

**Springer Series in Cognitive Development**

*Series Editor*  
Charles J. Brainerd

# Springer Series in Cognitive Development

*Series Editor: Charles J. Brainerd*

---

Children's Logical and Mathematical Cognition: Progress in Cognitive Development Research

*Charles J. Brainerd (Ed.)*

Verbal Processes in Children: Progress in Cognitive Development Research

*Charles J. Brainerd/Michael Pressley (Eds.)*

Adult Cognition: An Experimental Psychology of Human Aging

*Timothy A. Salthouse*

Recent Advances in Cognitive-Developmental Theory: Progress in Cognitive Development Research

*Charles J. Brainerd (Ed.)*

Learning in Children: Progress in Cognitive Development Research

*Jeffrey Bisanz/Gay L. Bisanz/Robert Kail (Eds.)*

Cognitive Strategy Research: Psychological Foundations

*Michael Pressley/Joel R. Levin (Eds.)*

Cognitive Strategy Research: Educational Applications

*Michael Pressley/Joel R. Levin (Eds.)*

Equilibrium in the Balance: A Study of Psychological Explanation

*Sophie Haroutunian*

Crib Speech and Language Play

*Stan A. Kuczaj, II*

Discourse Development: Progress in Cognitive Development Research

*Stan A. Kuczaj, II (Ed.)*

Cognitive Development in Atypical Children: Progress in Cognitive Development Research

*Linda S. Siegel/Frederick J. Morrison (Eds.)*

Basic Processes in Memory Development: Progress in Cognitive Development Research

*Charles J. Brainerd/Michael Pressley (Eds.)*

# **Cognitive Development in Atypical Children**

## **Progress in Cognitive Development Research**

Edited by  
**Linda S. Siegel and Frederick J. Morrison**



**Springer-Verlag**  
**New York Berlin Heidelberg Tokyo**

**Linda S. Siegel**  
Department of Special Education  
Ontario Institute for  
Studies in Education  
Toronto, Ontario  
Canada M5S 1V6

**Frederick J. Morrison**  
Department of Family Studies  
University of Alberta  
Edmonton, Alberta  
Canada T6G 2E9

*Series Editor*

Charles J. Brainerd  
P-243 Biological Sciences Building  
University of Alberta  
Edmonton, Alberta  
Canada T6G 2E9

With 7 Figures

Library of Congress Cataloging in Publication Data

Main entry under title:

Cognitive development in atypical children.  
(Springer series in cognitive development)

Bibliography: p.

Includes index.

1. Cognition disorders in children. 2. Reading  
disability. 3. Autism. I. Siegel, Linda S.

II. Morrison, Frederick J. III. Series.

RJ506.C63C64 1984 618.92'89 84-13884

© 1985 by Springer-Verlag New York Inc.

Softcover reprint of the hardcover 1st edition 1985

All rights reserved. No part of this book may be translated or reproduced in any form  
without written permission from Springer-Verlag, 175 Fifth Avenue, New York,  
New York 10010, U.S.A.

The use of general descriptive names, trade names, trademarks, etc., in this publication,  
even if the former are not especially identified, is not to be taken as a sign that such  
names, as understood by the Trade Marks and Merchandise Marks Act, may accordingly  
be used freely by anyone.

Typeset by Ms Associates, Champaign, Illinois.

Printed and bound by R. R. Donnelley & Sons Company, Harrisonburg, Virginia.

9 8 7 6 5 4 3 2 1

ISBN-13: 978-1-4612-9534-1

e-ISBN-13: 978-1-4612-5036-4

DOI: 10.1007/978-1-4612-5036-4

## Series Preface

For some time now, the study of cognitive development has been far and away the most active discipline within developmental psychology. Although there would be much disagreement as to the exact proportion of papers published in developmental journals that could be considered cognitive, 50% seems like a conservative estimate. Hence, a series of scholarly books devoted to work in cognitive development is especially appropriate at this time.

The *Springer Series in Cognitive Development* contains two basic types of books, namely, edited collections of original chapters by several authors, and original volumes written by one author or a small group of authors. The flagship for the Springer Series is a serial publication of the “advances” type, carrying the subtitle *Progress in Cognitive Development Research*. Each volume in the *Progress* sequence is strongly thematic, in that it is limited to some well-defined domain of cognitive-developmental research (e.g., logical and mathematical development, development of learning). All *Progress* volumes will be edited collections. Editors of such collections, upon consultation with the Series Editor, may elect to have their books published either as contributions to the *Progress* sequence or as separate volumes. All books written by one author or a small group of authors are being published as separate volumes within the series.

