

INFORMATION TO USERS

The most advanced technology has been used to photograph and reproduce this manuscript from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book. These are also available as one exposure on a standard 35mm slide or as a 17" x 23" black and white photographic print for an additional charge.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

U·M·I

University Microfilms International
A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
313/761-4700 800/521-0600

PREVIEW

Order Number 9019588

**Parent behaviors and Piagetian cognitive development of three-
to eleven-year-old rural Nebraska children: Concurrent and
longitudinal analyses**

Tomes, Ruth Elaine, Ph.D.

The University of Nebraska - Lincoln, 1989

U·M·I

300 N. Zeeb Rd.
Ann Arbor, MI 48106

PREVIEW

PARENT BEHAVIORS AND PIAGETIAN COGNITIVE DEVELOPMENT
OF THREE- TO ELEVEN-YEAR-OLD RURAL NEBRASKA CHILDREN:
CONCURRENT AND LONGITUDINAL ANALYSES

by

Ruth E. Tomes

A DISSERTATION

Presented to the Faculty of
The Graduate College in the University of Nebraska
in Partial Fulfillment of Requirements
For the Degree of Doctor of Philosophy

Major: Interdepartmental Area of Psychological and
Cultural Studies

Under the Supervision of Professor
Barbara S. Plake and Toni E. Santmire

Lincoln, Nebraska

December, 1989

PARENT BEHAVIORS AND PIAGETIAN COGNITIVE DEVELOPMENT
OF THREE- TO ELEVEN-YEAR-OLD RURAL NEBRASKA
CHILDREN: CONCURRENT AND LONGITUDINAL ANALYSES

Ruth E. Tomes, Ph.D.

University of Nebraska, 1989

Co-Advisors: Barbara S. Plake and Toni Santmire

Developmental studies pertaining to a relationship between parental behaviors and children's Piagetian cognitive development with infants and young children as subjects suggested that both concurrent and longitudinal cumulative relationships should be investigated over a longer span of childhood. A review of theoretical and empirical literature suggested that both fathers' and mothers' involvement and responsivity were likely to be salient variables in their children's development of Piagetian cognitive structures.

This study investigated the hypothesized concurrent and cumulative parental relationship with children's cognitive development with a statewide, randomly selected sample of three- to eleven-year-old rural Nebraska Children and their parents. Repeated measures were taken annually on subsamples of parents and their children at three, four, and five years; six, seven, and eight years; and nine, ten, and eleven years of age. Cohort controls of the same age tested each year ruled out retest effects. The 16-task Nebraska-Wisconsin Cognitive Assessment Battery administered in the rural homes of the families was used to test

children's Piagetian cognitive functioning. Factor scores from the self-report, paper and pencil Iowa Parent Behavior Inventory were used to measure the fathers' and mothers' behaviors.

Multiple regression analysis results were nonsignificant for concurrent relationships between parental factors and children's cognitive scores at every age level from three through eleven years. The parent factors were significantly more closely associated with cognitive scores of ten-year-olds than of seven-year-olds ($p < .05$). Cognitive scores of nine-year-olds together with the concurrent father involvement, mother involvement, and father responsivity significantly predicted the children's cognitive scores at age eleven ($p < .01$). The cognitive score was the best single predictor. Other statistical tests of cumulative relationships between early and later measures of parent and child variables were nonsignificant.

TITLE

Parent Behaviors and Piagetian Cognitive
Development of Three- to Eleven-Year-Old Rural
Nebraska Children: Concurrent and Longitudinal Analyses

BY

Ruth E. Tomes

APPROVED

DATE

<u>Barbara S. Plake</u>	<u>December 15, 1989</u>
<u>Toni E. Santmire</u>	<u>December 15, 1989</u>
<u>David S. Moshman</u>	<u>December 15, 1989</u>
<u>Roger H. Bruning</u>	<u>December 15, 1989</u>
<u>John C. Woodward</u>	<u>December 15, 1989</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

SUPERVISORY COMMITTEE

GRADUATE COLLEGE

UNIVERSITY OF NEBRASKA

ACKNOWLEDGEMENTS

My profound gratitude is due to Dr. Barbara S. Flake and Dr. Toni Santmire, Chairpersons of my dissertation advisory committee, for their guidance, patience, and continuing support throughout my years as a graduate student. My special thanks also to Dr. Violet Kalyan-Masih for her generous permission to use the data for the present study as well as for the counsel, friendship, and inspiration she has given me over many years. Thanks also to Dr. Roger Bruning, Dr. David Moshman, and Dr. John Woodward, other members of my advisory committee, for opportunities to learn from them.

