DEVELOPMENTAL PRAGMATICS

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his father, not yet visible, come in the outside door and start up the steps to his apartment. An example of the second sort is documented in the film *Early Words* (Greenfield, May, and Bruner, 1972) at 22 months of age. Matthew says *self*, trying to discourage his mother from buttering his bread for him so that he could carry out the action himself. An example of the third sort occurs at 19;4. Matthew has been trying unsuccessfully to cut his meat with a knife, when he hands the knife, an instrument, to his mother, saying *mommy*. Here the agent case is again used to signal a desired **change** of actor. Another example illustrates the same point, but both alternative agents are verbalized. At 20;10 Matthew's sister Lauren says *Let me do it*; Matthew answers *mommy*, explicitly replacing the agent of the verbal context, *me*, with *mommy*. This is also an example of paradigmatic substitution: That is, *mommy* can fill the same semantic/grammatical spot as *me* in the sentence *Let me do it*. The reply *mommy* presupposes *someone will do it*. This proposition is also presupposed by the original utterance *Let me do it*; it is thus "old" information. Once again, the child's answer expresses only "new" information.

The principal difference between the young child at the single-word stage and the adult is that the adult is capable of adding words when the information cannot be transmitted by nonverbal context, whereas the child is not. Despite this difference, ellipsis—incomplete sentences formed by adults—shows that basically the same process of information analysis described for earliest child language operates in adult speech. Because children generally talk about the here and now, a common process of information analysis means that an adult will often analyze a given referential situation in the same way as the child. This commonality does not in any way imply that the child speaker is aware of the listener's perspective, of what might be "old" or "new" information for the listener. The power of a process of information extraction common to child and adult is that it can make verbal communication between child and adult possible long before the child has developed any such awareness of the listener's point of view. A cognitive process common to mature speakers and language learners thus enables the still egocentric child to communicate from an impressively early point in the language learning process.

Chapter 8

A Functionalist Approach to the Acquisition of Grammar

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A central goal of American child language research in the 1960s was the formulation of a theory that could account for the acquisition of grammatical devices. In the last few years, however, there has been a virtual moratorium in research on child grammar, as investigators shifted emphasis to semantic, pragmatic, and cognitive aspects of language development. As Susan Ervin-Tripp indicated in her 1977 keynote address to the Stanford Child Language Forum, there was a good reason why research on grammar came to a temporary halt. In her view (and ours), grammatical structure cannot be understood outside a semantic-pragmatic framework. To investigate the process by which children acquire grammar, we needed much more information about speech act patterns, discourse structure, lexical semantics, case roles, and sentence processing strategies. Now that such information is available, we can return to an older question: Where does grammar come from? How do children come to understand and use the surface formalisms of a particular language? To what degree is this discovery process determined by the pragmatic, semantic, and cognitive-perceptual factors we have studied for the last decade?

There are at present two competing hypotheses about the origins of grammar in child language. One position stresses the arbitrary nature of grammatical formalisms, suggesting that languages are "learnable" only because the child has some sort of a priori knowledge regarding the structure and

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content of an autonomous and abstract grammatical component. The other position stresses the functional constraints on grammatical form, the natural "fit" between the surface structure of the utterance and the communication task for which the grammar is designed. According to this second position, languages are learnable because children are solving the communication problem and discovering for themselves the constraints that determine the form of the grammar.

The first position has been advanced by Chomsky (1957, 1965, 1971a, 1975) and other supporters of the "standard theory" of transformational grammar. Chomsky argues that the primary determination of structural relations among sentence elements is provided by an autonomous, meaning-free syntactic component. This component maps (meaning elements onto) abstract syntactic categories and relations onto phrase markers, and transforms these phrase markers into linear surface forms that can be realized in sound. Semantic and pragmatic components operate by "interpreting" the output of this syntactic machinery. But the syntactic categories and relations themselves are primary, axiomatic, and in no way derived from or isomorphic with meaning. This is, of course, a linguistic model, a theory of sentences rather than people. However, for psychologists interested in incorporating transformational grammar into a processing mode, there are some clear implications for language acquisition. According to Chomsky, syntactic categories cannot be derived either from the structure of meaning or from the performance constraints imposed by the acoustic-articulatory channel. Instead, children must bring to the language acquisition task certain innate clues about the range of possible human grammars. In particular, the child will use prior knowledge of abstract syntactic categories like "subject of" and "predicate of" as a starting point in formulating hypotheses about the way meaning is mapped into sound in his particular language. According to this proposal, then, the child must learn grammar by starting on the inside and working out. He must begin with certain fundamental, deep-structure categories and use these as a beacon which will illuminate the entire grammar.

The second position, the functionalist approach to the acquisition of grammatical devices, is a derivative of several linguistic traditions. These include The Prague School functionalism (Dezsö, 1972; Firbas, 1964; Sgall, Hajičova, and Benešova, 1973), British functionalism (Firth, 1957; Halliday, 1967), and the emergent tradition of American functionalism (see volumes edited by Li, 1975 and 1976, and by Grossman, San, and Vance, 1975). These researchers share the view that grammar is a secondary or derived system, whose form can be related to the constraints of the communication task. Although the relation between form and function may be complex, it is not so complex that it cannot be learned by a child. Thus, according to the functionalist proposal, the child's acquisition of grammar is guided, not by abstract categories, but by the pragmatic and semantic structure of communications interacting with the performance constraints of the speech channel. No one aspect

of the communication situation is sufficient to motivate surface forms. For example, a surface syntactic device like "subject" may not be isomorphic either with a case role notion like "agent" or with a pragmatic role like "topic." Instead, surface forms are multiply-determined. They are emergent solutions to the problem of communicating nonlinear meanings onto a linear speech channel. Because so many constraints converge to determine the form of the grammar, individual languages may evolve solutions in which the relationship between form and function is opaque. Hence we may have the impression that functionally motivated surface forms are, instead, completely arbitrary. However, it is a tenet of the functionalist school that if we understood enough about the competing constraints on the mechanism for mapping meaning into sound, the motivations for particular surface forms would become clear.

The key term here is "competition." There are a variety of underlying meanings and intentions which must be conveyed via some combination of only four kinds of signals: (*a*) lexical items, (*b*) word order, (*c*) morphological markers on lexical items, and (*d*) intonation contours. Given the limited resources of this channel, we must convey several types of semantic information including: (*a*) reference to particular objects and actions, (*b*) reference to qualities and aspects of objects and actions, and (*c*) case role relations between referents (e.g., who did what to whom, where, and when). In addition, we must also convey what has traditionally been called pragmatic information, including: (*d*) the speech act or communicative intention of the speaker, (*e*) status relations between communicators, (*f*) attitude of the speaker toward information, (*g*) relative newness of information, (*h*) topicalization and focusing of information, and (*i*) presuppositions (i.e., background conditions that are necessary for an utterance to be understood). All of these semantic and pragmatic functions are competing for access to the speech channel. Given these constraints, different languages have resolved the competition in different ways.

One solution is to "divide the spoils," using some of the above signals only for certain functions. For example, Hungarian (Dezsö, 1972) uses affixes on lexical items to mark case roles. Thus, both intonations and word order can be used to express topic and focus. English, on the other hand, tends to use word order rather than morphological markers to express information about case roles, that is, who did what to whom. Hence there are greater constraints in English on the use of word order to highlight and background information. In some African tone languages, marking of focus by stress is not possible. Therefore, expression of focus must be achieved through use of affixes and/or word order.

A second solution to the pragmatic-semantic competition is to compromise, assigning the same surface device to two or more underlying functions. This "peaceful coexistence" solution is optimal when the two distinct underlying functions tend to coincide most of the time in natural discourse; in such cases, the surface mapping mechanism exploits the statistical overlap. The quintessential example of a compromise device is the surface category of

"subject." We can distinguish three aspects of subject in English and other accusative languages (Fillmore, 1968): (*a*) the surface subject (the noun phrase that agrees with the verb in person and number), (*b*) the case role "agent," and (*c*) the pragmatic role "topic." It is a statistical fact of natural discourse that agents are more likely than any other semantic role to be the topic across long passages of discourse. Hence the assignment of a "privileged," high-priority surface device like "subject" to both agent and topic will result in peaceful coexistence most of the time. There will of course be instances in which we want to topicalize something other than the agent. In such cases, there are other more cumbersome surface mechanisms (e.g., the passive) that can be used to signal a divergence between topic and agent. Or, as is often the case in English, case roles like the experiencer, instrument, or patient can be treated **as though they were agents** and assigned the surface role of subject. Fillmore (1968), Cooper and Ross (1975), and others have noted that there is a hierarchy of "subjectivalization" that holds among case roles in so-called accusative languages, proceeding from more to less "agentlike." If a given predicate does not have an agent, the experiencer tends to be subjectivalized. If there is no experiencer, the dative tends to be given the surface role of subject, and so forth. The main point is that, under neutral conditions, for verbs that take agents as arguments, the same surface expression will be used to signal both topic and agent.

Finally, there is evidence from research on language universals and language typologies to suggest that "divide the spoils" and "peaceful coexistence" solutions are still insufficient to account for the diversity of surface forms across languages. In addition to these solutions, there is evidence for "implicational hierarchies" that hold among types of surface devices. For example, if a language uses a surface order of Subject–Object–Verb under neutral conditions, it is very likely that the same language will use postpositions (e.g., "table-on") rather than prepositions (e.g., "on the table"). Furthermore, in SOV languages, modifiers are more likely to precede rather than follow the noun. Several proposals have been put forward to explain such implicational relations. For example, Kuno (1974) suggests that there is a universal tendency to keep Verb and Object (OV or VO) together as a "natural unit." From a somewhat different perspective, Vennemann (1973) has proposed a more general perceptually-based tendency for languages to impose directional symmetry between "operators" and "operands." Evidence for this symmetry principle is drawn from a move toward parallel positions for modifiers across historical language change. There are exceptions to these universal tendencies, since languages must also obey a variety of other processing constraints. At any single point in history, the relationships holding among a broad set of surface mechanisms in a given language will represent the current compromise among various solutions to the problem of mapping nonlinear meanings onto a linear channel. Since no solution is perfect, there will be constant pressures toward change in the evolution of a given language.

Slobin (1977) has put forward a more detailed proposal for a functionalist, competition model of child language. In that article, he discusses parallels in four types of language development: language acquisition in children, historical change with single languages, borrowing between languages in contact, and the "creolization" process by which inadequate trade languages ("pidgins") evolve into fully functional native languages. The striking parallels in language change across time in all four domains are attributed to four competing "charges" or constraints on language that operate in all these situations: clarity, processibility, efficiency, and expressivity.

The clarity charge relates to a tendency for languages (and children) to preserve as much as possible a transparent, one-to-one relationship between underlying meanings and surface forms. Under this principle, a two-morpheme expression for two meaning units will be preferable to a single conflated surface expression. For example, many children go through a phase of preferring "can not" and "do not" to "can't" and "don't." Newport and Ashbrook (1977) have reported a similar tendency for children acquiring American Sign Language as a first language, in which children express three-unit meanings with three separate gestures under circumstances where adults would use a single, continuous gestural complex. Also in accord with the clarity principle, there is a tendency to mimic in the order of surface clauses the temporal or logical ordering that holds in the underlying meaning units. Hence *X before Y* is easier to process and more likely to be produced than *before Y, X*. Osgood and Bock (1977) have given this clarity constraint a particularly important role in their research on the "natural" origins of syntax. Osgood and Bock note strong parallels between high-probability orders across languages (e.g., SVO), and natural cognitive tendencies in the ordering of real-time events (e.g., actor–action–acted upon).

The second charge of "processibility" involves differences between alternative surface forms in relative demands on memory and perceptual clarity. For example, it is a general rule in most languages that information crucial to the understanding of subsequent information will be ordered prior to that information. Hence, under normal circumstances in adult language, topics will be ordered prior to comments on those topics. Second, there is a general tendency to avoid breaking up highly associated units with intervening or embedded information (e.g., Kuno's VO/OV principle discussed above). Third, units that are particularly high in information value tend to be placed in high-priority, salient, or "privileged" points across a sentence. For example, disambiguating inflections are particularly likely to occur in "punchline" position at the ends of the lexical items to which they refer. In some cases, the perceivability principles may run counter to the first charge, that is, the tendency to set up transparent, one-to-one relations between meaning and surface form. For example, since the beginnings and ends of utterance units are more salient and perceivable than middle positions, highly informative elements will tend to be placed at beginnings or ends regardless of their "natural" order in the

real-world events being described. The competition between these two charges is just one aspect of the converging constraints on language that influence language change in history and in acquisition.

