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THE TRANSITION FROM PRELINGUISTIC TO LINGUISTIC COMMUNICATION

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To Jordan Seth and Allison Ruth, delightful sources of fatigue and inspiration.

1 In the Beginning Was the Word: A History of the Study of Language Acquisition

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The study of language acquisition has grown disproportionately as compared to other areas of developmental psychology within the last 10 years. Research has proliferated because language acquisition has become incorporated into many different areas within a range of disciplines, sometimes to the point of submerging key issues. A primary goal of this volume is to retrieve language acquisition from these scattered directions and to reflect on the broadening of its concerns.

The purpose of this introductory chapter is to give an account of the expansion and diversity characterizing current research and to evaluate whether the broadened focus of recent years has added anything substantial to our understanding of language acquisition. To accomplish this goal we provide a brief, non-exhaustive historical overview of how the field of language acquisition has evolved in the past 20 years. This leads to a critique of issues that have been either presupposed or ignored, such as the importance of the transition period from pre-linguistic to linguistic communication. We conclude by pointing out future directions that appear promising with respect to critical issues in language acquisition.

Our historical account borrows a novel form; we present a "creation science" view of language acquisition, designed to parallel the seven days of creation. On each day of creation, the theoretical focus of language acquisition changed and as a by-product, the nature of the linguistic (or nonlinguistic) unit considered worthy and appropriate for study also changed. Just as the seven days in the creation of the world, seen metaphorically, encompass events by telescoping them, the field of language acquisition may be understood by segmenting into separate periods the scholarly progression of ideas in the past 20 years.

The First and Second Days of Creation: The Revelation of Generative Transformational Grammar

On the *first day* the deity created Chomsky. On the *second day* Chomsky—without the deity's help—created generative transformational grammar. This event occurred in 1958 with the publication of *Syntactic Structures,* Chomsky's dissertation, which caused a revolution in the field of linguistics (Searle, 1972). Certainly Chomsky did not create the field of child language, any more than Crick and Watson created the field of molecular genetics when they unraveled the genetic code. However, just as Crick and Watson's work reoriented the research of a generation of geneticists, Chomsky's work renewed and invigorated the field of language acquisition. What Chomsky did was to postulate a biologically programmed, species-specific universal model of language that others used as their theoretical base to explain the regularities which seemed to appear in child language. Chomsky's beliefs gained additional power with the publication of Lenneberg's (1967) influential volume which argued for the universality of the order and timing of acquisition across radically different languages, as well as mastery of language essentials among all children regardless of intelligence.

In reviewing the biological bases and evolutionary evidence for language as a species-specific signal system, Lenneberg (1967) began by writing that "reason, discovery, and intelligence are concepts that are as irrelevant for an explanation of the existence of language as for the existence of bird songs or the dance of the bees [p. 1]." Research by Marler (see Marler, Dooling, & Zoloth, 1980, for a review) on how birds learned their song did in fact seem to support this assertion. Marler found that if two types of sparrows are kept in isolation where they can hear no bird song during a critical period of exposure to song between 20 and 50 days of age, they will sing an abnormal, garbled song when they reach maturity. However, if isolated sparrows hear artificially combined elements of bird songs, parts of which do and parts of which do not match their species' song, they will sing a version of their species song when they reach maturity, approximately 300 days after their exposure to the artificial song. This finding suggests the existence of a template for the species song which is activated only under exposure to song—even unnatural, artificially constructed song. Parallels with human language acquisition are tempting to construct; Lenneberg (1967) argued strongly for a critical period of exposure to language, for its species-specificity and for its appearance among virtually all members of the species exposed to language. In other words, the idea that the capacity for language was prewired into the human brain, destined to emerge as the organism matured biologically, seemed to support Chomsky's views and was Lenneberg's contribution to the study of language acquisition.

As a farewell to behaviorist accounts of language acquisition, Lenneberg's book also opened up the possibility of an interdisciplinary approach to language study which could incorporate not only psychology and linguistics, but neurobiology and language pathology as well. "Language" was not equivalent to "speech" since it resided in the unique capacities of the human brain; disruption of speech could still permit language.

The theoretical weight and apparent empirical evidence behind Lenneberg's arguments combined with the paucity of methods available to investigate what Chomsky had called "competence" and "deep structure" often led psychologists to presuppose innateness as a solution to the problem of language acquisition. Although many researchers had interpreted statements by Chomsky (1965) as a blanket endorsement of a radically innatist position, Chomsky had in fact said, "any [evaluation] proposal . . . is an empirical hypothesis about the nature of language . . . we are very far from being able to present a system of formal and substantive linguistic universals that will be sufficiently rich and detailed to account for the facts of language learning [p. 46]." (See Piatelli–Palmerini (1980) for a recent formulation of Chomsky's position on language acquisition.)

The Third Day: Language Acquisition as the Acquisition of Syntax

On the *third day* Miller (1962) appeared and brought down to the psychologists tablets on which were inscribed the highlights of generative grammar. For lack of good theory psychologists had for the most part relegated the study of language and language acquisition to a minor position within their science. Here was Miller interpreting a rich, though elusive, theory to guide psychologists in their inquiry. At the same time, Braine (1963) claimed that children possessed a puerile version of the adult language model which he called "pivot-open grammar." Brown and Bellugi (1964), Miller and Ervin (1964), and McNeill (1966) all posited some version of a grammar in an attempt to account for children's 2– and 3–word utterances. As Fig. 1.1 indicates, at this time language acquisition was synonymous with the acquisition of syntax. The unit of analysis was at minimum the 2–word combination, since the study of syntax presumably could not begin before its appearance.

Although it is easy in retrospect to criticize developments on the third day of creation, that is, why an exclusively syntactic approach failed for both adult sentence comprehension (see Fodor, Bever, & Garrett, 1974) and children's early production (see Brown, 1973), developments on the third day should be seen in the context of the prevailing Zeitgeist. Many psychologists were not ready to abandon behaviorist accounts of cognitive processes, including language. That children under 2-years-of-age had themselves either induced or were endowed with grammatical rules and mysterious "deep structures" seemed to be heretical assertions. Thus, although the exclusively syntactic approach discussed earlier was eventually abandoned, these new ideas on language, in combination with other developments in what was not yet called "cognitive" psychology, were to change the landscape of the science of psychology.

