1 Description of Language Use and Development

What do adults know about language and what is the best way to describe their knowledge? The answers to these questions vary depending on one's discipline. In the following pages the differing positions of philosophers, psychobiologists, psychologists, and linguists will be briefly set forth. Since it is safe to state that the child is on his way to becoming an adult language user, these positions have been reflected in theories of language acquisition as well. That is, what the adult language user is assumed to know is also what we might assume the child is in the process of acquiring. However, unlike theories and descriptions of the adult language user's knowledge of the language, theory and descriptions of language acquisition attempt to provide explanations of why the child has a certain body of knowledge at given times and why this knowledge changes over time. Nevertheless, depending on one's professional prejudices, lesser or greater emphasis or primacy will be placed on a particular aspect of human behavior or the structure of the human being to explain language development. Thus, neurological or cognitive or social states and changes will be called upon to explain development.

The analogy of the three blind men who described the elephant in terms of the parts they happened upon is often used to describe partial views, but it is still appropriate in this instance. Various theorists have described and attempted to explain both the adult language user's knowledge and the process of language development in terms of its parts. To describe language development and use as a whole is clearly a complex task since it is probably made up of many parts. The task is rendered even more difficult because many aspects of language use and periods of language development have yet to be explored in depth. However, an integrated description and explanation is the hoped-for goal. How closely this goal has been approximated will be explored in the discussion that follows.

The Language User

The descriptions of the speaker-listener's knowledge of language can be immensely simplified by assuming that verbal behavior, as well as other behaviors, can best be described in terms of a repertoire of learned responses to internal and external stimulus

situations rather than in terms of presumed underlying knowledge (Salzinger, 1967). These responses can be grouped into varying classes. Sentence types (negative, question, passive), for example, can be considered as different response classes. Response classes can be specified in terms of common effects (reinforcement), a common stimulus controlling the emission of a group of responses (both verbal and nonverbal), a common response evoked by a group of verbal stimuli, and the topography of the responses (structural similarity). Through the process of generalization additional members can be added to a class because they share these common factors. Unfortunately such a simplification provides us with no information about what the language user may, indeed, know about the language; that is, the characteristics of stimuli, response, and reinforcers that are deemed to be "common." Further, the description itself is a tautological one. Response classes are to be defined by "common" responses. Such a description of language behavior was quite prevalent in the literature until an alternative was provided.

Chomsky (1966) described the language user's behavior as being composed of three parts: competence, performance, and capacity. Competence is the speaker-listener's knowledge of the rules of the language: semantic (meanings of words and the relations between them), syntactic (the forms to be used to express relations), morphological (the rules for composition of words), and phonological (the sound structure of the language). Performance is the speaker-listener's actual use of the language in particular situations and under certain conditions. Thus the language user's comprehension and production of utterances can be affected by such factors as who is participating in the interaction, where it is taking place, and the physical state of the listener. Capacity is the innate "language forming capacity" of humans. In Chomsky's view the role of the linguist is to describe the native speaker's competence. This competence is composed of knowledge of what has been termed linguistic "universals" and of the rules specific to the language for the realization of these universals. Universals consist of substantive and formal items. Substantive items of a particular kind are found in any language and are drawn from a fixed class, that is, phonetic representation (distinctive features such as ± nasal ±

coronal) categories central to syntax (such as noun, verb) and semantic features or categories (such as ± animate, ± human). The formal universals are designed to fit certain human goals, needs, and functions. For example, some formal universals are transformational rules, proper names, and names of objects that meet a condition of spatiotemporal contiguity. The speaker-listener not only "has" knowledge of the rules of the grammar of his language but is capable of acquiring knowledge of the rules of the grammar of other languages because these rules conform to the universal principles of formal and substantive items. He *somehow* uses these rules to understand and generate utterances. Finally, the syntax of the language (categories and rules for determining form) is the basis upon which semantic interpretations and phonological translations are made.

Searle (1972) adds to this description of the language user the following observations in his discussion of "Chomsky's Revolution in Linguistics." Before this revolution linguists classified elements of human language by using a corpus of utterances to discover which elements were alike and which were different to the speaker-listener. Further, it was hypothesized by these linguists that the human being determined these meaningful elements by a process of establishing stimulus-response connections. Searle points to Chomsky's arguments against such procedures and hypotheses. Since the possible corpus of sentences of the language is infinite, no procedure for classifying elements based on a particular corpus will capture the meaningful categorizations in the language. In addition, since sentences can have the same surface structure but different meanings, and different surface structures can have the same meaning, a description of the taxonomy of the language cannot lead to a classification of meaningful elements. Logically, acquisition of knowledge of meaningful elements cannot be based on stimulus-response connections in that what is *heard* can have a one-to-many or many-to-one relation to meaning. For example, the sentence *The shooting of the hunters is terrible* can have at least two meanings —that the hunters were shot is terrible or the fact that hunters shoot is terrible, even though there can only be one classification of the elements in the sentence. The sentences *John loves Mary* and *Mary is loved by John* presumably have the same meaning, although the classification of elements in each would