My loving appreciation is due to my children: Rawley, Jan, Patty, Dan, and Todd who have always supported me as well as my academic endeavors; and to my grandchildren: Joe, Jenny, Brian, Ricky, Katie, and Alex who continually enliven my interest in child development.

My gratitude is also extended to my mother, Mildred Walter, for her incomparable intuitive understanding of human development; and to my brothers and sisters for being there when it mattered.

Acknowledgements are also due to those individuals and institutions whose cooperative efforts in the North Central Regional Research Project: A life Span Analysis of the Mental and Social Development of Rural Children (NC124) made possible the present study:

The Nebraska Agricultural Experiment Station, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, for the generous financial support of the NC124 during 1974-1981.

Dr. V. Kalyan-Masih, University of Nebraska-Lincoln, and Dr. William H. Marshall, University of Wisconsin-Madison for production and use of the Nebraska-Wisconsin Cognitive Assessment Battery.

The following participating scientists in the NC124 project:

Iowa:

Dr. Sam Clark, Leader

Department of Child Development

Iowa State University

Ames, Iowa 50010

Dr. Damaris Pease

Department of Child Development

Iowa State University

Ames, Iowa 50010

Dr. Sedahlia Crase

109 Child Department
Iowa State University
Ames, Iowa 50010

Kansas:

Dr. Robert Poresky, Leader
208 Justin Hall
Family and Child Development
Kansas State University
Manhattan, Kansas 66507

Nebraska:

Dr. Violet Kalyan-Masih, Leader
144 Ruth Staples Child Development Lab
University of Nebraska
Lincoln, Nebraska 68583

Wisconsin:

Dr. William Marshall, Leader
Home Economics Building
University of Wisconsin-Madison
Madison, Wisconsin 53706

Rose Kastl, for contribution to the Nebraska-Wisconsin
Cognitive Assessment Battery manual and assistance in
production of assessment materials.

The Nebraska parents and children who participated as
subjects in the NC124 project.

TABLE OF CONTENTS

Chapter I	Page
Introduction.....	1
Summary.....	9
Chapter II	
Review of Theoretical and Empirical Literature.....	12
Piaget's Theory of Cognitive Development.....	12
Stages of Cognitive Development.....	15
The Sensorimotor Stage.....	15
The Preoperational Stage.....	17
The Stage of Concrete Operations.....	18
The Stage of Formal Operations.....	19
The Development of Operational Structures.....	20
Classification.....	20
Relations.....	21
Conservation and Coordination of Number and Length.	22
Theory of Social Factors in Development.....	23
Piaget on Social Factors in Development.....	27
Santmire on Values Development.....	32
Review of Research Literature.....	39
Overview.....	39
Piagetian Studies.....	41
Infant Studies.....	41
Early Childhood Studies.....	46
Related Studies.....	49
The Present Study.....	78
Definition of Terms.....	80

TABLE OF CONTENTS

Continued

	Page
Research Questions.....	81
Importance of the Present Study.....	82
Chapter III	
Methodology.....	83
Source of Data.....	83
Sampling Procedures.....	83
Description of the Sample.....	86
Instruments.....	91
The Nebraska-Wisconsin Assessment Battery.....	91
Administration and Scoring of the NEWCAB.....	94
NEWCAB Scores.....	99
NEWCAB Reliability and Validity.....	99
The Iowa Parent Behavior Inventory.....	101
Description of the IPBI Factors.....	102
IPBI Factor Scores.....	104
IPBI Reliability.....	104
Data Collection Procedures.....	105
Data Analysis.....	107
Chapter IV	
Results.....	108
Research Question 1.....	108
Research Question 2.....	127
Research Question 3.....	130
Research Question 4.....	130

