Language Development is in the Mind and Action of the Child

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Piaget spoke of a mountain too big for any one person to make a map of (Piaget, 1948/1967). However, many people had walked on the mountain and each had a somewhat different view of it. None of these views was complete but each one was correct. Piaget noted that if we wanted to understand the topography of the mountain, we should not ask one person what the mountain was like, but ask each one of the people to describe their perspective and integrate the various perspectives into a larger view of the mountain, a view larger than any one person had had.

The study of child language is something like that mountain and we who explore it frequently lose sight of the fact that many other persons are exploring its other regions. Part of the reason that it is so easy to lose sight of this fact is that we have no unifying theme. One purpose of this paper is to suggest a theoretical framework that can serve as a unifying perspective for the several views we have of the language-learning-child. This framework makes explicit reference to certain assumptions and practices that are implicit but widespread in the study of child language.

In our research, we have proposed a theory of language development in which we explicitly address the contents of conscious states of mind. We present this theoretical framework under the banner of "Intentionality"--the term is borrowed from philosophy; the construct is common to both philosophy and psychology. We suggest that any successful effort toward an understanding of language development must take an Intentional stance (Dennett, 1978), by which we mean explicit reference to the level

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1Plenary Address, Fourth International Congress for the Study of Child Language, Lund, Sweden, July 20, 1987. This paper is based largely upon a manuscript coauthored with Richard Beckwith (Bloom & Beckwith, 1987), and I am happy to acknowledge my debt to him here for the use of many of his ideas and words. The research that is described here was a joint effort with Richard Beckwith, Joanne Bitetti Capatides, Jeremie Hafitz, Karin Lifter, and Matthew Rispoli, and was supported by a research grant from The Spencer Foundation.
of awareness. An Intentional stance is implicitly taken in much of the study of child language, and, indeed, in virtually all of psychological theory and research. Our goal is to make this reference to the level of awareness explicit.

The word "intentionality" can be found in several contexts in language acquisition research. One such context is the proposal that language development depends on mothers attributing intentions to their infants during interaction. These intentions are desires for a goal or a change of state. By expressing these desires for her child, the mother provides experiences with the kinds of language that can achieve the goal (Bruner, 1975, 1981; Ryan, 1974), and the child comes to realize that vocalizations can serve to influence the behaviors of other persons (McShane, 1980). Another context is the application of speech act theory to prespeech and single-word speech, where the intention of an expression was invoked as the "primitive force" or purpose for uttering words (as in the "illocutionary force" of Austin, 1962) (Bates, Benigni, Bretherton, Camaioni, & Volterra, 1979; Dore, 1975). And in yet another context, the beginning of communication is identified with behaviors that are "intended" by the infant in the sense of being voluntary and purposive with sustained actions directed toward other persons and a goal (e.g., Bates, 1976; Dore, 1975; Greenfield, 1980; Harding & Golinkoff, 1979; Scoville, 1984). These several contexts have a theoretical continuity. Each suggests that children acquire language as a "tool" for achieving purposes and goals in their interactions with others, and the theory of language development that is promoted is an instrumental one.

When language is viewed as a tool for achieving desires and goals, the focus is on end states and the effect of the child's behaviors on the context. This focus on end states emphasizes the external dimension of language and how the child achieves the goal. However, the use of language as a tool should not be central for a theory of language development because it ignores the internal dimension—the mental contents that include the goal—and it is the mental content that is expressed through language. Tool use, in general, should be considered subordinate to the symbol making capacity of humans (Burke, 1935; Piaget, 1972/1973). The symbolic capacity allows us to represent objects and events in consciousness—in recalling aspects of events from memory, and anticipating new events. Language expresses these mental representations. Through language, the contents of conscious states of mind are made
manifest and put in a public space (Taylor, 1985). What should be central to a theory of language development is representation in these states of mind and expression of their contents. When language is viewed as the expression of mental contents, the focus shifts from end states to the origins of expression. The focus on the origins of expression allows us to inquire into development of the capacities that are necessary for expression. The theory of language development that results, in this view, is a mental theory rather than an instrumental one.