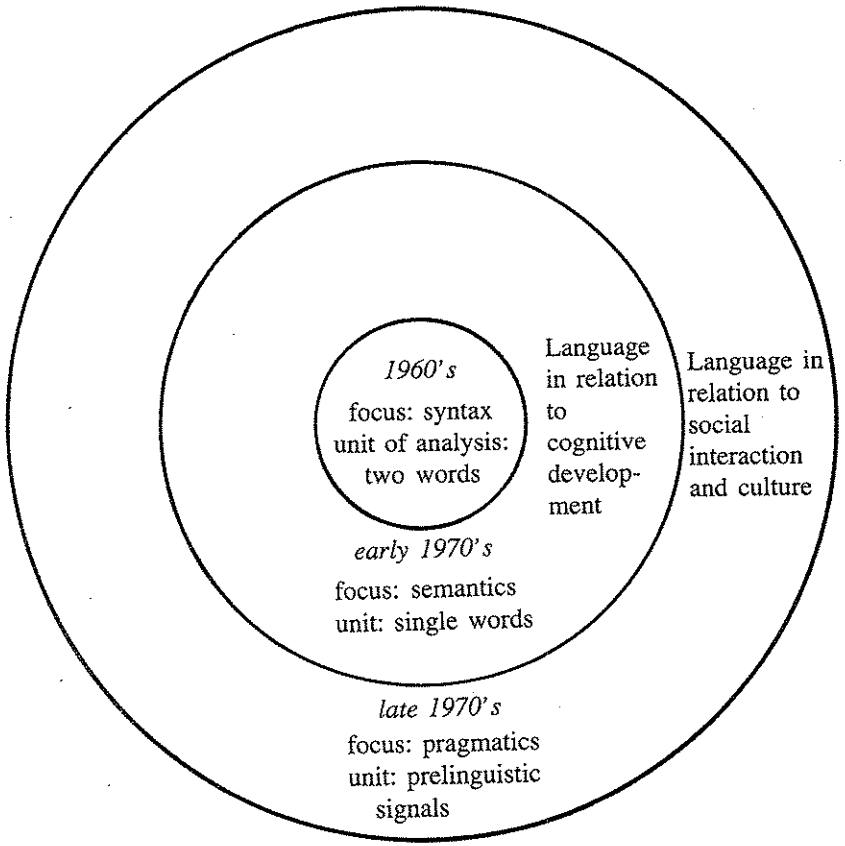

Fig. 1.1. Concentric circles represent the ever-widening view of language acquisition seen from an historical perspective.

The Fourth Day: The Reincorporation of Semantics into Child Language

On the *fourth day* (see the next larger circle in Fig. 1.1) Bloom (1970), Kernan (1970), Schlesinger (1971), and Slobin (1969) incorporated semantics into the study of language acquisition. Now not only the form but the *content* of children's earliest utterances was scrutinized. Developments in psycholinguistics and linguistics moved independently in this direction as well. For example, the "derivational complexity" issue (Fodor, Bever, & Garrett, 1974), which first appeared on the third day, was sacrificed on the altar of semantics. That is, the notion that the difficulty of comprehending a sentence should be linearly related to the number of transformations that the sentence contained was not true; sentence meanings could override the number of transformations, making some derivationally complex sentences easier to comprehend than some derivationally simpler sentences. In addition, theoretical linguists such as Chafe (1970) and Fillmore (1968), while basically accepting Chomsky's transformational view, seriously questioned whether deep structure contained more world knowledge than Chomsky seemed to grant in his 1965 version or indeed whether the notion of a deep structure was needed at all (McCawley, 1968).

The assertion that children possessed more knowledge of the world than their limited surface structures expressed caused researchers to expand their interpretation of 2– and 3–word utterances, and finally to examine single-word utterances (Greenfield & Smith, 1976) using the method of "rich interpretation." As Bloom (1970) and others astutely noted, the very same surface structure (e.g., the now famous "Mommy sock") could mean completely different things depending on the context in which it was uttered. What was so appealing about this account for many psychologists was that the study of the tacit, often inchoate knowledge of the world encoded by language was just what many psychologists (although not many linguists) called their life's work. Psychologists strongly believed in the power of context and task for determining perception, e.g., the perception of ambiguous figures; memory, e.g., intentional versus incidental learning; and reasoning, e.g., functional fixedness. Why shouldn't young children rely on context to convey meanings which their undeveloped linguistic skills prevented them from completely communicating?

Now children's early verbal productions were taken to reflect considerable world knowledge. Using this argument, early productions could be profitably studied even before two words appeared, since the concepts underlying these early utterances were an outcome of sensorimotor achievements such as object permanence and causal inference. Specifically, children's ability to encode case role concepts which specified such things as who did the action (the agent), who received the action (the patient), and where the action took place (location), received some support from perceptual research (see Golinkoff, 1981a, for a review) as well as from the broad outlines of Piaget's theory.

Instead of Chomsky's (1980) "Cartesian theory of mind" in which the infant's mind is compared to "a function that maps experience onto a steady state [p. 109]", Piaget's constructivist account stressed the infant's activity in selecting from experience and constructing first, conceptual, and then linguistic structures. Piaget (1951) proposed to incorporate language into the semiotic function which included symbolic play, deferred imitation and mental imagery. Thus, the cognitive hypothesis placed language acquisition in a general developmental framework that provided an alternative to earlier innatist views.

While the field turned away from linguistic nativism in that linguistic universals became cognitive universals, e.g., McNeill (1970), Slobin (1973), the linguistic environment available to the child was still seen only as providing information about the child's specific language community. The prevailing view of

the child was as an hypothesis tester (Fodor, 1966) and solitary constructor of a language which mapped onto preexisting concepts. The acquisition of syntax was reduced for some to the acquisition of linguistic devices to map onto world knowledge.