be different. To overcome this difficulty, states Searle, Chomsky proposed a model of sentence generation composed of two types of elements: deep and surface structure. In the deep structure of the sentence all description necessary for semantic interpretation is present. Therefore each interpretation of the sentence *The shooting of hunters is terrible* would have a different deep structure: (1) That hunters (object) were shot by someone (subject) is terrible. (2) That hunters (subject) shoot someone (object) is terrible. Although underlying sentences can then be transformed by certain operations into the same surface structure utterance, the different meanings are maintained by the different deep structures. The sentences *John loves Mary* and *Mary is loved by John* have, in generative grammar, the same deep structure: *John* (subject) *loves Mary* (object). This deep structure can be transformed by certain operations into a different surface structure: *Mary is loved by John*.

These are examples of the knowledge that is presumably available to the native speaker of the language. However, although Chomsky professes that it is this knowledge that the linguist should capture by specifying the rules underlying the construction of sentences, nowhere is the suggestion made that the linguistic analysis and description is "a model of sentence generation." Indeed, Chomsky (1971) has proposed that surface structure can determine at least part of the meaning of a sentence by, for example, the use of differential stress. However, what seemed to be implied in the description of the language user's *tacit* knowledge was that (1) form is independent from meaning and, thus, semantics does not determine the form of the syntax or influence it, and (2) man is basically a syntactic animal. This latter position is related to the notion that the structure of the brain and the innate properties of the mind (presumably the brain's functions) are the determinants of syntax.

Several aspects of these descriptions of the language user's knowledge have met with arguments. Some of these have been concerned with linguistic description alone and others with psycholinguistic questions; that is, the human being's acquisition and use of language. These are clearly not unrelated in the minds of some linguists who see the goal of linguistic description to be the description of at least the adult's use of language.

One argument concerns the relation between syntax and semantics and the position that syntax is core and semantics interpretative. Another argument opposes the notion of competence as being the language user's knowledge of the *structural* rules (sentence construction rules) of the language *alone*. Still others have argued against the notion of competence itself, that is, the positing of some abstract body of knowledge that is not definitively related to the perception and production of language. Finally, there have been heated arguments against the concept of an innate mechanism for the acquisition of language.

There is clearly a controversy between the "generative semanticists" and Chomsky on the issue of the relation between form and meaning on both formal and intuitive grounds. First, the generative semanticists suggest that there is no boundary between syntax and semantics, and hence no entities such as syntactic deep structures. Their position is that the grammar starts with the meaning of sentences and generates syntactic structures through the introduction of syntactic and lexical rules throughout the course of generation of the sentence. Thus the description of sentence generation as from deep structure (base structure rules with transformational markers, then the application of semantic interpretive rules) to derived structure (application of transformational rules) as described in Katz and Postal (1964) is considered to be descriptively inadequate. Linguistic evidence for the need for such insertion throughout the derivation of a sentence is presented by Ross (1971). Further, the generative semanticists argue, semantics shapes syntax. A grammatically correct sentence or a well-formed sentence requires the introduction of semantic concepts. For example, selectional restrictions are semantic, not syntactic. Thus, while there are predicates that require a *semantically* feminine subject (pregnant, menstruate), there are none in any language with gender distinctions that require syntactically feminine subjects. There are predicates that require semantically plural subjects (numerous), but these can never take syntactically plural but semantically singular subjects. In the sentence, *The scissors are sharp,* scissors can be semantically singular (one pair) or plural (several pairs). In the sentence, *The scissors are numerous,* scissors is semantically plural. (These examples are from Ross, 1967.) Therefore the syntactic feature of + plural is never germane

to the selection of lexical items which can co-occur, whereas semantic features always are. These are some linguistic arguments concerned with the form of the grammar (there are other linguistic arguments), but they also, obviously, relate to determining what is an adequate description of the language user's knowledge. What is being suggested is that a thought (or meaning) is the basis for sentence generation and that the meaning of words determines the structural context in which they appear; that is, semantic constraints rather than syntactic ones are the determinants.