The third charge, toward efficient and rapid processing, is in many ways compatible with the perceivability constraint, insofar as both are operating to ease the load on memory in both production and comprehension of speech. However, there are a number of ways in which the speed and ease of production can run counter to processibility in comprehension. In particular, the pressure toward rapid production may lead to the conflation of two or more elements into a single morpheme or lexical item to save time in the planning and execution of utterances. This conflation will violate the one-to-one mapping tendency described with regard to the clarity principle. In addition, rapid speech tends to result in the erosion of phonological distinctions, which in turn leads to greater difficulties in speech perception. Vennemann (1973) has given such phonological erosion a key role in his theory of symmetry in historical language change. For example, he suggests that a symmetrical operator–operand arrangement of suffixing in a particular language may be thrown into disequilibrium when speakers fail to pronounce all of the suffixes in rapid, informal speech. Eventually, the resulting ambiguities will lead to "reinvention" of additional disambiguating devices which may be placed outside the natural, symmetrical position, in order to "shore up" the disappearing inflections. The new elements may throw the entire system out of symmetry, resulting in a shift toward ordering in an opposite direction. In sum, since efficiency in production is not always compatible with efficiency in comprehension, the third charge may enter into competition with the other two principles for access to the resources of the acoustic-articulatory channel.

The final charge toward expressivity describes the information pressures on language to convey both semantic and pragmatic content. Slobin includes under this fourth constraint the need to encode not just ideational content (i.e., who is doing what to whom, where, and when), but also social information (e.g., relations between speaker and hearer) and rhetorical information regarding the highlighting and backgrounding of various meaning units. While the other three constraints tend toward simplifying the mapping system (albeit in separate directions), the expressivity charge more often serves to introduce new complexities into the surface structure of the language. For example, Slobin cites Sankoff and Brown (1976) on the emergence of relative clauses in a pidgin code called Tokpisin, as that code evolved into a natural language or creole. In this regard, Slobin notes that trade languages like the pidgin version of Tokpisin tend to be used in limited contexts where there is a great deal of redundancy between verbal expression and nonverbal information. Hence a few fairly simple surface forms are usually sufficient to convey all needed information. For example, in the northern European pidgin code called Russenorsk, there is only one locative preposition serving all possible locative functions (e.g., in, on, under, near). However, when a pidgin becomes

a native language, it must be used to convey more complex ideas, in a variety of contexts, with much greater probability of ambiguity. Hence the pressure toward sentence-embedding mechanisms like the relative clause is based on a pressure toward the expression of complex embedded **ideas**, with a great deal of cross-referencing from one idea to another. To illustrate this process, Slobin (personal communication) has cited two passages from Margaret Mead's *Growing up in New Guinea* (1930). The first passage is the intended message, as it would be spoken in the native language, by a litigant in a court dispute. The second passage is the version that actually occurred in the colonial court, where litigants were required to speak in pidgin rather than in their native language. The case involves a claim by the speaker that he has not been adequately compensated for a pig that was involved in a ritual family exchange, along a chain of thirty creditors.

> *Intended message*: Now I gave the pig to a man, a man who is my sister's husband. This man gave the pig to a man in Patusi who was planning to marry a daughter of his. She was not his own daughter, but he had inherited his father's position. This pig was accordingly given to this man. This man did not eat the pig but gave him to the brother of his wife. Now this man has a brother, a younger brother who is working on a plantation which belongs to a Malay. Soon he will finish his time of indenture. When he finishes his time, he will receive three pounds, together with many other things. Now this brother of the wife of the fiance of the daughter of the brother of my, he . . .
>
> *Pidgin English version spoken in court*: Now me sell 'em along one fellow man, he man belong one fellow sister belong me fellow. All right. This fellow man he sell him along one fellow man, he belong Patusi, he like marry him one fellow pickaninny mary (any native woman) belong 'em. He no pickaninny true belong 'em that all he help 'em papa belong this fellow mary. All right. Now this fellow pig he go along this fellow man. This fellow man he no kai kai pig, he sell 'em along one fellow man, he sister belong mary belong 'em. (*Note:* 'sister' *means sibling of opposite sex*; 'brother' *means sibling of same sex*.) All right. This fellow man he got one fellow brother, lik lik brother belong 'em, he work along one fellow station belong Malay. Close up now he finish 'em time belong 'em. Suppose he finish 'em time now he catch 'em plenty money, 3 fellow pound, he bring 'em along this big fellow brother belong 'em, one time along plenty fellow altogether something. Now this fellow sister belong mary belong man belong pickaninny mary belong sister belong sister belong mary belong me he no . . . (at this point the judge cuts in).

This comparison clearly illustrates the difficulty of conveying complex and cross-referenced ideas with the limited resources of a pidgin code. The pidgin is ideal for encoding linear ordering among events that follow Proposition$_1$ to Proposition$_2$ to Proposition$_3$ in a transparent mapping between meanings and surface forms. It is clearly **not** adequate for moving back and forth between different topics that are related to one another in nonlinear fashion. Furthermore, the different **kinds** of relationships at issue in this litigation cannot be coded and processed efficiently with only one or two relational terms like *belong 'em*. Because of pressures like these, Sankoff and Brown

suggest that relative clause markers (and other new syntactic markers) must become a reliable and conventional aspect of a creole language. Hence in Tokpisin a conventionalized particle *ia* has emerged to mark the opening and closing of a relative clause. Interestingly, this seemingly arbitrary particle can be directly traced to a prior conversational device *ya?* (as in "yes") which was used in the pidgin code to mark an interruption to check for listener feedback somewhere in the middle of an utterance. This is a particularly clear example of functional influences on the development of a formal, conventional syntactic device, under the fourth "expressivity" constraint in Slobin's model.

In sum, the variety of functions that must be conveyed by any natural human language must be carried out within the limited resources of the acoustic-articulatory speech channel. Hence we can view the mapping problem as a competition for channel access among these diverse pragmatic and semantic functions. This competition can be resolved in a number of ways, including (*a*) a "divide the spoils" approach in which different surface forms are assigned to each competing function, and (*b*) a "peaceful coexistence" approach in which two overlapping functions are assigned the same surface expression under neutral conditions. However, these two solutions are further constrained by certain implicational relations that hold among various surface forms across languages, for example, the tendency for SOV languages to use prepositions rather than postpositions. In other words, decisions about mapping from meaning to sound are interdependent, and some combinations are more viable than others. Slobin has described the interdependence of surface forms in terms of still another competition, holding among four kinds of processing constraints: clarity (transparent relations between surface and meaning), processibility in real-time language comprehension, efficiency and speed in real-time language production, and finally the pressure toward full expressivity of both semantic and pragmatic aspects of meaning. Slobin suggests further that parallels between child language and various types of historical language change reflect the fact that children are experiencing the same converging processing constraints that have operated to determine the range of possible grammars across all human languages.

At this point, we can put forward two versions of the functionalist hypothesis. The weak version suggests only that surface grammatical devices are "correlated" with various communicative functions and processing constraints. This version is compatible with either of the developmental models described above, since it makes no statements about the way that children derive or discover surface forms. The strong version goes a step further, to suggest that grammatical forms are "determined" and "maintained" by these same communicative functions and processing constraints. The strong version leads to a developmental model in which children discover the structure of grammar through their experience with competing communicative factors. Evidence for this last proposal will involve demonstrations that children acquire a function like topicalization **prior** to the acquisition of syntax, and that such

discourse notions are the basis of some first hypotheses about the nature of syntactic categories, ordering rules, morphology, etc. In this paper, we will be concentrating on the role of the functional relationship "topic–comment" in the child's acquisition of grammar. Although our own bias is toward the strong functionalist hypothesis, we should note that some of the evidence to be reviewed here can support only the weaker version of the functionalist position.

Defining Topic and Comment

Research on topic–comment relations has been marked by confusions and contradictions regarding the basic descriptions of this function. Although most writers imply that there is a single function of highlighting and backgrounding information, this one function has been related to:

1. A multiplicity of different bipolar terms (e.g., topic–comment, topic–focus, theme–rheme, and conversational dynamic unit versus conversational static unit);
2. A wide variety of distinct motives or subfunctions (e.g., new versus old information, perspective taking, salience);
3. A large and heterogeneous set of surface devices for expressing the function (e.g., ellipsis, pronominalization, relative clauses, adverbial expressions); and
4. Multiple applications of the single process within a single utterance, creating several nested levels of topic–comment relations.

First, regarding the multiplicity of terms, Table 8.1 lists just a few of the dichotomies that have been proposed in descriptions of the topic–comment process. Although all of these pairs of terms fall within some common domain, each author introduces a new set of terms in order to make subtle distinctions in meaning from uses by other authors. In short, the variety of labels reflects some deeper disagreements about the nature of this pragmatic process.

One of the major differences between theorists regards the second issue, the number of specific subfunctions attributed to the topic–comment process. Table 8.1 is organized into bipolar, single-function theories versus multiple-function theories. For example, Givón (1976) has proposed that there is a single continuum from presupposed, background information to proposed, foreground information. Elements in discourse can vary in their "degree" of "presuppositionality," and their surface realizations will be determined in part by the degree of foregrounding they require. To characterize this sort of single-function approach, take the metaphor of a black-and-white drawing. We can consider the ideational content of a sentence (i.e., who did what to whom) to comprise the outlines of a figure, with the relations among the parts specified at least enough for the figure to be recognized. The pragmatic weightings of information, foreground and background, are analogous to the

TABLE 8.1
Topic–Comment Terminology

	BIPOLAR TERMS	
1. new information	old information	Baroni, Fava, and Tirondolar, 1973; Bates, 1976; Chafe, 1976
2. new information	given information	Clark and Haviland, 1977
3. comment	topic	Bates, 1976; de Laguna, 1927; Hornby, 1972; Sechehaye, 1926; Vygotsky, 1962
4. figure	ground	Bates, 1976; MacWhinney, 1974
5. bound information	free information	Rommetveit, 1974
6. conversational dynamic element	conversational static element	Firbas, 1964
7. rheme	theme	Halliday, 1967
	BIFUNCTIONAL TERMS	
8. information focus	theme	Halliday, 1967
9. focus	perspective	MacWhinney, 1977a
10. secondary topicalization	primary topicalization	Fillmore, 1968
11. focus	presupposed	Chomsky, 1971a; Jackendoff, 1972
12. emphasis	theme	Dezsö, 1970
	RELATED LOGICAL TERMS	
13. proposition	presupposition	Bates, 1976
14. predicate	argument	Reichenbach, 1947
15. operator	nucleus	Seuren, 1969

lights and shadows applied to the sketch, drawing the viewer's attention toward some elements and away from others. In contrast with this single-function view, Chafe (1976) has proposed a list of distinct, sometimes orthogonal functions that are carried out during the process of foregrounding and backgrounding information. According to Chafe's view, a given element can be foregrounded for one purpose (e.g., establishing point of view) and backgrounded for another (e.g., degree of newness of information), so that it is impossible to assign a single "degree" of focus for that element.

This brings us to the third issue, regarding the wide variety of grammatical devices associated with the topic–comment function. Table 8.2 lists some of the surface mechanisms in English that are related to this pragmatic process. The list is impressive and heterogeneous, including aspects of lexical selection (e.g., definite and indefinite articles, adverbials, adjectives), sentence embedding (e.g., relative clauses and clefting), various word orders (e.g., the passive versus the active), ellipsis versus pronominalization versus nominal reference (along a continuum of reference specification), and intonation con-

TABLE 8.2
Grammatical Devices Associated with Topic and Comment

Topicalization devices	Commenting devices
Assignment of sentence subject	Assignment of sentence predicate
Initialization in word order	Initialization in word order
Pronominalization	Specific lexicalization
Ellipsis	Lexicalization
Definite articles and modifiers	Indefinite articles and modifiers
Existential sentences (e.g., *There was this guy. He . . .*)	Connectors to previous discourse (e.g., "yet," "now," "still," "too")
	Contrastive stress

tours (e.g., contrastive stress). In short, there is virtually no aspect of syntax and morphology that is not associated to some extent with discourse relations. If there is a single topic–comment function, why are so many devices necessary? Chafe, among others, would argue that so many devices are necessary because there is not just one topic–comment function, and that the multiple surface forms exist to encode multiple pragmatic functions. For example, intonational stress tends to be used to encode contrast, while newness is associated with aspects of lexical selection and reference specification. Nevertheless, there is also a great deal of overlap regarding the relations between particular surface forms and such functions as perspective taking, salience, and oldness of information. Taking the viewpoint of Givón (1976), one could just as easily argue that the different devices are used to reflect varying "degrees" of foregrounding (see Table 8.1).

