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ABSTRACT

From the standpoint of transformational grammar, this experimental work evaluates the extent to which children choose or fail to generalize their rules for the placement of the negative particles "not" and "n't." The subjects were eight three- and four-year-olds of middle-class background who had been producing sentences with auxiliary verbs and negative particles at the time of the study and could easily imitate affirmative sentences with two auxiliary verbs. The children were instructed by their parents to imitate multiple auxiliary sentences with different placement of negative particles. The pattern of results showed that children consistently allowed "auxiliary verb+n't" only as the first auxiliary verb. While there was consistency within a given child as to placement of "not" as either first auxiliary or pre-predicate, there was no unanimity across the children. Significantly, it was found that three children failed in varying degrees to take advantage of the prospective generalization offered by negative sentences, and chose pre-predicate rather than first auxiliary placements of "not," even as they consistently imitated "auxiliary+n't" forms as the initial negative forms of multiple auxiliary sentences. (EJS)

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IS NOT N'T? A STUDY IN SYNTACTIC GENERALIZATION

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A transformational grammar describes the sense adult speakers have of the relatedness of various sentence and morphological constructions. To the degree that a child is a transformationalist, we might expect the child to make active efforts to find and formalize such relations between constructions. Perhaps the strongest evidence of such generalizing organization may be found when the child is faced with novel situations which nevertheless allow general rules formed on previous analyses to be employed, or not.

The experimental work we report here constitutes an attempt to evaluate the extent to which children acquiring English syntactically relate two similar morphemes: the full negative forms Aux+not and the contracted forms Aux+n't (where Aux stands for any auxiliary verb form). The classic description of the placement of the negative particle (Chomsky, 1957; Klima, 1964) places the negative particle after the first auxiliary verb in the form not, with optional contraction to the form n't. Such a rule syntactically relates sentence pairs such as

The little boy could not have been singing. =>

The little boy couldn't have been singing.

The girl has not been looking at her duck. =>

The girl hasn't been looking at her duck.

The rule of contraction of not to n't is a natural one for a linguist to formulate. The privileges of occurrence are highly similar, the semantics are nearly identical, and there is a clear morphological similarity (ignoring the troublesome pair will not and won't).

Much of the clarity of the analysis for the adult speaker, however, stems from the presence of multiple auxiliary verb sentences. Consider, in contrast, an input language in which nearly all negative sentences

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contain just one auxiliary verb. Declarative sentences then have the following appearances (and analyses):

He is not singing.

He isn't singing.

He can not take the record.

He can't take the record.

What will tell the child to analyze He is not singing as involving the placement of not or n't after is, rather than before singing? Do not and n't follow can, or precede take? In such a language it is not clear whether the negative particle is being placed after the first auxiliary verb or in front of the predicate.[2]

In fact, it is most likely that children analyze the contracted n't form as belonging to the first auxiliary. We would expect this on the following two grounds:

1) However segmentation is performed, aux+n't constructions are indeed single words: i.e., isn't, can't, won't, couldn't, hasn't are unified lexical entries.

2) There are reasonably common sentences such as Aren't you coming, Isn't he here, Hasn't he left? in which the n't is clearly associated with the first auxiliary.

The case of children's analysis of not, however, offers more interesting possibilities. It seems to us that on grounds of generalization, children ought to analyze not similarly to n't. The positional overlap, semantic similarity, and morphological resemblance are almost as strong as in the adult language. There are a few sentence types which imply the association of auxiliary and not, such as truncates: I am not, He can not, He has not, but the case is less clear. Not has an independent word status, and might almost as well be placed with respect to the predicate as to the auxiliary. Children may occasionally hear questions such as Will he not come? Has he not seen that? in which not may appear associated with the predicate. Early in acquisition, children commonly produce sentences with no auxiliary verbs but not for negation (Klima and Bellugi, 1966; Bloom, 1970): He not coming, He not in there, It not a dog. Here place of not could be analyzed only with difficulty as appearing after the first auxiliary verb, since there is no auxiliary verb: it might be either post-subject or pre-predicate. When sentences with auxiliary verbs come in, the pre-predicate analysis would still be adequate.