Searle (1972) presents some philosophical arguments against the description provided by generative grammar of the language user's knowledge. First, he contends that "no clear and precise answer has been given to the question of exactly how the grammarian's account of the construction of sentences is supposed to represent the speaker's ability to speak and understand sentences and in precisely what sense of 'know' the speaker is supposed to know the rules of the grammar." This is an argument against the notion of competence as described. Second, the philosophical foundation of transformational generative grammar, namely, that knowledge is not derived from experience but is prior to all experience and determines the form of the knowledge that can be gained from experience (the "innate ideas" concept), is questioned. Because language is arbitrary and words are arbitrarily attached to ideas, knowledge cannot be unconscious but, rather, must be learned. Finally, Searle contends, one cannot account for the meaning of a sentence without considering its role in communication. As an alternative, an utterance or group of utterances can be described as a "speech act." The speaker utters a sentence or sentences in accordance with certain semantic rules and with the *intention* of invoking these rules to render a certain speech act: to attest to a state of affairs, to lie, to tease, to question, to demand. Semantic competence is defined as knowing the relation between semantic intentions, rules, and the conditions specified by the rules. Thus in the sentence, *The flower is red,* the speaker is not simply associating ideas with terms (idea "flower" with term "flower") but is also making a believed statement. From this description not only is the basis of sentence generation the meaning of the words and their relations, that is, the thought to be conveyed,

but also the purpose of the utterance (to state, to lie). Both the intention of the speaker and the content of the message determine the form of the utterance. For example, if I wish to obtain the salt at the dinner table, I can demand *Pass the salt!* or politely request *Please pass the salt* or *Can you pass the salt?* Which of these sentences I select is determined by my intentions (to request or demand). Notice, however, that prosodic features (intonation and stress) also differentiate between intentions. For example, *Can you pass the salt* (polite request) versus *Can you pass the salt?* (question) have different intonational contours. Sentence type and content alone do not convey intended meaning.

If the statements are correct, that the language user's knowledge can best be described as categories of speech acts in which the speaker's intentions govern the selection of semantic categories and rules, then what role does syntax play? Fodor, Jenkins, and Saporta (1967) state that meaning is predication not reference. The speaker has knowledge of the lexical and syntactic rules needed to convey these relations. Thus, in producing the sentence, *The flower is red,* not only may a believed statement be made but a relation between *flower* and *redness* is expressed, not simply an association of terms with ideas (the idea "flower" with the term "flower," the idea "red" with the term "red"). The intentions of the speaker are different, for example, in uttering either sentence (a) *She shot the man with a gun* or (b) *With a gun she shot the man.* This difference in intentions is conveyed by the different ordering of items in the two sentences, and speaker-listeners of the language *know* that such differences in ordering (syntactic rules) are used to convey differences in intended meaning.

Thus far, the language user's knowledge has been described as the ability of the speaker-listener to convey intended meaning (intentions and meaning) by the appropriate selection of semantic and syntactic categories and rules and prosodic features. Have we now obtained an adequate description of the language user's knowledge? Clearly language is not produced in a vacuum. There is a context or situation in which the utterance or utterances are not only produced but also understood. Olson (1970) points out that meaning does not equal reference, since some words have many referents and some referents have many

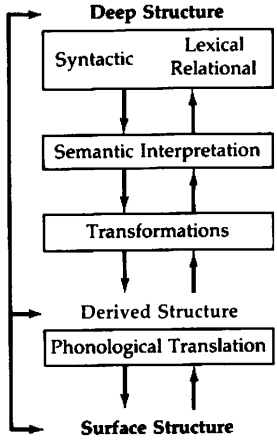
words applied to them. Olson states that the objective in communication is to arrive at the same referent. Thus, choice of words (or sentence) reflects the most frequent differentiations that have to be made. Words (or sentences) designate the intended referent relative to a set of alternatives. Therefore, to know the use of a word (or sentence) is to know what it includes and what it excludes. The speaker, when producing an utterance, searches for features that will distinguish an event from perceived or inferred alternatives. Thus, selection of either sentence (a) *The tall tree is spruce* or (b) *The tree on the left is spruce* will depend on the situation; that is, the number of tall trees, the positions of speaker-listener, and so on. When generating an utterance, then, if the speaker wishes to be communicatively effective, he or she must have knowledge not only of *how* to convey intended meaning (the rules of the language) but also of the situation or context in which it is uttered and appropriately select from his or her repertoire depending on the situation.

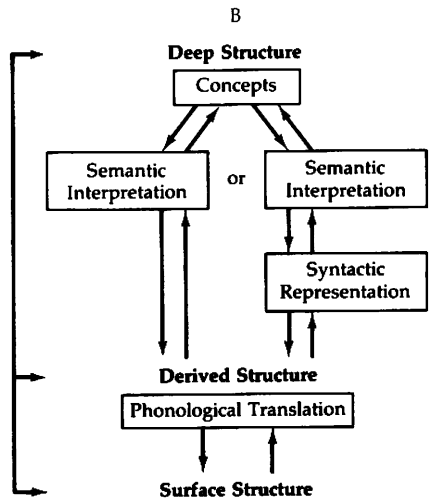
Is selection of utterances merely dependent on the physically perceived parameters of the situation? Hymes (1971) suggests that it is not. The rules for communicative interaction in a speaker's society impose constraints on the selection of utterances as well. Thus speakers have knowledge of which style to use (formal, informal), in which context (home, school), when speaking to whom (peer, superior, relative). It is the intention of the speaker to convey meaning (for example, *The world is round*), but selection of a form in which to convey this meaning will be dictated by the rules of that society for communicative interaction between speakers within settings. Thus degree of politeness (for example, *Can you close the window?* versus *Is it possible that you might close the window?*), degree of conviction in assertion of a state of affairs (for example, *It is possible that the world is round* versus *The world is round*), and various forms of interrogation, joking, and selection of whether to speak at all are determined by the rules in a society for communicative interaction. Hymes states that these are rules of "communicative competence" and are shared and understood by members of that society. These rules are as integral a part of the language user's knowledge as are the structural rules of the language. In addition to having knowledge of ways in which to communicate