Tool use, which is central to instrumental theories, is invoked for achieving desires, but desires do not exhaust all Intentional states. A desire, to achieve a goal or to communicate, is one kind of Intentional state in which one intends to change something in the world to fit the contents of mind (Searle, 1983). However, many of the Intentional states that we can hold in mind are beliefs, and the actions of their expression reflect the way we believe the world to be rather than the way we desire it to be. Language expresses, and the child acquires language in order to express, many sorts of mental states with a range of beliefs. These include but are not limited to the beliefs entailed in achieving goals and desires.

Intentional states of mind include some mentally present content, such as an event or an object, that is recalled from the past, perceived in the present, and/or anticipated in the future. These contents of awareness come from what we perceive and what we know, and are within the scope of our psychological attitudes of belief and desire. We propose that children endeavor to express the contents of beliefs and desires, and actively engage in acquiring words and constructing the grammar of a language in that endeavor. Thus, an understanding of language development requires a theory to explain how (1) accessing knowledge of objects and persons in memory provides the objects of awareness which we express through language; (2) processing language input provides the linguistic procedures to use for expression; and (3) understanding events in the context provides the public space to which the expression is relevant.

Inherent in the type of theory that we are proposing is the distinction between what we think about and what we know -- the distinction between the contents of conscious mental states and knowledge stored in memory. Intentional states and
knowledge differ with respect to their reference in time and space. Knowledge exists in memory independently of the present state of internal and external affairs; the content of knowledge is not related to the here and now. Intentional states, in contrast, contain what we experience "here and now." They occur in real time. They are constructed out of aspects of knowledge summoned from memory and the data of perception, under the condition of a psychological attitude of belief or desire. They are the momentary representations that are expressed through language.

Intentionality, so construed, is the "leading edge" of the mind. It intervenes between events in the immediate context and knowledge about the world. It is that aspect of cognition through which percepts and aspects of memory are related to one another, and both are related to words, sentences, and discourse. Intentional states and knowledge both have to do with objects and events, but knowledge can only articulate with language through the Intentional states that underlie acts of speaking and interpreting.

Just as these states of mind are not identical to the knowledge invoked in their construction, neither are they equivalent to the semantics of the language used for their expression. Intentional states are mental spaces which are personal constructions; they consist of "domains that we set up as we talk or listen and that we structure with elements, roles, strategies, and relations" (Fauconnier, 1985, p. 1). Such contextualized meaning, or situational meaning, is personal because the representation belongs to the individual. In contrast, semantics, based as it is on the language practices of a community of users, is interpersonal because the community, not the individual, assigns semantic value to an expression. Semantic knowledge is interpersonal because it is socially determined and conventional; it does not change from one token of an expression to another.

*Expression and Child Language Research*

Expression is basic to the theory we are proposing. An expression is "a set of material properties ... [which] embody a given representation" (Danto, 1983, p. 252); an expression "makes something manifest in an embodiment" (Taylor, 1979, p. 73). Because an expression makes something manifest, we can attribute what is expressed. In fact, a manifestation is a license to attribute something more to the actor than simply
what is observed (which is the behavior in the act of expressing). Utterances are only the observable behaviors; we can make inferences about why they occur or what motivates them. However, because an expression is an embodiment, it allows us to directly perceive, rather than to infer, the representation to attribute. A criterial feature of expressions is that, in Taylor’s words, "their expressing/saying/manifesting is something that they do... rather than something that can happen through them" (p. 76). Obviously, language is a mode of expression par excellence, and any study of language that admits of semantics or meaning is, by definition, the study of expression.

In child language, we tend to take expression for granted in the sense that it rarely finds its way into our research through the front door. However, as a background practice, attribution based on language as expression is ubiquitous. We attribute some underlying conscious model to the child when we discuss replacement sequences, for example, "car. ride car" (Braine, 1976). When we discuss successive single word utterances or the discursive unfolding of meaning, we do the same. When we follow one particular word or set of words over time, we attribute something that allows those words to cohere. When we discuss event-based descriptions, we attribute a single underlying event that a series of utterances is about. In all of these cases, and many more, we assume that language is an expression, and that we know what it is an expression of.

