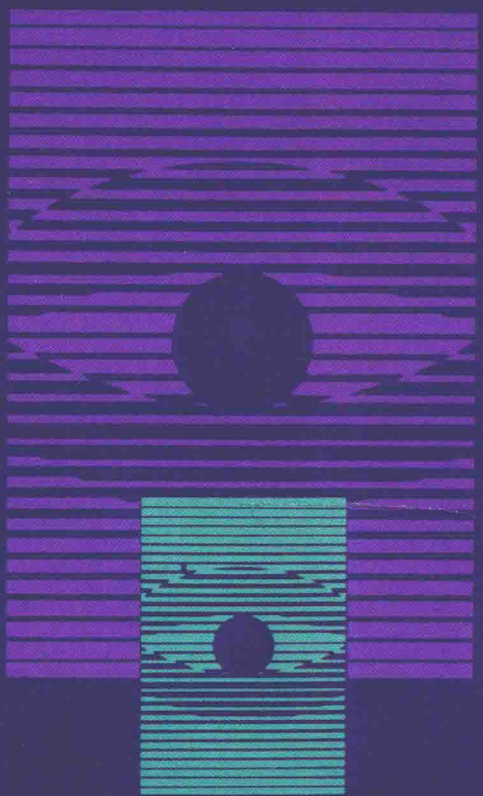
VISION
AND THE EMERGENCE OF MEANING

Blind and sighted children's early language



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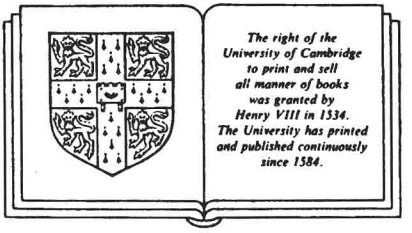

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Preface

One of the ultimate mysteries for anyone who wants to understand the remarkable human capacity for language is to discover how language is acquired by children and how it is integrated with other areas of cognition. This is certainly the central issue in child language research where there are two views that, in their strongest forms, appear irreconcilable. There are those who believe language is a special capacity, separate from other areas of cognition and learning, and there are those who believe language is one part of a larger, more general cognitive system. This study does not unravel the mystery, but in a very important way it is this central question that motivated the study in the first place.

Language is probably related in some interesting ways to conceptual development. It is not a trivial matter that language and other areas of cognition are mutually informative and that discoveries in one domain can lead the child to related discoveries in another domain of intellectual development. This relationship is not unidirectional, but rather it is symbiotic. Very simply, learning terms for, say, time may lead the child to grasp abstract concepts of temporality. Discovering that small items can be contained in larger ones may lead the child to discover words, such as *in*, that encode this idea.

With congenital blindness nature has created children whose representations of the world and paths to understanding the world are necessarily a little different from those of seeing children. This situation provides some intriguing possibilities for exploring the elusive relationship between language and other areas of development. Are there any interesting differences in the kinds of strategies blind children bring to the language learning task? Are there any significant correlations between language and other intellectual achievements? If blindness impacts upon development in one domain of thinking, then are there related effects in language?

Perhaps visual information itself is important in early language. Not all children learn language in precisely the same way and science has yet to delimit the range of individual variation that is possible among children. The ways into language seem to rely heavily on exploiting the non-linguistic context, on the immediate environment, and on utilizing visually based

strategies for gaining and directing attention. They also seem to involve some basic understandings about people, objects and events and how these fit together. Visually based strategies and information certainly seem to facilitate the usual course of language acquisition. How can these be circumvented by children who have no vision? To some extent, the congenitally blind test the flexibility of the kinds of information and strategies required for learning language.

Some years ago, in 1978, my friend and colleague Elaine Andersen and I were pondering these lofty questions when we realized how important it was to examine language development in blind children. At the time blind children's language had been of little interest to linguists. Only in the past few years have researchers turned to this population. That discussion led to a comprehensive longitudinal investigation at the University of Southern California on language development in several blind, partially sighted and sighted children. It was jointly conducted by Elaine Andersen, Linda Kekelis (now at the University of California, Berkeley) and myself. While the study has been very much a collaborative effort, each of us initially focused on a particular aspect of development. Kekelis is especially interested in mother–child interaction, Andersen in sociolinguistic and socio-interactive skills as well as general issues in psycholinguistics, and I in early semantic and pragmatic development. While the data have been gathered, at the time of writing this book various analyses continue.

The present study represents one aspect of this investigation and is based on a doctoral dissertation submitted to the University of Southern California in 1982. The discussions and some of the other material have been revised and expanded since the earlier version to reflect my current thinking about language and vision and thought.