Thus, on Day 4 the child's cognitive resources seemed sufficient to account for the acquisition of both the semantic underpinnings and the syntactic structures of language. Disenchantment with this position occurred when cognitive structures were not invariably found to precede linguistic structures or even to be closely linked (e.g., Beilin, 1975; Corrigan, 1979).

The Fifth Day: The Social-Functional Approach to Language Acquisition

On the *fifth day,* "pragmatics," or the "functions of signs in context" (Morris, 1946), represented by another circle in Fig. 1.1, caused language acquisition to be thought of as embedded in a social and cultural context. Children didn't just learn *language,* mysterious as that task alone might be, they learned a social system and how language functioned within it. For example, they learned forms of address, ways of asking, and other sociolinguistic rules that varied by culture and that defined a competent speaker in that culture. At that time Bruner (1974) wrote:

> Neither the syntactic nor the semantic approach to language acquisition take sufficiently into account what the child is trying to do by communicating. As linguistic philosophers remind us, utterances are used for different ends and use is a powerful determinant of rule structures . . . one cannot understand the transition from prelinguistic to linguistic communication without taking into account the uses of communication as speech acts [p. 282].

Ervin–Tripp and Mitchell–Kernan (1977) also speculated that without attending to the *functions* language served for the young child, we could not account for the acquisition of the *forms* of language.

Thus, on the *fifth day* formal analyses of the information available in the linguistic signal seemed incomplete, and the acquisition of "communicative competence" (Hymes, 1971) was sometimes used synonymously with "language acquisition" (see Berko–Gleason & Weintraub [1978] for a further discussion of this development). Knowing *how* to say something; that is, knowing how to employ the formal linguistic system was important but equally important was knowing *what* to say and knowing *when, where,* and to *whom* to say it. Theoretical linguists such as Austin (1962) and Searle (1969) brought researchers up short with their observations that precise analyses of the abstract form and content of a sentence could never be sufficient for knowing what that sentence actually meant in ordinary discourse. For example, "I love your tie" could mean

"I hate it," if said sarcastically, and "Gee, it's hot in here," uttered by a college president could make untenured faculty rush to open windows as if by royal command. In other words, the illocutionary force or intent of an utterance could contrast with the utterance's locutionary or propositional content. Psycholinguistic research by Clark and Lucy (1975), Jarvella (1974), Schweller, Brewer, and Dahl (1976), and others supported the view that adult speakers do, in fact, make inferences about illocutionary forces and perlocutionary effects from linguistic signals whose literal meanings contrast sharply with their conveyed meanings. Subsequent research using both experimental and naturalistic data indicates that even young children seem to have sophisticated knowledge of the shades of meaning possible in a speech act (see Shatz, in press, for a review).

If language acquisition was motivated by function one could look for the prelinguistic counterparts of such functions. Thus, the unit of analysis shrank even further on this day, moving from 2– and 3–word utterances (Day 3), to single-word utterances (Day 4), to preverbal signals used for intentional communicative ends (Day 5). Language acquisition was now seen by some researchers as the inevitable by-product of 18 or so months of social and communicative interaction where much shared meaning had been constructed between the infant and its caregivers. Schaffer (1977) wrote:

> Conceived initially as a beneath-the-skin system, as a set of behavioral patterns explicable purely in terms of the psychological organization of the individual, it [language] has increasingly been recognized as in fact deriving its significance primarily from its communicative function and is in need consequently of dyadic settings . . . Instead of seeing language arising *de novo* at the beginning of the second year, it is now being related to the preverbal communication patterns that are already established between mother and infant in the early months of life. Language acquisition in other words, has been firmly placed within a social setting [p. 4].

Research on the origins and growth of communication in the first year of life began to appear. Often using terms borrowed from linguistics, researchers began tracing the development of the child's communicative competence. For example, experimenters examined the infant's ability to preverbally establish reference (Bruner, 1974; Bates, Camaioni, & Volterra, 1975), to signal their intentions through illocutionary vocalizations (Harding & Golinkoff, 1979), to engage in turn-taking in protodialogues or protoconversations (Stern, 1977; Bullowa, 1979), and to establish topic-comment structures in social interaction (Bruner, 1974). Such research, while providing much new and important information on the infant as a communicative being, had another unexpected consequence.

Increasingly, as researchers moved back earlier and earlier in the child's life in an attempt to bridge the transition from preverbal to verbal communication, the study of language merged into the study of communication. Bruner (1975)

was the most radical and articulate proponent of this merging. He described how "joint action formats," originally initiated by the mother and then by the child during play, helped preverbal children to realize concepts such as agent, action, and object which were later directly translated into language.[1]

Aside from reducing the problem of language acquisition to a problem of understanding communicative social interactions between mother and infant, research on the functions expressed by the infant's preverbal communicative signals was plagued by an old problem: The rich interpretation of the infant's signals was done from the perspective of the adult researcher with little external evidence to support the researcher's fine categorical cuts (see Francis, 1979). For example, just as "Mommy sock" could mean a possessor-possessed relationship or an agent-object relationship (see Day 4), a preverbal vocalization could have either a "regulatory" or an "instrumental" function (Halliday, 1975) depending on context.[2]

Thus, the acquisition of language was seen as occurring in early dyadic social relationships. Given the importance of social interaction, the individuals interacting with the child might be expected to either facilitate or impede the child's language acquisition. Phillips (1973) was the first to falsify the oft-cited Chomsky dictum that the linguistic data available to the language-learning child was "defective," "degenerate," and full of slips of the tongue and grammatical errors. While this was not the only claim Chomsky made about the input language, psychologists chose to establish that parents do modify their speech when interacting with their children (see Snow & Ferguson, 1977). Moreover, children acquiring language seem to be exposed to adjusted speech no matter whom they interacted with: 4-year-olds (Shatz & Gelman, 1973); women without children (Snow, 1972); and fathers (Golinkoff & Ames, 1979).