We already know that linguistic action can be seen as expression, but children on the threshold of language have other forms of expression that we might look to, to help us to discover what is hidden in the child. We know that affect displays consist of particular behaviors and they are in place in the young infant. Are these appropriately considered expressions? Affect displays do allow us to say something more of an individual than simply that the display is apparent. At the least, we can say that the individual is experiencing some emotional state or is feigning that state. And this is non-inferential since the affect display, as the public aspect of the constellation of things associated with the emotion, is a manifestation of that emotion. Because there must be grounds for feeling an emotion independent of the desire to feel it, the grounds for the feeling can be attributed. In sum, affect displays are expression of beliefs presupposed by feelings, and expression through affect is in place long before any words are acquired for expression.
Given these two modes of expression -- language and affect -- we must address the question of what we are licensed to attribute to someone engaging in them. The issue of licensure in these attributions is likely to be problematic, since disagreement abounds as to what one is licensed to attribute to a child even based on language. For example, the dissension surrounding rich interpretation of child language is nothing if not an argument concerning the license to attribute. Affect expressions are often seen as expressions of such discrete emotions as disgust, joy, and happiness (as in Darwin, 1913). As such, we should be able to attribute at least these discrete emotions to the displays in question. However, we do not know whether individual expressions of these discrete emotions would relate in any interesting ways to language development, and we are not familiar with any theoretical or empirical work that makes such claims. And so this attribution, while possible, may not be interesting.

Another possibility, and one which we have pursued (Bloom, Beckwith, Capatides, & Hafitz, 1987), is attributing what these emotions are about in much the same way that we attribute what language is about. Affect displays, as manifestations of emotions, are about something. As pointed out by Danto (1983), emotions must be caused by something. For example, individuals at a party might taste a pie that disgusts them. If they were to express this disgust and someone were to ask what disgusted them, they could respond that it was the pie. If they were to say that nothing caused them to express the disgust, we could discount the expression as one of disgust. In order for something to be an expression of disgust, or any emotion, there must be something that caused it, something that it is about. We can often determine what caused the emotion from observing contextualized affect displays. Moreover, we know from the work of Stein (e.g., Stein & Jewett, 1986) that plans are relevant for both positive and negative feelings. Negative emotions are often associated with negative outcomes of plans or perceived obstacles to plans. Conversely, positive emotions are often associated with positive outcomes of plans. A child’s emotion may be disgust about a pie, or fear of a snake, or joy over achieving some goal. The point is that the things the child’s emotions are about are frequently part of the context so that thought about those things can be attributed to the child.

In sum, both emotional expressions and speech permit an observer to make an attribution of the state of mind of the expressor. We have made such attributions for
the speech and emotional expressions of the infants whom we studied, in the period of transition from prespeech vocalizing to the use of words (in Bloom, Beckwith, Capatides, & Hafitz, 1987). We believe that these representations underlying expression are the units on which the child operates in the construction of language (Bloom & Beckwith, 1987).

*Translating Theory into Method*

In our efforts to translate theory into method, we devised a coding scheme for attributing the contents of the Intentional states underlying words and affect expression. Coding the child’s Intentional state would be an unreasonable task -- that is, we would never be able to verify what the child was thinking of at any one point in time. But we can make attributions of the contents of the child’s awareness, which is what caregivers do routinely when they interact with children. For instance, when a baby whimper's, the caregiver might attribute hunger or discomfort or an inability to obtain a toy. We have made the same sorts of attributions to children, attributions of what the child is thinking about when the child displays an emotion or says a word. In coding these attributions we use the kinds of cues that caregivers use: what the child says, what the child does, what has been said or what is subsequently said, what is observable in the context, and what we know of the child from past experience. Moreover, we can do what the caregiver cannot do. We can use our videotapes to watch and listen to the moments that surround an expression, over and over, and we can look ahead as well as backwards for relevant cues (Beckwith, Bloom, Albury, Raqib, & Booth, 1985).

A representation of the components of these attributions is schematized in Figure 1.

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At the most general level, what should be noted is that we have chosen to code the contents of mental states in propositional form, that is, as predicate/argument structures. This should not be construed as our holding that the child also has
represented these in propositional form. Neither our coding scheme nor our research strategy is locked into a propositional theory of mind. We chose to maintain certain relationships within a propositional format simply for ease of coding onto a computer. This was not limiting since an effable system can be implemented in propositions. That is, anything that one can be conscious of can be represented in propositions and this holds whether the conscious material, itself, is in propositional form. Thus, our code is propositional without necessarily entailing a propositional theory of mind.

