The emergence of the child as grammarian[1]

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Abstract

Demonstrations of some young children's awareness of syntactic and semantic properties of language are presented. Rudiments of such 'meta-linguistic' functioning are shown in two-year olds, who give judgments of grammaticalness in a role-modelling situation. The growth of these abilities is documented for a group of five to eight-year old children, who are asked explicitly to give judgments of deviant sentences. Adult-like behavior, in these talented subjects, is found to emerge in the period from five to eight years. Possible relations of meta-linguistic functioning to other 'meta-cognitive' processes are suggested.

What do we mean when we say a speaker 'knows the rules' of language? Transformational linguists have been guarded in explicating this claim, for surely there is a difference between what the speaker knows and what a professional grammarian knows. There is broad agreement that speakers 'follow the rules' and, in fact, have trouble *not* following them (as in memorizing deviant sentences and the like; e.g., Miller and Isard, 1963). But performances of this kind are hardly equivalent to our everyday understanding of what it means to *know* rules. Used in this ordinary sense, the term *knowledge* implies awareness of generality; in its strongest form it involves the capacity to articulate the rule system itself, as in a chess player who can readily recite the rules of the game that constrain his behavior. The elite linguistic informant is rather like the chess player: he follows the language rules,

but on demand he can do much more. He can demonstrate some awareness of the existence of a rule system by performing the one task that provides the main data base for modern grammatical theories: he can indicate whether a sentence is or is not well-formed. A rule system may be followed and yet not be known in this sense. The spider weaves his web according to a well-defined set of arachnid principles, but we hardly expect him to note any deviance if he weaves under the influence of LSD. Rule following *per se* implies knowledge of a weaker sort than that which linguists have generally been interested in. The very tasks they impose upon their informants require more than mere obedience to the rule system: the rules themselves must be engaged in the service of a further cognitive act. In a way, the linguist assumes not only that the speaker knows the rules but that he knows something about his knowledge.

This paper is concerned with the development of this aspect of linguistic behavior, the ability of a speaker to reflect upon the rules that he follows. There is little doubt that this meta-linguistic skill has been a critical methodological prerequisite for the construction of linguistic theories during the last two decades. We are here concerned with the emergence of this skill in young children.

Developmental psycholinguists have shown us that the young child already honors the rules for English sentence formation, at least within very wide limits. Children of four and five speak the language fairly well, have trouble – like adults – in repeating and memorizing deviant sentences, and so forth (e.g., Labov, 1970). But this work tells us only that children follow the rules, 'know how' to speak English.[2] The question is whether they can also contemplate the structure of the language, whether they know that they know. We will claim that at least some five, six and seven year olds possess this meta-linguistic ability to a remarkable degree, and that a germ of this capacity can already be seen in the two-year old. Thus in part we are pursuing a claim some of us have made elsewhere (Gleitman and Gleitman, 1970), a claim that is, we believe, implied – though usually cautiously – in the writings of most generative grammarians: it is the speaker's potential abstract awareness of language structure, and not merely his orderly behavior in accord with these rules, that lies at the heart of the generative-transformational hypothesis.

2. We do not wish to overstate the case for the sophistication of children's speech. Although many developmental psycholinguists state the language-learning process is essentially complete at age four or five (e.g., McNeill, 1966; Lenneberg, 1967), this is by no means clear. We do know that gross errors in speech have largely disappeared at this time, except where morphophonemic irregularities *(bringed,* etc.) are involved; but we have no firm data on the complexity and variety of structures in early child speech.

1. The child's garden of syntax

At first glance, there seems to be something of a paradox for students of cognitive development in the pre-schooler's linguistic precocity: if language is simply a tool of thought, then it is surprising that language abilities seem to emerge so much earlier than other cognitive skills. The child's progress to logic, to a belief in the conservation of quantities, to concepts of number, seems painfully slow, but almost any mother can attest to leaps of apparently abstract thought in the particular areas of phonology and syntax. For example, no three-year old lisps out his syllables so poorly that he does not feel entitled to employ a self-conscious baby-talk to dolls and other social inferiors (Gelman and Shatz, 1972; Shipley and Shipley, 1969). Such aspects of juvenile competence are rarely studied, in part because of the widespread belief that they cannot be dealt with experimentally (e.g., Brown, Fraser, and Bellugi, 1964). Yet anecdotally it is easy to point to cases where young children manifest great sensitivity to identifiable subtle features of language. For example, here is a question about segmentation from a four-year old:

Mommy, is it AN A-dult or A NUH-dult?,

a query made doubly intriguing by the fact that this child did not make the *a/an* distinction in spontaneous speech until two years later. And a four-year old with a question about adverbial complements:

Mother (taking car around a sharp bend): Hold on tight!
Child: Isn't it *tightly?*

A precocious first-grader, unacquainted with formal punctuation marks, delicately observes the distinction between use and mention:

Child (writing): They call Pennsylvania Pennsylvania because William Penn
had a (Penn) in his name.
Mother: Why did you put those marks around the word Penn?
Child: Well, I wasn't saying Penn, I was just talking about the word.

This child quite apparently does more than speak in accordance with the rules of grammar. She recognizes paraphrases, laughs at puns, and rejects deviant though meaningful sentences. We believe that these features of behavior, far from being the icing on the linguistic cake, represent our best clues to central aspects of language competence. We will show in this paper that the capacity to reflect on linguistic structure is available to some very young children. First, we demonstrate the rudiments of this abstract attitude in two-year olds. Second, we document evolution of this capacity in the young school-age child. No normative data are presented. We intend the work as an existential comment on linguistic creativity in

some young children. We cannot speculate on how widespread such talents may be in the population at large.

2. Judgments of grammaticalness from the two-year old

2.1 *The problem of doing developmental psycholinguistics*

Fruitful linguistic inquiry can hardly begin unless the speaker-listener can provide firm judgments on at least some sentences of his language. The primary data are not the subject's utterances, but rather a set of sentences he judges, upon reflection, to be well-formed. The theory of grammar that emerges is an account of these judgments. Precisely how such an account is related to a description of language performances (other than judgment-giving performances) is currently something of a mystery. What is important for our purposes here is the fact that these judgmental data have not been available to the developmental psycholinguist. Even if we had a complete description of the child's speech and a complete description of the adult's linguistic judgments, this would be a dissatisfying state of affairs, for there is no obvious way to compare these accounts in the interest of describing language acquisition. Brown, Fraser, and Bellugi commented in 1964 on this methodological gap separating the linguist's study of the adult from the psychologist's study of the child:

> The linguist working with an adult informant gets reactions to utterances as well as the utterances themselves . . . Can such data be obtained from very young children?
>
> With Abel [a two-year-old] we were not successful in eliciting judgments of grammaticality. Of course there was no point in asking him whether an utterance was 'grammatical' or 'well-formed'. We experimented with some possible childhood equivalents. The first step was to formulate tentative grammatical rules, and the next to construct some utterances that ought to have been acceptable. For Abel 'The cake' should have been grammatical and 'Cake the' ungrammatical. How to ask? The experimenter said: 'Some of the things I say will be silly and some are not. You tell me when I say something silly.' Abel would not. If Abel had a sense of grammaticality, we were unable to find the words that would engage it . . .' (Brown, 1970, pp. 72-73).