TABLE OF CONTENTS

Continued

	Page
Summary.....	144
Chapter V	
Summary and Discussion.....	146
Findings and Discussion.....	148
Limitations of the Study.....	157
Future Research.....	157
Summary.....	158
References.....	160
APPENDIX A: Copy of Letter Sent to Parents.....	174
APPENDIX B: Nebraska-Wisconsin Cognitive Assessment Battery Task Descriptions, Reference, and Scoring.....	176
APPENDIX C: Iowa Parent Behavior Inventory: Mother Form Factors, Items, Loadings.....	181
APPENDIX D: Iowa Parent Behavior Inventory: Father Form Factors, Items, Factor Loadings.....	184
APPENDIX E: Iowa Parent Behavior Inventory Score Sheet..	187
APPENDIX F: Means and Standard Deviations on NEWCAB for the Three-Year Longitudinal Sample, Second-Year Control Cohort Sample, and Third-Year Control Cohort Sample.....	189
APPENDIX G: Raw Scores on NEWCAB Tasks and Parent Factors.....	192

LIST OF TABLES

Table	Page
1 The Nebraska Sample for the North Central Regional Research Project: A Life-Span Analysis of Rural Children's Mental and Social Development...	87
2 Distribution of Subject Data by Longitudinal Sample Age Group, Time of Testing, and Age of Children.....	90
3 NEWCAB Tasks by Selection and Age Level.....	94
4 NEWCAB Task Total Scores and Stage Level Score Ranges by Task Domain and Age Level.....	97
5 Means and Standard Deviations of NEWCAB Scores and Parent Factors for Three-Year-Olds.....	109
6 Correlation Matrix for NEWCAB scores and Parent Factors for Three-Year-Olds.....	110
7 Multiple Regression Analysis of Concurrent Parent Factors as Predictors of NEWCAB Scores of Three- Year-Olds.....	110
8 Means and Standard Deviations of NEWCAB Scores and Parent Factors for Four-Year-Olds.....	111
9 Correlation Matrix for NEWCAB scores and Parent Factors for Four-Year-Olds.....	112
10 Multiple Regression Analysis of Concurrent Parent Factors as Predictors of NEWCAB Scores of Four- Year-Olds.....	112
11 Means and Standard Deviations of NEWCAB Scores and Parent Factors for Five-Year-Olds.....	113

LIST OF TABLES

Continued

Table	Page
12 Correlation Matrix for NEWCAB scores and Parent Factors for Five-Year-Olds.....	114
13 Multiple Regression Analysis of Concurrent Parent Factors as Predictors of NEWCAB Scores of Five-Year-Olds.....	114
14 Means and Standard Deviations of NEWCAB Scores and Parent Factors for Six-Year-Olds.....	115
15 Correlation Matrix for NEWCAB scores and Parent Factors for Six-Year-Olds.....	116
16 Multiple Regression Analysis of Concurrent Parent Factors as Predictors of NEWCAB Scores of Six-Year-Olds.....	116
17 Means and Standard Deviations of NEWCAB Scores and Parent Factors for Seven-Year-Olds.....	117
18 Correlation Matrix for NEWCAB scores and Parent Factors for Seven-Year-Olds.....	118
19 Multiple Regression Analysis of Concurrent Parent Factors as Predictors of NEWCAB Scores of seven-Year-Olds.....	118
20 Means and Standard Deviations of NEWCAB Scores and Parent Factors for Eight-Year-Olds.....	119
21 Correlation Matrix for NEWCAB scores and Parent Factors for Eight-Year-Olds.....	120

LIST OF TABLES

Continued

Table	Page
22 Multiple Regression Analysis of Concurrent Parent Factors as Predictors of NEWCAB Scores of Eight-Year-Olds.....	120
23 Means and Standard Deviations of NEWCAB Scores and Parent Factors for Nine-Year-Olds.....	121
24 Correlation Matrix for NEWCAB scores and Parent Factors for Nine-Year-Olds.....	122
25 Multiple Regression Analysis of Concurrent Parent Factors as Predictors of NEWCAB Scores of Nine-Year-Olds.....	122
26 Means and Standard Deviations of NEWCAB Scores and Parent Factors for Ten-Year-Olds.....	123
27 Correlation Matrix for NEWCAB scores and Parent Factors for Ten-Year-Olds.....	124
28 Multiple Regression Analysis of Concurrent Parent Factors as Predictors of NEWCAB Scores of Ten-Year-Olds.....	124
29 Means and Standard Deviations of NEWCAB Scores and Parent Factors for Eleven-Year-Olds.....	125
30 Correlation Matrix for NEWCAB scores and Parent Factors for Eleven-Year-Olds.....	126
31 Multiple Regression Analysis of Concurrent Parent Factors as Predictors of NEWCAB Scores of Eleven-Year-Olds.....	126