Despite many studies on parental speech, three discordant notes have been sounded with regard to the impact of adjusted parental speech on the child's language acquisition. First, just documenting that adjusted parental speech is a fairly robust phenomenon, does not prove that it actually influences the child's acquisition of language. Shatz (1982) has referred to this logical error as an "existence proof." In addition, given that there are many possible grammars which can be induced from a limited corpus of utterances, without some "built-in" constraints on induction, it is not clear that the adjusted input language would lead the child to induce the right grammar (Gleitman & Wanner, 1982). Furthermore, results on the effects of parental speech adjustment on child language acquisition (Furrow, Nelson, & Benedict, 1979; Nelson, 1977; Newport, Gleitman, & Gleitman, 1977) have been mixed and controversial (see Snow & Ferguson, 1977).

[1]See Bruner (this volume) for a retraction of the position that concepts of action derived from non-linguistic routines are translated directly into language.

[2]A new phenomenon called the "negotiation of failed messages" (see Golinkoff, this volume) may help circumvent this problem since interpretation of the infant's meaning is done from the infant's perspective.

Bohannon and Hirsh-Pasek (1983) have further suggested that we may be pursuing the wrong model of the effects of parental adjustment. They argue that the field may have been presupposing an uncomplicated linear relationship between child competence and parental adjustment, whereas more sophisticated statistical models which do not presuppose linearity may be needed to evaluate the effects of parental speech. Little is known about which aspects of parental speech adjustment (isolated from the welter of other factors) have an effect on the child's language acquisition (if they do) and at what particular points in the child's language development.

The second discordant note in the parental speech adjustment literature has to do with claims of universality for a baby-talk register when addressing young children. Schieffelin and Ochs (this volume) and Ochs (1982) do not report any parental adjustment of the type reported in Western cultures among the Kaluli of Papua, New Guinea, and the Samoans of Samoa, respectively. If a baby-talk register on the part of parents proves not to be universal, "baby-talk" as presently defined, cannot be necessary for language acquisition. It is of course possible that parents are not the primary providers of the input language in these cultures; researchers must examine the extent to which peers and siblings in these cultures provide linguistic models of reduced complexity.

The third discordant note on the effects of parental speech adjustment comes from cases where linguistic input is unavailable to the young child. In these cases there is evidence that children's proclivity to symbolize their thoughts emerges under the worst of conditions. Linguistically-isolated deaf children (exposed neither to oral language nor to sign) seem to invent their own version of sign language called "home sign" by Feldman, Goldin-Meadow, and Gleitman (1978). Hearing children of deaf parents, who have had neither exposure to sign nor oral language (except television) may acquire the rudiments of linguistic expression, but achieve little conversational facility (Sachs, Bard, & Johnson, 1981).

In sum, on the fifth day the child's environment (both linguistic and social) came to the forefront in the study of language acquisition. The accomplishments of the fifth day will be evaluated on the seventh day, the day of judgment.

The Sixth Day: The Revival of Formal Approaches and Nativism

On the *sixth day* formal and nativistic approaches to language acquisition were revived, partly as a backlash to the myriad directions in which the field of language acquisition had gone. As Slobin (1981) put it, seven popular terms characterized attempts in the late 1960s and 1970s to enrich the field's purely structural approach to language acquisition, namely, "semantics, context, input, pragmatics, discourse, cognition, and strategies [p. 275]." He went on to write, "Although these terms obviously represent important variables, embedding language acquisition within developing processes of social, logical, and physical

cognition, the original *linguistics issues of the acquisition of language* as a peculiarly structured system in its own right have often been obscured or even willfully abandoned [p. 275, our underlining]." Thus, in the late 1970s there appeared a renewed interest in the acquisition of syntax per se and in the unspecified native endowments which may make language acquisition possible. These new developments were partly inspired by research in the field of artificial intelligence and in animal learning.

The field of artificial intelligence, and computational linguistics in particular, has provided new impetus to formal approaches to language and language acquisition. Attempts to simulate language acquisition on the computer have been useful because they force researchers to specify the conditions that an explanatorily-adequate theory must meet in order to account for language acquisition on the basis of limited exposure to linguistic data. Pinker (1979) lists six conditions that must be satisfied by an explanatorily-adequate theory of language acquisition: (1) learnability (the fact that languages can be learned, as children learn them, in the first place); (2) "equipotentiality" (the necessity for positing learning mechanisms that can apply to all natural languages); (3) the "time condition" (the theory must take account of the fact that children learn the rudiments of a language within their first three years; (4) the "input" condition (only input actually available to the child must figure into the theory); (5) the "developmental" condition (the theory must make the putative child go through the same stages of acquisition that the real child goes through; and (6) the "cognitive" condition (the theory must be realistic about cognitive abilities the child actually possesses). The satisfaction of all six of these conditions seems at the present time to be a Herculean task. Pinker (1979) reviews which of the above conditions are successfully addressed by various existing theories, concluding that Anderson's (1977) Language Acquisition System (LAS) and Wexler, Culicover, and Hamburger's (1975) Invariance, Binary, and Freezing Principles look most promising. As explanatorily adequate learning models, the LAS program seems to satisfy the cognitive, input, and time conditions, whereas the Wexler, Culicover, and Hamburger model meets the learnability and equipotentiality conditions.

It has been demonstrated that there are a tremendous number of linguistic rules which could be induced from a limited corpus (Gold, 1967, in Pinker, 1979). Therefore, it appears that unless the computer can be given *a priori* constraints to guide its induction of grammatical rules, learning a language requires more than a human lifetime. Just selecting the right set of rules would require much time since incoming linguistic data must be tested against each successive model which the processor constructs. In reality, only certain categories of rules actually are induced by children. Thus, the processor (be it the computer or the child) must have some built-in predilection to construct certain rules over others.