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[2] We wish to use "predicate" in this paper as that verbal or predicate material that follows the auxiliary verb(s). We could all uses of the verb be, whether progressive or copulational, as auxiliaries. Thus, below, the underlined parts are the "predicate."

He is a dog.
He will have been singing.
He may have been in the yard.

So it seems to us that there is evidence available to children to motivate either similar or dissimilar analyses of the distributions of not and n't. Such differential analyses should show up in children's treatment of sentences with more than one auxiliary. In effect, we should expect children who have made a first-auxiliary placement analysis to prefer sentences such as

The boy should not have been eating ice cream.

while those who have made a pre-predicate analysis would find more congenial a sentence, odd to adult ears, such as

The white fence would have been not very long.

In this study we exposed children who had been producing negative sentences with auxiliary verbs to multiple auxiliary sentences with different placements of the negative particles.

Method

Subjects. The subjects were eight children of middle-class, graduate student background, four three-year olds and four four-year olds. All subjects had been producing sentences with auxiliary verbs and negative particles at the time of the study, and could easily imitate affirmative sentences with two auxiliary verbs.

Linguistic Stimuli. Each child was given a total of 100 negative sentences to imitate, 54 declaratives and 46 yes-no questions. For reasons of space, we shall report extensively here only on the declarative sentences, with occasional references to results from the yes-no questions. The fifty-four declarative sentences were divided among 30 sentences which contained a M(odal) + Have + be form, 12 which contained M + be, and 12 which contained Have + be.[3] Not was placed in all possible places after each auxiliary verb position in equal number. N't was not treated quite identically. Since only M+n't and Have+n't form actual lexical items among the forms, n't was not placed after the forms of be. The three auxiliary verbs used were could, should, and would, with equal frequency. The frequency of each type of stimulus sentence, with an example of each is given in Table 1.

In addition to the 54 negation sentences, the children were also asked to imitate 46 simpler filler sentences, such as Fire is very hot and Crabs swim in the ocean. These were provided to afford a relief from the often difficult multiple auxiliary experimental sentences.

Procedure. The method we employed was elicited imitation, in which the experimenter asks the child to repeat a sentence (e.g., Fraser, Bellugi, and Brown, 1963; Slobin and Welsh, 1973). It has been found that children will frequently filter imitated sentences through their extant grammatical systems (Slobin and Welsh, 1973), preserving elements consistent with that system and changing or deleting those which are not.

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[3] The subjects were given equal numbers of sentences in which the progressive auxiliary be (e.g., as in The big turtles have not been swimming in the pond) and copular be (e.g., The white fence would have been not very long) were used. Analyses turned up no case of this distinction having any general effect, and it will not be discussed further.

Table 1

Types of Different Stimulus Sentences

Sentences with not	Number
M+HAVE+BEEN	
M not have been {V+ing / Cop Ph} 3	6
The boy should not have been eating ice cream.	
M have not been	6
The garbageman should have not been in the tree.	
M have not been	6
The white fence would have been not very long.	
Mn't have been...	6
The girl shouldn't have been playing with matches	
M haven't been	6
The car would haven't been going really fast.	
M+BE	
M not be...	4
The rubber-band would not be a nice present.	
M not be...	4
The tiger would not be eating his friend.	
Mn't be	4
A big elephant couldn't be hiding behind a tiny ant.	
HAVE+BEEN	
Have not been...	4
The big turtles have not been swimming in the pond.	
Have been not...	4
The old man has been not inside the closet.	
Haven't been	4
The girl hasn't been painting his kitchen.	

Bloom (1974) has mentioned difficulties with the elicited imitation method. She has produced evidence that one child's imitations were in fact less complex than his spontaneous speech, probably because of lack of contextual support. We have noted that a characteristic of many of the successful imitation studies has in fact been the use or aid of parents as experimenters (e.g., Kuczaj and Maratsos, 1975; Slobin and Welsh, 1973). In work elsewhere we have also found difficulties when outside experimenters attempted to work with young children. We do not know that this problem accounted for Bloom's results--the nature of the stimuli were probably also of importance--but it may have contributed. In the present study, the

experimenters were indeed the parents of the children. Each parent was left with a list of 100 sentences (declaratives only being described) and a tape recorder, with the purpose of having the child imitate the sentences whenever convenient. When the list was completed (usually approximately one week), the parent phoned us, the tape recorder and tape were retrieved, and the imitations were transcribed off the tapes.