LIST OF TABLES

Continued

Table	Page
32 Fisher's Z-transformation Tests of Differences in Magnitude of Correlations for Age Level Pairs.....	127
33 Pearson Correlation Coefficients for First-Year Factors and Scores with Second-Year NEWCAB Scores for Age Group 1.....	131
34 Multiple Regression Analysis of First-Year Parent Factors and NEWCAB Scores as Predictors of Second- Year NEWCAB Scores for Age Group 1.....	132
35 Pearson Correlation Coefficients for First-Year Factors and Scores with Second-Year NEWCAB Scores for Age Group 2.....	132
36 Multiple Regression Analysis of First-Year Parent Factors and NEWCAB Scores as Predictors of Second- Year NEWCAB Scores for Age Group 2.....	133
37 Pearson Correlation Coefficients for First-Year Factors and Scores with Second-Year NEWCAB Scores for Age Group 3.....	134
38 Multiple Regression Analysis of First-Year Parent Factors and NEWCAB Scores as Predictors of Second- Year NEWCAB Scores for Age Group 3.....	135
39 Pearson Correlation Coefficients for First- and Second-Year Factors and Scores with Third-Year NEWCAB Scores for Age Group 1.....	136

LIST OF TABLES

Continued

Table	Page
40 Multiple Regression Analysis of First- and Second-Year Parent Factors and NEWCAB Scores as Predictors of Third-Year NEWCAB Scores for Age Group 1.....	137
41 Pearson Correlation Coefficients for First- and Second-Year Factors and Scores with Third-Year NEWCAB Scores for Age Group 2.....	138
42 Multiple Regression Analysis of First- and Second-Year Parent Factors and NEWCAB Scores as Predictors of Third-Year NEWCAB Scores for Age Group 2.....	139
43 Pearson Correlation Coefficients for First- and Second-Year Factors and Scores with Third-Year NEWCAB Scores for Age Group 3.....	140
44 Multiple Regression Analysis of First- and Second-Year Parent Factors and NEWCAB Scores as Predictors of Third-Year NEWCAB Scores for Age Group 3.....	141
45 Stepwise Regression for Predicting Third-Year NEWCAB Scores from First-Year and Second-Year Parent Factor Scores and Children's NEWCAB Scores for Age Group 1.....	142

CHAPTER I

INTRODUCTION

"Cognitive processes never take place within a social vacuum" (Hinde, Perret-Clermont, & Stevenson-Hinde, 1985, p. 269).

"The constructive process, whatever its precise nature, does not take place in a vacuum" (Kuhn, 1985, p. 157).

"Based on the now widely unquestioned notion that the human organism does not develop in a vacuum, there has regrettably been no empirical effort dedicated solely to the examination of the possibility of a linkage between social factors and Piagetian operational development" (Adjei, 1977, p. 227).

The above comments refer to fact that the legacy of Piaget's theory has not yet been realized. In seeking explanations for cognitive development, no researchers have looked at relations between individual differences in progress through the Piagetian developmental sequence and the proximate social context in which that development occurs although some limited attempts have been made in this regard. The present research is designed to investigate the relations between parental behaviors and children's cognitive development as described within the Piagetian theoretical framework.

"Human intelligence develops in the individual in terms of social interaction--too often disregarded" (Piaget, 1971, p. 224).

Piaget's theory of cognitive development describes the child's construction of knowledge from birth to maturity as proceeding through an invariant sequence of stages. Each new stage is characterized by qualitative changes in the structure of the individual's knowledge. To account for the progression from stage to stage, Piaget proposed four general factors: (1) heredity, internal maturation; (2) physical experience, i.e., action on objects; (3) social interaction and transmission; and (4) equilibration, the internal regulating mechanism of change (Piaget, 1974, pp. 27-29, 148-150).

