THE CHILD PSYCHOLOGY SERIES

THE STRUCTURE OF COMMUNICATION IN EARLY LANGUAGE DEVELOPMENT

by Patricia Marks Greenfield
and Joshua H. Smith

ACADEMIC PRESS, INC.
A Subsidiary of Harcourt Brace Jovanovich, Publishers

The Structure of Communication in Early Language Development

Patricia Marks Greenfield
University of California
Los Angeles, California

Joshua H. Smith
Stanford University
Stanford, California

ACADEMIC PRESS New York San Francisco London 1976

A Subsidiary of Harcourt Brace Jovanovich, Publishers

ACADEMIC PRESS, INC.
111 Fifth Avenue, New York, New York 10003

United Kingdom Edition published by
ACADEMIC PRESS, INC. (LONDON) LTD.
24/28 Oval Road, London NW1

Library of Congress Cataloging in Publication Data

Greenfield, Patricia Marks.
The structure of communication in early language development.

(Child psychology series)
Bibliography: p.
1. Children–Language. I. Smith, Joshua H., joint author. II. Title. [DNLM: 1. Language development–In infancy and childhood. 2. Verbal behavior–In infancy and childhood. LB1139.L3 G812u]
LB1139.L3G69 372.6 75-32027
ISBN 0–12–300250–8

PRINTED IN THE UNITED STATES OF AMERICA

THE
CHILD
PSYCHOLOGY
SERIES

Smith

The Structure of Communication in Early Language Development

ACADEMIC PRESS

ISBN 0-12-800250-8

The Structure of Communication in Early Language Development

THE CHILD PSYCHOLOGY SERIES

EXPERIMENTAL AND THEORETICAL ANALYSES OF CHILD BEHAVIOR

EDITOR

DAVID S. PALERMO

DEPARTMENT OF PSYCHOLOGY
THE PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY PARK, PENNSYLVANIA

The Perception of Stimulus Relations: Discrimination Learning and Transposition, HAYNE W. REESE, 1968

Cognitive Development: The Child's Acquisition of Diagonality, DAVID R. OLSON, 1970

The Ontogenesis of Grammar: A Theoretical Symposium, DAN I. SLOBIN, 1971

An Ethological Study of Children's Behavior, W. C. MCGREW, 1972

The Child's World of Make-Believe: Experimental Studies of Imaginative Play, JEROME L. SINGER, 1973

The Study of Behavioral Development, JOACHIM F. WOHLWILL, 1973

Studies in the Cognitive Basis of Language Development, HARRY BEILIN, 1975

Infant Perception: From Sensation to Cognition, Volume I, Basic Visual Processes; Volume II, Perception of Space, Speech, and Sound, (Eds.), LESLIE B. COHEN AND PHILIP SALAPATEK, 1975

The Structure of Communication in Early Language Development, PATRICIA MARKS GREENFIELD AND JOSHUA H. SMITH, 1976

To Dot with thanks

Preface

As we come to know more about language in general and language development in particular, it becomes ever clearer that communication and knowledge of the world are intrinsic to the organization of human language. Our study traces the child's emerging grammar from these two points of origin: the child's world of action and perception and the communicative processes in adult interpretation and adult–child dialogue.

In 1967 and 1968, I was struck by the communicative power of my daughter Lauren's single-word utterances. I also noticed developmental change in the range of messages she was able to convey by a single word. Upon closer observation, I concluded that she was achieving this communication by systematically combining her word with nonverbal elements in the situation— action, object, gesture, intonation, and so forth. I also noted that these same messages were later actualized in dialogue, as Lauren used her single words to respond to my comments and questions. I thought, moreover, that other people would recognize the same basic messages, given the same contextual cues. This book is an attempt to convince others of these facts, through systematic investigation of the phenomena that originally caught my attention.

The two children studied were Matthew Greenfield, my second child, and Nicholas Thompson, the first child of Dorothy and Robert Thompson, whose lives were interwined with ours in various ways. When we started, it was very suspect to study anything one knew about from personal experience—one might not be "objective." In the years since, it has been liberating to watch this attitude of distrust and suspicion lift—as students of child language have come to realize that abstracting language from its lived context destroys just what one wished to study in the first place. In part, this book is an attempt to show that scientific method does *not* depend upon studying something one knows and cares nothing about.