The three superordinate predicates that we used for coding the contents of mental states are be, do, and go. The predicate be is attributed if the child appears to be thinking about a static event, for example, when the mother smiles and the child smiles back, or the child looks up at the clock on the wall and says “ticktock.” The predicate do is attributed if the child appears to be thinking about a dynamic event, for example, hugging the doll, or banging the truck. The predicate go is attributed if the child seems to be thinking of a dynamic event that results in a change of location (or possession), for example, walking across the room to a snack table, or giving a doll to the mother. Thus, the three predicates be, do, and go name static, dynamic, and change of state events.

The vocabulary that we used in the coding scheme is straightforward. Because attributions for young children can frequently depend on the context, the elements of the context in which we observed the children were particularly important. A substantial proportion of the vocabulary was the set of names for the objects and people in the playroom in which our observations were videorecorded. A set of potential actions on and relationships of these objects made up another significant portion of this vocabulary, as did a number of states of affairs. Examples of these subordinate predicates included show, give, ride, push, and so forth. These subordinate predicates, along with their arguments (objects) were, in turn, the arguments of the superordinate predicates be, do, and go. However, objects alone could be the argument of superordinate predicates, as when the child notices the clock. With this vocabulary, coders could write the descriptions of the underlying representations that they attributed to the children’s speech and affect expressions.

In addition to describing these mental events, coders decided whether the child desired the event to be the case or believed the event to be the case. We coded belief
and desire because they are the most fundamental of the psychological attitudes. Expressions based on belief or desire are relatively easy to distinguish and therefore to code. Finally, coders decided whether the event had already taken place, was in the process of taking place, or was anticipated. When the attributed event was evident, in that it matched the events in the context because it either had already taken place or was in process, then data from perception contributed to the Intentional state. When, in contrast, the attributed event was anticipated, mental contents were derived from knowledge in memory, being more or less cued by perceptual data.²

So, in offering a strategy of research with children on the threshold of language, we suggest keeping in mind that several modes of expression are available to the young child and we are licensed to make attributions on the basis of each of them. To make these attributions, our research practices do not need to significantly change. We need only acknowledge and make explicit the practice of making attributions based on language as expression and then to expand the conditions under which we engage in this practice. Our coding scheme is just one way in which to implement such a strategy. However, only through this strategy are we able to look at some of the relations between diverging forms of expression, and to inquire into the developments that such expressions require.

We have used this research strategy to address several questions in child language. In this paper, I will have time only to summarize the results from two studies relevant to developments in the single-word period. However, in addition, we have also addressed the origins of categories of transitive and intransitive verbs in early sentences (Rispoli & Bloom, 1987), and the child's use of input for learning grammar (Beckwith, 1986). We also see research by others in the field as converging upon the same theoretical perspective, (e.g., Budwig, 1985; Gee & Savasir, 1985; Gopnik, 1982; Mervis, 1984).

²Reliability for coding was high; the percent agreement between independent coders ranged from .79 to .93 for each of the coding decisions in these attributions.
Expression through Affect and Speech.

Our subjects were 14 infants, from different ethnic and socioeconomic backgrounds, living in the metropolitan New York area. Data were collected in videotaped monthly observations from about 9 months of age until the children began to use sentences (and MLU was approximately 2.5 words, at the average age of about two years).

In addition to the laboratory observations, the infants were also visited at home every month until they were 15 months old and every three months after. Their mothers also kept diaries of the words that the children understood and said at home in the intervals between observations. We used the transcriptions of the children's speech in this period of time to construct monthly cumulative lexicons, with both word types (the number of different words learned from one month to the next) and word tokens (their frequency of use).

The typical analysis of the words that children acquire takes what Searle (1984) called a "third person perspective." Looking for what children know about words in the lexicon, researchers classify a child's words according to one or another categorization scheme that captures putative differences among words. Examples include names of general objects, actions, and personal social words (Nelson, 1973); or person names, object names, and relational words (Bloom, 1973); or even part of speech, i.e., nouns and verbs. The assumption is that different classes of words require different kinds of learning, and differences in their acquisition will explain the development of language in the single-word period.

In our research, in contrast, we have used the attributions of the representations in the Intentional states underlying the children's expressions (using the scheme in Figure 1 above), taking what Searle called a "first person perspective." This analysis attempted to capture what the child had in mind, shifting the focus from the words that the child says and displays of affect, to the states of awareness underlying the words and affect expressions.