Such predilections or constraints on learning are also present, Keil (1981) suggests, in the domains of ontological knowledge, number concepts and deductive reasoning. A belief in constraints on learning in humans bears comparison to the new nativism in animal learning (see Seligman & Hager, 1972; Hinde & Stevenson-Hinde, 1973). Learning theorists have documented many cases of learning—or failure to learn—which cannot be explained by traditional learning theories. One example is the Garcia effect in which food-aversion learning occurs after a single food and illness pairing mediated by a long delay. It appears that different species do not associate events in arbitrary ways; rather, they come prepared to acquire certain linkages over others. As Bolles (1975) writes, "if a particular animal can learn a particular thing it is because it is *genetically endowed to do so* [p. 176, our underlining]."

Human beings, whether normal, retarded, or deaf, may be endowed in some way to learn language. Neo-nativist accounts differ, however, from the nativism of the 1960s. While earlier the linguistic structures themselves were given (e.g., McNeill, 1966), now constraints which guide the learner's *search* for the structures are given (e.g., see Wexler, 1978).

Some neo-nativists also continue to endorse the notion of a critical period for language learning. There have been a number of "natural experiments" which take the opportunity to study children after they have been in prolonged social isolation. Genie's case (a child who was locked in a bedroom and not spoken to for her first 13 years) (Curtiss, 1977) suggests that first language learning is even possible after puberty. However, in some ways Genie's speech never developed beyond the basics. It is tempting to draw an analogy between the inadequacies of Genie's speech and the sparrow's "abnormal garbled" song (discussed earlier) when it has not been exposed to its species song during the sparrow's critical period of exposure (Marler, 1980). Exposure to language prior to puberty may be necessary for the appearance of certain syntactic capabilities which Genie continues to lack.

To summarize, scientific thought in the area of first language acquisition seems to have gone in a spiral as opposed to a circle. That is, although some theorists have on Day 6 returned to formal approaches to language acquisition and a form of nativism (earlier seen on Day 2 and Day 3), these recent attempts have been enriched and broadened by intervening developments in language acquisition, cognitive learning theory, and computational linguistics. However, unlike the creation of the world, the creation of the field of language acquisition is not complete. Nor do the concerns of Day 6 supersede earlier concerns. The issues of Day 4 and Day 5 continue to be studied extensively along with the work motivated by developments on Day 6.

The Seventh Day: The Day of Rest and Judgment

On the *seventh day,* worn out from these theoretical struggles, researchers rested and reflected on what they had done in creating the field of language acquisition as they had. What they saw, by way of summarizing the products of Days 1 through 6, was the following: Day 1 witnessed the creation of Chomsky who on

Day 2 created generative transformational grammar, a theoretical breakthrough that transformed psycholinguistics and the study of language acquisition. Day 3 witnessed the first ambitious but mostly unsuccessful attempts to translate Chomsky's theory into psycholinguistic research and to look for grammatical rules behind children's early linguistic productions. An exclusively syntactic approach to language acquisition begun on that day proved too narrow and soon yielded to semantic approaches to language acquisition on Day 4. On that day, the revelation that children could apparently discuss events and relations they perceived in the world became a focus for research, and language acquisition was seen as prompted by prior cognitive developments. On Day 5, researchers discovered the child as a social being in a cultural context and theoretical concerns shifted to the *functions* of language during communication. In fact, language acquisition was often treated as a problem the child solved exclusively through social interaction, apart from collateral cognitive achievements.

On Day 6, partly as a backlash against the diverse directions in which the study of language acquisition had gone, some researchers returned to the study of the acquisition of syntax per se, although now their theories were informed by the emphasis on semantics gained from Day 4. Computer simulations of the language acquisition process clarified for researchers the view that human beings had some innate propensity to learn particular grammars over others. Neo-nativist views on syntax acquisition were indirectly supported by new discoveries of constraints on learning in animals.

Despite the fact that the field of language acquisition had expanded dramatically, touching on new areas of research as well as reinvigorating traditional areas, solutions to a key problem in language acquisition, namely, the acquisition of the formal syntactical system presumably at some level common to all natural languages, eluded explanation. There also lurked the distinct possibility, as Brown (1977) wrote, that the burgeoning and increasingly amorphous area of language acquisition would become one of those areas that psychologists studied intensively but eventually abandoned. Therefore, on this day of judgment, it is timely to consider theoretical and empirical problems which have continued to plague our efforts.

Four problems are discussed: First, and perhaps most fundamental, is the conflation of "communication" and "language." Efforts to understand the latter have been stalled in recent years by overemphasis on the former, while language's unique properties have been played down or ignored. Second, the importance of cognitive development for language acquisition is still controversial. One aspect of this problem is that the metaphor of the child as "active processor," or constructor of her cognitive and social environment, seems to have met its demise in some accounts of language acquisition which emanate from Day 5. Another aspect is the premature abandonment of the semantic relations view of Day 4. The third problem is the overabundance of "universals" found in the literature on communication development and language acquisition.

We continue to disregard culturally shaped variation in communication and language socialization. The fourth major problem is the issue which motivated the organization of the original symposium and of this volume: What occurs in the transition period from prelinguistic to linguistic communication development? This chapter concludes with a brief discussion of how the field of language acquisition may fare in the future, given its recent tumultuous past.

Problem 1: The Conflation of Communication and Language. As researchers endeavor to determine what role, if any, the development of communication plays in the acquisition of language, little progress will occur if communication and language are persistently conflated. Language is only one of the many channels which human beings use to communicate, so that language use falls under the rubric of communication. However, though it is a component of communication, language in itself is *more* than communication. For one thing, all natural languages are describable by a finite set of rules for the infinite recombination of their elements. To our knowledge no aspect of nonverbal communication—although such communication may be systematic and rule-governed—has the complexity, uniqueness, and power afforded by knowledge of the linguistic code. Bierwisch (1980) lists three other distinguishing characteristics between language and communication. First, in many cases language is used outside of any communicative interaction, such as when constructing interior monologues or in making notes to aid memory. Second, much communication is not based on language—that is, nonverbal acts such as a handshake or a salute carry meaning efficiently without language. Third, language and communication, aside from being based on different sets of rules, tap into different systems of knowledge.