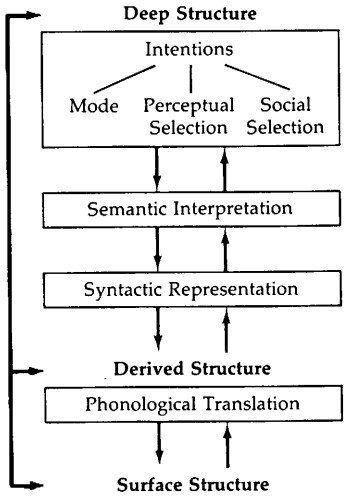
the intentional mode (statement, question, demand), the relation intended (actor-action, possessor-possessed, instrument-action, attribute-object), an event distinguishable from a group of perceived or inferred alternatives (the black one not the red, green, or yellow one), the speaker has knowledge of rules of communicative interaction.

Figure 1.1 is a graphic representation of the kinds of knowledge that the speaker-listener of the language is presupposed to have according to various theorists. The models not only become increasingly complex but the hierarchy of relations between parts of the model changes as well. In A, emphasis is laid on the dominance of syntax; in B, semantics is predominant; and in C, intentions composed of affective-cognitive-social aspects supersede the semantic component.

I have said nothing, thus far, about a very important aspect of the language user's knowledge and have begged the question in figure 1.1. It should be noted that arrows are inserted in both directions, to and from each component and each level of structure. The real-time processing techniques employed by the language user are also a part of his or her knowledge. Several alternatives have been suggested in descriptions of processing techniques. One model proposes that recognition of the phonological aspects of the utterance is based on analysis by synthesis (Halle and Stevens, 1964). The notion here is that sentences are analyzed by regeneration of at least parts of the utterance. An alternative to this is the suggestion that some preanalysis of the sentence takes place to limit the processing time required (Fodor, Bever, and Garrett, 1974, ch. 6). A verb strategy that takes into account the kinds of constructions varying types of verbs can and cannot take (for example, transitive versus intransitive verbs) is one suggestion for preliminary analysis. Both require that some analysis of the deep structure of the utterance take place in order to comprehend utterances, and Fodor, Bever, and Garrett (1974, ch. 7) suggest that this is also true of sentence production. Another possibility for real-time sentence decoding is one of parallel processing in which deep and surface structure are analyzed simultaneously. The results of a study by Garrod and Trabasso (1973) indicated that surface information was available in short-term memory storage and that both surface and deep structure information were available in long-term







1.1 Models for comprehending and producing utterances.

memory storage. This finding seems to imply that the listener holds both surface and deep structure information for analysis of the sentence.

In general, experimental efforts that attempt to understand how language is processed are directed toward determining how linguistic information is stored and retrieved under varying circumstances. The factors examined in these studies are the structure of the linguistic information presented to subjects, the contexts in which it is presented (verbal and imaginal), and the accuracy and speed (response time) with which the material is recalled. Techniques for eliciting this information have varied as well. Subjects are asked to recall, paraphrase, answer questions, and recognize sentential material over differential amounts of time. It has been found that subjects recall or attempt to reconstruct the main idea, central theme, or relation in the material that they hear or see. However, their ability to recall accurately and the rate at which they do recall is affected by the particular structures of the sentences (for example, the ordering of information in the sentence) (Holmes, 1973), what the listener perceives the intentions of the speaker to be (Springton and Clark, 1973), and the particular conditions of recall in the experiment (delay or immediate recall, paraphrase or recognition). Thus, context, both verbal (within and between sentences) and nonverbal, plays a role in sentence decoding and, one might presume, in encoding as well. Therefore, describing how linguistic information is used is not simply a matter of determining the hierarchy of linguistic knowledge used and the relations between aspects of this hierarchy.

Descriptions of the techniques used for both sentence perception and production are still rudimentary in nature. In the descriptions of the language user's knowledge that have been provided, it has been assumed that this knowledge forms the basis of actual behavior. Chomsky's description of competence as tacit knowledge playing no direct role in sentence processing is an exception. There is a large body of evidence indicating that the categories and relations described thus far, structural rules, intentional rules, and the distinctive features of speech sound segments (Wickelgren, 1966), are psychologically real. However, how these categories and relations are acquired and used in actual communicative interaction is far from clear, and

it is exactly this information that researchers must obtain to achieve a real understanding of maturational changes in language development.