Given this outcome, psychologists have used various indirect methods in the study of the very young language learner. Almost all of the techniques represent attempts to get at the classificatory system. Large contributions to our knowledge of the emerging speaker have come from careful observation of spontaneous speech (e.g.,

Braine, 1963; Miller and Ervin, 1964; Brown, Cazden and Bellugi, 1969; Bloom, 1970) which must, in some admittedly cloudy way, reflect something of the speaker's underlying organization of the language. Similarly, studies of repetition, memory, and the comprehension of various syntactic and semantic structures (e.g., Brown and Bellugi, 1964; Menyuk, 1969; Chomsky, 1969) are in many ways analogous to solicitation of judgments of well-formedness. These latter methods are to some extent validated by their success with adult informants for whom concordant judgmental data can be provided (e.g., Savin and Perchonock, 1965; Johnson, 1965; Bever, Lackner, and Kirk, 1969; and many others).

At present, then, we are able to get a fairly coherent picture of the course of speech-acquisition and some hints about the mechanisms of language learning from the work of these investigators. But the fact remains that the insights incorporated into modern generative grammar could probably not have been achieved by the use of such indirect methods (see, for discussion, Chomsky, 1965). Judgments of grammaticalness have always been used to provide the primary data. Comparable data from child informants would obviously be very useful. They would enable the developmental psycholinguist to proceed just like a linguist who studies some exotic adult language. But so far no one has found a little child who gives stable judgments on his own primitive language.

Why is the young child unable or unwilling to provide these judgments? Does he merely fail to understand the instruction? Is this failure orthogonal to his linguistic capacities – perhaps representing a general cognitive immaturity? The work of Shipley, Smith, and Gleitman (1969) was designed to examine this issue. Perhaps the child does make judgments of well-formedness, but simply cannot understand an instruction to report on them. If so, we might get classificatory data from the child by developing some behavioral indices of differential responsiveness to various language forms. An examination of this study will help set the problem toward which the present paper is directed: the growth of meta-linguistic reflection in the language learner.

Shipley *et al.* had mothers give commands (mild imperative sentences) to children aged 18 to 30 months. Some commands were well-formed (e.g., *Throw me the ball!*) but some were 'telegraphic' or foreshortened, as in the children's own speech *(Ball!; Throw ball!)*. We found that children discriminate among these formats, as shown by their differential tendency to obey these commands. More specifically, the holophrastic children (who do not yet put two words together in speech) tended to obey foreshortened commands. In contrast, telegraphic speakers ignored, repeated, talked about, laughed about, telegraphic commands, but obeyed well-formed commands. Shipley *et al.* assumed that children fail to obey commands that they perceive as linguistically deviant; thus differential tendency to obey these commands was

interpreted as an implicit judgment on the 'acceptability' or 'naturalness' of their format.[3]

This study revealed that the spontaneous speech of children provides a limited data source for the study of their linguistic knowledge, in practice as well as in theory. Clearly, the telegraphic speech of these children did not reflect the fact that they could discriminate telegraphic syntax from the adult syntax. Perhaps the children 'preferred' the well-formed sentences that they themselves never produced at this stage, as indicated by their tendency to act on just these. But such behavioral indices can be at best crude indicators of the child's 'judgments' on the sentences offered to him – if indeed he can make such judgments. These indices do not come to grips with the question of classification.

2.2 *Soliciting judgments from two-year old children*

Can the two-year old child be induced to give judgments of grammaticalness more directly? Some curious hints began to appear among the subjects of Shipley *et al.* Every once in a while, a child seemed to behave much like an adult when confronted with a linguistically bizarre stimulus:

  Mother: (delivering stimulus) Joseph: Gor ronta ball!
  Joseph: [4] Wha', Momma? 'Gor ronta ball'?

We have punctuated this sentence advisedly. The child seemed to be querying the format directly – not asking whether or not his mother really wanted him to gor ronta ball. Other children would grab the list of stimulus sentences from their mothers (obviously they could not read) and say 'Now I do one!' Such behavior suggests that these children were regarding the sentences apart from their communicative function.

In a longitudinal variant of this work, in which eight children were studied at successive stages of language development, these sophisticated responses became

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3. A simpler hypothesis – that the child fails to obey only because there isn't enough information in the shortened commands – is falsified by the outcome: a child is more apt to obey *Ball!* than *Gor ronta ball!* though the two contain identical intelligible information. Further, at these ages information outside the noun itself has no effect on the specific behavior of the child given

that he looks at the stimulus object in the first place: If he does anything at all with the ball, he is equally likely to throw it if you say *Ball, Throw ball, Throw me the ball,* or *Gor ronta ball.* Only the likelihood of his coming into contact with the ball in the first place differs under these formats.

4. In all instances, names have been changed to protect the innocents.

too frequent to ignore.[5] To be sure, in the first run of the experiment, the children behaved as we had anticipated. By and large (but with the usual enormous noise) the telegraphic speakers obeyed well-formed commands more often than telegraphic commands. In successive runs some months later with these *same* children, we expected to see the culmination of this development: the subjects would now more uniformly respond to well-formed sentences, and balk more often at deviance. But this was not the outcome. On successive runs, the distinction between well-formed and telegraphic commands became *less* potent in predicting the children's tendency to obey.

Obviously these subjects had not been unlearning English. On the contrary, they seemed to have learned to cope with anomaly. Our feeble operational techniques thus are well-foiled:

Mother: Allison: Mailbox fill!

Allison: We don't have any mailbox fills here.

Assuming the subject is playing it straight, she has interpreted the stimulus as a compound noun (albeit one whose referent she cannot discern) and has responded accordingly. But in light of Allison's ten-month-long experience as a subject with such sentences – and with her favorite ready-to-be-filled mailbox toy not two feet from her eyes – it is more likely that she is putting us on. Accordingly, we had to reopen the question of whether she had become a functioning linguistic informant at all of two years old.

Abandoning the indirect route, we now performed an experiment designed to solicit judgments of grammaticalness directly. The subjects were three girls, all about two-and-a-half years old, who had participated in the longitudinal study. Two of the girls (Allison and Sarah) had responded preferentially to well-formed sentences in the first part of the longitudinal study (the expected result for the 'telegraphic speaker'), and had become indifferent to this distinction ('post-tele-graphic') by the last run, as we have just discussed. The third (Ann) had responded preferentially to telegraphic sentences in her first run through the experiment (the expected result for the 'holophrastic speaker') and responded preferentially to well-formed sentences by the time of the final run (the telegraphic stage). Thus, by the behavioral measures, Allison and Sarah were a step ahead of Ann in language development when the present experiment was run.