Unfortunately, there has been a tendency in some of the literature which focuses on the preverbal aspects of communication development to conflate language and communication. A practice which may inadvertently contribute to this conflation is the fact that much of the terminology in early communication development has been borrowed from linguistics (discussed earlier) with the result that terms describing *communicative* achievements are used interchangeably with terms describing *linguistic* achievements. Trevarthen (1979), for example, has made strong assertions about very young infants' communicative abilities:

> In primary intersubjectivity [communication between the mother and the 3-month-old infant] the infant exhibits a number of preadaptations to language in which speech and gesture express acts of communication in address and reply with another . . . There is no discernible topic contained in these 'messages' apart from their quality of intersubjectivity within the dyad of mutual interests, and the infantile communications must be regarded as very crude in linguistic differentiation. Most are unvocalized. Nevertheless it is not a great act of interpretation to attribute

> a presumptive language function to the remarkable associations of movement of head or body, of aims of gestures of hands, of expression of mood on the face, and of lips and tongue in articulations of prespeech [p. 548].

This tendency to credit even young infants with rudimentary aspects of linguistic knowledge is perhaps a natural outgrowth of the continually shrinking unit which is subject to analysis in language acquisition research (see Fig. 1.1). However, statements such as Trevarthen's only serve to confuse the issues. Communicative precursors, impressive as they are, have not solved and cannot solve the problem of language acquisition. Nor apparently does language acquisition guarantee communication (e.g., Blank, Gessner, & Espocito (1979); Braunwald, this volume) since there are cases of children who possess linguistic structures which they cannot harness in service to communication. Communication development and language acquisition are theoretically and empirically divisible processes. This conflation of communication development and language acquisition has contributed to two major problems in this area: (1) the tendency to argue for vague continuities between the two achievements, sometimes to the point of explaining the latter by reference to the former; and (2) the tendency to minimize the cognitive correlates and bases of language acquisition in favor of correlates and causes emerging from social interactional sources in the environment.

Since several chapters in this volume (Bloom, Shatz, Sugarman, and Snow and Gilbreath) consider the meaning of continuity positions in development, this issue will not be discussed here except to cite Kaye's (1979) caveats about apparent continuities:

> To find nothing in early communication but protolanguage and precursors of language would be virtually devoid of explanatory value. It is self-evident that everything one observes in adult language has an origin, and if one defines a phenomenon sufficiently broadly and vaguely one can always see some manifestation of it or analogy to it, in infancy or perhaps in the womb. Taken by itself this tells us nothing about the process by which the early form comes to be the later form. In fact it need not be the case that the formal similarity has any psychological, developmental reality at all [p. 192].

To summarize, achievements on Day 5 during which communicative competence and the functions of language were stressed, have sometimes led to a blurring of the boundaries between language and communication. This has misled researchers into thinking that issues in language acquisition could be resolved by finding precursors to language such as gestures and dialogic structures in communication development. Thus, the literature contains arguments of continuity between communication development and language acquisition which rely heavily on social-interactional mechanisms. As a consequence, the child's cognitive contributions to communication and language development have been underplayed. Problem 2 below focuses on the recent minimization of the infant's cognitive capabilities.

Problem 2: The Failures (Both Actual and Apparent) of Cognitive Accounts of Language Acquisition. Since Day 5 there seems to be a trend toward minimizing the role of the infant as an active processor and constructor of both the linguistic system and the social system in which language is embedded. Extreme statements treat the child's cognitive faculties as though they had become irrelevant to the language learning process. Although Vygotskyan approaches to cognition emphasizing the construction of knowledge as occurring first on the intermental level have increased in popularity, there is clearly some "mental" called for on the part of the child to even collaborate in this knowledge construction. Atkinson (1980) and Shatz (1981) both point out that the communication-based approaches to language development which emerged on Day 5 often neglect to provide explicit characterizations of the mechanisms of development which might account for changes in language skill.

Instead, increasing responsibility for the process of language acquisition is vested in the child's environment. However, even if we could specify the characteristics of environments which are maximally conducive to language acquisition, we would still not possess a sufficient account of how language acquisition occurs. What the child selects from the environment at various points in development and how the child processes what is selected must be known as well. An analogy can be seen in the phenomenon of combustion: It is patently false that the mere existence of oxygen, combustible material, and a matchbook necessarily implies that there must be a fire. Combustion will not occur unless a causal agent (or a bolt of lightning) lights a match to the combustible material. Environmental accounts of language acquisition make an analogous error; such accounts ignore the causal agent in the process (the child) whose function it is to interpret both the linguistic and the non-linguistic environment, guided by what their evolutionary heritage and developmental status make available.

It is an interesting coincidence that the infant's cognitive abilities are being down-played in communication-based approaches to language acquisition at the same time that the optimism of the last decade about how cognitive factors would eventually account for language acquisition has faded. Bates and Snyder (in press), Bloom, Lifter, and Broughton (in preparation), and Corrigan (1979), have discussed the failure to find close correspondences, let alone causal links, between variables such as level of object permanence and lexical or syntactic production. In retrospect the failure of what may be referred to loosely as the "cognitive hypothesis" of language learning is not surprising. Piaget's theory (1951, 1954) was the one most relied on for making the link between, on the one hand, general representational and cognitive abilities, and on the other, language development. Yet this theory has notoriously underplayed the importance of language in development and has failed to provide a consistent and clearly

articulated theoretical approach to language development itself (see Beilin, 1980; Piatelli–Palmerini, 1980; Ryan, 1974).