The wide set of alternative mappings for topic–comment relations may be related to the fourth issue, concerning the possibility for multiple levels of topic–comment within a given utterance. Take the following sentence:

> *It was **this** beer, not the other one, which was drunk by the man who had only **recently** returned from Cincinnati (as opposed to the guy who came back from there a month ago).*

What is "the" topic in that sentence? Or "the" comment? Clearly there are several nestings of topic–comment relations. ***This** beer* serves as comment to the topicalized beer *the other one*. In turn ***this** beer* is the topic for the comment *was drunk by the man. The man* is the topic for the comment about returning from Cincinnati. *Returning from Cincinnati* is the topic for the comment ***recently***. The entire clause *The man who had only **recently** returned from Cincinnati* is a comment made against the topicalized *guy who came back from there a month ago*. In other words, what is the topic at one level serves as the comment at another. From either a single- or a multiple-function perspective, a large set of surface mechanisms may be necessary to organize

discourse into layers of relations, in which commenting (or predication) at one level serves as the topic (or argument) for yet another higher level comment. Our own solution to each of the four issues mentioned at the beginning of this section can be summarized as follows:

1. There is indeed a single pragmatic function involving setting up topics or referents in discourse space, and making points or comments about those referents. In this sense, argument–predicate, presupposition–proposition, and topic–comment can all be seen as essentially the same process of "point making," applied at different relational levels (i.e., word-to-word, proposition-to-proposition, paragraph-to-paragraph).
2. Although there is only one point-making function, a variety of factors can motivate the selection of particular topics and points to be made about those topics. Newness versus oldness, salience, contrast and contradiction, perspective taking—all of these conditions affect the communicative activity of point making.
3. The point-making process is recursive, in the sense that it can be applied several times within a given section of discourse to create nested topic–comment structures (as in the above "beer" sentence).
4. The wide variety of surface devices in the service of point making is motivated by both 2 and 3. That is, some grammatical forms may be associated with particular "motives" for topicalization and commenting. For example, contrastive stress is typically used when the point of the utterance is to contradict or replace some aspect of the listener's beliefs (e.g., ***This*** *beer, not the other one . . . .*). In addition, some surface devices may be associated with situations in which the speaker must nest a series of points (e.g., relative clauses); other devices may be used in much simpler topic–comment structures. The amount of topic nesting will also be related to a distinction that we will describe shortly, between active versus default topicalization.

In our view, then, there is a single pragmatic relation of topic–comment, created in the process of making communicative points. Topic and comment are inseparable aspects of a single, active communicative process. However, we can to some extent distinguish separate influences on the choice of topics versus the choice of comments. In addition, the grammatical devices related to topicalization may in some cases be very different from the devices associated with commenting.

Topicalization: Why and How

The process of topicalization actually involves two parts: (*a*) the selection of a topic that we want to make some point about, and (*b*) the specification of that topic in sufficient detail so that our listener will be able to follow our

subsequent point. Given the same topic selection, the amount of explicit topic specification that will be necessary depends on the amount of shared information that the speaker can assume in his listener. Take the following example, based on Rommetveit (1974). Two football fans, Hank and George, are watching a televised game, in which player Bob Wilson makes a brilliant touchdown. Hank cries out immediately, *Terrific!* At this point, both the speaker, Hank, and listener, George, are completely wrapped up in the game. They share exactly the same psychological and physical context, including the semantic content of the game (e.g., Bob Wilson just made a touchdown) and the pragmatic weighting of that content (e.g., the touchdown was important, brilliant, and stands out as a figure against the background moves of the game). In such a context, the one-word comment carries perfectly. There is no risk that the uncoded topic (Bob Wilson's touchdown) will be lost. Rommetveit suggests that very young children, unable to see the world from a viewpoint other than their own, always assume such a shared here-and-now context for their brief utterances, even when such an assumption is invalid. (See Bates, 1975, for a review of egocentrism in child speech.) Adults, however, have enough experience with different listeners and different viewpoints to judge whether a one-word comment will make its point or not.

In the case of our two adult football fans, suppose that Hank says nothing during the touchdown itself. Later over beer and popcorn, he says *That play was terrific!* Given the shared experience of the game, this particular topic–comment structure will probably work, since the listener, George, will know immediately which play is under discussion. However, 24 hours later, discussing the same game with a colleague at the office, Hank might decide to add still greater topic specification to his utterance, saying something like *That touchdown by Bob Wilson in the last quarter was terrific.* To make the same point to a friend, who did not watch the game, Hank might have to set up a series of sentences like the following:

> *There was a football game Saturday between the Los Angeles Gorillas and the East Bay Packers. Bob Wilson, who is the Packer quarterback, made a touchdown in the last quarter that was terrific.*

Finally, to make this point to a friend who knows nothing about football whatsoever, Hank may have to prepare his comment with topicalization involving a detailed history of football, a definition of touchdowns and other plays, and so forth. Indeed, so much topicalization may be required that he will decide not to bother with the point at all. Hence, the amount of topic specification required may feed back on the topic-selection process, eliminating certain candidates from subsequent point making.

The amount and type of topic specification required will be a function of the amount of shared information that speaker and listener can assume at a given moment in conversation. As noted, the degree of topic specification required may also influence the selection of the topic. In general, however,

topic selection emerges out of the flow of previous discourse. Much of the time in conversation, the same topic is carried across a long series of conversational turns, with the participants adding a series of points to each other's knowledge of that topic. **Hence topic selection is strongly associated with the givenness or oldness of information in a particular conversation.** Topic is not **defined** as given or old information. But topics typically **are** given or old information. A primary motive for topic selection is topic continuation, at least in a cooperative conversation between participants who are relatively interested in one another's views.

However, givenness is only one motive for topic selection. We frequently initiate new topics, encoding information in a topic–comment format even though each and every element in the sentence is new. What determines topic selection when there is no given element? There is a set of factors influencing choice of new topics, discussed under the heading of "perspective taking" or "point of view" (Cooper and Ross, 1975; Ertel, 1977; Kuno, 1975; MacWhinney, 1977; Silverstein, 1973). According to this proposal, when all the elements in a proposition are equally novel, speakers are particularly likely to choose as the starting point the element with the greatest "closeness to ego" or similarity to the speaker. Recall the subjectivalization hierarchy discussed above, in which the surface role of subject is assigned under neutral conditions to the most "agentlike" argument available for a given predicate. Silverstein (1973) has argued that there is a similar hierarchy **within** agency, such that surface subject or ergative markings are determined along a continuum from first person, to second person, to third person agents and experiencers. Cooper and Ross (1975) have extended this "me first" principle to the ordering of attributes, inanimate objects, and other nonhuman sentence elements in idioms suggesting that we will give priority ordering to the element that we identify with most. Thus, we say *man and machine* rather than *machine and man*, *here and there* rather than *there and here*, and *cowboys and Indians* rather than *Indians and cowboys*. In other words, we focus first on things we care about, and a good predictor of caring across individuals and situations is similarity to speaker.

Finally, this "me first" principle often fails to predict topic selection in situations in which some sentence element competes for topic choice by virtue of situation-specific kinds of vividness, salience, and so forth. In a linguistic theory of discourse, it would be impossible to catalogue all the factors that determine a quality like salience. We can talk about how the grammar operates to encode topic after topic selection has taken place. However, a definition of salience with predictive value will require building into our theory of discourse a general theory of human attentional processes, as well as a guide to individual differences and developmental factors in attention. So far, our analysis has suggested that topic selection is motivated by some combination of at least these three intentions: givenness, perspective, and salience.

Turning from the motives for topic selection to the devices for encoding topic, we find that the devices of subjectivalization and initialization have somewhat different relations to these intentions. Subjectivalization can be viewed as a sentence-level device for encoding topic, used by many of the world's languages. In these languages, a special surface role of "subject" (NP agreeing with the verb in person, number, etc.) serves to encode both perspective and agency. This solution capitalizes on the fact that the agent is usually the topic by placing agent and topic in "peaceful coexistence" on a single surface device. This is an example of a case where topic selection is strongly associated with the "me first" principle, insofar as agency is a semantic role high on a dimension of similarity to speaker.

Initialization (i.e., ordering items at the beginning of an utterance) is another surface device for encoding topic, reflected in the fact that SOV and SVO languages predominate worldwide over VSO or VOS (see Li, 1976, for a series of discussions of the interaction of subject, topic, and word order). Topic initialization can be viewed as an efficient solution to a simple perceptual processing constraint: Points will be understood better if their topic is understood in advance. Hence initialization is a device for encoding topics that have evolved for the listener's sake. We will say more about this later with regard to word order hypotheses in very young children who may not be sensitive to this constraint.

In addition to subjectivalization and initialization, there are a variety of surface forms that are related primarily to the **amount** of topic specification that is necessary for a point to carry. Surface topicalization devices can be ranged along a continuum from low specificity or default topicalization, through to the kinds of complete, paragraph-length descriptions that are sometimes necessary for making points to ignorant listeners.

Starting at the beginning of this continuum, the minimal surface form for indicating topic is the zero form, that is, ellipsis of the topic. In the above football example, the topic for the one-word comment, *Terrific!*, was not expressed at all. Another typical framework in which elliptical topicalization works is in question answering, that is, *What did you have for dinner last night?—Spaghetti.* As we shall see later, ellipsis is a favorite mechanism for small children, who are often unaware that further topic specification is necessary.

Moving up to the lexical level, pronominalization is a means of lexicalizing the topic with minimal specification or identification of the referent. Selection of a nominal lexicalization provides much more explicit identification of the topic. Note, however, that the particular nominal form selected can also range in specificity. For example, the word *play* in the football example contains much less specific information than the word *touchdown*.

Moving to the phrasal level, topic specification can be increased by providing modifiers of various sorts on the nominal form. These include adjectives

(*the last touchdown*), prepositional phrases (*the touchdown by Bob Wilson in the last quarter*), and relative clauses (*the play that Bob Wilson made*).

At the modifier level, there is a particularly important class of adjectives for expressing definite versus indefinite reference. Definite articles (the), and demonstratives (that) aid the listener in locating the referent by indicating that the listener already knows it. This "clue" narrows down the range of possible topics. Indefinite articles (a or an), and indefinite quantifiers (e.g., some), are clues in the opposite direction, letting the listener know that a new referent is being introduced.

Beyond the phrasal level, topicalization can also involve setting up entire sentences prior to point making. Typical examples are existential sentences like *There was this play by Bob Wilson in the last quarter*. If we think of topic–comment relations as predications across indefinitely large discourse units, it becomes clear that entire paragraphs (or, for that matter, chapters) can function as topic specification devices for later point making.

To summarize, there are a variety of syntactic devices associated with the process of topicalization. These include subjectivalization, initialization, and reference-specifying mechanisms ranging from ellipsis to paragraph-sized descriptions. When the topic is old information, definite articles and demonstratives are devices typically used in topic specification. When, instead, the topic is new information, indefinite articles and quantifiers are more likely to be used. In all cases, the heuristic for deciding what kind of surface topicalization mechanisms to use is always the speaker's assessment of the listener's ongoing knowledge base. The amount of topic specification will optimally be the amount needed for this. This suggests that acquisition of syntax by children will be related to the child's ability to predict a need for topic-specifying mechanisms.

Commenting: Why and How

Unlike topicalization, commenting is never a default process. It is by definition "active" communication. However, commenting can also involve different "degrees" of explicitness or specification, depending on the listener's needs. At the minimal level, a point may carry with a wink, a nod, or a point of the index finger in some relevant direction. In most conversations, the minimum specificity in commenting is a one-word command or question (e.g., *Coming?*), or a one-word response to a question (e.g., *What did you eat?—Spaghetti*). From this level on, the amount of specificity required will depend on the amount of knowledge shared by speaker and listener. In this sense, then, topicalization and commenting are quite similar. However, the "motives" for comment selection and the "devices" used to encode comments are for the most part different from, and in some cases polar opposites to, the motives and devices associated with topicalization.