5. The longitudinal study was undertaken, in part, to replace spontaneous speech measures with a better external criterion of each child's development. Thus each child served as his own control. This experiment differed in various ways from the 1969 study, most relevantly by the inclusion of some word order reverses (e.g., *Ball bring; Ball me the bring*), which allow us to ask whether the child who rejects telegraphic sentences does so merely because they lack the intonation contour of well-formed sentences.

In designing the test situation, we exploited the children's willingness to imitate adult roles. The child was told 'Today we have a new game'. Mother, experimenter, and child would take turns being 'teacher'. As a preliminary step, the experimenter (as teacher) read a list of sentences to the mother, who judged them 'good' or 'silly', and did so correctly in all cases. She also repeated the good sentences verbatim, and 'fixed up' the silly ones. If the child hadn't quickly clamoured for her turn, she was now offered it. The mother became teacher and the child was asked to judge the sentences, repeating the good ones and fixing the silly ones. Finally, the child became teacher. She was handed the stimulus list (needless to say, she could not read), and was told to offer sentences to the experimenter, who gamely undertook to judge these (as correctly as he could) for grammaticalness.[6]

The stimuli were 60 sentences, all short imperatives. The noun object of each sentence was the name of a toy or other object known to the child. The sentences varied along two dimensions:

(a) Intonation contour: the sentences had either the contour of a well-formed imperative (*Bring me the ball; Ball me the bring*) or that of a telegraphic sentence of the kind these children sometimes still produced in speech (*Bring ball; Ball bring*).

(b) Order: the serial order of words might be correct (*Bring me the ball; Bring ball*) or the order of noun and verb might be reversed (*Ball me the bring; Ball bring*).

Thirty of the sentences were those used in the prior study, and thus were familiar to the child. The other thirty sentences were new. The familiar sentences were presented at one session, the new ones a week later.

All three children undertook to judge the sentences offered to them. The mere fact that they did so, and that the results were non-random, suggests that these two-year olds could view language 'as an object'. That their classificatory skills were quite feeble, nevertheless, can be seen from Table 1. Each child tended to judge well-formed sentences (those that were full in contour and correct in serial order) as 'good', though this outcome is far from categorical (combined probabilities from chi-square test, $p < .02$). There were no differences between the familiar and the unfamiliar sentences. For all subjects, the reversed-order sentences result in more judgments of 'silly' (combined probabilities from chi-square test, $p < .001$). But only Allison judged telegraphic sentences with word order preserved as sillier than

6. We have frequently been asked how we succeeded in telling the children to deal with 'sentences' when these children could hardly be expected to understand the word *sentence*. Indeed that is a puzzle, but nevertheless the children acted as if they understood what to do.

well-formed sentences. Recall that all three subjects distinguished telegraphic from well-formed sentences by the behavioral index (tendency to obey such commands) in earlier runs through that test.

Table 1. *Sentences judged 'Good' by three two-year olds (in percent)*

Subjects	Normal order		Reversed order	
	well-formed	telegraphic	well-formed	telegraphic
Sarah	92	100	75	58
Ann	80	82	50	58
Allison	80	58	58	58

Two of the three subjects (Allison and Sarah) were willing to repeat those sentences they had judged to be good. Sarah's repetitions were with one exception verbatim; her single 'error' was a recognizable correction of a telegraphic sentence. Allison judged 20 of the 30 sentences of session 2 to be good, and she was asked to repeat these. Of these 20 sentences, 10 were actually well-formed, and she repeated all these verbatim. Of the 10 that were actually deviant, she repeated 5 verbatim, and changed 5 in some way. That is, she gave verbatim repetitions of well-formed sentences 10 times out of 10, and of deviant sentences 5 times out of 10 (Fisher test, $p = .025$). Four of the five non-verbatim 'repetitions' are partial corrections. This outcome is similar to that achieved by Labov (1970), whose 12-year old subjects unintentionally, and in spite of the task requirements, 'corrected' sentences offered for repetition to conform with their own dialect.

The repetition data, coupled with Labov's findings, give some independent evidence of these children's language organization. More relevant to the issue of metalinguistic functions are Allison's and Sarah's attempts to correct those sentences they had judged to be silly (Ann refused to attempt this). The corrections are shown in Table 2. Inspection of the table shows that Allison usually (about 7 times in 10) and Sarah sometimes (about 4 times in 9) made a change in the direction of well-formedness. It appears that the children understood the question that was asked and made a conscious attempt to restructure the output.

There is a further curiosity in Allison's responses: some of them are non-paraphrastic (e.g., *Bring book / Close book; Cup find / Fill the cup*). We must admit that the instructions are vague; when we told the child to 'fix it up if it is silly', we did not stipulate that the correction had to mean the same thing. But it is worth noting that one need not so instruct an adult. If we ask an adult to correct the expression *The dog bit cat the,* we expect the response *The dog bit the cat.* If informants responded *The dog bit the rat* with any measurable frequency, linguistic

Table 2. *Sentences judged 'silly' and corrected by two two-year olds* *

Subjects	Sentences judged 'silly'	Correction
Sarah	Pull wagon	Pull the wagon me
	Chair look	Chair look
	Clothes iron	Iron clothes
	Door shut	Door shut
	Put on a coat	Put me in a coat
	Make up the bed	Make the bed
	Wash the dishes	Wash the dishes
	Song me a sing	Sing me a song
	Box the open	Get in the box
Allison	Find cup	Drink out of the cup
	Push sweeper	The rug sweeped
	Bring book	Close book
	Mailbox fill	Mailman, put the mail in the mailbox
	Cup find	Fill the cup
	Pick up the iron	Iron the clothes
	Fill the mailbox	Put mail in the mailbox
	Ball me the throw	Throw the ball
	Sweeper the push	The sweeper push on the rug
	Iron up the pick	Iron the clothes

* The table shows all cases in which correction was attempted. Some other sentences were also judged to be 'silly' but no correction was offered for them. One subject, Ann, refused to provide any corrections at all.

theory would look a good deal different than it does. Nor would we ever expect as responses *The cat was bitten by the dog, The domestic canine bit the cat, It was the dog who bit the cat,* or any of a host of other paraphrastically related responses. The adult informant has a surprisingly precise notion of what 'it' means in the instruction 'Fix it up' in the context of a deviant sentence. We show later on that at least some six and seven-year olds interpret the task just as adults do.