Both children were born in 1968. Discussion of my earlier observations of

Lauren with David McNeill, just before Matthew's birth, were influential in my decision to carry out the study. I am very grateful to him, both for his encouragement and for introducing me to Joshua Smith, the co-author of this book. Despite McNeill's important role, our theoretical interpretation of single-word utterances is, nevertheless, quite different from the one he proposed for my original observations of Lauren (McNeill, 1970a, 1971).

Our data were collected in 1969 and 1970. Joshua Smith analyzed a portion of the data for an undergraduate honors thesis in linguistics at Harvard in 1970. This was the first step in the fruitful collaboration that culminated in this book. A first draft of our book manuscript, called *Communication and the Beginnings of Language* by P. M. Greenfield, J. H. Smith, and B. Laufer, was complete in early 1972. It is to this draft that many citations in the literature refer. At that point, a delay occurred, caused by the necessity of retranscribing our tapes. One advantage of the delay has been to allow us some perspective on what amounted to an explosion of interest in this early period of langauge development. Hence, we have been able to discuss a number of studies carried out simultaneously with ours.

A book can hardly capture the rich and subtle means by which word and event interact in early language. When Matthew was 22 months old, the end of the period under study, I had the opportunity to make a sound film with Allegra May, a talented and sensitive film maker. Through the medium of film, it was possible to present Matthew's early messages to eye and ear, as they were intended. This project was an exciting and rewarding collaboration on many levels. After the film was edited, Jerome Bruner joined us to help develop and to present the narration. Partly because it was designed for a nontechnical audience, partly because it represents a compromise between our differing points of view on the material, and partly because it was formulated several years ago, the narration deviates in places from the analytic concepts presented in this book. Nonetheless, *Early Words* (1972), the film that resulted from our collaborative effort, shows how Matthew lived the phenomena that are at the heart of this research.

The plan of our book is basically chronological. Chapter 1 is an historical and theoretical account of the relevant body of knowledge that existed before our study. It is an attempt to show that a semantically based account of grammar provides a point of contact between the early diary studies, which have been ignored for so long, and modern studies of grammatical development. Chapter 2 describes our empirical framework, with its methodological and theoretical rationale, as well as its limitations. Chapter 3 presents the basic data of semantic development in the period under study. (Although the researcher should find the detail of Sections 3.3 through 3.16 useful, other readers may prefer to read only the summaries in Sections 3.3 through 3.16 or even just the overall summary, Section 3.17.) Chapter 4 has three major parts: The first relates semantic

development to cognitive development; the second concentrates on analyzing the role of adult-initiated dialogue in the child's transition to syntax; and the third shows how the principle of informativeness (in the information theory sense) can be used to predict *what* the child says *when*. In this chapter, the ratio of ideas to data is higher than in Chapter 3 and will, we hope, stimulate other researchers to further empirical investigation. Chapter 5, the final chapter, relates our study to work that has been reported since our data were collected. (Because of this chronological organization, Bloom's (1973) book on one-word speech is discussed in Chapter 5, whereas her earlier book is discussed in Chapter 1.) This chapter also discusses linguistic models, and draws some general conclusions.

Because both our subjects happened to be male, we refer to the language learner as "he" throughout this work. For analagous reasons, the adult interacting with the child is always referred to as "she." This, unfortunately, compounds the much more general problem of sexist bias in language. We hope, nevertheless, the reader will keep in mind that children of both sexes learn to speak and that adults of both sexes are capable of teaching them.

We would like to express our thanks to many people who helped at various points along the way: Bernice Laufer, who served as the observer for the formal observations; Alexis Koen, Linda Schantz, Christine Hodson, and Wanda Wong, all of whom played important roles in the data analysis; Edy Veneziano for a number of insightful ideas; Alvin Hall, who gave me careful and detailed comments on our first draft; Susan Braunwald, Patricia Zukow, Elinor Keenan, and Bambi Schieffelin, who read and discussed the manuscript with me; Martha Platt, who carefully prepared the index.