Turning first to motives for comment selection, we said earlier that a primary factor influencing topic selection is givenness in discourse. In other words, topic selection is often a function of topic continuation. The opposite is true for commenting. The point-making process almost always involves selection and encoding of new information. There are some apparent exceptions where a speaker intentionally makes a point that is obvious to the listener in order to make a more subtle, indirect, new point. For example, in the sentence *Dr. Jones, you are not yet a member of the tenured faculty*, the new information that is conveyed is clearly **not** the information explicitly encoded in the surface form (see Larkin and O'Malley, 1973). In this situation as well, however, commenting is "defined" as the point that is made, the predication of some new information about some topic (e.g., *You may **not** become a member of the tenured faculty, Dr. Jones*).

Verbal material is considered here to be new whenever it leads to a modification in the way the listener represents the situation in working memory (Feigenbaum, 1970, p. 457) **or consciousness** (Chafe, 1974). **Material is considered to be given when it leads to no such modification.** Thus newness refers, in general, to the extent to which the speech signal alters the listener's conscious knowledge. New information may modify the listener's conscious knowledge in at least three ways. That is, there are at least three basic operations that can be involved in the modification of information: addition, contrast, and replacement.

Addition occurs whenever new information is added to working memory or consciousness. Thus information about "a rat" is being newly added to consciousness in 1a, whereas in 1b information about the identity of the same referent is already present and need not be added. The only new information in 1b is *ran into the strawberry patch*, predicated of the referent that was introduced in 1a.

(1) (a) A rat crawled through the gate.
(b) Then the rat ran into the strawberry patch.

The second type of newness involves contrast between existing informational elements. For example, *the cat* in 2c contrasts with *the dog* in 2b.

(2) (a) A cat and a dog ran into the backyard.
(b) The dog fell into a hole.
(c) Then the cat fell into the hole.

In 2c the semantic elements *the cat* and *fell into the hole* are both already present in consciousness. However, the "relationship" between these units in 2c is new, and contrasts with the parallel relation that occurs in 2b. In a sense, then, the predication in 2c serves as a "comment" on the predication in 2b, in which *cat* contrasts with *dog*.

The third type of newness involves the replacement of information. Instead of setting up a parallel predication with contrasting elements, the speaker in a sense "undoes" an earlier predication and/or substitutes one argument for another in that predication. The simplest type of replacement occurs in self-corrections, such as 3.

(3) The cat, I mean, the dog fell into the hole.

We also find examples of replacement in dialogue, as in 4a and 4b.

(4) (a) The cat fell into the hole.
(b) No, the dog fell into the hole.

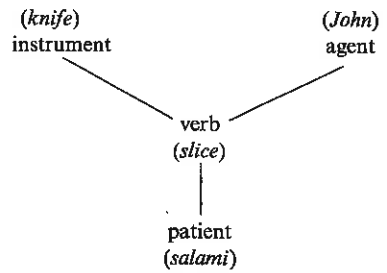
In Sentence 3, the speaker never actually got the chance to make a predication on the argument *cat*. Hence Sentence 3 is a replacement **without** a corresponding contrast within the same predicate structure. Sentences 4a and 4b

TABLE 8.3
Varieties of Newness

Feature set	Item	Example
+addition +contrast +replacement	a raccoon	*A dog chased a cat, I mean, a raccoon chased a cat.*
+addition +contrast −replacement	a raccoon	*A dog chased a cat and then a raccoon chased a cat.*
+addition −contrast +replacement	a raccoon	*A dog chased a cat, I mean, a raccoon.*
+addition −contrast +replacement	a raccoon	*A dog chased a raccoon.*
−addition +contrast +replacement	the raccoon	*The dog chased the cat, I mean, the raccoon chased the cat.*
−addition +contrast −replacement	the raccoon	*The dog chased a cat and the raccoon chased a cat.*
−addition −contrast +replacement	the raccoon	*The dog chased the cat, I mean, the raccoon.*
−addition −contrast −replacement	the raccoon	*The dog chased the raccoon.*

are replacements **with** contrast. Hence contrast sets up parallel predications, while replacement substitutes one element for another within a configuration. The combination of contrast with replacement in 4a–b is only one of eight possible combinations of these three types of newness. Table 8.3 summarizes the various possibilities. In that table each of the eight possible combinations is illustrated by an example. Thus addition plus contrast is illustrated by *a raccoon* in the sentence *a dog chased a cat and then a raccoon chased a cat.* Combinations at the top of the table have the greatest overall newness (+addition, +contrast, +replacement); those at the bottom have the least (−addition, −contrast, −replacement) (see Table 8.3).

Newness is not the sole determinant of comment selection, however. We noted earlier that, when new topics are introduced, we often have a situation in which all the semantic elements underlying an utterance are equally new. In such situations, topic selection was said to be a function of (*a*) perspective taking along a continuum of similarity to ego, and/or (*b*) salience or vividness. Under such circumstances, the choice of a topic or "starting point" for the utterance usually dictates automatically that the rest of the proposition will serve the predicate or comment function within that utterance. However, in a complex proposition with a variety of arguments and relations, only a "portion" of the untopicalized material will be selected to serve as the comment or main point of the utterance. In such cases, other factors of salience or vividness will determine comment selection. To illustrate, let us take a hypothetical case structure relating the action "slice" to a corresponding agent–argument (John), instrument–argument (knife), and patient–argument (salami). We will use a satellite notation to avoid any implications of linear ordering among these arguments.



Suppose that all of the elements in this case structure are equally new. The principle of perspective taking will dictate that the most speakerlike argument, the agent John, will be selected as the topic of an utterance based on that case structure. According to the definition of newness provided above, the assumption that all elements are equally new also means that there are no contrasts or replacements involved. In other words, we have no prior assumptions that John might have used anything other than a knife, or sliced anything other

than a salami. Under such conditions, we have two alternative surface mappings for this case structure, one highlighting *knife* and the other highlighting *salami*:

(5) (a) John sliced the salami with a knife.
(b) John used a knife to slice the salami.

All other things being equal, we might prefer 5a to 5b simply because it involves fewer words, one surface predicate instead of two. However, if for some contextual reason *salami* is more salient or vivid than *knife*, we would probably select form 5a. If, instead, our attention is drawn (for perceptual reasons, or reasons of prior history) to the knife, 5b may be preferable.

In other words, topic selection is determined by "givenness," "perspective taking," and "salience." Comment selection is determined by "newness," "distance from ego" (the reciprocal of perspective taking), and "salience." The first two motives are in complementary distribution between topic and comment. The third motive serves to separate both topic and comment from other sentence material. In addition, the salience motive may occasionally involve competitions between topic and comment. This will hopefully become clearer when we examine the various surface devices associated with these two aspects of point making, particularly regarding the topic–comment competition over initial position in early child language. Finally, the model we have proposed here may also involve relative "weightings" or "amount" of salience, highly context-sensitive assignments which would be difficult to predict without a great deal of information about specific situations.

Turning to the surface devices associated with commenting, we noted above that subjectivalization is a special surface role that many languages use to encode two statistically overlapping categories: semantic agent and pragmatic topic. Hence "subject" can be seen as a high-probability bet on the most likely topic among a set of semantic elements, based on the closeness-to-ego principle of perspective taking. It is as though the repeated experience of subjectivalizing agents has "congealed" in the grammar, so that by extension we tend to give a "nounlike" look to topics even when we are talking about actions and events, for example,

(6) John's drinking surprises me.

By a similar process, comments tend to be about salient, changing, high-interest information. While actions are not the only kind of element that can be selected for comment, they are particularly **likely** to qualify as dynamic, changing, salient elements. Insofar as comments tend to be about actions, commenting tends to be associated with verblike predicative structures, at least at the sentence level. Hence the "verbness" of comments can be seen as an extension from the highest-frequency, most probable kinds of comments. This is true

regardless of whether the point being made is an action, a state, an attribute, or an entity. In Sentences 7–11,

(7) The engineer built the bridge.
(8) The engineer slept.
(9) The engineer is tired.
(10) The engineer is peculiar.
(11) The engineer is John.

all the comments or predications about the engineer employ verbs or verb-associated structures (see Cooper and Ross, 1975, on the syntactic continuum from adjectives to verbs). Our point here is that "subject" and "predicate" can be viewed as sentence-level conventions that have evolved in language to reflect the fact that topics are generally agents or other ego-related entities, while comments are particularly likely to be dynamic, active elements. The "nouny" and "verby" surface devices associated with topic and comment reflect the prototypical selections for each. In those cases where topics are not agents and comments are not actions, the noun-verb look is preserved and generalized to the nonconforming elements.

In addition to the subject–predicate roles, another device that is associated with both topicalization and commenting is linear ordering. Insofar as both topics and comments are salient information, both are in competition for high-priority, perceptually-clear positions and markings in the surface structure. This means that both are competing for either sentence-initial or the sentence-final "punchline" position. There are a number of compromises that can be worked out for this competition, using a combination of alternatives to surface marking other than order. However, we hope to make clear below that for very young children the need to mark topic first to clarify matters for the listener and the need to mark comment first to indicate its salience, are competing constraints that have a decisive impact on early word order tendencies.

In addition to predication and ordering, commenting is associated with several other surface devices. For example, comments (particularly those that are new through contrast or replacement) tend to be marked with strong or contrastive stress markings. In addition, insofar as they encode new information, noun comments are more likely to appear with indefinite articles, as in Sentence 12:

(12) John is a bore.

Finally, since comments tend to be particularly new and salient information, they are likely to receive more lexical specification than topics. Hence comments are much less likely to be encoded with anaphoric or pronominal surface forms. When a pronoun is used in commenting, we can predict that it will occur with

extremely strong stress, and in either initial or "punchline" position:

(13) He hit the ball, not her.
(14) The guy who hit the ball is **him**.

To summarize, the motives for comment selection include (*a*) newness, (*b*) distance from speaker, and (*c*) salience or vividness. The first two are in complementary distribution with the motives for topicalization, while the third may involve competition. Regarding "devices" for encoding comments, just as topicalization is associated with subjectivalization, commenting tends to involve verblike surface devices, at least at the intra-sentential level. In fact, we have proposed that "subject" and "predicate" can be seen as "congealed" decisions, conventionalizing high-probability topic and comment selection into a sentence-level syntax that is ideal for conveying agent–action relations. Topicalization and commenting make similar demands on resources for linear ordering, competing for initial position. Finally, commenting is associated with indefinite reference (related to newness), contrastive stress, and explicit lexicalization rather than anaphora or pronominalization. Topics, on the other hand, tend to be associated with neutral stress, definite reference, and anaphoric surface forms.

We will turn now to a review of some of our own research as well as relevant findings by other investigators, supporting the functionalist approach to grammar acquisition that we have just outlined. As noted earlier, some of these findings can support only the weak version of the functionalist hypothesis, that is, the view that grammatical devices are correlated with communicative functions. Other studies, however, also lend support to the strong functionalist view that children use communicative functions as guides in discovering the surface mechanisms of their language.

The results reviewed below are divided into longitudinal versus experimental evidence for topic–comment relations in early child grammar. Both types of studies have serious flaws for the study of pragmatic functions. In longitudinal analyses of free speech samples, the information on the verbal and nonverbal context for child speech is often insufficient to determine newness, givenness, salience, and so forth. Hence we risk a certain circularity in using the child's utterance to establish the given–new conditions operating in a particular situation, and then turning around and using the given–new conditions to explain the linguistic form chosen by the child. For this reason, functionalist hypotheses must also be tested within experimental studies in which we can control the newness, givenness, and salience of information as independent variables. On the other hand, in experimental situations we lose much of the natural flow of discourse, as well as the natural fit between nonverbal context and speech that emerges in spontaneous conversations. No method is optimal. We will have to use longitudinal and experimental methods as converging operations in investigating these complex and difficult questions.

Longitudinal Evidence

Subject and Word Order

In the functionalist model presented above, subject and word order were both viewed as devices associated with the process of topicalization. In particular, the surface subject was viewed as a compromise device, encoding both the semantic role of agent and the pragmatic role of topic under neutral conditions. Initialization, that is, the assignment of the "starting point" position in sentence construction, was also viewed as a topicalization device, although under certain conditions the topic and the comment may be in competition for sentence-initial position. Finally, insofar as subject and initialization are both topic-specifying mechanisms, it is not surprising that the subject is in first position in the standard or neutral word orders of most of the languages that have surface subjects at all.