   In the last experimental condition (the child as 'teacher'), we get some further suggestive evidence from Allison, who invented 20 sentences for her mother to judge. Of these 20, 18 were well-formed imperatives of the type she had been tested on in this and the earlier experiment (e.g., *Sit on the horsie; Put pants on yourself; Look at that chair*). One was a reversed-order imperative (*Rug put on the floor*), and the last a peculiar declarative (*Hair is on yourself*). It is of some interest that all save one of these inventions are imperatives, reproducing in minute detail the syntactic structure of the sentences we had offered to her. It seems unlikely that a child asked simply to 'say sentences' will produce imperatives so exclusively; thus it is probable that Allison was capable of developing a set for a unique grammatical

structure in response to her perception of the requirements of the task. On the other hand, she showed no tendency to be rigid on semantic grounds, for her inventions varied over a wide range of topics.

In sum, we have found that the method of Shipley *et al.* (1969) rapidly becomes unworkable as the child passes out of the telegraphic stage of speech. The sophisticated two-year old, like his seniors, seems to fiddle around with deviant material. He may somehow internally 'correct' it, and then respond to the corrected material (the general paradigm hypothesized for adults by Katz, 1964; Ziff, 1964; and Chomsky, 1964; *see* Gleitman and Gleitman, 1970, for some experimental evidence). Thus no simple behavioral index now gets close to his recognition of the distinction between well-formed and deviant sentences. At this stage, some of his knowledge can be tapped by direct query: *Tell me if the following sentence is good or silly.* Tenuously, but quite clearly, some two-year olds can follow this instruction in the role-modelling situation. Further, two of the three subjects studied give evidence of going beyond simple classification. Isolating the deviance, at least in some measure, they often provide partial corrected paraphrases of deviant material. Indirect data from their spontaneous speech and from corrected repetitions are also consistent with these interpretations.

We believe that, with appropriate refinement of these elicitation procedures, it may be feasible to inquire quite directly into aspects of young children's language organization. However, we do not know how far this judgmental capacity extends. In this study we dealt only with very simple sentence types. We do not know if these subjects could provide stable judgments if we edged closer to the limits of their knowledge (a matter which is after all in some doubt even for adults; *see*, e.g., Maclay and Sleator, 1960; Hill, 1961). What has been demonstrated here is at least a minimal capacity in some children under three to contemplate the structure of language.

3. The child as informant

We will now show that some children from five to eight years old come up with intuitions about syntactic and semantic structure so subtle that they are often overlooked even by professional grammarians. We will not argue that most or even many children can perform such feats of reflection. Since extreme differences in linguistic creativity have already been demonstrated for adults (Gleitman and Gleitman, 1970; Geer, Gleitman, and Gleitman, 1972), it would be surprising if we did not find great differences among children. We have not, then, looked for subjects who are in any way representative of the dialect population. On the contrary, we have taken some pains to interview children we suspected were highly articulate,

either from personal knowledge or from aspects of their background. After all, the adult informants whose judgments provide the empirical basis for linguistic theory are at least as far from being a random sample of the population.

Having granted the bias of our sample, we begin with a transcription of a dialogue between one of us (LRG) and one of her children.

3.1 *An interview with a seven-year old child*

At the time this dialogue was taped, Claire was seven years old, in her second year of grammar school. She had had a good deal of exposure to language games, and had participated when very young in pilot studies of the sort reported by Shipley *et al.* (1969). We are not suggesting, then, that Claire was average either in linguistic capacity or experience, although some of the results we will report below for children of less special background suggest that her approach to syntactic questions is by no means unique.[7]

LG: Are you ready to do some work?

CG: Yes.

LG: We're going to talk about sentences this morning. And I want your opinion about these sentences.

CG: Yes, I know.

LG: Are they good sentences, are they bad sentences, do they mean something, are they silly, whatever your opinions are. Do you know that your opinions can't really be wrong?

CG: I know because you told me.

LG: Do you believe me?

CG: Yes, I believe you, because everybody has his own opinion.

LG: You and I may disagree; would you like me to tell you when I disagree with you?

CG: Yes, but you won't tell me!

LG: Okay, okay, I'll tell you. The important thing is you should know it's all right to disagree. Okay: *John and Mary went home.* (1)

CG: That's okay.

LG: That's an okay sentence?

CG: Yes.

LG: Does it mean the same thing as: *John went home and Mary went home?* (2)

CG: Yes, but it's sort of a little different because they might be going to the

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7. All sentences presented to Claire and all of her initial responses appear in this tran-   script. A few tedious interchanges resulting from probes have been deleted.

same home – well, it's okay, because they both might mean that, so it's the same.

LG: Here's another one: *Two and two are four.* (3)

CG: I think it sounds better *is.*

LG: *Two and two is four?*

CG: Am I right?

LG: Well, people say it both ways. How about this one: *Claire and Eleanor is a sister.* (4)

CG: (laugh) *Claire and Eleanor* are *sisters.*

LG: Well then, how come it's all right to say *Two and two is four?*

CG: You can say different sentences different ways! (annoyed)

LG: I see, does this mean the same thing: *Two is four and two is four?*

CG: No, because *two and two are two and two* and *two and two is four.*

LG: Isn't that a little funny?

CG: *Two and two more is four,* also you can say that.

LG: How's this one: *My sister plays golf.* (5)

CG: That's okay.

LG: How about this one: *Golf plays my sister.* (6)

CG: I think that sounds terrible, you know why?

LG: Why?

CG: Poor girl!

LG: Well, what does it mean?

CG: It means the golf stands up and picks up the thing and hits the girl at the goal.

LG: How about this one: *Boy is at the door.* (7)

CG: If his name is *Boy.* You should – the kid is named *John,* see? *John is at the door* or *A boy is at the door* or *The boy is at the door* or *He's knocking at the door.*

LG: Okay, how about this one: *I saw the queen and you saw one.* (8)

CG: No, because you're saying that one person saw a queen and one person saw a one – ha ha – what's a one?

LG: How about this: *I saw Mrs. Jones and you saw one.* (9)

CG: It's not okay – *I saw – You saw Mrs. Jones and I saw one* (ha ha). Besides there aren't two Mrs. Jones.

LG: Is that the problem there? Is that why the sentence sounds so funny?

CG: No, the other problem is *I saw – You saw Mrs. Jones and I saw one – a one.*

LG: A one, you mean like a number one?

CG: No – a one, whatever a one – well, okay, a number one.

LG: How about this: *Be good!* (10)

CG: That sounds okay.

LG: How about this: *Know the answer!* (11)

CG: That's the only way to say it, I think.

LG: The only way to say what?

CG: *You better know the answer!* (threatening tone)

LG: How about this one: *I am eating dinner.* (12)

CG: Yeah, that's okay.

LG: How about this one: *I am knowing your sister.* (13)

CG: No: *I know your sister.*

LG: Why not *I am knowing your sister* – you can say *I am eating your dinner.*

CG: It's different! (shouting) You say different sentences in different ways! Otherwise it wouldn't make sense!

LG: I see, you mean you don't understand what that means, *I am knowing your sister.*

CG: I don't understand what it means.

LG: How would you say it?

CG: *I know your sister.* Do you disagree with me?