Employing parents as experimenters in this task offered some clear advantages. With such long lists, it is difficult to carry out the task at one time. Parents could do parts of the lists at different times. More important, outside experimenters typically have to take what they find available in the way of cooperativeness, something not always available in preschool children. Parents may select times when the child is feeling most agreeable. They also have more authority than outsiders in asking their children to attend to the task.

At the same time, it is our guess that given the highly restrictive and obscure nature of the task, parents could do little to influence their children's performance in unintentional ways. Sentence types were randomly scattered through the list so that it made no difference where a parent might stop at a given time. By and large we think from listening to the tapes that no obvious experimenter bias effects appeared.

Results and Discussion

The pattern of results showed children consistently allowing Aux+n't only as the first auxiliary verb. But while there was consistency within a given child as to the placement of not as either first-auxiliary or pre-predicate, there was no unanimity across the children: some preferred a first-auxiliary placement, others a pre-predicate placement, and one a mixture contingent on the auxiliary verbs of the sentence (the two least advanced children showed no clear tendency).

Three of the eight children of the study consistently placed the negative particle not in front of the predicate in all or a systematic portion of the imitations of declarative negative sentences. We shall describe these children's imitations separately, with some brief comments about their yes-no question imitations.

Steven (3 years old) gave twenty-nine imitations containing more than one auxiliary verb and a form of not. In all of these he placed not in pre-predicate position, regardless of its position in the model. Examples:

Model: The turtle could not have been in the jar.

Imit.: THE TURTLE COULD BEEN NOT IN THE JAR.

Model: The zoos should not be crowded tomorrow night.

Imit.: THE ZOO SHOULD BE NOT CROWDED TOMORROW NIGHT.

Model: The tiger would be not eating his friend.

Imit.: THE TIGER WOULD BE NOT EATING HIS FRIEND.

Seventeen of these twenty-nine imitations consisted of conversions from other not placements, as in the first two examples.

Steven's imitations of yes-no questions were consistent. Usually (twenty-three times) he converted yes-no negatives to questions with initial Aux+nt:

Model: Has the monkey not been eating the banana?

Imit.: Can't the monkey eat the banana?

He maintained not as the negative particle in five imitations, however, in all of which placement was pre-predicate:

Model: Should not a tree grow in the back yard?

Imit.: SHOULD A TREE NOT GROW IN THE BACK YARD?

Model: Have not the boys been falling off the cliff?

Imit.: THE BOYS BEEN NOT FALLING OFF THE CLIFF?

In imitations with contracted negatives Steven consistently maintained contracted auxiliaries in first position. Thus the same child who gave imitations such as The boy should'been not eating ice cream converted yes-no questions to Auxn't NP... forms and gave declarative imitations such as The girl shouldn't been playing with matches.[4] His placement of negatives could be described with two clear disjunct rules: 1) Aux+n't are the first auxiliary verb of a sentence. 2) Not is placed before the predicate.

Mickey, a four-year old, also showed a strong general tendency to place not in a pre-predicate position (16 of 19 conversions, 12 of 14 correct imitations). Examples:

Model: The big turtles have not been swimming in the pond.

Imit.: THE BIG TURTLE HAS BEEN NOT SWIMMING IN THE POND.

Model: The girl should have been not on the chair.

Imit.: THE GIRL SHOULD BE NOT ON THE CHAIR.

She failed to show as strong a generalization to yes-no questions as Steven, however. Her preferred forms were Auxn't NP and Aux NP not (aux) VP, essentially the most common surface forms for yes-no negatives, the second pattern being in strong conflict with her declarative imitations.

Abe, another four-year old, placed not contingent on the presence or absence of have in his imitations. Pre-predicate placement predominated in his imitations which contained have (22 or 24 showing this pattern), e.g.:

Model: The fireman should have not been sleeping on the floor.

Imit.: THE FIREMAN SHOULD HAVE BEEN NOT SLEEPING ON THE FLOOR.