Contrasting with the functionalist position, in many other syntactic theories—particularly transformational grammar—grammatical devices like subject and word order are axiomatic, that is, primary concepts in the grammar. Although subject and word order may be used to organize and encode information about topic and agent, the relationship between form and function is sufficiently indirect that one cannot be derived from the other. Furthermore, within such models the surface mechanism "subject" is not related to initialization merely by pragmatic coincidence. Rather, word order rules are based on prior syntactic categories like "subject" and "predicate." Hence we would not expect to find regularities in word order in the absence of evidence for syntactic categories.

The clear difference between these linguistic models leads to two competing hypotheses about the way that children acquire the surface mechanisms of subject, and the standard word order of their language.

1. The strong functionalist view predicts that children will show evidence for the intention to encode agent and/or topic **before** they evidence control of the surface role of subject (e.g., agreement between verb and one noun phrase, use of subject pronouns, standardized word order). Furthermore, it suggests that regularities in word order will initially be based on either the agentive case role or on the topic–comment distinction.
2. The autonomous syntax view predicts that, insofar as subject and predicate are a priori categories, early rules of ordering, agreement, etc., should be extended simultaneously to all possible subject noun phrases in the child's repertoire. In other words, encoding decisions should be more related to form class (e.g., noun, verb) than to semantic or pragmatic role.

Within the functionalist model, there is one further predication that can be made.

3. If there are no clear semantic ordering tendencies in the adult input language, it is more likely that early ordering tendencies will be based on pragmatic factors. Insofar as both "topic" and "comment" compete for sentence-initial position, the child's early ordering strategies may be based on either role. However, topic initialization is presumably based on recognition of the listener's needs, while comment initialization is based on the salience and/or newness of information from the child's perspective. Hence we can predict that the earliest pragmatic ordering will be comment–topic. Later, when the children become aware of the need to actively specify topics for the listener, they may switch to a topic–comment ordering.

While the evidence is far from complete, there is some support for the strong functionalist hypothesis in the recent longitudinal literature on subject and word order. First, there is evidence that as early as the one-word stage children have both the topic–comment distinction and the concept of agent. Second, across several languages there is evidence for two functionally based word-order tendencies: (*a*) an ordering in terms of agent–action, and (*b*) an early tendency to order new information before old information, regardless of either semantic role or form class. Third, the subsequent course of grammar acquisition in some languages suggests that the surface category of subject and a standardized word order both emerge gradually through the interaction of a variety of factors, perhaps as late as 4–5 years of age.

Starting with the one-word stage, a number of studies (de Laguna, 1927; Greenfield, and Zukow, 1978; Mueller, 1975; Rodgon, 1976; Sechehaye, 1926; Vygotsky, 1962) indicate that single-word utterances tend to express new, changing, and/or uncertain information. Background or given information that is relevant to the meaning of the utterance is rarely encoded; if such information is indicated at all, it is usually carried through nonverbal gestures like pointing. Hence the child at the one-word stages uses his limited channel resources to encode comments, topicalizing contextual information by default. This means that something like a topic–comment structure is present in child speech prior to any ordering strategies whatsoever. Bates (1976) has argued that this early division of information into topic and comment reflects the natural tendencies of the human attentional system, with orienting reflexes and figure-ground mechanisms determining the child's active focus on novel, changing, or uncertain elements in both verbal and nonverbal situations. Indeed, Bates suggests that the critical problem in the development of pragmatics will be learning **not** to presuppose or take old information for granted when such information is not obvious to listeners.

Regarding the availability of the concept of agent, several studies of semantic intentions in the one-word stage (e.g., Bloom, 1970; Greenfield and

Smith, 1976) have reported that children prior to multiword speech use single-word utterances to indicate the actor or agent in a given situation. Also, as we shall see in the experimental section below, there is some nonlinguistic evidence suggesting that children have a concept of agent available prior to multiword speech. We can conclude, then, that prior to any sort of ordering tendencies in multiword speech, children can comprehend and encode information about agency, as well as some primitive form of the topic–comment distinction.

At the beginning of multiword speech, there is evidence supporting the hypothesis that children may use either agency or topic–comment or both. Researchers like McNeill (1966b) reported that the early speech of English-speaking children obeys Subject–Verb–Object ordering constraints. However, Bowerman (1973b) and Brown (1973) both note that the same corpora that can be described with subject–verb ordering rules can also be described with agent or vehicle-action ordering rules. In other words, at the early stages the English child's ordering tendencies may be semantically based. Since this period in development precedes the acquisition of morphology, we cannot yet discern a notion of subject defined at the surface level (i.e., as the noun phrase that agrees with the verb in person and number). Hence, there is no justification for a word order rule based on abstract categories when the data can be described equally well by a rule based on easily verified semantic categories.

There is also considerable cross-linguistic evidence that the first ordering tendencies of some children are based on the topic–comment distinction, as opposed to either a syntactic or a semantic rule. Although interpretations vary from one study to another, several researchers report a phase of verb initialization in the first two-word combinations of their children. These include studies of SVO languages like English (Braine, 1963, p. 682), German (Park, 1974), Serbo-Croatian (Radulovič, 1975), Italian (Bates, 1976; Fava and Tirondola, 1977), and Dutch (Snow, 1978), as well as studies of SOV languages like Garo (Burling, 1959) and Hungarian (Dezsö, 1970; MacWhinney, 1974; Méggyés, 1971; Viktor, 1917). In our view, such predicate-initial utterances probably reflect a more general strategy for initializing comments, insofar as the changing and/or salient aspects of a situation are typically predicates. Support for this interpretation comes from the Fava and Tirondola study in Italian. These researchers analyzed a longitudinal corpus of six children whose early ordering patterns fit a "new-given" rule better than either a semantic (e.g., action–agent) or a syntactic (verb–subject) rule. A similar tendency for Italian children to place the subject after the verb in the early stages was also noted by Bates (1976). This pattern could not be derived by imitation, since input to children by Italian adults is either predominately Subject–Verb, or divided evenly between sentences with pre- and postverb subjects. However, the word "rule" may be somewhat misleading in describing the early comment–topic ordering tendency. Instead, as suggested in Bates (1976), a tendency to order multiword utterances from new to old may be a direct reflection of attentional processes, in an extension of the earlier tendency in one-word speech to "blurt out" the most interesting aspect of any situation. The suggestion that the new–old order in

production is not actually a rule is supported by evidence that this tendency applies **only** in production. As we shall see below in the section on experimental evidence, children who have not yet developed strong syntactic strategies in comprehension tend to interpret utterances with varying word orders in terms of probability of events (i.e., who is likely to be the actor among a particular set of lexical items, regardless of order). Hence comprehension in these early stages may not be based on semantic, syntactic **or** topic–comment ordering rules.

After this early new–old ordering tendency, the next phases in the development of subject and word order vary considerably, depending on the language being learned. The discovery of standard order and the various surface phenomena that define "subject" takes place very early in some languages, while in other languages children do not seem to be aware of a distinct syntactic category of "subject" until as late as 4–5 years of age. Keenan (1976) has suggested that there are at least 34 different syntactic phenomena that are associated in varying degrees across languages to the surface category of "subject." As Snow (1978) notes for children acquiring Dutch, there is no particular reason why these differing aspects of "subject" have to be acquired in a block. Instead, the various surface mechanisms can be acquired a few at a time, by children who are unaware of a single surface category that unites these devices.

Starting with English-speaking children, Braine has reported an early predicate-fronting tendency in his corpus, while Brown reports that his children seem to obey an agent or vehicle-action rule in early speech. It appears, then, that English children may derive their early orders either from a tendency to initialize comments, or from learning of the high probability agent–action ordering in the adult input language. Brown reports that correct subject–verb agreement begins as soon as the child acquires the requisite inflections. Hence children have acquired one means of marking the surface subject by Stage II (MLU 2.5). However, we cannot conclude that this subject–verb agreement is based on an independent notion of subject until we have evidence for extensive productive marking of nonagentive subjects, as in instrument–action sequences like *knife–cuts*. Also, to have firm evidence for a category of subject that is distinct from both topic and agent, we need instances in which the child uses alternative orders like the passive, where the surface topic is clearly distinguished from the agent (e.g., in the sentence *The ball was hit by John*, *the ball* is the topic in the surface–subject role, while *John* is the agent). Since these alternative surface forms are late developments in English child speech, and nonagentive subjects are rather infrequent, we cannot be certain at what point English-speaking children have derived a notion of surface subject that is something more than just the category of Agent. As we shall see shortly, experimental evidence indicates that English children do not rely on verb agreement or standard word order in comprehension until 4–5 years of age. Hence it is possible that the English category "subject" has no psychological reality for children until as late as 4–5 years. Even when the 4–5-year-old child begins to

evidence control of subjects, there is still no necessary evidence for the derivation of subjects from abstract categories. Rather, subjects could be viewed as based on a category that is derivative of the semantic category of Agency and the pragmatic category of topicality.

In Italian child speech, Bates (1976) suggests that the surface notion of subject is not available until multiword speech is well established. Bates notes that the early verb–subject (or new–old) tendency in two middle-class Italian children drops out at MLU 2.0–3.0. Prior to this point, the subjectlike element in VS sentences tends to be **old** information. Interestingly, during the same period in which the function of VS utterances changes, we also find evidence for productive subject–verb agreement and the appearance of subject pronouns. Soon thereafter, both children pass into a brief period of preserving SVO order in fairly rigid fashion, and lexicalizing the subject in situations where adults would delete it. Given this pattern, Bates concludes that the surface notion of subject emerges between MLU 2.0 and 3.0, coordinating three surface mechanisms: word order, subject pronouns, and noun–verb agreement.

Fava and Tirondola (1977) have followed up on the earlier study by Baroni, Fava, and Tirondola (1973), providing much more detail on the transition from comment fronting to topic fronting in Italian children. Unlike the children studied by Bates, Fava and Tirondola's six subjects continue to use pragmatically based ordering beyond the point at which subject–verb agreement and subject pronouns are acquired. Hence the acquisition of the surface category of subject does not necessarily result in ordering tendencies based on syntactic relations. Furthermore, they provide interesting data on the motivation for this shift from comment- to topic-fronting. The children in their sample tended to comment-front the first time they encoded a particular proposition. However, if the communication misfired (i.e., the adult failed to understand or answer appropriately), the children would rephrase their proposition with the topic shifted to first position. These data support the second functionalist hypothesis outlined earlier, suggesting that children begin with a pragmatic order based on their own perception of salient or changing information. Because of communication misfires, the child becomes aware of a difference between his own perspective and that of the listener. Under such conditions, Italian children apparently learn to order the topic first, to insure that the subsequent comment or point will carry.

We know much less about transitions into syntactically defined surface structure in other languages. For example, Radulovič (1975) reports that the phase of verb-initial ordering is very brief in Serbo-Croatian. Very soon thereafter, these children pass into a phase in which SVO word order is rigidly preserved. This phase lasts until the complex Serbo-Croatian inflectional system is at least partially mastered, so that the child can go on to use the more flexible word order that characterizes the adult input-language. Since the rigid SVO period precedes subject–verb agreement, it is difficult to know whether this word order rule is based on case role regularities (e.g., agent–

action ordering), on some sort of topic-fronting tendency, or on a deep or surface definition of subject. In Hungarian (MacWhinney, 1974), children apparently continue to base their ordering on pragmatic factors, both before and after surface inflections distinguishing the "subject" have emerged. Because Hungarian has no passive, there seems to be less reason for either children or adults to establish the subject as a separate category. Snow (1978) reports that Dutch children use comment fronting well into the period of multiword speech, and will topic-front (like Fava's Italian children) only when misfires occur and the utterance must be rephrased. Since instrument–subjects are not permitted even in adult Dutch, Snow concludes that the evidence for syntactically defined ordering is very slim in Dutch children. She suggests instead that, at least until around 4 years of age, a combination of semantic and pragmatic factors can account for all of Dutch child syntax.

To summarize, current longitudinal research in several language communities supports the functionalist hypothesis that children use a combination of semantic and pragmatic factors to guide their discovery of surface grammatical devices. In addition, there is a certain amount of evidence to support the prediction that early pragmatic ordering will place comment before topic, while topic fronting will be discovered only after the child becomes aware of the fact that the listener's perspective is different from his own. Child language researchers have only recently become aware of the fact that the surface category of subject can be defined in terms of a correlated set of factors like noun–verb agreement, ordering, pronoun choice, etc. Children may not acquire all these aspects of surface syntax at once. In fact, children may not become aware of a grammatical entity "subject," or of ordering rules based on subject, until a number of surface rules have been acquired. We need to know much more about the contribution of various semantic and pragmatic functions to the discovery of such surface regularities, to determine when (and whether) syntactically defined categories emerge. At this point, however, we can at least conclude that the evidence for an a priori notion of an abstract category called subject is slim.