LG: It so happens I agree with you. How's this one: *I doubt that any snow will fall today.* (14)

CG: *I doubt that snow will fall today.*

LG: How's this: *I think that any snow will fall today.* (15)

CG: *I think that some snow will fall today.*

LG: That way it's okay?

CG: I don't think snow will fall today cause it's nice out – ha ha.

LG: How about this: *Claire loves Claire.* (16)

CG: *Claire loves herself* sounds much better.

LG: Would you ever say *Claire loves Claire?*

CG: Well, if there's somebody Claire knows named Claire. I know somebody named Claire and maybe I'm named Claire.

LG: And then you wouldn't say *Claire loves herself?*

CG: No, because if it was another person named Claire – like if it was me and that other Claire I know, and somebody wanted to say that I loved that other Claire they'd say *Claire loves Claire.*

LG: Okay, I see. How about this: *I do, too.* (17)

CG: It sounds okay but only if you explain what you're trying to say.

LG: How about: *The color green frightens George.* (18)

CG: Doesn't frighten me, but it sounds okay.

LG: How about this one: *George frightens the color green.* (19)

CG: Sounds okay, but it's stupid, it's stupid!

LG: What's wrong with it?

CG: The color green isn't even alive, so how can it be afraid of George?
LG: Tell me, Claire, is this game getting boring to you?
CG: Never-rrrrrrrrrrrrrrr.
LG: Why do you like to play a game like this? What's the difference how you say things as long as people understand you?
CG: It's a difference because people would stare at you (titter). No, but I think it's fun. Because I don't want somebody coming around and saying – correcting me.
LG: Oh, so that's why you want to learn how to speak properly?
CG: That's not the only reason.
LG: Well, what is it?
CG: Well, there's a lotta reasons, but I think this game is plain fun.
LG: You want to go on playing?
CG: Yeah, and after this let's do some spelling; I love spelling.

3.2 *Other subjects*

As a further check on the incidence of skills apparent in Claire's responses, we tested six more children with these same materials. Listed in ascending age, they were: S1 – female, 5 years; S2 – male, 5 years; S3 – male, 6 years; S4 – male, 7 years; S5 – male, 7 years; S7 – female, 8 years (S6 was Claire Gleitman, 7 years). All of the subjects were children of academic families. The interviewer for S1 and S5 was their mother, an undergraduate psychology student. The interviewer for S2, S3, S4, and S7 was an undergraduate linguistics student who had never met the children before the interview. All sessions were taped.

3.3 *Results*

Rather to our surprise, all of the children we interviewed were prepared to play the game; all classified the sentences in fair conformance with adult judgments; and all, including the youngest, gave interesting and relevant accounts of what is wrong with the deviant sentences, at least some of the time.

3.3.1 *Classification of the sentences*

Table 3 presents the conformance of the children's judgments on these sentences with our own. There are many reasons to be embarrassed by so formal a presentation of these data. Most centrally, the accuracy of the child's response was often dependent on the wit of the interviewer in making the correct probe. In particular, the youngest subjects would accept almost any sentence unless some further question was asked:

E: How about this one? *Boy is at the door.*
S1: Good.
E: Good? Is that the way you would say it?
S1: No. *A boy is at the door. Boy is at the door* isn't a good sentence.

Table 3. *Conformance of children's judgment to those of adults* *

		Subject:						
		S1	S2	S3	S4	S5	S6	S7
	Adult			Age:				
	judgment	5	5	6	7	7	7	8
(1) John and Mary went home	wf	+	+	+	+	+	+	+
(2) John went home and Mary went home	wf	+	+	+	+	+	+	+
(3) Two and two are four	wf	+	+	+	+	+	+	+
(4) Claire and Eleanor is a sister	d	—	—	+	+	+	+	+
(5) My sister plays golf	wf	+	+	+	+	+	+	+
(6) Golf plays my sister	d	+	+	+	+	+	+	+
(7) Boy is at the door	d	+	+	+	+	+	+	+
(8) I saw the queen and you saw one	d	—	—	—	—	+	+	+
(9) I saw Mrs. Jones and you saw one	d	+	+	+	+	+	+	+
(10) Be good!	wf	+	+	+	+	+	+	+
(11) Know the answer!	d	—	—	—	+	—	+	+
(12) I am eating dinner	wf	+	—	+	+	+	+	+
(13) I am knowing your sister	d	—	—	—	+	+	+	+
(14) I doubt that any snow will fall today	wf	+	—	+	+	+	—	+
(15) I think that any snow will fall today	d	—	—	+	+	+	+	+
(16) Claire loves Claire	wf/d							
(17) I do too	wf	+	—	+	—	+	+	+
(18) The color green frightens George	wf	—	+	+	—	—	+	—
(19) George frightens the color green	d	+	+	+	+	+	+	+
Total '+' judgments for all sentences		12	10	15	15	16	17	17

* Adult judgment were provided by three independent judges who indicated whether each sentence was well-formed (wf) or deviant (d). The children's judgments are marked '+' if they agreed with those of the adult and '—' if they did not, regardless of their explanation. Sentence 16 cannot be scored in this manner; whether or not it is deviant depends upon whether the same referent is assumed for both nouns. The names in sentences 4 and 9 were chosen to be familiar; in sentence 16 the child's own name was used.

More generally, it should be clear that this test was performed simply to ascertain whether children of these ages can in principle adopt the attitude of judging and classifying in a manner similar to that of adult informants: with respect to this point, the results are clear-cut. But since the choice of test sentences was haphazard in terms of any metric of well-formedness, complexity, and the like, we can make no general statement about the judgmental capacities of children as compared with adults; the percentage agreement with adults would almost certainly be changed

by varying the proportion of one or another kind of deviance. In the absence of normative data, these subjects' responses are useful only to expand the picture drawn in the original interview. But the results leave little doubt that a variety of delicate questions of syntax and semantics are handled rather neatly by these children. Below we give a number of examples, organized according to several rough syntactic subcategories.

3.3.1.1 *Stative verbs:* Sentences 13 (*I am knowing your brother*) and 11)*Know the answer!*) contained stative verbs in deviant environments. As can be seen from these examples, this verb class has no forms in the present progressive or in the imperative. As Table 3 indicates, the younger children fail to notice the problem. The older ones reject the deviant forms. S6 suggests the so-called 'pseudo-imperative' interpretation (an ellipsis for an *if*-clause), which is acceptable for such verbs (*Know the answer* = *You better know the answer* = *If you don't know the answer, *≠!*).

3.3.1.2 *Collective versus distributive use of and:* All children stated that (1) *John and Mary went home* and (2) *John went home and Mary went home* mean the same thing. Claire spontaneously brought up the collective/distributive issue in response to this comparison. She first tried to distinguish the two sentences on this basis ('they might be going to the same home') but then recognized that both forms share both construals ('they might both mean that, so it's the same').