Because emotional expression is in place before speech begins, we have asked how expression through affect was related to expression through words as words were
acquired in the single-word period. We used the contents of the attributions of Intentional states as a heuristic for comparing the meanings that children express with affect and with words in the single-word period (in Bloom, Beckwith, Capatides, & Hafitz, 1987).

Two levels of attribution (in Figure 1 above) are relevant to the first study discussed here. For this analysis we were interested in what the infant had in mind when saying words or expressing affect: (1) whether the infant had a goal to change the world, an expression of desire, or expressed a belief in the way the world was (to them), and (2) whether the contents of their desires and beliefs concerned themselves or other persons (the mother most often). The results consist of relative frequencies for attributions of beliefs and desires, with contents that included representation of the mother or the child. These were compared between the two reference points that we have used in this and other studies to define the transition from infancy to language: first words (FW) and a vocabulary spurt (VS).

At FW, affect expressions were far more frequent than words, as was expected. At VS, words were eight times more frequent than they had been at FW. This was neither surprising nor interesting because an increase in numbers of words was the criterion for the vocabulary spurt. However, although words and propositions attributed to words increased, the frequency of affect expressions and propositions attributed to affect expressions remained essentially the same from FW to VS (as can be seen in Figure 2).

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This means that the frequency of emotional expression (and number of

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3Expressions could be coded with more than one proposition, so that a word might express contents that included the mother and the child. The analyses reported here were based on numbers of attributed propositions. We have treated these data only descriptively and not statistically, because speech and affect expressions were not independent (given that some words were said with emotional valence so that two attributions, one for speech and the other for affect, were made for the same expression).
propositions attributed to emotional expressions) did not change between the two language achievements for the group of infants as a whole. Thus, words did not replace affect in the period of word learning. Rather, these children learned language as a new system of expression for the contents of their thoughts and feelings, while they continued to express those feelings through displays of affect.

Desires were expressed more frequently than beliefs, with both emotional expression and speech, as can be seen in Figure 3. At FW, the ratio of desires to beliefs attributed to emotional expression was 2 to 1, but the ratio for word attributions was less, 1.3 to 1. At the time of VS, the ratio of desires to beliefs was essentially 2 to 1 for both emotion and word attributions. Thus, these infants expressed desires more often than beliefs. However, words at FW tended to express beliefs somewhat more often than did their emotional expressions at the same time, or their word and emotional expressions at a later time. This means that early words (at FW) expressed what the infant saw or imagined the world to be relatively more often than did later words (at VS) or emotional expression at either time. Thus, one part of development in this period was in learning to use words with the same belief:desire ratio as prevailed with affect expression when words first appeared.

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The desires that these infants expressed at both FW and VS, for both speech and affect overall, were most often desires concerning the children themselves as actors, rather than their mothers (in Figure 4). They expressed what they wanted to do or were doing to change the world more often than they expressed what they wanted their mothers to do. The ratio for affect expressions was somewhat higher than for words: the ratio for affect expressions of desires directed towards the self rather than mother was almost 6 to 1 at FW and 4.4 to 1 at VS. The ratio for words at both FW and VS was 4 to 1. Thus, the children in this study expressed desires concerning their own actions in regard to their own purposes and goals primarily. Their words and emotional expressions were not used primarily as tools for manipulating actions by other persons.
Developments in Word Learning in the Second Year

The second study was concerned with the words that these children acquired in this period (Bloom & Hafitz, 1987). We began with a third person perspective and applied several of the lexical categorization schemes that are in the literature to these data, in the effort to describe the kinds of words that our subjects learned in this period. However, the development that occurred in the period from FW to VS, which, essentially, represented the beginning and end of the single-word period for most of the children, was not in the kinds of words they said. For example, object words predominated at FW for some of the children and relational words predominated for others. Similarly, some of the children showed relative increase in relational words at VS, while object words increased at VS in the speech of the others, and still other children showed no differences in the kinds of words they said at FW and VS. A sequence of development from object words to relational words or from relational words to object words, reported in other studies of only one or a few children (e.g., Bloom, 1973; McCune-Nicolich, 1981; Menn & Hazelkorn, 1977) were characteristic of individual children, but not the group.