Other Grammatical Devices Associated with Topic–Comment

Most research on child grammar from a functionalist perspective has focused on subject and word order. Much less research is available regarding other grammatical devices associated with the topic–comment distinction. However, the limited evidence that we have so far does support the hypothesis that these forms are acquired to fill pragmatic communicative functions.

Ellipsis

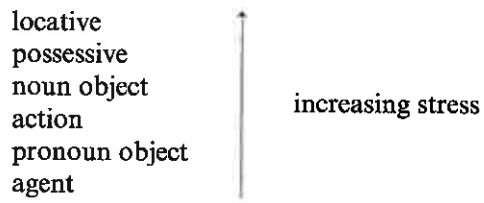
As we noted earlier, children at the one-word stage tend to encode the novel or changing element in a given situation, letting contextual factors serve

as the implicit topic for their one-word comments. Another way of putting this is to say that ellipsis serves as a topicalization device from the very beginnings of language.

Beyond the one-word stage, few researchers have considered the role of givenness versus newness in determining lexicalization versus ellipsis. For example, Bloom (1970) has argued that the high frequency of noun–noun constructions in her corpus reflect a syntactically based verb deletion rule. Mueller (1975) has challenged this interpretation. In a reanalysis of Bloom's data from a functionalist perspective, Mueller reports that deletion (or, more precisely, failure to lexicalize aspects of contextual meaning) is almost always associated with the greater givenness of deleted information in a given situation. There are, of course, serious difficulties in recovering the pragmatic information necessary for such analyses from corpora that were not transcribed for that purpose. Hence Mueller's proposal that all the deletions from meaning to surface in two-word speech are pragmatically motivated should be subjected to an experimental test in situations where the newness and givenness of information is controlled. We are a bit puzzled by the claim that a high proportion of verb deletion involves verbs that are old or contextually obvious information, since predicates are almost always new information in natural discourse. Also, the high-frequency noun–noun constructions of English child speech are much less frequent in two-word speech in other language communities. It seems likely to us that the noun–noun constructions of English reflect the child's effort to approximate adult English input, in which subjects (or agents) are rarely omitted. However, Mueller's overall approach to ellipsis in early speech certainly deserves further investigation.

Contrastive Stress

There is little longitudinal research of any kind on stress and other intonational phenomena. However, the most detailed study available to date (Weiman, 1976) has been carried out from a functionalist perspective, and strongly suggests that contrastive stress is used from the very beginning to encode new or contrastive information. Weiman studied the two-word speech of five children between MLU 1.4 and 2.3. She reports consistent tendencies to stress some case roles more often than others. The probability of occurrence of contrastive stress forms the following hierarchy from locative to agent:



This hierarchy is the inverse of the subjectivalization hierarchy described earlier. Recall that topic selection tends to proceed according to the "me first" principle from agent to decreasingly "me like" case roles along a continuum of distance from ego. The fact that the probability of assignment of contrastive stress moves in the opposite direction supports Weiman's assertion that contrastive stress is used from the beginning to encode new information, that is, the comment in a two-word topic–comment structure. Furthermore, the few exceptions that do occur for the above hierarchy reflect situations in which a lower-order case role (e.g., the agent) is new or contrasting information. Hence we can conclude that contrastive stress, at least in English, is a comment-marking device from the time it first appears in child speech.

Pronominalization

While there is longitudinal data on the acquisition of pronouns (e.g., Bates, 1976; Bloom, 1970; Brown, 1973), there is very little information in these studies that is relevant to the functionalist hypothesis. It has long been noted that child speech is egocentric, that is, is not well tailored for a listener who does not share the child's speech (see Bates, 1975a). Hence children tend to use pronouns in situations where the antecedent cannot be recovered by the listener (Krauss and Glucksberg, 1969). This does not mean, however, that children are unaware of the function of pronouns to indicate contextually specified, given information. It merely means that the child assumes givenness inappropriately.

One of the most striking findings concerning pronouns in early child speech is the amount of individual variation in pronoun use. Bloom, Lightbown, and Hood (1975) report that children who make extensive use of pronouns tend to be imitators. Leonard (1976) suggests that a tendency to use pronouns is also associated with the use of idiosyncratic, empty forms (i.e., nonsense words) by some children to "fill out" or extend short utterances into longer-sounding sentences (e.g., the word *wida* as used by Bloom's daughter Allison). There is some indication (Starr 1975) that heavy pronoun use characterizes the language of children who adopt an "expressive strategy" as opposed to a "referential strategy" (Nelson, 1973), where "expressive" refers to a tendency to use unanalyzed idioms and whole forms in the service of social functions, and "referential" describes a relatively greater interest in playing with and labelling object referents. Ramer (1977) finds that the expressive style characterizes slower language learners, and that high-frequency pronoun use is also associated with slower rate of acquisition. Finally, Parisi and Giannelli (1974) have compared with speech of two lower-class Italian children with that of two middle-class Italian children. They report that the only major difference in speech between the two classes was a greater use of pronouns by the working class children versus nominal forms by the middle-class subjects. Parisi and Giannelli relate this finding to Bernstein's (1970) theory of restricted versus

elaborated codes. According to Bernstein, the restricted code, which characterizes the speech of working class adults and children, makes much greater use of idioms, anaphora, and pronominalization—in short, forms that depend on an ongoing conversational context for their semantic interpretation. Parisi and Giannelli suggest that the greater use of pronouns by working-class children is a direct reflection of the class differences reported by Bernstein.

Although conclusions are premature at this point, the individual differences in pronoun use may be related to a greater reliance on context by some children versus a tendency toward more explicit reference (i.e., topic specification) by others. This hypothesis involves the interpretation that pronouns are related to topicalization, via the motivation of givenness, from their first appearance in child language. From that point on, pragmatic development will be based primarily on learning **not** to pronominalize, that is, not to take information for granted in situations where the listener's perspective may differ from the child's own. However, this prediction must be modified with regard to children learning languages that permit "subject" ellipsis. In such languages (e.g., Italian and Hungarian), the use of "subject" pronouns in situations where "subject" deletion is permitted probably involves "active" topicalization (i.e., + mention, + contrast). The fact that "subject" pronouns are very infrequent in Italian (Bates, 1976) and Hungarian (MacWhinney, 1974) child transcripts, in comparison with a much higher frequency in English child speech (Brown, 1973), leads us to conclude that the pragmatics of pronoun use are rather different in these three languages.

Definite and Indefinite Articles

The acquisition of articles by children has been described by a large number of diarists (MacWhinney, 1978). In most European languages, articles emerge between 2;0 and 3;0. However, in Bulgarian (Gheorgov, 1905), where the article is a suffix, it emerges well before 2;0. In Italian, articles appear as early as the one-word stage, as "schwas" preceding nouns. Hence the differentiation into definite versus indefinite articles is a gradual one. MacWhinney (1978) argues that these cross-linguistic differences are related to morphophonological and intonational factors, rather than acquisition of the functions of definiteness and indefiniteness. Indeed, it appears from most of these reports that the two kinds of articles are used correctly from the time that they are first distinguishable in transcripts of child speech. Where errors do occur, they may be related more to the child's egocentric perspective rather than to difficulties with the concept of definiteness. In other words, the child may say *the doggie* to an adult who does not know which doggie is at issue, simply because he takes familiarity with the dog for granted. As we shall see shortly, the existing experimental evidence on definite and indefinite articles also supports the interpretation that the function of definiteness is acquired very early.

Intersentential Connectors

This category includes a syntactically heterogeneous set of adverbs, adjectives, conjunctions, etc., which serve to relate the information in one sentence back to information in an earlier section of discourse. These include phrases like *And now he . . .*, *This time they . . .*, *Once again the girl . . .*, and *The same boy . . .*. These diverse elements are related to one another only by their pragmatic function. In the longitudinal literature, they have been treated separately as emerging aspects of particular form classes (e.g., acquisition of adjectives, adverbials, etc.). In particular, the literature on conjunctions has focused on the logical status of "and," "but," "because," "if/then," etc. (e.g., Beilin, 1975).

One longitudinal analysis of connectors from a functionalist point of view is offered in Bates (1976). In an analysis of the longitudinal records for two middle-class Italian children, Bates reports that many of these connecting terms come in together around $2\frac{1}{2}$ years of age. Exceptions are some of the more logically difficult terms like "if/then." In the same period that connectors appear, there is also evidence for "metapragmatic awareness," that is, the ability to talk about talking, or refer explicitly to previous or ongoing speech acts. Examples from this period include phrases like *I told you that . . .*, *You're not supposed to say . . .*, and *He doesn't talk . . .*. Bates suggests that this sort of metapragmatic statement is related to the onset of connecting terms, reflecting a more general new ability to consider both performatives (speech acts) and propositions as "mental objects" that can be explicitly referred to in speech. The ability to talk about talking and the ability to weave sentences together across discourse through the use of explicit connecting terms are viewed as essentially the same thing, even though the particular surface forms involved vary considerably. Here again, the conclusion is that the pragmatic function precedes and guides the acquisition of relevant grammatical forms.

Modifiers and Relative Clauses

We have asserted that adjectives and restrictive relative clauses serve the function of topic specification at the sentential level. While there is some existing research on the acquisition of modifiers, and on the later acquisition of sentence-embedding structures, there is to our knowledge no longitudinal evidence concerning the way children use these forms to establish referents in discourse.

Experimental Evidence

In this section, we will concentrate on some recent research of our own concerning the influence of givenness and newness on aspects of child language

in Hungarian, Italian, and English (MacWhinney and Bates, 1978), together with some studies by other authors on particular grammatical devices. In the longitudinal research described above, the strongest evidence for the functionalist hypothesis involved acquisition of subject and word order. Much less evidence is available for the functional bases of other structures. In the experimental research, the reverse holds. Evidence for a functional basis of subject and word order is quite indirect, but much stronger evidence is available for some of the other grammatical devices associated with topic and comment.

In the MacWhinney and Bates study, 40 children (ranging in age from 3 to 7) and 10 adult controls in each of the above three language communities were shown a series of nine 3-picture sets. Each set depicted human and nonhuman characters illustrating a different semantic relation (e.g., agent–action–patient, agent–action–dative–patient, agent–locative–location). In the first picture in each set, all the information was new; in the next two pictures, one element varied while the others remained constant (i.e., given). For example, one set pictured a little girl eating an ice cream cone, followed by the same girl eating a cookie, followed by the same girl eating an apple. Table 8.4 presents the various semantic relations depicted in the 9 stimulus sets, with the underlined element representing the semantic role that was varied across frames within the set. The subjects were simply asked to describe the pictures (see Table 8.4). Within- and between-set orders were randomized across age levels. This procedure was similar to that used by Hornby and Hass (1970), although our study included a larger number of dependent and independent variables. The procedure yielded an Age × Language × Frame design, in a multivariate analysis of each semantic element in each of the sentence types. The dependent variables were ellipsis, contrastive stress, pronominalization, definite article use, indefinite article use, connector use, and initialization.

The experiment was designed to test the degree to which the changes in relative newness affect the use of various grammatical forms that are associated with givenness and newness in the functionalist literature. Six varieties of

TABLE 8.4
Stimuli Used in MacWhinney and Bates

Series	Structure	Contents
1	A V	A bear (mouse, bunny) is crying.
2	A V	A boy is running (swimming, skiing).
3	A V O	A monkey (squirrel, bunny) is eating a banana.
4	A V O	A boy is kissing (hugging, kicking) a dog.
5	A V O	A girl is eating an apple (cookie, ice cream).
6	A V L	A dog is in (on, under) a car.
7	A V L	A cat is on a table (bed, chair).
8	A V O D	A lady is giving a present (truck, mouse) to a girl.
9	A V O D	A cat is giving a flower to a boy (bunny, dog).

outcomes were possible in this study. Each corresponded to a main effect or a two-way interaction.