3.3.1.3 *Pronominal referents:* Sentences 8 and 9 display the anomaly that arises when a definite noun-phrase is the apparent antecedent of an indefinite pronoun:
   (8) *I saw the queen and you saw one.*
   (9) *I saw Mrs. Jones and you saw one.*
The oddity is clearer in (9) for while there may be only one Mrs. Jones in the world, *one* cannot have that same Mrs. Jones as its grammatical antecedent. The four younger children accept (8) without question, which is consistent with their tendency not to notice syntactic deviance when no semantic anomaly arises. On the other hand, all of the subjects rejected (9). The responses to these questions are displayed in full below. It is quite clear that the quality of the explanations improves with the age of the children; put another way, there is an increasing conformance of their judgments with our own. Note that the younger children give explanations that accord with their judgments: they reject only the case with the proper noun, and they explain by claiming that this structure is incorrect with a name.
(The stimulus sentence is tagged by its number; the experimenter's comments, somewhat abbreviated, are bracketed):
   S1: (8) Good. (9) No, 'cause there's only one Mrs. Jones. [Then how would you

say it?] *I saw Mrs. Jones* [and?] *I did, too.*

S2: (8) Yeah. (9) I would hate that 'cause they're not – I got two reasons. They're not the same age and they don't look the same. [So how would you say it?] I don't know. It's silly. Because it don't say the name and – it don't say the name – it's a – *I saw Richard Jamison, and you saw one.* Don't give no reason.

S3: (8) Good. (9) It sounds funny 'cause *You saw Mrs. Jones* is okay, but *I saw a one* – it should mean something like *I saw* – *You saw a tree and I saw one, too.* You can't say it with a name. [So what's the problem?] Because you have to say something like *You saw a tree and I saw one.* But you can't say something like *You saw Mrs. Jones and I saw one.* You have to say *You saw Mrs. Jones and I saw her, too.*

S4: (8) That's a good sentence. (9) That's silly, 'cause there might not be two Mrs. Jones that I know. [So how would you say it?] *I saw Mrs. Jones and so did you. Both of us saw Mrs. Jones.*

S5: (8) No, *I saw the queen and you saw the same queen that I saw – you and me saw the queen.* (9) No, *I saw a Mrs. Jones and so did you.*

S6: (8) No, because you're saying that one person saw a queen and one person saw a one – ha ha – what's a one? (9) It's not okay – *I saw – You saw Mrs. Jones and I saw one* – ha ha – besides, there aren't two Mrs. Jones. [Is that the problem here?] No, the other problem is *You saw Mrs. Jones and I saw one – a one.* [Like a number one?] No – a one – whatever a one – well, okay, a number one.

S7: (8) That doesn't really make sense. *You saw a queen* – no, I'll say *me – I saw a queen and you saw a queen, too.* (9) That doesn't make sense because there's only one Mrs. Jones that you saw and you have to see the same one, probably. *I saw Mrs. Jones and you saw her, too.* [But if there were two Mrs. Jones?] *You saw her* – I don't know. I guess if there were two you could say *one.* It would sound funny. [Suppose your grandmother and your mother are both Mrs. Smith, so you might be able to see two of them at the same time.] *I saw Mrs. Smith and you saw them, too* – ha ha – that sounds – *and you saw them, too – I saw Mrs. Smiths* . . . I don't know.

3.3.2   *Explanations of deviance*

While our subjects very often rejected syntactically deviant but meaningful expressions, they ordinarily, and improbably, explained their rejection on semantic grounds; e.g.,

E: How about *Kari and Kirsten is a sister.*
S4: Funny.
E: Why is it funny?

S4: Because that doesn't make sense.

E: How would you say it?

S4: *Kari and Kirsten are sisters.*

This happened with trying consistency. Since the subject easily provided a paraphrase, he had obviously grasped the sense of the sentence; but even so he often 'explained' the peculiarity of the sentence by denying its meaningfulness. Again, this confusion is not restricted to children; one has only to make the case a bit more difficult. Thus adults given the sentence *I saw the queen of England and you saw one, too* will often reject it on the grounds that there is only one queen of England. The fact that the sentence would sound just as odd if there were fifty queens of England entirely escapes their notice (Gleitman, 1961).

Of course very often a semantic explanation is appropriate; here is an example from a five-year old:

E: *George frightens the color green.*

S1: No, because green is used to boys.

E: If there was a color that never saw children, it could be frightened?

S1: No. It couldn't be frightened because – 'cause – I'm thinking, okay, Mom? . . . No, 'cause colors don't have faces of paint. You talking about paint?

We have seen that semantic 'explanations' are common among our subjects, even where they are inappropriate. Yet there also are many instances in which the children, including the five-year olds, point quite precisely to a syntactic violation; e.g.:

E: *I think that any rain will fall today.*

S3: You can't say *any* there.

E: *I am knowing your brother.*

S4: It's not right English. It should be *I know your brother,* not *I am knowing your brother.*

E: *Two and two are four.*

S6: I think it sounds better *is.*

It is worth noting that these children, not yet exposed to grammar exercises in school, nonetheless have definite opinions that take the form 'you can't say . . . you have to say.'

To this extent, the children seem to adopt a frame of reference in answering these questions that is similar to our own. The non-paraphrastic responses often observed in the two-year old subjects (see Table 2) have disappeared. The quality of explanation changes markedly with age (whether it also changes with intelligence, schooling, and the like, is a question we cannot speculate on).

Some further ticklish differences in the frame of reference for dealing with our experimental question are left unanswered here. As a final comment, however, the

following kind of response would probably be exceedingly rare in adult subjects, but it occurs more than once in our sample. (We were trying to find out whether *is* and *are* are both acceptable in sums):

E: *Two and two are four.*
S3: Yeah.
E: Can you think of any other way to say that?
S3: Three and one?

3.4 *Discussion*

We now consider the factors that determined the behavior of these subjects in responding to the question: *Is the following sentence 'good' or 'silly'?* A number of tangled issues of truth, plausibility, meaningfulness, and syntactic patterning enter into the interpretation of these findings. Did our subjects distinguish between implausible or false expressions and linguistically anomalous ones? Even if they did, did they really contemplate the constraints on arrangements of words and phrases (syntax) or did they consider only the meanings of such arrays and the entities that comprise them (semantics)? Below we comment on our subjects' approaches to these fine distinctions. These matters are presumably of some importance, perhaps especially to those psychologists who claim that 'semantics is what is important' about language and language learning, and that the transformational foray into syntax is in some ways uninteresting or not cogent for psychologists of language. In our view there are really two issues. One is the immediate question about the factors that determined our subjects' judgments. The other concerns the general problem of distinguishing syntax from meaning.

3.4.1 *What makes a sentence 'silly': Falsehood or ill-formedness?*
There are many ways that a sentence can be 'silly'. For example, there are quite different oddities involved in saying *Mud makes me clean* versus *Mud drinks my ankle*. Notice that the negative of the first is entirely unexceptional (*Mud does not make me clean*), while the negative of the second is precisely as odd as the positive (*Mud does not drink my ankle*). Stated more generally, *Mud makes me clean* is implausible to the extent that mud is rarely a cleansing agent, but it is a 'good' sentence of English.