Much of the work was done while I was a Research Fellow at the Center for Cognitive Studies, Harvard University. I profited greatly from discussing the first draft with a group there that included Jerome Bruner, Paul Harris, Susan Carey Block, and Jeremy Anglin. I also received support from the Milton Fund, Harvard University and from a University Research Grant, University of California, Santa Cruz.

Most of all I would like to express my appreciation to Dorothy Thompson, who paid the same careful attention to Nicky's language as I did to Matthew's.

P. M. G.

Contents

chapter 1

Single Words and Grammatical Development: An Historical and Theoretical Perspective

When toward the end of the first year of life, children begin to speak their mother tongue, each utterance consists of but a single word. About 6 months after this modest beginning, they start to produce two-word utterances as well. By the age of 3 or 4 years, children are well on their way to linguistic mastery. A number of studies carried out in the 1960s (Braine, 1963; Brown and Fraser, 1964; Miller and Ervin, 1964; Blount, 1969; Kernan, 1969; Bloom, 1970; Bowerman, 1973) investigated the nature of child language at various ages after the appearance of two-word utterances. In contrast, child language before the appearance of two-word combinations was virtually ignored during this period.

There is ample reason why more effort was not expended on one-word utterances. Later speech is easier to understand because the child's repertoire of sounds, or phonological system, is more adult; it is considerably more accessible, since there is more of it; and fewer assumptions need be made to study it. When a child begins speaking in single words, an investigator will be lucky to obtain more than a handful of examples during several hours of observation. For these single words to yield data of interest, moreover, it is necessary to relate them to the circumstances in which they were uttered. Even though parents have been doing this for years, modern investigators of child language have just begun to do so (Bloom, 1970). A further complication to the study of this early period in the development of language is the fact that little is known about how adults

use contextual information in real life to understand emerging speech. In other words, what are the cues that enable adults to interpret and expand many of the earliest one-word utterances?

Our study was an attempt to rethink and reformulate these "complications," taking them as intrinsic, rather than extrinsic, to linguistic communication, especially language acquisition. We followed two children during this early period of one-word speech and attempted to connect single-word utterances with later grammatical development.

When our project began in 1969, there existed two main lines of relevant research. The more recent line might be called "grammatical studies." These studies applied various tools that had been developed in American structural and transformational linguistics to the analysis of child language in the two-word stage and later. The second, older line of research consists of studies that have touched on one-word speech, often termed "holophrastic speech." These studies show less unity of approach, but they have developed some analytic concepts and a rich body of data that complement the linguistic methods of the grammatical studies.

1.1 Grammatical Studies

PIVOT GRAMMAR

Three independent studies begun in the early 1960s (Braine, 1963; Brown and Fraser, 1964; Miller and Ervin, 1964) form the beginning of the modern grammatical approach to child language. In this approach, children's speech is taken as a language to be discovered, not merely an imperfect replica of adult speech. These studies found child language to have relatively similar properties. Their findings have been unified (McNeill, 1966) and criticized (Bloom, 1970; Bowerman, 1973; Brown 1973)[1] in subsequent reviews of the literature. Here, we will briefly present the unified version of their results and some criticisms of those results, and will proceed to discuss the theoretical bases of their methods.

Pivot and Open Classes

These early studies found that young children's two-word sentences were made up of two types of words, which later came to be called the "pivot" and

[1]These three references report earlier work that was available to us in unpublished form at an early point in our study: Bloom's book is based on a 1968 thesis, Bowerman's on a 1970 thesis. Brown's book is the final comprehensive account of a study begun in 1962; we read a preprint of his chapter on two-word speech in 1970.