1. Main effects of Language merely illustrate the fact that these languages differ. For example, variation in word order is expected to be more frequent in Hungarian than Italian, and in turn more common in Italian than in English.
2. Main effects of Frame demonstrate that the manipulation has worked as planned, and that a given grammatical form does indeed increase or decrease in use as the given–new relations change across frames. For example, we would predict that contrastive stress on new elements will increase from Frame 1 to Frame 3.
3. Main effects of Age reflect the overall acquisition of particular surface forms between 3 and 7 years. Such effects do **not** imply that the child understands or intends the particular form–function relationship involved in given–new changes across frames. For example, a main effect of Age on definite article use simply means that this form is used more often by older children, regardless of whether that use is appropriate.
4. Age × Frame interactions do relate to form and function, that is, the relationship between development and understanding of the given–new function of a particular grammatical device. For example, if children show the effects of newness on indefinite articles **after** they have already begun to use these forms, we would have evidence **against** the functionalist hypothesis.
5. Age × Language interactions suggest that a particular surface form is more difficult in one language than in another, so that its acquisition is later, between 3 and 6 years in one of the three languages. Such findings, while interesting, would not necessarily have implications for the functional basis of these grammatical devices.
6. Finally, Language × Frame interactions indicate that languages differ significantly in the degree to which the given–new manipulation affects the level of use of a particular form. For example, pronominalization of the agent is expected to increase across frames to a greater degree in English, where subject deletion to indicate givenness is not permitted.

We will describe our findings under subheadings for each of the relevant grammatical devices, together with related findings by other investigators.

Ellipsis

Recall that longitudinal studies of one-word speech have indicated that children tend to encode the new or changing element in a given situation. Snyder (1978) has subjected this finding to an experimental test, with normal and with language-delayed children at the one-word stage. In a series of tasks,

Snyder involved the child in a simple sensorimotor game (e.g., dropping blocks in a bucket one at a time) and then substituted a new element (e.g., handing the child a small doll to drop into the bucket instead of a block). Across tasks, normal children with an MLU of 1.0 were significantly more likely, if they spoke at this point in the game, to encode the new element. Language-delayed children with the same MLU did **not** show this pattern. Their utterances at the critical point in the games were (*a*) much less frequent than those of MLU-matched normal children, and (*b*) often encoded some aspect of the situation that was unrelated to the new or changing information. Snyder relates this finding to observations in the clinical literature. Children display attentional deficits in both verbal and nonverbal situations. We will return to this point later with regard to the role of attentional deficits in the acquisition of syntax. For the normal children, Snyder's results support the interpretation that one-word utterances tend to be comments, while topics are left implicit in the situation (i.e., indicated by ellipsis).

In our own study of 3–6 year olds, main effects of Language indicated that Italian and Hungarian made greater use of agent ellipsis than English, as predicted. Main effects of Age showed a fairly consistent drop in the use of ellipsis with increasing age. In other words, older children were lexicalizing more and more of the information in the pictures. Frame effects indicated that ellipsis was significantly affected by the given–new manipulation, with ellipsis increasing across frames for given elements, and decreasing for new or changing elements. However, the results are also strongly influenced by baseline (i.e., ceiling and floor) effects. For example, the tendency to encode the agent in the first picture was so strong that ellipsis could not possibly decrease if the agent was the changing element. Similarly, verb omission was so frequent on the first frame that verb ellipsis could not increase on a verb that was a given element across frames. Apparently the picture description task has its own pragmatic rules, determining the appropriate "starting point" on the first description. These include a tendency to label animate figures, without commenting on the depicted action until attention is drawn to that action across frames.

Turning to the interactions, there were several Language × Age interactions on ellipsis. In these interactions, 3-year olds tended to differ more across languages than 5-year olds. In particular, Hungarian 3-year olds used more agent ellipsis, English 3-year olds more verb ellipsis, and Italian 3-year olds **less** object ellipsis. By 5 years of age, the children were much more alike in their use of ellipsis. Insofar as the 3-year-old patterns reflect relative frequencies of ellipsis and lexicalization in the adult input languages, it is clear that language-specific patterns are having an effect on lexicalization versus omission by 3 years of age.

Other types of interactions were rare, fewer than we would expect by chance. Particularly with regard to Age × Frame patterns, we can conclude that ellipsis is associated with givenness and newness throughout the 3–6 year

old range. In other words, ellipsis is probably well established as a topicalization devices by 3, while at the same time commenting is already associated with greater probability of lexicalization. This is not surprising, given the findings on the one-word stage reported earlier.

We know very little about the use of ellipsis in the period between the one-word stage and the 3-year-old level where the MacWhinney and Bates study begins. Note that one-word speech shows the same pragmatic pattern in all languages that have been studied, while at 3 years of age some language-specific patterns of ellipsis and lexicalization have been established. This suggests that between $1\frac{1}{2}$ and 3 years, the topicalization function of ellipsis comes into competition with other influences on lexicalization versus omission. Clearly, more research is needed on this uncharted period to determine how givenness and newness interact with other factors in determining the child's encoding decisions.

Contrastive Stress

Hornby and Hass (1970), using a method very similar to the one used in MacWhinney and Bates, report significant frame effects on contrastive stress. We also found an increase in contrastive stress on elements that were increasing in newness or contrast across pictures. In addition, there were significant main effects of Language, with English speakers using stress more often than Hungarian or Italian. Apparently, English uses stress more often to mark newness in situations where Hungarian and Italian use word order or other devices. There were main effects of Age on contrastive stress in only 3 out of 27 possible instances. Hence it appears that the use of contrastive stress to mark newness is well established by 3 years of age, and increases little between 3 and 6.

There were a few Language × Age interactions, with English children increasing their use of contrastive stress across time, and with Hungarian and Italian children using devices other than stress to mark newness. Other interactions were extremely rare. In particular, the failure to find Age × Frame interactions suggests that by 3 years of age, contrastive stress is already recognized as a device for encoding newness. This experimental finding is in accord with Weiman's longitudinal results on the acquisition of contrastive stress patterns.

Pronominalization

Osgood (1971) has reported that, in research with adults, pronominalization is not easily elicited with manipulations of givenness alone. Our experimental findings with children lead to similar conclusions. There were very few significant Frame effects on pronominalization. In part, these results are due to the extensive use of ellipsis by the same children and adults. Since the old element was generally omitted altogether, that element simply could not appear in pronominal form.

We found a large number of main effects of Language, in accord with our predictions. Because English does not permit subject deletion, English speakers tended to use agent pronouns in situations where the Hungarians and Italians tended to omit the agent. This is further illustrated in the only significant Language × Frame interaction, in which English showed a decrease in pronoun use with newness, whereas Hungarian and Italian actually showed an increase in pronominalization of a new agent. It appears that pronominalization reflects a more passive type of topic specification in English, which serves as the closest possible approximation to agent ellipsis. By contrast, in the other two languages, pronominalization is a more active and strongly marked device for setting up referents in discourse.

The overall level of pronoun use tended to **decrease** with age. Putting this finding together with the decrease in ellipsis with age, we conclude that there is a general developmental tendency to lexicalize more and more information, with increasing explicitness, from 3 to 6 years of age. The Language × Age interactions are in accordance with the main effects for Language. English children increase their use of pronouns, while children in the other two language groups used very few pronouns at any age.

In general, we can conclude that between 3 and 6 years of age the relationship between pronominalization and givenness is much more complex and indirect than the straightforward given–new effect on both ellipsis and contrastive stress. Pronouns are more explicit than ellipsis, but less explicit than full lexicalization of the same referent. Hence it is likely that pronouns are related to the information flow in discourse via a set of specific conditions on the type and degree of givenness and newness. For example, Maratsos (1973) has shown that children as young as 3 years of age can select the correct antecedent for ambiguous pronouns in sentences like *The lion chased the gorilla and then he fell into a hole*, based on either the probability of one event over another, or on the presence or absence of contrastive stress on the pronoun. Furthermore, a study by Garvey, Caramazza, and Yates (1975) demonstrated that children use fairly detailed presuppositional structure in locating antecedents for pronouns. Since frequency of pronoun use is, as noted earlier, strongly associated with a variety of individual difference patterns in language development, we clearly need much more information about the pragmatics of pronoun use in young children. The one conclusion we can draw from our own research is that the form–function relationship in pronominalization is not simple.

Definite and Indefinite Articles

There is now a fairly large literature on the use of definites and indefinites by English-speaking children. Brown (1973), Maratsos (1974, 1976) and Warden (1976) have reported that American children as young as 3 years of age make correct use of the definite article to mark referents that are uniquely given in previous discourse. Other experiments (Bresson, 1974; Maratsos, 1974, Experiment 1; Warden, 1976) indicate certain differences between adult and child

article use in situations where the child must compute the exact state of the listener's working memory. However, in situations where children and their listeners share the same information, correct use of articles seems to be established quite early.

In our experiment, the main effects for Language showed Hungarian using the indefinite article far less than either English or Italian. This is expected from the fact that the "indefinite article" in Hungarian is the numeral "one," a form which is usually reserved for use as a quantifier. Indefinite nouns in Hungarian are generally encoded with no article at all. In addition, Hungarians and Italians made far more use of the definite article than English speakers. In both these languages, the definite article is used more frequently to encode generic definiteness (e.g., *The dog is man's best friend*). For example, where English speakers would say *Monkeys eat bananas*, an Italian would use the definite article in a form more like *The monkey eats the banana*. These language differences are reflected in some Age × Language interactions in our data, with children approximating the specifics of adult article use in their particular languages across age.

Regarding frame effects on article use, our results are partially masked by the degree to which children used ellipsis on given elements. Obviously, the definite article will only appear on an item when that item is lexicalized, and will not appear when the item is omitted. Since old information tended to be left out altogether by the children, frame effects on the definite article were infrequent. On the other hand, there were a number of significant frame effects on the indefinite article, with an increased use of indefinites on elements that increased in newness across frames, and decreased use of indefinites where newness decreased. There were two interesting exceptions to the latter finding. In one situation, the constant element was a banana eaten by three different characters; in another, the constant element was a flower given by the same cat to three different receivers. In both these situations, children continued to use the indefinite article on the given element. This of course makes perfect sense; children are probably making the fairly reasonable assumption that different animals would eat different bananas, and that the cat would give each of his friends a different flower. These results indicate a fairly high level of sophistication in reasoning about newness by 3–6-year olds. Finally, we did not find Frame × Age interactions on article use, again suggesting that the function of definite and indefinite articles precedes or accompanies discovery of the surface forms.

Connectors

As noted in the section on longitudinal evidence, most of the research on connectors has concentrated on acquisition of particular form classes, that is, adjectives, adverbs, conjunctions. We are unaware of any research on the pragmatic function of connectors in relating sentential material to previous

discourse. In the MacWhinney and Bates study, there was a very highly significant effect of Frame on the use of connectors, $F = 80.22\,(2, 216)$, at $p < 0.0001$. Connectors were used far more often in the second and third frames than in the first frame. There was also a significant effect of Language on connector use, $F = 6.02\,(2, 108)$, at $p < 0.005$. The source of this effect was greater overall use of connectors in English as opposed to Hungarian and Italian. The result of greatest interest was the significant Age × Frame interaction, $F = 5.92\,(6, 216)$, $p < 0.001$. The adults showed a far more pronounced difference between the first frame and the other two frames than did the children. Whereas children showed an increase of about 200% in the second frame over connector use in the first frame, adults showed an increase of almost 600%. Thus the exact pragmatic application of these forms (although it is already established at 3) continues to show a marked development after age 6.

Modifiers and Relative Clauses

In the MacWhinney and Bates task, the elements that varied across pictures were always distinct lexical items, that is, different animals or human figures, different types of food, or different activities. Modifiers like *the red dog*, *the dog near the gate*, and *the dog that my brother gave me* tend to be used to distinguish a particular referent from another member of the same class (e.g., *the black dog*, *the dog in the middle of the yard*, and *the dog that my brother kept for himself*). It is not surprising, then, that these particular topic-specifying structures did not appear in our data.

Other experimental research on modifiers has concentrated more on form class (e.g., adjectives, embedded clauses) or on the kinds of lexical information encoded by these forms (e.g., the semantics of size, color, or location). The only study we are aware of on the discourse function of modifiers is a pilot study by McNew (1975). Twenty-six preschool children, ranging in age from 3 to 6, were brought into a room with a variety of toys, many of which were identical or distinguishable from one another by only a few perceptual features. The experimenter and an adult confederate began playing with the child and discussing the toys. During this phase, the confederate would identify one member of each set with an expression something like *Gee, I've got one a lot like this* or *I like this one best*. The confederate then left the room, while the experimenter and the child continued playing with the toys. In the next phase, the confederate telephoned the child from the next room to inquire about how the game was going. In probing for further descriptions of the game from the child, the confederate tried to elicit identification of the particular toys or dolls that were now being used in the game, for example, *Which doll do you mean?* The dependent variables in the study were the types of referent-specifying descriptions that the child used during the telephone conversation, for example, *The red one*, or *The one that you like*.