Theories and Descriptions of Language Development

Presuppositions about the kind of knowledge the language user has and/or the verbal behavior evidenced obviously affect theories about the process of language acquisition. What the child is supposed to acquire, that is, the end product, influences the thinking of those who theorize. Over some developmental period, and estimates of this period vary depending on descriptions of the language user's knowledge, this end point is achieved. Is the child acquiring abstract knowledge of rules or sentence processing strategies or a repertoire of responses or some combination of all of these?

The domain or data which the theorist is willing to deal with is also very much influenced by what is presumed to be acquired. Therefore, some theorists are only concerned with describing the behavior itself and disclaim the explanations that can be found within other areas of development, while others are only concerned with explaining the behavior by referring to biological, cognitive, and social factors without engaging in thorough description of the behavior itself. A further dichotomization is in the use of the theoretical data, which is most evident in the controversy concerning competence and performance. Competence has been defined as either tacit knowledge of the rules of the language or active knowledge. As Derwing (1973) and many others have pointed out, if the meaning of knowledge of rules is unknowable to the observer or experimenter, then there is no evidence of its actual existence. If on the other hand knowledge is the use of rules to perceive and produce language, they can be determined. If knowledge is an abstract organization of linguistic information that is never actually applied in language processing but somehow interacts with the language-processing device, then the reality of this knowledge can only be inferred from the behavioral data. These controversies concerning the language user's knowledge are quite evident in theoretical descriptions of language development. These theories appear to fall into four primary categories: bio-

logical, cognitive, sociocultural, and behavioral. However, as might be expected, branching occurs within each of these categories, and there are strong and weak positions concerning the primacy of factors. Not only do these theories place emphasis and predominance on differing aspects of the process they are also fundamentally in conflict concerning their views of man as a learning organism and the basis of this learning.

Differences in emphasis have had a marked effect on explanation and on the aspect of language behavior that has been the center of experimental concern. It has been assumed by some that man's knowledge of language is innate in that the human infant is predisposed to search for those phonological, syntactic, and semantic categories and relations that mark important linguistic generalizations in all languages. These generalizations have been termed "universals." The position is that if the language acquisition process were a discovery procedure, then it would take several lifetimes for these generalizations to be made since the data presented to the child for analysis provide only a small subset of the possibilities and is often distorted (Bever, Fodor, and Weksel, 1965). The alternative is an evaluation procedure, that is, the testing of a constrained set of hypotheses about the possible form of human language behavior. The interpretation of this position has two parts: (1) this hypothesis testing ability is somehow given in the nervous system, and (2) these given structures and pathways are uniquely engaged in language processing. The weaker position includes only the first part.

If there are structures of man's brain and its functions that are uniquely engaged in the behavior called *auditory-vocal* language, then the question arises: Can structural and functional differences between man and other animals be found? Both peripheral and central differences in man as compared to other primates have been explored. The findings of these explorations are summarized in Lenneberg (1967). Peripherally, the musculature of man's face, lips, and mouth and the geometry of his head and neck (that is, the structure and relations of the sound-producing chambers) are different from that of the gorilla and chimpanzee and make possible the articulation of the speech-sound repertoires found to exist in all languages. The production of these kinds of sounds is impossible for primates other

than man. The structure and positioning of the larynx also permit the production of sounds that are impossible for other primates to produce. Thus, there appear to be, in the vocal tract mechanism of man, structural specializations for speech-production behavior. The question, of course, arises: Did the development of structure affect the direction of behavioral development or vice versa? The latter seems more feasible given evolutionary laws. (See also, Lieberman, 1974, for a further discussion of specialization and the issue of dependency.)

Man's central nervous system also provides evidence of structural and functional differences from that of other primates. However, there is no evidence indicating that these factors are specifically related to man's language processing rather than to cognitive functioning in general (Menyuk, 1971, ch. 2). Such differences as size, weight, and fissurization of the human brain, the length and quantity of dendrites, and the differentiated areas of cerebral cortex have been noted, but none of these point to language-specific behaviors. The possible role of experience versus innate programming in the development of function has been addressed by studies of the neonate's central nervous system structure and behavior. Hemispheric differences in size (Geschwind, 1972) and in functioning in response to speech and nonspeech stimuli (Molfese, 1972) have been found in neonates. The fixed developmental schedule of linguistic and motor behavior (that is, babbling, then word, then words, then sentences, and sitting up, then crawling, then walking) has been remarked upon to indicate that these fixed schedules are based on specific neurophysiological maturations and are unaltered by gross environmental factors (Lenneberg, 1966). Finally, evidence of specific linguistic behavior changes, rather than loss of a general ability to function cognitively because of suspected or incurred neurological abnormalities at a very early age, has been cited for species-specific structures for language processing. That is, children labeled aphasic are often referred to in the literature as exhibiting normal or above-average intelligence on standard tests but having a specific language disability. These data, however, are now being seriously questioned, and recent findings indicate that these children may be deficient in nonlinguistic as well as linguistic processing (Levy and Menyuk, 1974; Tallal and Piercy, 1973).