Further disenchantment with the cognitive hypothesis is reflected in the apparent eagerness with which some researchers have abandoned the belief that infant's early utterances encode role relations, the achievements noted on Day 4. Howe (1976) and Macrae (1979) have concluded that it is presumptuous to presuppose, as many theorists of language acquisition have done (e.g., see Brown, 1973, for a review), that children are capable of commenting on relations such as "agent" of the action, "location" of the action, and "recipient" of the action. The end result of such a counterproposal would be a return to the situation which Schlesinger (1971) criticized in accounts of Day 3, during which language was synonymous with the acquisition of syntax; such accounts left the child holding "empty structures which he subsequently stuffs with meanings [p. 85]." The problem of meaning in early language, however conceived, is interconnected with the acquisition of syntax and must be included in any theory of language acquisition. The rejection of semantic relations has been criticized on logical grounds by Bloom, Capatides, and Tackeff (1981) and on logical and empirical grounds by Golinkoff (1981a). The latter paper describes a mounting body of evidence which suggests that infants in their second year are capable of discriminating at least the roles of agent and recipient in the nonlinguistic events they observe.

Problem 2, the minimization of cognition's contribution to the child's communicative and linguistic development, has yielded to an alternative theoretical focus. The social-interactional, environmentally-based explanations of language development, have succeeded no better than exclusively cognitive explanations. An argument has been made that the minimization of the importance of cognition for both communication and language development was spurred by the simultaneous rejection of Piagetian-based cognitive "explanations" of language development as well as a partial rejection of the semantic relations position, both seen first on Day 4. To conclude, explanations of language development which rely exclusively on either social or cognitive mechanisms fail to capture the complexity of learning language.

Problem 3: The Overabundance of Universals. Only recently has there been some concern about whether statements made about the course of communicative development in our culture are true of other cultures as well (see Field, Sostek, Vietze, & Leiderman, 1981; Schieffelin & Ochs, this volume). In general, the literature is replete with unquestioning assertions about the nature of the mother–infant relationship and how that relationship contributes to communication and language development. For example, Newson (1978) among others has argued:

> The desire to establish a degree of shared understanding with her baby is normally a powerful motive for the mother. She treats him from birth as a person who can be credited with feelings, desires, intentions, etc., and looks for confirmation that he will relate to her in a person-like way [p. 37].

Such statements, so comprehensible and "natural" when read by Western researchers who hold these views of the infant as well, have led to an uncritical acceptance of the "necessary" environmental influences for communication and subsequent language development. These "necessary" experiences may simply be artifacts of child-rearing in Western culture. At least four specific "universals" are now being challenged from data derived from ethnographic and experimental studies of non-Western cultures (see Schieffelin & Ochs, this volume): (1) the attribution of intentions and feelings to prelinguistic infants; (2) the prevalence of the baby-talk or adjusted speech register when adults address infants and young children; (3) the primacy and importance of the dyadic relationship between mother and infant for communication development; and (4) the necessity for affect-reciprocity in extended face-to-face interactions for language development (see Dixon, Tronick, Keefer, & Brazelton, 1981). Until very recently these four claims were not considered controversial. Despite the fact that cross-cultural differences make our explanatory attempts more difficult, they cannot be swept under the rug.

A further result of the often unquestioning acceptance of Western, middle-class beliefs about infants is our implicit assumption of homogeneity among the middle class mothers whose interactions with their children comprise our data sets. Explorations of how mothers report that they perceive and interpret their infants' communicative behaviors are rare (e.g., Harding, this volume; Hayes, 1982; Ninio & Wheeler, 1983). Rarer still are studies of whether individual differences in such interpretations affect the infant's communication and language development (Harding, 1981).

To summarize, as a result of Day 5 when social-interactional concerns began to be considered as pertinent to the development of communication and language, the experiences of Western investigators and their middle class subjects began to be treated as though they were universal and necessary precursors for the development of language. In addition, perhaps because of the presumption of homogeneity within cultures, the child rearing beliefs which guide Western mothers have rarely been examined. The failure to close these research gaps will greatly limit the generalizability of our theoretical claims and empirical findings.

Problem 4: Understanding the Transition from Prelinguistic to Linguistic Communication. The goal of this volume and of the conference which preceded it[3] has been to examine the period during which children move from using predominantly nonverbal and vocal means to using predominantly linguistic

[3]Aside from the discussion of this issue here, the reader may wish to refer to the preface which details the charge given to the contributors to this volume with regard to conceptualizing the transition from prelinguistic to linguistic communication.

means for communication. This transition period occurs between approximately 12 and 18 months. During this time, infants, in collaboration with their communicative partners, augment, refine, and coordinate their nonlinguistic communicative signals enabling them to convey their goals and intentions in extended "conversational" interactions. This development has been little studied. Research done during the transition period focused either on infant communication behaviors or on maternal language input without regard for the infant's response. To trace development in the transition period, studies conducted within an *interactive* perspective are required in which the infant's communicative development is described in the context of everyday conversational interactions. An interactive perspective presupposes that communicative development is a) partially a product of communicative episodes constructed by infant and mother; and b) that the meaning of the infant's evolving communicative signals must be interpreted in their functional context. On the other hand, some have argued that little of communicative or linguistic note occurs during this period (Bates, 1979; Shatz, this volume). However, the interactive examinations of the child's communicative skills during this period are yet to be conducted.

Up to now, research in communication development has focused on exciting discoveries about communicative interaction between mother and infant in the first 6 months of life (see Bullowa, 1979; Lock, 1978; Schaffer, 1977), the period characterized by Adamson and Bakeman (1982) as "affective communication." For example, the early communicative exchanges which occur between young infants and their mothers (aptly described by Stern, 1977) have been argued to possess the dialogic qualities of linguistically constructed conversations (e.g., intersubjectivity and turn-taking). Although these forays into early communication development have been partly in service to learning more about language acquisition (Schaffer, 1977), they have provided relatively meager returns for the study of the transition period or the acquisition of the formal structure of language per se.