McNew reports that 3-year olds describe the referent almost exclusively with demonstratives like *this one*. As the confederate displayed confusion and probed for further identification, 3-year olds would actually begin pointing to the toy in question and stressing ***this one***. Four-year olds did not display that same sorts of egocentric reference, but they did describe the toys almost exclusively with adjectives and prepositional phrases as identifying terms. In many cases, these expressions were not sufficient to disambiguate the potential referents. The 5- and 6-year olds also used adjectives and prepositional phrases as identifying terms, but in addition they began producing relative clauses like *the one like you've got* or *the one that you like*. Relative clauses were particularly likely to appear in descriptions elicited after the confederate showed confusion, that is, *Which one do you mean?* Although there are too few subjects in the McNew study for significant age effects to emerge, it does look as though the various types of topic-specifying modifiers are acquired in a sequence of increasing explicitness, with the syntactically difficult relative clauses appearing as last resorts. Furthermore, these results indicate that the more difficult modifiers are acquired to fill the same pragmatic function as the earlier demonstrative adjectives, that is, the function of topic specification.

Initialization and Word-Order Variation

The longitudinal results reviewed earlier indicated that, at least in some languages, the earliest ordering strategies of many children are based on a topic–comment distinction rather than either a case role or a form–class rule. Bates (1976) has argued that the early comment-fronting tendency that appears in some languages should not be regarded as a rule of the same type as the rules governing language-specific word orders. Instead, Bates suggests that the comment-fronting tendency is an extension of the tendency evidenced in the one-word period to encode the element that naturally attracts the child's attention. Hence, comment fronting should begin to drop out as the child becomes aware of the ordering constraints of his particular language.

Support for the suggestion that the first pragmatic strategies are not actually ordering rules comes from the experimental literature on comprehension of word order. For example, Wetstone and Friedlander (1973) have reported that children in the one- and two-word stages interpret multiword commands by carrying out an activity that is the most probable combination in the real world for the elements in the commands. Hence, given **either** *Make the mommy feed the baby* or *Make the baby feed the Mommy* as a command, children in this age range will tend to act out the mother doll feeding the baby doll. Similar findings are reported by Newport and Gleitman (1977). In addition, there are experiments indicating that this "probable event strategy" in comprehension continues to as late as 5 years of age. For example, Tager-Flusberg (1977) reports that normal children use probable event interpretations until 5, while language-delayed and autistic children use the same strategy as late as

7–8 years of age. These results do not necessarily mean that children do not "have" pragmatic, syntactic, or semantic ordering rules. They do suggest, however, that children do not **trust** such rules until fairly late in language development. When grammar and world knowledge are in conflict, children will base their interpretations on world knowledge. When grammar and world knowledge are compatible, we as observers cannot be certain what the child is using to make his interpretation. Certainly these findings indicate that children as young as 2 years of age are not using a topicalization or comment-fronting rule in comprehension.

Bates (1976) reports a phase of "syntactic conservatism" occurring fairly late in the transcripts for two middle-class Italian children, with standard word-order and lexicalization of the subject preserved where adults would use neither. In the same volume, Bates reports further evidence for such syntactic conservatism in an elicited imitation task. Italian children were presented with a situation in which an enormous lion puppet repeatedly chased various small animals about to "devour" them. The child received a series of "telephone calls" from a confederate, in which he heard sentences that he was to repeat to the experimenter who was manipulating the lion puppet. These sentences varied the word order in combinations like

The cow eats the lion
The lion the sheep eats
Eats the horse the lion

In addition, contrastive stress was varied appropriately or inappropriately on either the agent or the patient. Insofar as this situation very strongly biases the child toward only one interpretation in terms of who is eating whom, it was predicted that the child's imitations would attempt to reestablish agent–action–patient word order and/or appropriate contrastive stress (since varying word orders are perfectly grammatical in Italian). Bates initially intended to test 2-year old children, who might be expected to use the kinds of pragmatically based ordering tendencies uncovered in longitudinal research. However, the task proved too difficult for the younger children. The subjects used in the experiment ranged in age from 3 to 7, a period following the emergence of standard word order and conservative subject-lexicalization in the longitudinal records. The findings from the elicited imitation task support the interpretation that by 3 years of age, Italian children have indeed discovered the standard word order of their language. Although they clearly made more errors in imitation of sentences inconsistent with the pragmatics of the lion situation, their errors concentrated on reestablishing NVN order—even at the expense of correct semantic interpretation. Hence although more reordered sentences were of the *Lion eat X* form, there were also a large number of reorderings to an *X eat Lion* form. In imitating nonstandard word orders, children tended to drop contrastive stress altogether, as though the information overload for correcting both stress

and word order were simply too much. For those sentences in which word order was standard but contrastive stress was inappropriate, children did try in many instances to correct the contrastive stress (i.e., move it from Lion to the animal being eaten). Bates concludes that by 3–4 years of age, Italian children are aware of standard NVN order as a surface form in some way independent of event probabilities. This finding is in keeping with reports by other authors that children around 4 years of age switch from event probability to syntactically based interpretations of standard and nonstandard word orders. Something like a standardized surface syntax does emerge in the preschool age range, after the earlier period in which pragmatic and semantic ordering strategies dominate.

In the MacWhinney and Bates study, we also investigated the effects of the given–new manipulation on "initialization," that is, the use of word orders in which new information is moved closer to the front of its standard position and old information is moved closer to the end of the sentence from its standard position. There were, as expected, significant main effects of Language on initialization, with Hungarian using more nonstandard variations than Italian, and Italian in turn using more word order variation than English. There were also significant age effects on initialization with the amount of variation increasing from 3 to 6 years. Language × Age interactions, although infrequent, reflect a situation in which children are moving toward freer word order in Hungarian, more standardized order in English.

Contrary to predictions, there were very few significant frame effects on initialization. Clearly, the kind of simple given–new manipulation used in this study is not sufficient to determine variations in word order. There are a number of explanations for this. One is that word order is **not** in the service of givenness and newness, at least after 3 years of age. This explanation would be in keeping with results suggesting that an awareness of standard orders and concommitant "syntactic conservatism" emerges somewhere between 3 and 5 years of age. In addition, however, MacWhinney (1977a) has suggested that initialization is more affected by perspective-taking factors than by either givenness or newness. This would include a tendency to take the perspective of the agent, according to the "me first" principle discussed earlier. Hence the fact that initialization shows few relations to givenness and newness in our study may be related to a tendency to start sentences from the perspective of the character in the pictures who is "closest to ego." There is some evidence in our data that this is in fact the case. For example, in the picture where the same agent (cat) gives flowers to three different receivers, two of the receivers are animals while one is a little boy. There were a number of instances where children would try to start their descriptions from the perspective of the little boy, for example, *The boy is getting a flower*. . . .

We suggest that future investigations of word order and subjectivalization should involve efforts to peel apart the relative contributions of givenness,

newness, perspective, and salience, to determine the strongest influences on the child's selection of the starting point for utterances. Second, insofar as the pragmatics of the picture-description task itself strongly biases the child to encode agents and leave out actions, we propose that future investigations should employ more active or "lifelike" stimuli that will more closely approximate the pragmatics of real-life event description (e.g., cartoons, videotapes, puppet sequences). Third, all of the experimental evidence available so far on pragmatic factors versus either case role or surface syntax rules in word order has concentrated on children from 3 to 4 years onward. The available longitudinal findings suggest that a crucial period for observing the influence of pragmatic factors on discovery of word-order rules is at the beginning of multiword speech. After that point, children seem to take different routes into the grammar depending on the particular language being learned. In particular, research on these early phases stands a greater chance of capturing the moment in which the child discovers the surface device "subject" as well as ordering rules based on the subject role.

Conclusion

Among the Greek philosophers, the debate on the nature and origins of language settled on several issues, one of which was the distinction between "analogy" and "anomaly" (Robins, 1967). The analogists, associated with Aristotle, proposed that true irregularities in language were rare, and that reason rather than irrationality determined the overwhelming regularities of language. The anomalists, including the Stoics, argued instead that language is characterized by irregularity or anomaly, and must be learned without great reliance on the rational faculties. In some respects, the current debate between the functionalist approach and the autonomous syntax view is a reincarnation of the analogy–anomaly debate. This is not true for all aspects of language. For example, with regard to phonology Chomsky should certainly be classified as an analogist, arguing for the inherent regularity and rationality of seemingly arbitrary or irregular spelling rules in English. However, with regard to the origins and status of basic grammatical categories, the autonomous syntax view holds that the child could not possibly derive or learn the complex and indirect relations uniting form and function. Instead, children must begin with some arbitrary and unanalyzed syntactic givens. These include basic syntactic categories like "subject" and "predicate," as well as formal aspects of language, that is, transformational mappings from deep to surface structures. Hence, Chomsky the rationalist must be classified as an anomalist with regard to the penetrability and rationality of deep syntactic knowledge. By contrast, the functionalist hypothesis asserts that children can indeed discover the structure of grammar by rediscovering the same solutions mankind has always had to apply

to the set of converging constraints on communication. Hence even apparently opaque and arbitrary aspects of the surface structure of language are understandable and reasonable solutions to ongoing problems. This is essentially an analogist approach to grammar.

Given the fact that the analogy–anomaly debate is almost two thousand years old, it is not surprising that the issue has yet to be settled within child language. Nevertheless, we are persuaded that current evidence favors an analogist approach to the acquisition of grammar. There is adequate evidence that children are influenced by pragmatic and semantic constraints on their encoding decisions from the very beginning of speech. There is virtually no evidence that their first encoding decisions are based on anything other than these pragmatic and semantic contraints. It may or may not be the case that children eventually derive a surface syntax that is independent of these underlying categories and relations. There is, for example, some reason to believe in a phase of "syntactic awareness' or "syntactic conservatism" somewhere around 4 years of age. However, the conclusion that the child eventually ends up with an arbitrarily defined surface structure is quite independent of the claim that he begins with arbitrarily defined syntactic categories. If children in some language communities do arrive at autonomous categories and relations in surface syntax, the functionalist view nevertheless provides a "natural" route by which children could derive such solutions.

We do, however, need a great deal more evidence from diverse sources before any real conclusions can be reached in the modern analogy–anomaly debate. Some of our suggestions include the following:

1. Insofar as there are **multiple** pragmatic and semantic constraints on grammar, functionalist research should concentrate on peeling apart the various factors that are hypothesized to influence encoding decisions. For example, experiments on sentence "starting points" or initialization might set certain constraints against one another (e.g., givenness versus perspective taking as determinants of initial position) to weigh their relative influence on encoding decisions.
2. It has been postulated that the pragmatic weighting of information (through salience, givenness, and newness, etc.) is directly related to nonlinguistic aspects of the human attentional system. Such hypotheses might be tested by research on orienting, on eye movements in picture scanning, etc., as they correlate with encoding decisions in picture description (see Carpenter and Just, 1976).
3. Some language-deficient children have been reported to have general attentional deficits in nonverbal tasks. If discourse factors underlying syntax are indeed based on attentional processes, this might mean that certain language deficits are reflections of more pervasive information-processing deficits. We offer the specific prediction that children with diagnosable attentional problems will be deficient in precisely those aspects of the grammar that function to encode topic–comment relations. In other words, if these children do not know what the topic is, or how the information in discourse is changing in successive comments, they will have difficulty in determining what certain aspects of the grammar are for.
4. We suggested that a shift from comment fronting to topic fronting is related to a shift from egocentric perspective, to taking the listener's information needs into account. This hypothesis could be tested in a variety of experimental paradigms that have already been developed (e.g., Krauss and Glucksberg, 1969; Warden, 1976) to measure relative egocentrism in child speech.

The above suggestions pertain only to the influence of various motives for topicalization and commenting on child grammar. Functionalist theory generates a great many more predictions concerning the relative influence of other types of semantic and pragmatic factors, as well as effects of the channel on grammatical form. It may well turn out to be the case that children acquire a great many syntactic regularities **without** assimilating those regularities to their competing communicative needs, as the functionalist position would predict. The acquisition of grammar may be a mixture of anomalies and analogies. However, we do at least feel confident that this is an empirical question.