The most important issues are the processes and not the end products of learning language. After all, blind children *do* learn to talk. Yet we are at best only able to speculate about what these processes might be. Here, in this special population, we find a few clues about how language and cognition may converge in development: about some of the non-linguistic information that may aid the child in learning language, about some of the purely linguistic accomplishments that occur despite some seemingly large obstacles placed by blindness and somewhat lagging conceptual and social development, and indeed about some areas where language cannot progress without a supporting conceptual framework.

Acknowledgements

The children and their families made this study possible and it is to them that my first and deepest gratitude goes: to Teddy, Lisa, Julie, Lydia, Brett and Bonnie (the names are pseudonyms). The families were very generous in sharing their children's early years and the triumphs, accomplishments and occasional disappointments. In part as a way of thanking these families, the products of this research not only go to exploring academic issues, but also to finding new ways to aid blind children.

This investigation received financial support from several sources. The analysis and data collection specific to the study of meaning were supported by a grant from the National Science Foundation and by a Morkovan Research Fellowship from the University of Southern California. The larger project on the emergence of communicative competence in blind children, of which this study is one part, was supported by a grant from the Spencer Foundation to Elaine Andersen.

Elaine Andersen and Linda Kekelis are very much a part of this study. Together we visited the families and shared the tedious tasks of transcribing and preparing the data. We also shared the challenges and frustrations of this kind of research and best of all the excitement of discovery. I especially want to thank Elaine who has stimulated my thinking in many ways, first in supervising my doctoral dissertation, then as a colleague and always as a friend.

Over a dozen student research assistants gave many painstaking hours to help prepare transcripts for the larger project. I am especially grateful to Martin Lampert who helped me code the data on semantics and pragmatics and to Marie Taillard who helped with some of the home visits. I would also like to thank the faculty and staff of the Blind Children's Center in Los Angeles where I learned so much.

I am also grateful to several colleagues for their thoughtful comments, and sometimes lively discussions, after reading earlier versions of this material: Lois Bloom, Bernard Comrie, Sue Foster, Alison Gopnik, Patricia Greenfield, Randa Mulford, Ann Peters and Cathy Urwin.

I would like to thank Penny Carter of the Cambridge University Press for her interest in this book, for her help during preparation and for her patience

when completion of the manuscript took a little longer than originally planned.

Finally, infinite thanks to John Hawkins for surrounding me with his keen intellect, lively wit, peaceful nature and gentle spirit.

Symbols

Phonetic symbols (American pronunciation)

Consonants						Vowels			
p^h	pill	t^h	till	k^h	kill	i	beet	ɪ	bit
p	spill	t	still	k	skill	ey	bait	ɛ	bet
b	bill	d	dill	g	gill	u	boot	ʊ	foot
m	mill	n	nil	ŋ	ring	o	boat	ɔ	bought
f	feel	D	rider	h	high	æ	bat	a	pot
v	veal	s	seal	ʔ	bottle	ʌ	but	ə	sofa
θ	thigh	z	zeal	l	leaf	ai	bite	aw	bout
ð	thy	č	chill	r	reef	ɔi	boy		
š	shill	j	Jill	j	you				
ž	azure	ʍ	which	w	witch				

Other symbols

[ ] Material contained within these kinds of brackets is written in the phonetic alphabet

/ To mark the end of an utterance, e.g.: drop the horsie/

≠ Utterance boundary, but no pause, e.g.: We better go ≠ Right now!

‾ Similar to an accent mark but placed above several letters at the end of a word or phrase. Indicates a rising intonation contour, e.g.: drop the horsie/

* Ungrammatical or unacceptable

⊃ Implies

⩾ Used here to mean 'appears before or at the same time as'

> Before or greater than

((SNG)) Sings, or singing (appears in some transcripted material)

((LF)) Laughs, or laughing

((SHT)) Shouts, or shouting

((SW)) Spoken sweetly

((EI)) Exaggerated intonation

((FS)) Fussing or fussily

Main codes used in various analyses

(See indicated chapter and section for definitions)

Semantic case roles and grammatical categories (chapter 5, section 5.3.1)

Agt	Agent
A/S	Action or State
Attr	Attributive
B	Benefactive
Com	Comitative
Conj	Conjunctive
Dat	Dative (Recipient)
Dem	Demonstrative
E	Experiencer
Ent	Entity
FR	Formulaic Request
I	Instrument
L	Locative
N	Negation
O	Object
Poss	Possessor
Possn	Possession
Q	Question
Rec	Recurrence
StSp	Stereotypic Speech

Type of utterance and its discourse status (chapter 6, section 6.3)

B	Babbling
B+	Babbling with Expressive Jargon
BW	Babbling or Jargon with some real words
F-I	Frame Insert
IM	Imitation
IV	Interactive Vocalization
R	Reiteration

