking:	0	

(9)

Sarah		Adult	
		S-comparative	P-comparative
Child	S-comparative	36	0
	P-comparative	0	0
	Double-marking:	1	

First, children never produced over-regularization errors like *more big*, contrary to what one would anticipate from Graziano-King's claim. Second, when comparative forms were produced, they were always S-comparatives (not a single P-comparative was produced). Third, very few instances of double-marking errors were attested. Importantly, the fact that children did not produce any P-comparatives is unlikely to have resulted simply from the rarity of P-adjectives. To evaluate this possibility, I first estimated the ratio of (bare) S-adjectives (e.g. *big, long,* etc.) to S-comparatives (e.g. *bigger, longer,* etc.) in a given child's spontaneous speech. Next I used a binomial test to calculate the probability of finding the observed number of (bare) P-adjectives simply by chance, on the assumption that the frequency of the child's wanting to express a comparative meaning was constant across utterances containing S-adjectives versus P-adjectives. The results of the binomial test, illustrated in (10), suggest that children's lack of P-comparatives was not simply an accident, but instead resulted from the children deliberately avoiding them.

(10) # of S-adjectives (*big, long,* etc.): 3941
# of S-comparatives (*bigger, longer,* etc.): 226
# of P-adjectives (*beautiful, careful,* etc.): 463
# of P-comparatives (*more beautiful, more careful,* etc.): 0
Relative frequency of S-adjectives over S-comparatives: 3941 / (226+3941) =.945
Binomial Test: $p = (.945)^{463} < .001$

Clearly there exists a conflict between the data from Graziano-King's experiment and the data from spontaneous speech: large numbers of over-generalized P-comparative forms were observed in the former, but no such errors were attested in the latter. Put differently, we encounter the following puzzle: If, as Graziano-King claims, P-comparatives are the default option, why is it that children never produce them in their spontaneous speech?

5. Analysis

To account for the puzzle laid out in the previous section, I propose that the lexicon of English-speaking children around age four lacks the adults' abstract comparative morpheme ('CMPR'), as illustrated in (11).

(11) [[ADJ]~~-CMPR-~~] (cf. Bobaljik 2007)

This explains why children's judgments in Graziano-King's experiment were murky for the monosyllabic SC adjectives like *old, cold, short* and *long* (around a 60% preference for P-comparatives): Because the children did not have clear knowledge of comparative forms, their judgments were close to chance (in contrast, seven-year-olds chose P-comparatives for these adjectives only 12.5% of the time). Furthermore, absence of P-comparatives in spontaneous speech is a natural consequence: Given that children are grammatically conservative, it is expected that they will not use any P-comparative forms until they acquire CMPR and determine which comparative forms a certain adjective takes.

If their lexicon does not include CMPR, why do children ever produce S-comparatives? I argue that the S-comparatives children produced were not true comparatives. For example, as given in (12) below, Gathercole (1983) observes that when children produce S-comparatives, it is sometimes fairly clear that they do not have a comparative meaning: They produce 'X-*er*' forms equivalent to 'X' or 'very X'.

(12) Children's utterances in which X-*er* is used without a standard of comparison
a. Don't make this tighter. It's tighter! (Rachel, 3;06)
[Rachel trying to open pickle jar lid. She finds she can't open it.]
b. Hey! I got two prettier shirts! (Rachel, 3;06)
[Rachel has taken one of her favorite shirts out of her drawer to put it on. When asked about 'two', Rachel referred to a shirt that she wore home from school after getting her other clothes wet at school.]

(Gathercole 1983)

In (12a) Rachel produced the S-comparative form *tighter*, even though she clearly did not compare anything in the given context. Likewise, in the situation where the S-comparative form *prettier* was uttered in (12b), she did not intend that she had two prettier shirts compared with other shirts; she simply wanted to convey that she had two (very) pretty shirts. These data suggest that English-speaking children around three or four years of age produce S-comparative forms in a situation where no comparison is involved. This is consistent with my proposal that the lexicon of young English-speaking children lacks CMPR, and their S-comparatives are not true comparatives.

Evidence for the absence of CMPR in child grammar comes from the fact that children do not use S-comparatives together with *than*-clauses until relatively late, as shown in (13).