Fundamental to the theory is Piaget's insistence that cognitive development cannot occur in the absence of interaction with an environment. Such interaction includes experiences with both the physical and social aspects of the environment. Mere exposure to environmental experience is not enough, however. The child must be active. "Children themselves must verify, experiment" (Piaget, 1964, p. 5); and they must be able to do so in a social atmosphere that provides for spontaneous activity and self-correction of errors (p. 5).

It is clear that Piaget considered the social environment in which intelligence develops to be of vital importance to that development. He stated, "The human being is immersed right from birth in a social environment which affects him...even more, in a sense, than the physical

environment" (Piaget, 1947/1955, p. 156). Yet, despite the importance Piaget attributed to the social environment, he did not discuss this factor in his theory beyond stating its importance and brief descriptions sprinkled throughout his writings. He also did not include study of this factor in his massive empirical work. Instead, that effort was directed toward describing the sequence of knowledge construction in numerous domains and delineating the role of equilibration in the knowledge construction process. Piaget's relative neglect of the social factor is explained by the fact that his central questions were concerned with universals in intellectual progress toward the stage of formal operations. Questions of environmental influence on that progress arise when the concern is with individual differences in rate of developmental advance.

The majority of American psychologists who were inspired by Piaget's work focused on the "doctrine of stages" (Kuhn, 1984, p. 142). They invested their research efforts in replications and training studies aimed at confirming or disconfirming the reality of stages while virtually ignoring other aspects of the theory.

On the other hand, numerous cross-cultural studies have investigated the universality of Piaget's theory and the rates of diverse groups of children's progress through the developmental stages in relation to such global social variables as schooling, socioeconomic status, and

urbanization (Dasen, 1972, 1977). The cross-cultural studies have shown that there is great variation from culture to culture in the age at which children attain any particular stage. Further, these studies have shown that achievement of the stage of formal operations is rare in many cultures (Rogoff, Gauvain, & Ellis, 1984). These results suggest that the larger social context has a modifying influence on stage-wise progression, and perhaps, on the terminal level of development (Adjei, 1977).

While the cross-cultural studies support Piaget's statements regarding social influence on development in general, they tell us nothing specific about how the proximate social world of individuals with whom the child interacts may influence his or her rate of development. It is with this proximate social world that the child carries on the exchanges necessary for the construction of knowledge. It is in this sphere that the experiences which are restructured internally via equilibration occur. How the behavior of other individuals with whom the child interacts relates to the child's intellectual progress through the Piagetian stages has been largely uninvestigated. To understand how cognition develops, it seems important to ascertain how that development correlates with these more proximate factors in the child's social world.

The proposed research was designed to investigate the

relationship between particular parental behaviors and children's cognitive development as described within the Piagetian theoretical framework. Any number of individuals with whom children interact in the course of development might conceivably influence their cognitive progress. However, since the parents are usually the earliest and most enduring individuals in the child's social environment, it seemed reasonable to assume that their behaviors, more than any others, would be related to their children's rate of cognitive progress. Further, a large body of literature shows that particular kinds of parental behaviors are related to children's cognitive development as measured by scores on IQ and school achievement tests (e.g., see a recent review by Clarke-Stewart, 1988). There are, as well, a small number of studies which link parental behaviors, usually those of the mother, with differential achievement on tasks derived from Piagetian theory (Ainsworth & Bell, 1970; Ainsworth & Wittig, 1969; Adjei, 1977; Bell, 1970; Gottfried & Gottfried, 1984; Hatano, Miyake, & Tajima, 1980; Hunt, 1986; Kirk, 1977; Wachs, 1984; Wachs, Uzgiris, & Hunt, 1971; and Yarrow, Rubenstein, & Pederson, 1975).

The age range encompassed by Piaget's theory is from birth through adolescence. The four major stages which mark qualitative changes in the structure of thought and their approximate age ranges are: (1) sensorimotor, birth to two years; (2) preoperational, two to seven years; (3) concrete