RIM	Requested Imitation
SP	Sound Play
SpL	Spontaneous Language
TG	Turn using conventionalized gesture (but not language)

Type of fundamental illocutionary act (chapter 6, section 6.3, and see table 6.1)

Asst	Assertion
Attn G	Attention Getting
Dr Attn	Draw Attention (to something other than self)
I/D	Identification or Description
Id +	Elicited identification or description
N-Resp	Verbal Response of negation
No I F	No Illocutionary Force
Off/Sh	Offer or Show
P/R/R/D	Protest, Refusal, Rejection or Denial
Q	Question
Resp	Response
Rout	Routine
Rq Act	Request for Action or Activity
Rq Obj	Requestion for Object
Rq Rout	Request for Routine
Soc	Social Routine
U I F	Unspecifiable Illocutionary Force (reflects interpretation problems)

Contents

1 Introduction

> If we tried to picture the most precocious child orator, we should think of a blind girl, the only daughter of wealthy parents.
>
> George Miller (1963, p. 157)

This provocative statement culminates a discussion of individual differences in language learning in Miller's pioneering text, which first appeared in 1951, for a fledgeling discipline that was to become known as developmental psycholinguistics. The book was the first to bring together various approaches for studying and analysing children's language and it was to influence several generations of child language researchers. While research techniques and the theories motivating them have changed, the text remains a fascinating historical document, articulating some important underlying assumptions about language learning.

Miller's description of the precocious child orator stems from an examination of factors in a child's environment and background that seem to be related to rapid language development. High family income, being a girl and being an only child have all been correlated, at least in surveys, with slightly facilitating language learning. But what possible advantage might blindness give a child?

In fact, the suggestion is derived from two interacting ideas about language acquisition. The first is what Miller calls "ear–voice reflexes" or the "ear-to-voice link" in infancy. Babbling stimulates a baby acoustically and kinesthetically, thereby encouraging the infant to continue making sounds. Eventually the child imitates sounds spoken by others and begins to learn words. Miller proposes that the blind may develop more rapidly in this area because of their verbal dependence on others. The second factor is an implicit assumption that once a child makes sounds and learns a few words, the course of language development will progress in a predictable and unremarkable way.

This line of reasoning motivated several decades of research into language development in deaf children, but until the late 1970s there was a total lack of interest in how blind children learn language. The neglect reflects the assumption that blindness should have little impact on language. Even more

importantly, it reflects a bias toward isolating language from its social context and conceptual underpinnings. Congenital blindness affects both cognitive and social development (see chapter 2 and Warren, 1985). Examining language acquisition in this population can thus provide a unique opportunity for evaluating whether and how language intersects with other capacities.

Moreover, since the mid 1970s, there has been growing evidence suggesting that vision itself plays an important role in the emergence of communication. An obvious corollary is that the absence of vision may have an impact on the course of language development.

Visual information has been implicated as an explanation for many facets of the process of language acquisition as it normally progresses. It is thought to be important in fostering early parent–infant interaction, in providing the child with a stimulus for hypothesizing about what language encodes, and in supplying the parents with clues about what a young child's early verbalizations mean. Furthermore, vision seems to be crucial in the infant's conceptualization of the environment, on which early language development is thought to depend.

The basis of early interaction between parents and their infants depends on visually based strategies. Stern (1974, 1977) points out that the infant's first exposure to the human world is composed of his mother's activities, especially her repertoire of "infant elicited behaviors." These center on exaggerated facial expressions, accompanied by vocalizations and gazing at the infant. The human neonate has a strong propensity to observe and even imitate these expressions (Meltzoff and Moore, 1977), with the result that they form the core of interactive play. The play episodes themselves are typically initiated by caregivers using a combination of eye gaze and vocalization in which the objective is to obtain mutual orientation in a face-to-face position with the infant (Stern, 1977; Tronick *et al.*, 1979; Kaye, 1979). Once the infant is attending, a play-dialogue ensues until the infant disengages by glancing away. The best predictor of when a mother will respond again to the infant is the moment that the infant's gaze again focuses on her (Brazelton *et al.*, 1974; Stern, 1974; Fogel, 1977). Thus, visual attention on the part of both the caregiver and the infant is crucial in initiating and maintaining early exchanges. These rudimentary exchanges are structured along the same lines as the adult discourse system and they develop very quickly into a communicative framework which increasingly permits linguistic interchanges. Without access to visual information, the structure of these interactions is necessarily disrupted and there seems to be no substitute for their effectiveness in establishing a bond between parents and infants, and in initiating the human infant into the social world from which language emerges (Fraiberg, 1977).