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[4] In particular, if the pre-predicate not imitators had been using a similar placement rule for not and n't, we might have expected either or both of the following to occur: 1) Multiple auxiliary sentences ought to have been reduced to single auxiliary sentences far more often, so that n't would appear in front of the predicate, or 2) conversion of n't negatives to not in multiple auxiliary sentences ought to have been common, so that not could be placed before the predicate. Neither of these results was obtained.

But of eleven imitations in which only M+Be appeared, ten contained a first-auxiliary placement of not, e.g.:

Model: The man should be not hitting the little pony.

Imit.: THE MAN SHOULD NOT BE HITTING THE LITTLE BOY'S PONY.

Model: The policeman should have been not standing on his head.

Imit.: THE POLICEMAN SHOULD NOT BE STANDING ON HIS HEAD.

The last example illustrates that it was the presence or absence of have in Abe's imitation that was criterial, not whether have appeared in the model. Clearly Abe placed not only after the choice of auxiliary verbs.

Have is in fact the last of the auxiliary verbs to appear in acquisition (Brown, 1973), and gave the subjects of this sample the most difficulty in imitation. Abe seems at this time to have acquired a first auxiliary verb placement for not in the developmentally earlier sentences not containing have, but to have failed to generalize this placement to the later acquired constructions with have. Data from imitations given to Abe nine months earlier supplement this analysis. Abe at that time imitated a large set of sentences including instances of Modal+Be negative sentences. Nine of his eleven imitations involved converting to or preserving pre-predicate position for not:

Model: The fly could not be on the side of the window.

Imit.: THE FLY COULD BE NOT ON THE SIDE OF THE WINDOW.

Corroboratively, from naturalistic transcripts, we have Abe's only recorded sentence around this time which contains a form of not and two auxiliary verbs:

I will be not angry. I will be happy.

So Abe appears to have learned in the intervening time to place not on the first auxiliary in the developmentally earlier Modal+Be negatives, but not to have generalized this rule to the newer have acquisitions.

Abe, like all other subjects, consistently imitated n't sentences with first auxiliary verb placement; in particular he gave the strongest evidence of such placement in his imitation of M+Haven't+Be sentences:

Model: The fire could haven't been very hot.

Imit.: THE FIRE COULDN'T HAVE BEEN VERY HOT.

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4 con't. Preservation of the contracted negative status of models was overwhelmingly the chosen path (around seventy-five to ninety-five percent for multiple auxiliary sentences among the subjects of the sample). Preservation of a contracted negative was obtained even if the auxiliary originally containing n't was not imitated; n't would then appear on another auxiliary, as in the following imitation of a M haven't be negative:

Model: The fire could haven't been very hot.

Imit.: THE FIRE COULDN'T BEEN VERY HOT. (Steven)

Given that children showed no reticence in rearranging not in sentences, the stability and pervasiveness of multiple auxiliary imitations with initial Auxn't is convincing evidence of the generality of the children's first-auxiliary analysis of n't.

Abe's yes-no questions show no simple preferences, though illustrating some preference for the forms Aux+n't NP..., and peculiarly enough, Aux+not NP....

The data indicate three children, then, whose treatments of n't and not sentences were quite dissimilar. All three children had produced single auxiliary verb negative sentences, both contracted and full form, for a period of months to years.

First-Auxiliary Imitators.

Three other children provided imitation patterns more comfortable to the adult ear. These children consistently rendered negative declaratives as first-auxiliary negatives. The most consistent of these imitators was Amara (four-years old). Fourteen of the fourteen relevant declarative not imitations contained first-auxiliary placements, e.g.:

Model: The water has been not very warm today.

Imit.: THE WATER HAS NOT BEEN VERY WARM TODAY.

Model: The policeman should have been not standing on his head.

Imit.: THE POLICEMAN SHOULD NOT BE STANDING ON HIS HEAD.

Amara, interestingly, was the only subject who frequently contracted declarative negatives from full to n't form, a total of 20 times, e.g.:

Model: The airplane could have been not flying.

Imit.: THE AIRPLANE COULDN'T BE FLYING HOME.

Her imitations of yes-no questions were also consistent, being usually of the form Auxn't NP... or less frequently Aux+Not NP..., e.g.:

Model: Will the boy be not in side the car?

Imit.: WILL NOT THE BOY BE INSIDE THE CAR?

Positing a direct relation between full and contracted negative forms appears reasonable in her case.