In summary, the human vocal mechanism, and the structure of the brain and its functions, play an important role in the development of auditory-vocal language. Indeed, these structures and functions may predispose man toward the acquisition of such a system of communication. However, it is not clear from the evidence provided that there are structures and functions of the brain given at birth that are specifically designed to engage in language processing alone, that is, apart from processing nonlinguistic data as well. It is also not clear at this stage that linguistic behavior, outside of its auditory-vocal character, is unique to man. There is now an increasing body of evidence that primates other than man may be capable of acquiring at least some aspects of a symbol system that has at least some of the characteristics of human language (for example, Premack and Premack, 1974). We are, of course, referring to Washoe, Sarah, and Lana, among others, who have acquired, respectively, a sign language, a "chip" language (see Premack and Premack, 1974), and a computer language.

Hypothesizing that biological factors are of principal importance has led to studies of language development that have emphasized two aspects of this development. First, syntactic and phonological development have been the primary areas of interest, since the meaning of words and relations are, at least initially, derived from the extralinguistic state of affairs—reference to objects and events perceived and means for expressing needs and feelings. However, the forms in which these meanings, needs, and feelings are expressed are held to be specifically linguistic. These forms are generated by the use of syntactic and phonological categories and rules. Second, the sequence of development of these forms, both syntactic and phonological, was held to be universal. That is, both children acquiring the same language and children acquiring different languages were found to exhibit the same sequence of development in the forms they used. This, in turn, it might be hypothesized, was due to a fixed developmental schedule in aspects of neurological maturation, which might then be thought of as underlying a specific language acquisition device (McNeill, 1971). Although it appears to be the case that at the very early stages of development children from varying linguistic environments select to talk about the same things in the same way (Slobin, 1970), there is evi-

dence of individual variation. Certainly the possibility exists that these selections are based on cognitive and social factors in development that are universal rather than simply neurological predispositions. The strong claim of a specific language-learning device with a neurological basis seems most appropriate to speech-sound production and productive planning of linguistic sequences, but here too cognitive and social factors play a role. Further, the universals that have been described are either quite gross in nature (from babbling to words to sentences) or are, possibly, the product of experimenters' descriptions rather than those of the child's knowledge.

Cognitive theories of language development take several forms. In all of them semantic development receives the first and greatest emphasis. What is hypothesized is that children use first those aspects of language that represent the meanings they need and are able to convey. These meanings are a reflection of what is known about classes and relations of classes in the world. In many discussions it appears as if cognition and semantics are being treated as if they were one and the same "thing." However, a word, which is a semantic category, and may in some instances represent a nonlinguistic perceptual category, is not the same "thing" as a nonlinguistic perceptual categorization. The act of linguistic representation may be a part of, in addition to, or apart from the nonlinguistic perceptual categorization, depending either on one's point of view or on how one describes the developmental process in word use (for example, Werner, and Kaplan, 1963). The word, of course, is also a phonological representation and is considered by some to be a predication as well, not simply a reference to a perceptual categorization. From this stems the term "holophrastic" to describe one-word utterances.

Changes in being able to classify perceptually or conceptually may, of course, be due either to neurophysiological development or experience or both. Regardless of differences in points of view about the bases for cognitive development, early language acquisition is viewed by these theorists as being primarily dependent on nonlinguistic cognitive development. The invariant sequence in cognitive development, then, would account for whatever universality in language development is observed. Thus language development universals are primarily

based on semantics which, in turn, are dependent on cognitive development (Slobin, 1971b). Research with this underlying hypothesis has taken several directions. Some studies describe the language produced at an early age in terms of semantic relations and find that these semantic descriptions more adequately describe the data than do syntactic descriptions (Bowerman, 1973). Thus, instead of describing early utterances as subject and verb and object when there is no evidence that the child has knowledge of these syntactic categories, it seems more reasonable to describe them as animate actor, action, and inanimate acted-upon because the child's selection of language indicates that these are the categorizations being used. That is, the subjects and objects that initially appear have *only* these latter semantic characteristics. These can in turn be related to observations about cognitive development before this early period of language development (Brown, 1973). There are a number of studies that attempt to correlate development of certain early syntactic relations with the developmental stages described by Piaget (for example, Sinclair de Zwart, 1969). Several studies test the child's ability to carry out Piagetan tasks and to understand and produce various sentence types (for example, Beilin and Spontik, 1969). The notion here is that certain kinds of operational thinking are needed to carry out analysis and production of certain sentence types that require "similar seeming" operations. The hypothesis, again, is that linguistic processes are dependent upon nonlinguistic processes. Although emphasis is laid upon semantic development, which is explained in terms of cognitive development, some efforts have been made to account for other aspects of language development as well.