As the child begins to use language, visual information seems to provide an important stimulus for building hypotheses about meaning. For example, in

ascribing meaning to words, the child appears to abstract certain salient attributes from early referents and uses these as a basis for extending the domain of application for words (Bowerman, 1976, 1978; Clark, 1973; Nelson, 1973a; Rescorla, 1980). This process is essential in helping the child move from using a word as a "name" for a specific referent, to using words as symbolic vehicles to denote a heterogeneous class of referents. The overwhelming evidence is that such visually based properties as shape, size, and movement are the most important criteria used in constructing these classifications. Not only is visual information important in the child's organization of referent properties, but it appears to underlie adult categorization and the structure of many lexical fields as well (Andersen, 1978; Clark, 1977b; Rosch, 1975, 1977). Some of the evidence for this comes from the analysis of classifier systems in a variety of natural languages. Classifiers are expressions which group together entities that share some particular attribute. English does not exploit these, though the principle can be seen in the utterance "She bought four *lengths* of material." Some languages classify all varieties of countable objects yielding such sentences as "She has seven *round-things* eggs." Clark's (1977b) analysis of classifier systems reveals that perceptual information, again largely visual, is the primary basis of groupings. The features round, long and flat are especially important. For example, the Indonesian language groups such objects as fruit, peas, eyes, balls, and stones together on the basis of roundness; Nung groups together trees, bamboo, thread, nails, and candles on the basis of length; Kachari groups together leaves, fans, and cloth on the basis of flatness. Even in cultures which do not have classifier systems, these features are important. As the result of a number of experiments conducted in a variety of cultures, Rosch (1973, 1975, 1977) has found that people tend to group objects on the basis of perceptual features, especially the visual perception of shape. Thus, there appears to be a human propensity to exploit perceptual features in constructing sets of objects and in defining lexical classes which operates from infancy on, and visual information seems to be central in this.

Vision is an important basis for concept development in general. During its first year, the infant comes to learn a great deal about the physical environment in which it lives. The Piagetian notion of interaction with the environment as the basis of sensorimotor intelligence specifically involves perception, especially visual attention to objects and events, as well as purely motoric behavior. Moreover, visual information coordinates other schemata (Piaget, 1927, 1951, 1952a, 1952b, 1955; Piaget and Inhelder, 1969). In particular, the infant attends to the movements that entities can perform, identifies the relationships between people and objects, and recognizes and comes to know how things are used. The quantity and quality of the information available without the aid of vision is drastically reduced and it appears that the course of development is hampered for infants who are born

blind (Piaget and Inhelder, 1969). This is significant for the present discussion, since language acquisition seems to depend on the emerging conceptual system and the young child's developmental task involves matching linguistic and cognitive structures (Clark, 1977a; Nelson, 1974; Pylyshyn, 1977). One area where this is particularly evident is in the child's early expression of semantic roles in which such fundamental relations as Agent + Object or Agent + Action are thought to reflect the child's understanding of and experience with his immediate environment.

Perhaps the most frequent explanation for how very young children come to understand and produce language is that they depend on the "here and now," which has been defined as "whatever is directly under the child's eyes" (Clark and Clark, 1977, p. 322). The child learns about the matching of language and world largely through context. A now classic example is Shatz's (1974) analysis of how toddlers successfully respond to such directives as "Can you shut the door?" Basically, the child maps maternal speech onto the objects and actions he sees in the world with the aid of the mother's non-verbal clues. In this instance, the child follows his parent's eye gaze and gesture which are directed toward the door, a strategy which crucially depends on vision. The child's previous observations and explorations equip him with the knowledge that doors can be opened and closed, and the child may pick up the parent's intonation and recognize the utterance as a directive. (Stern and Wasserman, 1979, among others, have presented considerable evidence that infants as young as six months old are sensitive to basic intonational contour, though they do not associate it with grammar until much later.) If the door is open, the child closes it. We do not infer that the toddler understands the grammatical components of his parent's utterance, or the meaning of each word, or how the meanings are combined, but through context, the child comes to solve the puzzle of language. Much of this context, and certainly most of the parent's non-verbal clues, depend on vision for their interpretation. Similarly, the "here and now" provides parents with clues that enable them to interpret their infant's first efforts to communicate. In particular, they rely on eye gaze and the children's conventionalized gestural complex (e.g., pointing, reaching) in order to understand early vocalizations and to distinguish the focus of their child's attention (see Bates *et al.*, 1979; Carter, 1978, 1979; Pechman and Deutsch, 1980; and many others). Without the aid of vision, these clues are lost.

Taken together, the evidence strongly suggests that visual information is crucial in the development of fundamental social, cognitive, and linguistic structures, and it is not surprising that vision has been inferred as an underlying mechanism in the process of language acquisition. But there has been little effort to test this by examining how development progresses when visual information is not available. The motivation for the present