Similar patterns in negative declaratives were shown by Shannon (three years old; 24 of 25 sentences consistent) and Leslie (four years old; 35 of 35 sentences consistent). Neither of these two subjects showed as much consistency in the imitation of yes-no questions, however. Shannon's yes-no imitations show no simple pattern, while Leslie's display the following pattern: 1) If the negative particle appears after the first auxiliary, it is preserved (seven times out of seven), e.g.:

Model: Could not the girl be sleeping in a bed?

Imit.: COULD NOT THE GIRL BE SLEEPING IN THE BED?

But 2) If the negative particle appears anywhere after the subject NP, it is placed before the predicate (five conversions, seven preservations of position), e.g.:

Model: Has the frog not been on top of the car?

Imit.: HAS THE FROG BEEN NOT ON TOP OF THE CAR?

Leslie showed a clear first-auxiliary pattern in declaratives, but some tendency toward pre-predicate placements in yes-no questions.

Thus three children in the study treated declarative negative sentences consistently. Again, these children showed no tendency to place n't other than on the first auxiliary verba of the sentences, preserving these forms quite stably in imitations. Their placements of not were consistent with this in declaratives.

No Marked Tendency.

Two three-year olds, Julie and Jeremiah, showed no convincing consistent pattern in the imitation of negative declaratives. Julie, in general the least competent imitator,[5] most often reduced sentences to single auxiliary verb forms, placing n't and not after the first auxiliary (or before the predicate). She seems to have learned the patterns should not be or shouldn't be, which she used eight times, e.g.:

Model: The girls should have been not on the chair.

Imit.: THE GIRL SHOULD NOT BEEN ON THE CHAIR.

Her only other multiple auxiliary imitations contained would, three times in a contrary pattern:

Model: The car would haven't been going real fast.

Imit.: THE CAR WOULD BEEN NOT GOING REALLY FAST.

Yes-no questions were generally converted to the form Auxn't NP...?

Jeremiah simply showed no preference in not placements, placing not either before the predicate or after the first auxiliary verb indiscriminately (ten pre-predicate imitations, nine first-auxiliary imitations in multiple auxiliary imitations), e.g.:

Model: The fireman should have not been sleeping on the floor.

Imit.: THE FIREMAN SHOULD HAVE BEEN NOT SLEEPING ON THE FLOOR.

Model: The marbles should be not inside the doghouse.

Imit.: THE MARBLES SHOULD NOT BE INSIDE THE DOGHOUSE.

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[5] The data offered internal means of gauging the linguistic maturity of the subjects. Subjects nearly always kept some form of negative in their imitations (.97 of the time for declarative sentences), but often deleted one or more auxiliary verbs, especially have. Thus subjects could be analyzed for the proportions of auxiliary verbs they kept in their imitations for various imitations. Julie, the least competent subject, for example, retained forms of have just .08 of the time in both M+Have+Be sentences and Have+Be sentences, and kept both auxiliaries in M+Be sentences just .64 of the time, both of these the lowest scores among the subjects. Abe, the most advanced subject in these terms, retained have in M+Have+Be sentences .73 of the time, and in Have+Be sentences 1.00 of the time. Other subjects fall between these two points.

Jeremiah's yes-no questions also tended strongly towards the Auxn't NP... form.

Use of Been.

The imitations clearly show highly assimilative activity by the subjects, of a non-rote nature. A striking general result, in fact, is that children never imitated declarative negatives in a way such that not appeared after the subject NP, which would have frequently happened had they simply dropped auxiliary verbs. Consider the following imitation from Shannon, who from her multiple auxiliary imitations was clearly a first-auxiliary imitator:

Model: The red flowers have not been growing fast.

Imit.: THE RED FLOWERS BEEN NOT GROWING FAST.

If Shannon had simply deleted the Modal and Have, the result would have been THE RED FLOWERS NOT BEEN GROWING FAST. Instead, she placed not after the only auxiliary verb, been, even though the sequence been+not is not heard in English speech. Imitations with the resulting form NP been not Pred were common in this study, showing for first-auxiliary imitators that 1) not was placed only after the choice of auxiliary verbs had been made; 2) children will generalize their placement of not to placement after been if that is the only auxiliary verb, even though the result is the particular sequence been+not, an unheard sequence. Thus the placement represents a true overgeneralization.