We then analysed the attributions of underlying Intentional contents for these words, and we focussed on two aspects of the content expressed. The first was what we are calling "propositional content" and was derived from the predicates be, do, and go in combination with different arguments. Two categories of propositional content emerged from this level of coding: see and act. The category of see content was the combination of the predicate be with arguments of presentation, including point, see, show, give, and have. The category act included the predicate be with action arguments and the dynamic predicates do and go. The first result was that the frequency of see and act were essentially equal at FW. However, in the interval between FW and VS, act content increased significantly, Chi-square (1, N = 14) = 47.889, p < .001, and at the time of VS, act content was represented significantly more often than see content, t(13) = 6.717, p < .001. These results mean that the children's early words, at FW, expressed
stative/presentational kinds of content about as often as activity/happening kinds of content. With development at VS, the children were expressing activity/happening content significantly more often.

The second Intentional analysis was an analysis of what we are calling "evidential content" and was derived from the third level of coding in Figure 1 above: whether the event in mind had already taken place in the context, was in the process of taking place, or was anticipated. The two categories of evidential content were EVIDENT content, when the event was happening or had happened, and ANTICIPATED content, when the child's expression preceded the event in the context that the expression was about.

The result was that ANTICIPATED expression increased significantly, relative to EVIDENT expression, from FW to VS, Chi-square (1, N = 14) = 5.273, p = .022. Moreover, this increase in ANTICIPATED expression was significantly greater for ACT than for SEE content, Chi-square (2, N = 14) = 12.86, p = .002. The ratio of ANTICIPATED to EVIDENT ACT expressions changed from 1 to 3 at FW to less than 1 to 2 at VS (in Figure 5). These results mean that the development that occurred in the period had to do with what the children could hold in mind and express in language: specifically, to express an anticipated action.

Insert Figure 5 here

The ratio of ANTICIPATED to EVIDENCED SEE expressions did not change and was approximately equal (1 to 1) at both times (in Figure 6). The presentational SEE content of expressions included, for example, a desire (anticipated) that the mother see the cup, as when the child held out a cup saying "cup." These were a continuation of the sorts of protodeclaratives (pointing, showing, giving) that have been described for prelinguistic infants just prior to the emergence of speech (Bates et al, 1979). They did not change in either relative frequency or evidential content over time. Development occurred instead in expression of activity/happening kinds of content, and, especially, the ability to express such content in anticipation of the activity/happening in the context.
In sum, looking at the kinds of words these children learned in this period did not reveal the development that occurred. The words themselves do not determine what children learn to express. Rather, their thinking guides them to look for and learn words in the input that can be used for expression. What does determine development is the child's capacity for representation in awareness. In particular, these children learned to express desires that included themselves rather than other persons as actors; they did not learn words primarily as instruments to influence the actions of others. And with improvements in recall, they learned to use words for expressing some aspect of an activity/happening that they anticipated in the context.

We conclude this section with the following observation. Most child language studies, in taking a third person perspective (Searle, 1984), observe speech as it occurs in real time, and compare features of the utterance and context to discover the child’s knowledge of the lexicon, semantics, syntax, or discourse. For example, studies of the development of word meaning are almost exclusively studies of conditions and procedures for applying words. The theoretical stance in the studies we have reported take a first person perspective and make the assumption that the actions of speaking and interpreting are determined by the contents of conscious states of mind: by beliefs and desires directed toward some mentally present content (e.g., object, event). This perspective has informed our efforts to understand the development that occurs with the transitions in language development from prelexical vocalizing to the use of conventional words sometime at the beginning of the second year, and the transition from single-word speech to a simple sentence grammar towards the end of the second year.

In sum, with developments in world knowledge and the capacities for recall, the child can construct increasingly discrepant and complex Intentional states. One thing is clear. If the capacity to generate expressions is to keep up with changes in the contents of mental states, then the child's knowledge of semantics and syntax must necessarily change. That is, the child must acquire a language that can generate such expressions.
Given the ability to perceive and reproduce the units of a language, the child can proceed to learn words and construct the grammar for expressing aspects of these states of mind, and for interpreting the expressions of others.