(13) First clear use (followed soon after by regular use) of comparative forms with a *than*-clause
Abe: 3;04 (File 91. Line 202)
"this airplane is different because the one I saw was shorter than this one?"
Adam: 4;06 (File 49. Line 2077)
"I'm bigger dan [: than] him"
Naomi: Not attested (through 4;09)
Sarah: 4;06 (File 115. Line 1466)
"it's better (th)an coffee"

If we require at least one clear use before we give the child credit for grammatical knowledge, and if we require the presence of a *than*-clause before we credit the child with a clear-cut use of CMPR, then the data suggest that many children do not actually acquire CMPR until around four and a half.[4,5]

Summarizing this section, I propose that there are at least two developmental stages in the acquisition of comparative morphology in English, as shown in (14).

(14) a. No CMPR stage: [[ADJ] ~~CMPR]~~]
BIG[6] -> big
BIG -> bigger
VERY -> -er
b. Adult-like stage: [[ADJ] CMPR]
BIG -> big
CMPR -> -er / $ADJ^{[+M]}$ __ ,
-> more / $ADJ^{[-M]}$ __ [7]

In the 'no CMPR stage' in (14a), CMPR is not present in child's grammar. Also, children analyze the comparative form X-*er* as an alternative form of a positive form of adjective 'X' or with an intensifier meaning 'very X'. This explains the following facts: a) children produced no P-comparatives in their spontaneous speech, because there is no slot where *more* can be inserted, b) children's judgments on the relative judgment task were not systematic, because they did not have clear knowledge of comparatives due to the absence of CMPR, and c) children used S-comparative forms for the root BIG or VERY BIG without comparison.

In the 'adult-like stage' in (14b), children acquire CMPR, and begin using adult-like comparatives. This stage is exemplified by the productive use of *than*-clauses. Following Bobaljik (2007), I assume that the choice of comparative forms is determined by a diacritic [±M(erger)] on adjective roots. Bobaljik proposes the following structure for comparatives.[8]

(15) $[[ADJ^{[\pm M]}]$ CMPR]

Graziano-King (1999) shows that the determining factor of the choice of comparative forms is

[4] Abe produced his first *than*-clause earlier than the other three children. This might be because Abe's data were collected using a mixture of naturalistic observation and elicited production.
[5] I acknowledge that the estimated ages of acquisition are likely to be somewhat high, because of the relatively low frequency of *than*-clauses even in adults' speech, and because of the processing load associated with planning and producing such a long and complex sentence. Nonetheless, I believe the estimates are close enough for the points being made here.
[6] Capital letters indicate abstract roots prior to vocabulary insertion in the theory of Distributed Morphology (Halle and Marantz 1993).
[7] Technically, this yields *big-more*. To get the correct word order *more big*, some sort of local dislocation rule needs to be applied before vocabulary insertion. For more complete accounts of comparative formation, see Bobaljik (2007), Embick (2007), and Embick and Marantz (2008).
[8] Bobaljik (2007) argues that comparatives are properly contained in superlatives, as implemented in the structure in (15). His proposal predicts that children who have not acquired CMPR should lack adult-like knowledge of superlatives. I leave it to future research to determine whether this prediction is correct.

frequency, not their phonological forms, when an adjective has fewer than three syllables. Based on this, Bobaljik argues that [+M] is acquired through positive evidence, and if children are exposed sufficiently often to the X-*er* form of an adjective X, then the root of X comes to have [+M]. For example, *big* is a high-frequency adjective: a child will have plenty of opportunities to hear the form *bigger*. This makes the root *big* have [+M] as a result. Due to [+M], Merger applies in the morphological component, yielding the S-comparative form *bigger* as illustrated below.