Conclusions

The purpose of our study was to examine the extent to which children chose or failed to generalize their rules for the placement of the negative particles not and n't, two forms intimately related in most descriptions of the adult negation system (Klima, 1964; cf. however, Jackendoff, 1972). Our starting ground was the possibility that the combination of the children's own early speech and the speech sample they were exposed to allowed them some latitude in the analysis of not-placement but not in the placement of n't auxiliary verbs.

In these terms, clearly the most striking discovery was that three children failed in varying degree to take advantage of the prospective generalization offered by negative sentences, and chose pre-predicate rather than first auxiliary placements of not, even as they consistently imitated Auxn't forms as the initial negative forms of multiple auxiliary sentences. These results have a number of implications, both methodological and more broadly theoretical.

Klima and Bellugi, in their work describing the child's acquisition of negation (1966) noted that the earliest auxiliary verb negative forms in the children they studied were don't and can't. Corresponding full forms like do not or can not, or even do and can in affirmative sentences, were absent. They accordingly analyzed don't and can't as unitary negative forms not related to the Aux+not forms of adult speech. When both full and contracted negative auxiliaries appeared, however, they reasonably gave a rather adult-like analysis of the relation between full and contracted

not. What the present results suggest is greater skepticism about relating forms in a manner similar to adult analyses even if the data might allow such analyses--or indeed, generally, giving the most general analysis the data might allow. Some children may be failing to capture generalizations that appear to be present; at least these possibilities must be considered in the analysis of naturalistic speech.

Given, in fact, the incidence of pre-predicate placement, it becomes difficult to conclude that even those three children who treated n't and not alike in declaratives have formed a system of rules systematically treating the two forms alike. They may simply have independently chosen similar placements for the two morphemes. The analyses we have discussed do not provide evidence of a psychologically real operation of not-placement and contraction even for first auxiliary imitators, though further analysis of this and other data may provide such evidence. We also note the occasionally strong disjunction between declarative and yes-no systems as a further spur for such skepticism.[6]

Perhaps more important than the methodological point, the data suggest that at least some children do not achieve a maximally general formulation of the distributional relation of not or n't for periods of months or even years. The point of transformational analysis, of course, is to capture such possible generalizations and economies. We may say, perhaps, that children, while showing prodigious powers of generalization,[7] are not necessarily thorough and active transformational analyzers; they do not apparently

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[6] In particular, we should demand stronger evidence of some kind of contraction rule. There is a notable lack in the naturalistic literature, of reports of the very expectable overgeneralized form will+n't. The subjects in this study had many chances to produce the form been+n't as a result of their imitations. One subject, Jeremiah, apparently did so once, but otherwise none did. Brown and Hanlon (1970) do report an utterance from Adam containing amn't, which others anecdotally report. In general we believe that stronger evidence should be adduced to justify the existence of such rules where possible than to point out the presence of relatable forms.

[7] We can point out in the following study, for example, the treatment of been as a first auxiliary verb for not-placement, and for that matter, the vigor with which pre-predicate analyzers generalized their placement of not so as to produce such oddities as THE BIG TURTLE HAS BEEN NOT SWIMMING IN THE POND. The point is that there is an even more general formulation available by which children might relate not and n't forms systematically with no great contradiction from the speech around them and much support, a formulation which is not taken advantage of. Another point, of course, is the possibility of different analyses underlying the same apparent sets of input and production data.

seek and capture possible generalizations even for long periods. Nor can we be certain that the presumably eventual achievement of an adult-like system truly stems from a reorganization made only to achieve greater generality. Actual sentences with multiple auxiliary verbs are heard and eventually seen occasionally. Perhaps children need to hear actual determining instances before they achieve the correct placements of not. Abe in particular showed an interesting capacity to maintain a discordant system for the placement of not in declaratives (pre-predicate in have sentences, first-auxiliary in others), even though our naturalistic records and his general skill in imitation make it clear he had acquired much knowledge of language. Languages are in fact not as fully general and elegantly simple as they could be, as attested to by the exceptions or lack of complete generality to be found in many of their rules. Neither, it seems, are children.

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