Development in the Single-word Period from an Intentional Stance

In the effort to explain the transition to words, we already know that infants observe language used by others as one component of a complex event. The child perceives analyzable sub-components (whether acoustic, e.g., Eimas, Siqueland, Vigorito, & Juszyk, 1971, or manual, e.g., Suppalla, 1982; Carroll and Gibson, 1986) and registers these along with other types of perceptual data about the event. Thus, the child perceives a lexical item, or perhaps a larger speech unit like a phrase or sentence, and this is one component of an episode with such other elements as persons, objects, and actions. The spoken word may not then be dissociable from the episode in memory. Inasmuch as the contents of Intentional states, in turn, inform the child's knowledge base, these early utterance/episode compounds enter the memory system as a virtual fusion of form and content. Because of this linked storage, recalling the utterance and the rest of the episode are, at first, interdependent.

Virtually all developmental accounts of children's first words have noted the strong association between word and object or word and event, and the so-called "decontextualization" of words with development (e.g., Barrett, 1985; Bates et al, 1979; Bloom, 1973; Dore 1983; Nelson & Lucariello, 1985; Werner & Kaplan, 1963). When children first begin to say and interpret words, word and episode are summoned together from memory into Intentional states. Thus, some percept cues the recall of a word/episode compound from memory when some aspect of the same or similar episode reappears, or the child hears the word. Even if the child has said a word, this does not ensure that recall on demand is facile. The eliciting conditions for both understanding and speaking these early words are responsive to the child's own agenda, and are not easily manipulated by others. The frustration that parents often have when they try to "show off" their child's talk is witness to this fact. Appropriate perceptual data are required to cue the recall of stored knowledge for the child to summon something from memory. If a linguistic unit is part of what is recalled then the child can use it for expression.
The child's capacity for retrieval determines just how percepts and the elements retrieved from memory "fit" together. Early words depend on cued recall in the context of a close match between perception and recalled content (i.e., a match between the perceptual field and beliefs about the perceptual world), as when a child looks at the clock and says *ticktock*, holds out a cup and says *cup*, or points to the stove and says *hot*. In instances like these, the child's expressed beliefs about the world match what is perceived in the context.

But other beliefs do not match the way the world is when something in the context cues recall of something else from memory, along with the words to express it. For example, seeing a strange man might cue recall of the person *Daddy* from memory and the word *Daddy* as well. Children's overextensions in early word use are typically interpreted as evidence for the limits of a word's intensional meaning for the child. However, when a child says "Daddy," on seeing a man who is not Daddy, the child saying *Daddy* is actually expressing something about the person *Daddy*, having recalled him to the contents of an Intentional state. Seeing another man cued recall of something about Daddy from memory which the child then expressed. Such so-called overextensions do not consist in labeling other men "Daddy."

Internal physiological states like hunger may cue the recall of a set of beliefs about food, the availability of food, and possible ways of getting food, and these representations can be discrepant from the perceptible context. Similarly, an external event can summon an aspect of a concept that may include more than just what is perceived in the event, like when the child sees a pile of blocks and starts to build a tower, or sees a train car and searches for other cars or the tracks for the train. Seeing the blocks cues recall of something from memory that figures into a belief that a tower can be built; seeing the train car cues recall of an aspect of memory that suggests the belief that other train cars and train tracks may accompany this train car. And still other external events summon information from the knowledge store that have no direct corollaries at all in the present context, as when the ringing telephone sets off a chain of mental events that includes an idea about Daddy. As different experiences, like being fed when hungry, building towers, or Daddy's voice on the telephone are stored in memory and world knowledge increases, the internal resources for the contents of consciousness expand. These, in interaction with developments in cued
recall, allow Intentional states to become increasingly discrepant from perception. These discrepancies press the child to use language for expression, in the absence of the here and now as an interpretive resource by others.

With development, the relational and object concepts that are derived from episodic memories strain the initial compound of word and episode, as more different words are heard in contexts that cue the recall of concepts. As concepts develop with exposure to more instantiations, as well as networks of relations to other concepts, the words are freed from the earliest schemas with which they were stored initially, to become accessible for expressing Intentional states with different contents. (Certain words, however, will remain closely connected to particular types of experiences, as, for instance, when hearing a certain sonata invariably cues recall of the word Mozart. This association of word and episode is now a complex, however, inasmuch as the elements are separable in a way that the elements in the early compounds were not).