Is this true of *Mud drinks my ankle?* Again, some would say that this is a good sentence of English on the grounds that it is a case of a noun-phrase followed by a verb-phrase in which the right-completion of the verb *drink* (a noun-phrase) is also correct, given the gross patterns of English. But most linguists would respond that a description of the English language that fails to account for the oddity of

this sentence is primitive and incomplete (after all, if linguists disclaim responsibility for this phenomenon, who is to handle it?). In the standard transformational formulation, such oddities are described as violations of *selectional restrictions* that obtain among the words and phrases of the language (for discussion, *see* Chomsky, 1965): *drink* requires an animate subject while *mud* is not an animate noun. Knowledge of selectional restrictions on words is claimed to be part of the lexical information that speakers have internalized. (Whether this information is 'semantic' or 'syntactic' is a question to which we will return.) Linguists are less concerned (although not utterly unconcerned) to account for the implausibility of *Mud makes me clean,* which more clearly turns on the language user's 'knowledge of the world' as opposed to 'knowledge of language.'

How do speakers interpret the instruction to tell whether or not a sentence is 'silly'? By and large, adults will accept *Mud makes me clean* with only mild waffling, and they will reject *Mud drinks my ankle.* They accept implausible sentences and reject violations of selectional restrictions.

In contrast, two-year olds, as already mentioned, seem to reject implausible sentences. For example, *Find book* is 'corrected' as *Close book.* Our guess is that these non-paraphrastic responses are attempts to come up with more plausible expressions. Similarly, the five-year olds studied here sometimes reject sentences on these grounds:

E: *I am eating dinner.*
S2: I would hate that.
E: Why?
S2: I don't eat dinner anymore.
E: How about *I am eating breakfast?*
S2: Yum, yum, good!

On the contrary, the older subjects rarely reject sentences on the basis of implausibility or falsehood. If the experimenter suggests that they do so, they consider this only a joke:

E: *I think that any rain will fall today.*
S3: Well, *any* is not the right word. You should say *I don't think that any rain is going to come down.* Right?
E: Okay. It's a pretty nice day anyway.
S3: So it's not gonna rain, so that's why I'm probably right (gails of laughter).

Similarly, Claire points up this distinction in one response:

E: *The color green frightens George.*
S6: Doesn't frighten *me,* but it sounds O.K.

On the other hand, violated selectional restrictions – which indeed lead to a bizarre meaning – are uniformly rejected. For a simple case such as *Golf plays my brother,*

all subjects say that it is 'backwards' or that 'it doesn't make sense.' They may also provide a reading for the deviant sentence:

> S3: Ha ha. That doesn't sound right. You should say *My brother plays golf* instead of *golf plays brother* – that would mean a golf ball or something bats the boy over the thing.

It is also worth noting that S1, who for mysterious reasons of his own rejects *I am eating dinner,* rejects *Golf plays my brother* on appropriate grounds:

> S1: I hate it cause it's backwards.

While the tendency to reject implausible but 'correct' sentences diminishes with the older subjects, it does not disappear. All subjects reject *George frightens the color green,* which violates a selectional restriction on *frighten.* But some also reject *The color green frightens George* on grounds of implausibility:

> S7: No, because green is just still. It isn't going to jump up and go BOO!

Nor should we expect categorical acceptance of implausible expressions in the light of the vagueness of these instructions. The point here is not whether categorical behavior is found: given these instructions, some adults will also reject such sentences. (After all, the idea *is* silly). Much more centrally, the plausibility dimension seems highly salient for two-year olds (*see* Table 2), is still sometimes apparent in five-year olds, and becomes much less salient as the determinant of judgments among the older children and adults. As we will now discuss, syntactic dimensions become more potent with age.

3.4.2   *What makes a sentence 'silly': syntactic deviance or semantic anomaly?*

We have so far seen that what differs among our subjects, and what differentiates them most clearly from adults, is the precise understanding of the question: *Is the following a good sentence of English.* Do they respond in terms of truth and plausibility or of form? One might ask in addition: do they respond in terms of meaning or form? (Of course this further question raises serious problems of definition, most of which we regretfully ignore, for they reach well beyond the scope of this paper.)

While syntactic structure appears to be the basis of many of the rejections of sentences we have cited thus far, it may be argued that semantic anomalies arose from the syntactic deviations, and that it was the semantic anomaly to which these subjects responded. In that event, the best test cases for sensitivity to syntax would be those sentences whose syntactic deviations have the least semantic force. These will usually be low-order violations of phrase-structure constraints. Examples among our stimuli are sentences in which number concord is violated (*John and Jim is a brother*) or in which determiners required by count nouns are missing (*Boy is at the door*). Similar to the last instance are the foreshortened forms without particles and determiners presented to two-year olds (*Bring book*). These cases can be con-

trasted with deviations from well-formedness that, at least intuitively, do more radical violence to meaning, such as *Golf plays my brother, I think that any rain will fall today,* and, for the two-year olds, *Ball me the throw.* If the children notice only semantic anomaly and ignore syntactic patterning, they should accept sentences of the first sort (*John and Jim is a brother*) and reject sentences of the second sort (*I think that any rain will fall today*).

The youngest subjects were indeed most responsive to deformations which obscured or complicated semantic interpretation. Thus the two-year olds gave clear-cut data only for sentences with word-order reversals such as *Ball me the bring* whose meaning is obscure. Similarly, the five-year olds often accepted a deviant sentence if it was odd only in its word-arrangement but still clear in meaning (e.g., *John and Jim is a brother*). But nevertheless there are some indications that even the youngest children were sensitive to syntactic issues as such. For example, one of the two-year olds (Allison) was much more likely to judge a telegraphic sentence as 'silly' than a well-formed one. The sensitivity to syntax is more obvious in the five-year olds who sometimes noticed syntactic oddities that yielded no semantic problems. One of them rejected *Boy is at the door,* and spontaneously added, '*Boy is at the door* isn't a good sentence'. From six years on, the salience of syntactic deviance is no longer in doubt. All children over five years of age rejected *Boy is at the door* and *John and Jim is a brother.* Each provided the appropriate paraphrase so they obviously understood these expressions. They were then rejected solely on grounds of syntactic nicety.