"open" classes. A key characteristic of the pivot class is that each member occurs only in a fixed sentence poisition (either initial or final) (Bowerman, 1973, p. 29). In the sentences *allgone shoe, allgone train,* and *allgone record, allgone* functions as an initial pivot. There are also final pivots in some children's speech. In *shoe on, record on,* and *hat on, on* is a final position pivot. Some other characteristics are often ascribed to pivots: There are relatively few pivot words, but they are used frequently; new words are rarely added to the pivot class (McNeill, 1966, p. 20); pivot words occur neither alone nor in combination with other pivot words; pivot words are usually function words, which build on the reference of another word but do not have reference of their own (p. 20). However, the pivot class need not be uniform (Brown, 1973). *Hi, allgone, on, mommy, that,* and *no* are common examples of pivot words (McNeill, 1966, p. 22). The open class is essentially the complement of the pivot class (Bowerman, 1973, p. 34). A specific open-class word can occur both initially and finally; open-class words may occur alone or together with other open-class words, as well as with pivots; new words are easily added to the open class and need not be used frequently. Most of the words in a child's vocabulary belong to this class. These words are content words, like nouns and verbs in adult language.

A child's grammar, at this point, may be described by the rules (McNeill, 1966, pp. 21, 23)

(1) $$S \rightarrow \begin{Bmatrix} P \\ O \end{Bmatrix} \quad O$$

(S = sentence; P = pivot; O = open; → = "consists of"; the brackets { } enclose alternatives.) An extra transformation is needed to move some pivots to final position.

Bowerman (1973, p. 68) has shown that the characteristics just given do not actually define a single class of pivot words in child speech; that is, all pivot words do not really have the same privileges of occurrence. In the data of the original studies, she found words of high frequency and function-word meaning which variously occurred alone (*more*), occurred with other pivots (*do*, in *want do*), and occurred in both initial and final position with open-class words (*that*). She also found words with characteristics of both classes. For example, *truck* had the high frequency and constant position characteristic of the pivot class, but the concrete reference characteristic of the open class. Although one can reassign words to different classes and include some words in both classes to maintain the original form of a pivot grammar, most of the generalizations that it was intended to capture would be lost. With this in mind, let us turn to the original studies and consider what methods led these investigators to those characteristics of child language that were formalized as pivot grammar and caused them to dismiss apparent "exceptions" to the rules of this grammar.

Assumptions Underlying Pivot Grammar

The investigators who first applied grammatical techniques to the study of child language shared a number of assumptions. The most basic among these was the assumption that child language was sufficiently similar to adult language that it could be studied by the same techniques. This assumption led to other assumptions implicit in the techniques of grammatical analysis which these investigators borrowed from American structural linguistics. These techniques, treated in detail by Bloomfield (1933) and Harris (1951), are summarized and discussed by Gleason (1961) and Lyons (1970). It is primarily this second set of assumptions with which we shall be concerned.

Structural linguistics was concerned primarily with methods for the statement of regularities in a particular corpus of material (body of actual speech data) in a language (Harris, 1951, pp. 1–5, 12–13). Harris (1951) and other workers formulated a number of procedures for discovering those regularities without recourse to information about the meaning of the corpus. These methods for discovering grammatical regularities in a sample of an unknown language are often called "discovery procedures." Both these aspects of linguistic methodology were well suited to the study of child language.

First, the notion of grammar as a description of a corpus fitted the position of the investigator who collected samples of child speech and then proceeded to analyze them (cf. Miller and Ervin, 1964). Although children talk all the time, it is difficult to guide their production. To investigate a particular aspect of their language, one must await the right data in the corpus. Collecting a sufficiently large corpus is a substitute for being able to elicit information about specific aspects of a language.

Second, the separation of grammatical description from meaning solved a difficult problem for these investigators. It is often felt that the assignment of meanings to child language causes much to be read in which is not there (Bloom, 1970). Investigators would prefer to exclude the incorrect meanings. It is difficult, however, to specify an objective basis for differentiating valid and invalid semantic interpretations. One way to avoid using invalid interpretations is to disregard meanings altogether. In doing, so, one can claim not to be making any prior assumptions about the nature of child language. This solution to the problem of meaning in child language found theoretical justification in linguistics. Since meanings were peripheral to the study of language (Chomsky, 1957, Ch. 9), it was not apparent that they should be included in studies of child language. The discovery procedures that had been developed in linguistics gave a principled method for analyzing child language while excluding considerations of meaning.

An approach to language based on discovery procedures entailed a number of more specific assumptions. Discovery procedures must be of a relatively