This development—the abstraction of words from the utterance/episode compounds in which they were stored—results in the capacity to coordinate words with new types of episodes, and also the realization that words can serve this purpose. The result in the child’s speech is typically a sharp increase in both the number of words that the child uses and the frequency in the use of individual words—a "vocabulary spurt" some time towards the end of the second year (e.g., Bloom, 1973; Corrigan, 1978; Nelson, 1973; Stern & Stern, 1907). The notion of decontextualization is not explanatory nor even descriptive of this development because expression and interpretation never occur out of some context, physical or otherwise (Bloom, 1974). The relevant developments in the single word period are in the sources for the contents of the child’s conscious states of mind. These consist of developments in the child’s knowledge, and in the resources that the child can use for ways into and out of memory.

We propose that the units of the child’s semantic categories are determined by the contents of their own conscious states of mind. If children can interpret the nonlinguistic actions of another well enough, and once they understand words as signs for real world phenomena, then the semantic roles played by the words in others’ utterances will begin to be transparent. The child will search for regularities in the input that correlate with the interpreted meaning. By considering Intentional states, a
theory of language development can argue that perceptible covariation—of (1) the surface structure of language with (2) the meaning categories contained in the mental states that underly actions—provides the objects on which the child's mechanism for learning words and simple syntax will operate (Beckwith, 1986).

In closing, we offer the following conclusions. First, by introducing Intentionality into a theory of language development, we are not discounting theories that deal with the acquisition of knowledge, or with the procedures whereby children process the surface features of speech and learn words and syntax, or with how children learn to communicate in social contexts. Cognitive, linguistic, and social interaction theories are vital to understanding language development. Indeed, Intentionality not only encompasses these but also provides just the sort of unifying theme that an explanation of language development will require.

Second, the major thrust of the theory offered here is the emphasis that it places on the mind of the child and its development. In this view, the control of language development belongs to the child (as also observed by Shatz, 1978, in another context), rather than to the events of the external environment, the support that the child receives in familiar interactions with adults, or the interpretations that mothers give to their infants' actions. The emphasis in the present theory is on how the development of the child's memory store and processes of recall influence the contents of mental states, which, in turn, determine what the child expresses and interprets of what others express. Events in the context and interactions with others are obviously vital to this development, but it is the child's understanding of these external events that is the critical explanatory factor.

And, finally, the theory that we offer is a mental theory rather than an instrumental one. The instrumental function of language, like many of its functions, happens between individuals in social events and is one aspect of language. A mental perspective, rather than allowing access to one aspect of language, can serve to integrate various perspectives because, as we have argued, it serves as the foundation for each of them.
References


Figure Captions

Figure 1. Components of Intentional State Coding

Figure 2. Frequency of Expressions and Attributed Propositions, Ratio FW:VS

Figure 3. Psychological Attitude, Ratio Desires:Beliefs

Figure 4. Content, Ratio Child:Mother Representation

Figure 5. Developments in ACT Expressions, Ratio Evident:Anticipated

Figure 6. Developments in SEE Expressions, Ratio Evident:Anticipated
COMPONENTS OF INTENTIONAL STATE CODING

\[
\begin{array}{c}
\left[ \left( \text{PSYCHOLOGICAL ATTITUDE} \right) \right] \\
\left[ \left( \text{belief} \right) \left( \text{desire} \right) \right] \\
\left[ \left( \text{be} \right) \left( \text{do} \right) \left( \text{go} \right) \left( \text{person} \right) \left( \text{action} \right) \left( \text{thing} \right) \right] \\
\left[ \text{TIME} \right] \\
\left[ \text{evident} \left( \text{anticipated} \right) \right]
\end{array}
\]

Figure 1
FREQUENCY OF EXPRESSIONS AND ATTRIBUTED PROPOSITIONS, RATIO FW:VS

Figure 2
PSYCHOLOGICAL ATTITUDE, RATIO DESIRES:BELIEFS

Figure 3

CONTENT, RATIO CHILD:MOTHER REPRESENTATION

Figure 4
DEVELOPMENTS IN ACT EXPRESSIONS
RATIO EVIDENT:ANTICIPATED

Figure 5

DEVELOPMENTS IN SEE EXPRESSIONS
RATIO EVIDENT:ANTICIPATED

Figure 6