Beyond the immediate issue we have just considered is the question of whether a relevant distinction can in general be drawn between syntax and semantics. Certain psycholinguists seem to believe that it can. They seem to assume that constraints on word order and the like, insofar as these are not merely historical accidents, are relevant only to the nature of memory, sequencing of outputs, and other issues of linguistic information processing. What they fail to notice, or misinterpret, is that very much of what we mean by meaning is expressed through syntactic devices. Notions such as subject, predicate, noun, adverbial phrase, and the like, are the categories and functions described in the syntax of the language; but of course these are not semantically empty notions. The movement within transformational linguistics known as 'generative semantics' (e.g., Lakoff, 1972) is an attempt, as we understand it, to merge the semantic and syntactic descriptions of the language in a way more perspicuous than in Chomsky's (1965) formulation. But whatever success this venture may have, it is bizarre that any version of transformational-generative grammar could be viewed as describing 'merely' the semantically empty syntax of the language. Clearly these theories have always been attempts to describe the complex interweave of form and meaning that natural languages represent.

This being our view, it is hard for us to argue any more strenuously than we have that our subjects are aware of English syntactic structure. If it can be shown that the features of syntactic structure that these children note and comment on always have some semantic content, that can come as no surprise to us, and cannot mitigate our interpretations of these findings.

4. Conclusions

4.1   *The child as language knower*

All of the children we have studied show at least a muddy capacity to be reflective about knowledge. Even the two-year olds provided nonrandom classifications of simple sentences: the fact that they undertook this task at all is evidence of at least the rudiments of a meta-linguistic skill. A child who can do this must already be said to know something about language that the spider does not know about web-weaving.

The ability to reflect upon language dramatically increases with age. The older children were better not only in noting deviance but also in explaining where the deviance lies. By and large the five-year olds offered only paraphrastic corrections. They did not add much in the way of explanation, even though they indicated that there are ways 'you have to say it' and that some of the sentences are just 'not right'. In contrast, the older children often referred to linguistic categories (e.g., 'you can't say it with a name') and occasionally changed the lexical classification of a familiar word thus rendering a deviant sentence well-formed (e.g., 'you can't say that unless you are "a Green" '; *'One person saw a queen and one person saw a one – whatever a "one" is'*). This achievement is all the more impressive considering the fact that many adults have serious difficulty when required to change the categorial status of a word (Gleitman and Gleitman, 1970). But even where the subjects offered only example or paraphrase, the older ones sometimes came up with all of the data relevant to writing a rule of grammar, Claire's response to *Boy is at the door* is a case in point:

If his name is *Boy*. The kid is named John, see? *John is at the door*, or *The boy is at the door*, or *A boy is at the door*, or *He's knocking at the door*.

Most of the main distinctions among noun and noun-phrase types (count, proper, pronoun; definite versus indefinite noun-phrase) are neatly laid out in this response. Such manipulation of linguistic data is a not inconsiderable accomplishment. It is after all the *modus operandum* of the practicing linguist.

We should reiterate that the abilities we have demonstrated in some children will

not necessarily appear in very many. Our claims are simply existential. The lack of normative data is only one of the reasons for this caution. A number of studies (e.g., Pfafflin, 1961; Gleitman and Gleitman, 1970) have shown that there are substantial individual differences among adults in the ability to deal with classificatory problems. These differences in meta-linguistic skills are not attributable solely to differences in non-linguistic matters such as memorial capacity (Geer, Gleitman, and Gleitman, 1972). Under the circumstances, it is only reasonable to suppose that such differences already exist among young children. Chomsky's demonstration (1969) of individual differences in the recognition of transformational features of verbs in six to ten-year olds gives further grounds for this belief.

4.2 *Meta-linguistic functions compared to other meta-cognitive processes*

At least in adults, there are some other 'meta-cognitive' processes which seem to be similar in some ways to the meta-linguistic functions we have just considered. We think and we sometimes know that we think; we remember and sometimes know that we remember. In such cases, the appropriate cognitive process is itself the object of a higher-order cognitive process, as if the homunculus perceived the operations of a lower-order system. But the lower-order process often proceeds without any meta-cognition. This is certainly true for language whose use (even in professional grammarians) is often unaccompanied by meta-linguistic reflection. Similarly for other cognitive processes such as memory: we see a friend and call him by name without any awareness that we have just recognized and recalled. The important point is that we *can* deal with memory in a meta-cognitive way, just as we can reflect meta-linguistically. Examples of meta-cognition in memory are recollection (when we know that we remember) and intentional learning (when we know that we must store the material for later retrieval). Another example is the phenomenon of knowing that one knows – that is, has stored in memory – some item of information even though one cannot recall it at the moment (e.g., the 'tip-of-the-tongue' phenomenon, Brown and McNeill, 1966; memory monitoring, Hart, 1967).

Developmental evidence suggests that these various meta-cognitive processes may be closely related. In particular, their time of emergence seems suspiciously close to the five to seven year age range in which we found adult-like performance on meta-linguistic tasks. Whether Piaget's stage-analysis can handle such findings is another matter, but it is interesting to note that the period from five to seven is just about the time when children begin to explain their judgments of space and number (Ginsburg and Opper, 1969). Similarly for monitoring processes in memory. Several Russian investigators have shown that intentional strategies for remembering are

rarely adopted before five years of age but are increasingly utilized thereafter (Yendovitskaya, 1971).

Whether these relations among the various meta-cognitive functions will turn out to be more than mere analogies remains to be seen. The primary emphasis of the present paper has been on the meta-cognitive aspect of language behavior, for it is this that allows us to say that language is not only used but known. The results indicate that this kind of knowledge is found even in children. Consider a reaction to Chomsky's paradigm (1969) in which the child is shown a blindfolded doll and is asked: 'Is this doll easy or hard to see?' (Claire, age 8):

CG: Easy to see – wow! That's confusing.
LG: Why is it confusing?
CG: Because it's hard for the doll to see but the doll is easy to see and that's what's confusing.

Or again, on the ambiguity of *ask to* :

LG: What would it mean: *I asked the teacher to leave the room.*
CG: It would mean *I asked the teacher if I could leave the room to go to the bathroom* or it would mean *I asked the teacher to leave the room so I could go to the bathroom in privacy.*

Here knowledge is explicit. The child has moved from mere language use to serious innovation and creativity, to contemplation of language as an object. Such skills are frequently manifest in six, seven, and eight-year olds. We believe it is this kind of language activity that is most intriguingly engaged and convincingly explained by transformational theory; this is hardly surprising because just such data are the methodological prerequisite for grammar construction.

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Résumé

Cet article présente des exemples de la con-
naissance qu'ont les enfants des propriétés
syntaxiques et sémantiques du langage. Les
rudiments d'un fonctionnement 'méta-lingui-
stique', peuvent être mis en évidence chez
les enfants de deux ans qui donnent des
jugements de grammaticalité dans une si-
tuation de jeux. Les auteurs ont examiné le
développement de ces capacités avec un
groupe d'enfants de 5 à 8 ans, à qui l'on a
demandé explicitement de donner des juge-
ments sur des phrases déviantes. Les résul-
tats montreraient qu'un comportement sem-
blable à celui des adultes apparait entre 5
et 8 ans. Il est suggeré qu'il y a des rela-
tions possible entre le fonctionnement 'meta-
linguistique' et d'autres processus 'meta-
cognitifs'.