(16) Merger: [[BIG$^{[+M]}$] CMPR] -> bigger

Now how do children acquire [-M] when an adjective is low-frequency? One possibility is that [-M] is the default, and only [+M] is acquired by positive evidence. This approach, however, is problematic in two respects. First, it predicts that children will produce a certain number of over-regularization errors like *more big*, contrary to the evidence from spontaneous speech. Second, Graziano-King reports that the English-speaking adults who participated in her experiment preferred P-comparatives for nonce words exactly 50% of the time. If [-M] were the default, they would have preferred P-comparatives over S-comparatives 100% of the time, because the frequency of nonce words is zero. I suspect that children (and also adults) are conservative when they have a choice between [+M] and [-M]. Since [-M] must also be learned, it takes time for children to start producing P-comparatives.[9,10]

6. Conclusion

In this paper I proposed that the lexicon of English-speaking children lacks the abstract comparative morpheme CMPR until around age four or five. This proposal is consistent with the finding that some adult languages actually lack comparative constructions. Stassen (1985), based on the cross-linguistic survey of comparative constructions from 110 languages, reports that around 20 out of the 110 languages have what he calls the 'conjoined comparative'. In these languages comparison is expressed only by establishing an adversative relation between two clauses (for example, 'Y is big, X is little'). Also, he reports that around the same number of languages only have the 'exceed comparative', in which comparison is expressed roughly with the form 'Y is big exceeding X'. Given that these strategies are not specific to comparative constructions, but are available universally, these languages are likely to lack the comparative construction. I propose that children start with a no-CMPR option, and then learn the abstract morpheme later, from positive evidence - if their target language has it. This knowledge may be acquired late because children initially lack the conceptual pre-requisites to analyze the comparatives in their input.

References

Bobaljik, Jonathan David. 2007. On comparative suppletion. Ms. University of Connecticut.

Brown, Roger. 1973. *A First Language: The Early Stages*. Cambridge, MA: Harvard University Press.

Embick, David. 2007. Blocking effects and analytic/synthetic alternations. *Natural Language and Linguistic Theory* 25, 1-37.

Embick, David, and Alec Marantz. 2008. Architecture and blocking. *Linguistic Inquiry* 39, 1-53.

[9] This raises the question of how English-speakers acquire their strong intuitions about the comparatives of nonce words: No one should be able to form the comparative of a word for which they have never heard the comparative used. I need to assume that some of the relevant learning of diacritics is rule-governed (e.g. adjectives in –y are always [+M]). When the rules do not apply, the speaker may simply rely on analogy to phonologically similar words.

[10] One remaining issue raised by Graziano-King is the existence of double marking (DM) errors such as *more bigger*. Yet, the tables in (6) through (9) reveal that such errors are extremely rare. In the three purely naturalistic corpora examined here, DM errors account for none (0%) of Naomi's 18 comparatives, 1/68=1.5% of Adam's, and 1/37 = 2.7% of Sarah's. In Abe's mixed naturalistic/elicited corpus, DM errors account for 5/110=4.5%. When DM errors (and other co-mission errors) occur, they attract the attention of parents and child-language researchers alike, but their very low frequency places them well within the range (≤5%) conventionally attributed to performance errors. The DM errors are much too rare to provide support for Graziano-King's approach.

Gathercole, Virginia C. 1983. Haphazard examples, prototype theory, and the acquisition of comparatives. *First Language* 4, 169-196.

Graziano-King, Janine. 1999. *Acquisition of comparative forms in English*. Ph.D. Dissertation, CUNY.

Halle, Morris, and Alec Marantz. 1993. Distributed Morphology and the pieces of inflection. In *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger,* ed. Ken Hale and Samuel Jay Keyser, 116-176. Cambridge, MA: MIT Press.

Kuczaj, Stan. 1976. *-ing, -s, and -ed: A Study of the Acquisition of Certain Verb Inflections.* Ph.D. Dissertation, University of Minnesota.

MacWhinney, Brian. 2000. *The CHILDES Project: Tools for Analyzing Talk*. Mahwah, NJ: Lawrence Erlbaum.

Marcus, Gary F., Steven Pinker, Michael Ullman, Michelle Hollander, T. John Rosen, and Fei Xu. 1992. Overregularization in language acquisition. With commentary by Harald Clahsen, *Monographs of the Society for Research in Child Development* 57.

Sachs, Jacqueline. 1983. Talking about here and then: The emergence of displaced reference in parent - child discourse. In *Children's Language, Volume 4*, ed. K. E. Nelson. Hillsdale, New Jersey: Lawrence Erlbaum.

Snyder, William. 2007. *Child Language: The Parametric Approach.* Oxford: Oxford University Press.

Stassen, Leon. 1985. *Comparison and Universal Grammar*. Oxford: Blackwell.

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