The problem has been to describe the details of this relation. That is, What aspects of cognitive nonlinguistic development are related to what aspects of linguistic development, how, and when? Sometimes the similarities between the two types of performances seem forced. At other times both linguistic and nonlinguistic developments that seem to be similar appear simultaneously. This obviously is discongruent with a notion of dependency, but even earlier appearance of a nonlinguistic operation need not necessarily imply that a linguistic performance is dependent upon it (Menyuk, 1975a).

If language is viewed as primarily a vehicle of communication

to others, speaking as engaging in speech acts, and listening as attempting to understand the intentions of speakers, then the overriding concerns are with the acquisition of knowledge of how to encode one's intentions and variability in means of encoding between culturally different groups and within individuals depending on context. The child's language-acquisition task is viewed as one of determining the rules of use of forms in particular situations. The contention is that the child's communicative interactions with other members of society act as a catalyst on language development (Vygotsky, 1962) and are its primary shaper.

There are at least two logical consequences to this position. First, since the use of language in different societies is variable, the emphasis is placed on the role of environment in conveying the rules of use in the following ways: determination of who are the primary conveyors of these rules in a society (for example, siblings, peers, parents, grandparents) and determination of the means by which this information is conveyed (by implication, by direction, by formal teaching) (for example, Brandis, and Henderson, 1970). Second, since part of the knowledge to be acquired is knowing which forms to use in which situations, a speaker of a language may have available to him not *a* grammar but perhaps several grammars, and speakers of the same language may have different grammars, not in toto of course but in part. Therefore, the variable styles, dialects, and codes used by individual speakers are emphasized (for example, Labov, 1969).

The primary focus then, from this theoretical point of view, has been studies of variability (either group or individual), the structure of this variability (the particular rules of use of language with particular contexts), the determination of the causes of this variability, and, from a developmental point of view, the maturational schedule at which different kinds of rules of use (how to demand, request, question, lie, explain) are acquired. Most of the studies have been observations of communication interactions between, for example, parents and children, teachers and children, siblings and peers. In these studies the form and function of the communicative interaction participants are analyzed, and the context in which this communicative interaction takes place is described. However, do these descriptions adequately explain the behavior observed? Is it the case that the

acquisition of the knowledge of the rules of language use is dependent on environmental influences alone (primary conveyors, means of conveyance, and forms conveyed)? An alternative is provided in descriptions of "social cognition" (for example, Youniss, 1975) in which the child is described as actively engaging in developing constructs for social interaction. The structure of these organizations is dependent on the level of the child's cognitive development, not the environmental variables alone. If this is the case, one might expect at least some universality in the sequence of development of rules of use.

Theories and descriptions of the development of linguistic knowledge seem to be proceeding from the inside out in the views of what are principal factors. We began with the notion of basic neurological processes as primary, then the role of internalized organizations that are a product of both neurological processes and cognitive interaction with the environment were considered primary, and then greatest emphasis was placed on interaction with the environment. However, none of these theories and descriptions seems mutually exclusive, but rather their differences are a matter of emphasis.

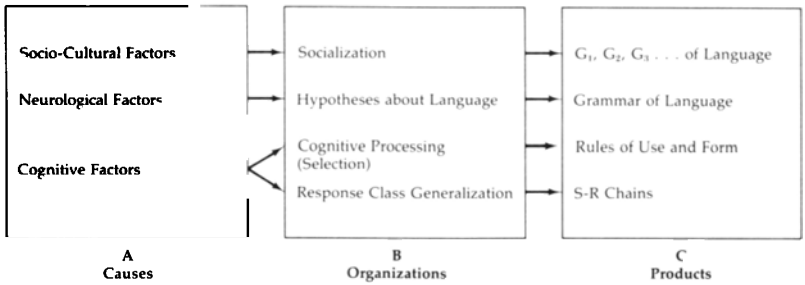
The learning theorist attempts to overcome the question of emphasis or primacy in the acquisition of language use by postulating that both the acquisition of rules of forms and function can be characterized in terms of various couplings among stimuli, responses, and reinforcers. The environment may be characterized in terms of stimuli, behavior in terms of responses, and reinforcers as stimuli which, when applied contingently, can increase or decrease the behavior. What is described then are classes of learned behaviors, and sentence types, morphological rules, classes of word meaning can be subsumed under this characterization. So, for example, in learning that a ball (S_1) is named *ball* (S_2), the child is first exposed to a pairing of S_1 and S_2. Because of this exposure the child learns to associate the object ball with the word *ball*. Both S_1 and S_2 then can elicit the verbal response *ball* or a nonverbal response of doing something with the ball (for example, Stemmer, 1971). The formation of these classes of behavior can be manipulated by the environment, and the child adapts to his environment by a process of response selection governed by reinforcement. Imitation is a basic mechanism of learning by dint of the fact that imitation of