Since research on early communication often uses terms borrowed from linguistics, it seems ironic that the use of these linguistic terms may have hampered the study of the transformation of the child's communicative skills during the transition period. Sometimes, use of these labels has persuaded researchers that non-linguistic achievements were actually linguistic ones (see Problem 1). Further, some researchers' optimism about the contribution of early communicative precursors to language acquisition has been deflated by the lack of evidence to support this presumed relationship. Bates, Bretherton, Beeghly–Smith, and McNew (1981) in an extensive review of the effects of early communication development on language acquisition, report few apparent effects between these variables, measured in diverse ways. For example, Kaye's (1979) research included a multifaceted microanalytic analysis of the relationship between many measures of the mother–infant communicative relationship in the first 6 months of life and later language development. Kaye's results (or rather lack of results) led him to conclude:

> We certainly cannot say that our contingent and interactive measures (taken before 6 months) added anything to our ability to predict outcomes in the children's cognitive, language, or social development at 2 1/2 . . . mother and infant do not constitute a dyad or social system *until the infant becomes an intentional and skillful partner in their interaction* [p. 17, our underlining].

The period alluded to in Kaye's statement, roughly dating from the beginning of the second year of life and not the first 6 months, seems a much more likely candidate for helping us understand the role of communicative development in the transition into language use. This is because two very different kinds of communicative interaction are being initiated by the infant in the first 6 months and in the transition period. Golinkoff (1983) has distinguished between intentional communication for *interactional* purposes, appearing in the first months of life and intentional communication for *instrumental* purposes, appearing in the last quarter of the first year. It is this latter type of communication which seems to herald the onset of the transition period. At that time infants begin to use communication for the purpose of manipulating others to attain their goals. Prior research has shown that they have begun to perceive the instrumentality of their communicative signals and the necessity to contact another (see Golinkoff, 1981b, for a review; Harding, this volume). The ways in which infants can reformulate and repair their signals and attempt to gain their mother's attention as a prerequisite to communicating are discussed in Golinkoff (this volume).

Despite the apparent achievements of this period, accounts of communicative development dwindle at this point, only to increase once language, in the form of isolated lexical items, appears. However, the way in which the infant's communicative skills expand and grow in complexity and sophistication during this period is not known. Research available on the transition period has focused on lexical development (e.g., Nelson, 1973) and on language comprehension (e.g., Huttenlocher, 1974). Few investigators have attempted to trace the child's communicative achievements within their everyday communicative contexts. The studies available (e.g., Carter, 1979; Dore, 1974; Dore, Franklin, Miller, & Ramer, 1975; Greenfield & Smith, 1976; Halliday, 1975; Lock, 1979; Scollon, 1976), although informative, provide only a partial account of what occurs during the transition period. One of the most well-known of these studies (Halliday, 1975) followed the author's son as the child's range of preverbal communicative functions (analyzed only in his vocal output) expanded. Halliday's emphasis on the differentiation of communicative functions reflected a new conceptual approach to the transition period, although the approach taken in this study has been criticized by Francis (1979).

Golinkoff and Harding (1980) have argued that communication continues to develop in at least two ways during the transition period before language emerges. First, preverbal signals begin to be combined and coordinated. In this way the goal of the infant's signals becomes clearer. Second, communicative episodes increase in length and complexity as the infants' initial failures are

followed by repeated and more varied attempts at communication. Golinkoff (this volume) attempts to capture these developments by studying how infants persevere when their first attempts to establish a particular meaning fail. Research of this nature may provide links to both language onset as well as the child's progress in mastery of the linguistic code. While syntax acquisition may certainly be driven by innate, species-specific constraints, environmental influences on this process should not be underplayed since the child's development of communication skills seems to partly depend on the interactional opportunities the infant experiences with its caregivers. The puzzle of the transition period is two-fold: first, what is the nature of communicative development during this period; and second, how do changes in communicative skill, which occur at this time, relate to the onset and rapidity of language development?

To conclude, the University of Delaware conference and the chapters in this volume are concerned with Problem 4, namely, the transition from the use of prelinguistic to linguistic means of communication. Relative to other periods of communication development this period has not received sufficient attention. Many of the chapters also assess what the field of language development gained from focusing on communication development in the first year of life. Unfortunately it appears that we still do not know what, if any, are the nonverbal communicative achievements that provide the foundation for the transition into language. Thus, Problem 4, understanding the transition period, may be restated as a question: What is the relationship in ontogeny between communication development in the transition period and language development?

Our Fall from Eden and Our Search for Redemption

Researchers in the field of language acquisition are no longer the naive, unknowing individuals we once were. We perceive our naked state in the face of the complexity of the language acquisition process. Simple solutions sought either in the infant's first year of life or during the actual process itself have been cast aside. Since Eden is gone forever, what new directions will the field of language acquisition take? Given that neither author of this chapter has been trained in prophecy, this section will be brief.

First, we predict that there will be more of a theoretical bifurcation between those who study communicative development and those who study language development. Both areas will profit from a clearer demarcation of the uniqueness of language and communication. Nonetheless, researchers in communication development will continue to be enriched by theorizing in linguistics; language researchers will continue to follow research on how linguistic structures are actually deployed. Second, within the field of language acquisition the child will continue to be viewed in a holistic light. Many of the researchers who were present during the seven days of creation would not return to Eden even if given

the choice. They could no longer be content to work on isolated syntactic frames devoid of meaning and considered without regard to their function within the extralinguistic context. Once having bitten of the apple of semantics and pragmatics, they will continue to view the acquisition of the formal aspects of language within a social and cultural frame. Although the metaphor of the infant as the isolated hypothesis tester may no longer be useful, we can now recognize the child's critical role as well as the environment's role in contributing to linguistic growth.

Researchers have sometimes studied the impact of the environment by following cases of language acquisition in disabled or disordered populations. Thus, a third trend we see is a proliferation of such studies for the purpose of clarifying and resolving theoretical arguments about the interaction of the environment and innate programming in language acquisition.

In addition, new developments in linguistic theory will continue to influence research in language acquisition. Specifically, a recent lexical interpretive theory of grammar (Bresnan, 1978) which reduces the need for transformations and deep structure by placing additional knowledge in the lexicon is already inspiring some researchers to propose new models of language acquisition (see Pinker, 1982).

To conclude, it is our hope that future researchers may be inspired, rather than burdened, by the problems and pitfalls we have outlined in this paper. Just as the Bible did not end with the seven days of creation, the field of language acquisition has many chapters (some no doubt based on revelations) yet to be written.

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