a model is reinforcing. Variability in the course of learning may be due to the state of the listener and/or response, stimuli, and reinforcer preference. These are a function of environmental manipulation. Developmentally, conditionability increases with age, the type of stimuli preferred changes with age, and changes in the attributes of stimuli attended to occur with age. Notice that these latter findings may imply that internal organizations vary with age and that these changes are not simply a matter of environmental manipulation.

The application of this viewpoint has taken several experimental directions depending on the content of the particular learning theory (that is, S-R or S, r, s_2 r_2 . . .). There have been a great many studies of how language behavior can be instituted, developed, or modified in children and adults who have language-acquisition problems for varying reasons (for example, Guess, Sailor, and Baer, 1974). In these the stimulus, response, and reinforcement conditions necessary to change language behavior in the direction of the desired goal (for example, to apply time and plural markers) are studied. They indicate that the language behavior is first acquired as an imitated bit and is then generalized to other bits that have many of the parameters of the initial conditioning situation. How these bits are then organized into a system of knowledge is far from clear. This experimentation is limited to individuals who have difficulty in developing internal organizations. The explanatory adequacy of these models when describing normal language development has been severely criticized (for example, the discussions in Slobin, 1971a).

In addition, the effect of various kinds of language behavior on the acquisition of knowledge in the nonlinguistic domain has been investigated throughout the developmental course. Depending on the hypothesis of the researcher, either the influence of linguistic knowledge in discrimination, concept formation, and problem solving has been examined (the verbal mediation hypothesis) or the influence of these named processes on the acquisition of linguistic knowledge has been examined (cognitive theory of language development).

Figure 1.2 is an attempt to represent graphically the varying theories of language development. The distinctions that appear



1.2 Alternative descriptions of the language development process.

to lie within box A are whether attention is paid to possible underlying causes at all (certain learning theories as compared to all others) and the emphasis that is placed on factors (neurological, social, affective, and cognitive). The distinctions within box B are concerned with the processes presumed to be involved in language development, and the distinctions within box C are those concerned with descriptions of the state of linguistic knowledge that is derived from these processes. As we have also seen, particular theorizing affects which aspect of language is studied and the conclusions reached about experimental findings.

In an attempt to present an integrated theory of language development, Bever (1970a) has suggested that multiple factors obviously play a role in language development. However, none of these factors is logically prior to any other. That is, "social urge," "common properties of human communication systems," "psychological mechanisms," "semantic structures," "biological universals of human communication systems," and "common properties of human cognition systems" all interact and modify each other. The student of language development must, then, be concerned with specifying how the child's desire to communicate recruits and organizes human motivation and capacities into the behavior that we know as language. Although the plausibility of these statements seems overwhelming, the attempt to specify has led to distinct paths of inquiry. Each path has its own theoretical (or atheoretical) models of the process and its own populations and methods of investigation. The conclusions

drawn, therefore, about the logical priority of factors, be they cognitive, sociocultural, or biological, are a product of the paths selected.

In the following pages an attempt will be made to present an integrated picture of language development. However, the student should be warned that this is merely an approximation, and a summary one at that. Too many paths have yet to be explored. The research that has been carried out to determine what the maturing individual appears to know about language at different stages and what factors appear to have led to this stage of knowledge will be discussed. It should be kept in mind that a description of maturation in terms of stages is an arbitrary one. Whether a truly representative model of the maturing individual should be one of stages of development, with reorganization at each stage, or an accretionary model, in which knowledge is expanded, has been debated but is still open to question. Indeed, a combination of models, although begging the question, might be most appropriate. Although, for example, it is the case that water and ice represent two states of H_2O, with markedly different properties, both solid and liquid states can coexist in equilibrium. Further upon the application (or removal) of heat one can see the gradual growth (development) of one state and the diminution of the other.* In like fashion, the development of language may also be a process in which a structure is acquired, but only in particular contexts, and the more general application of this structure may take a period of time. This latter suggests an accretionary model. Cognitive development, as described by Piaget, also appears to exhibit this pattern. For example, conservation as an operation is not universally applied to all domains simultaneously. Application to, respectively, the domains of mass, time, and space takes a period of years. Despite these questions, the language behavior manifested during different age periods or stages in the maturation of the child to the adult have, at least on the surface, markedly different structure. Therefore, the discussion that follows divides language development into periods. Conclusions can then be drawn about the appropriateness of either model, in general, or at various periods of development.

*I am grateful to B. Stokes for the suggested analogy and to N. Menyuk for the facts.