A fairly broad definition of cognitive development is being used in the selection of books for this series. The classic topics of concept development, children’s thinking and reasoning, the development of learning, language development, and memory development will, of course, be included. So, however, will newer areas such as social-cognitive development, educational applications, formal modeling, and philosophical implications of cognitive-developmental theory. Although it is

anticipated that most books in the series will be empirical in orientation, theoretical and philosophical works are also welcome. With books of the latter sort, heterogeneity of theoretical perspective is encouraged, and no attempt will be made to foster some specific theoretical perspective at the expense of others (e.g., Piagetian versus behavioral or behavioral versus information processing).

C. J. Brainerd

## Preface

Children's problems have always occupied an important place in the psychological study of development. In particular, cognitive disorders such as reading disability, autism, language delay, and attention deficit/hyperactive problems have been actively investigated for decades. Nevertheless, until very recently, focus on the cognitive problems of atypical children occupied a peripheral position in mainstream developmental psychology. As such, throughout the 1960s theory and methodology in the more applied domains developed relatively independently of those in basic research. In the mid 1970s, however, significant changes in scientific activity occurred that not only created a resurgence of interest in childhood cognitive pathology but forged a more integrative and comprehensive framework for understanding both normal and atypical development. The present volume in the Springer Series highlights salient examples of this evolving perspective.

Several factors have contributed to the resurgent interest in atypical cognitive growth. First was the "cognitive revolution" that refocused interest on the importance of mental processes in understanding learning and development. Most salient was development of a theoretically and methodologically rigorous tool for studying mental processes, the information-processing framework. The benefit of the "revolution" for more applied areas was twofold: it provided a clear set of testable hypotheses derived from basic theory that could be applied directly to understanding cognitive disorders; in addition, the field of cognitive psychology made available a more rigorous set of methodological tools than heretofore available in applied domains. As a result, major progress has been made in understanding such previously puzzling disorders as reading disability and autism.

Second, as more investigators became interested in atypical children, it became

apparent that the field of cognitive pathology could serve as a fertile testing ground for basic theory in cognitive growth. Hence, psychologists found themselves studying deviations in reading acquisitions in order to understand how normal reading progressed. Other scientists began to focus on dissociations between language and social skills found in some autistic children to help explain the relation between language and social behavior in normal children.

Third, the heightened awareness of basic scientists to the value of studying cognitive disorders catalyzed a broader attempt to bridge the interdisciplinary gaps that had separated experimental from clinical and educational psychology for several decades. It has become clear that cognitive disorders such as reading disability, language delay, and autism provide a substantive focus for the fruitful and natural interchange of developmental scientists working in disparate domains.

These factors, and others, have served to reawaken interest in the atypical child. The present volume illustrates not only the trends witnessed in recent years, but also the progress made in understanding selected cognitive disorders and the implications for a fuller understanding of cognitive development in general.

While still evolving, the study of atypical cognitive development promises to reap important scientific and intellectual benefits in the ensuing years. For example, a more balanced study of cognitive growth can already be discerned. Scientists who formerly were content to limit themselves to laboratory research on basic processes are expanding their focus to include the everyday world of the child and the tasks he or she faces. Moreover, the stultifying disciplinary isolation that plagued experimental psychology for decades has begun to erode as more basic scientists talk to clinicians and educators about children having problems. In reciprocal fashion, basic scientists are radically altering the theories and methods of applied scientists. Continued interaction promises to bring the most recent advances in basic theory and research to bear on understanding cognitive disorders.

As you can discern, the field of atypical development possesses a richness and vitality that constitute the life-blood of progress in science. We hope you will share the sense of excitement and promise we feel in this emerging field. Continued progress in this area will not only benefit the study of atypical children but also will enliven the study of cognitive development.

Linda S. Siegel  
Frederick J. Morrison



# Contents

<b>Chapter 1 Reading Disability: A Deficit in Rule Learning? .....</b>	<b>1</b>
<i>Franklin R. Manis and Frederick J. Morrison</i>	
Word Recognition in Good and Poor Readers .....	2
Sources of Phonological Coding Difficulties: Learning the Spelling-to-Sound Rule System .....	8
Rule Learning in Nonreading Tasks .....	18
Conclusions .....	21
References .....	23
<b>Chapter 2 Information-Processing Approaches to Reading Disability .....</b>	<b>27</b>
<i>George Wolford</i>	
Perceptual Hearing Deficits .....	27
Partial-Information Hypothesis .....	28
Benefits of an Information-Processing Approach .....	33
Some Cautions in Evaluating Reading-Deficit Hypotheses .....	35
Accounting for Other Literature .....	40
Size of Effects .....	41
Conclusion .....	42
References .....	42

<b>Chapter 3 Psycholinguistic Aspects of Reading Disabilities.....</b>	<b>45</b>
<i>Linda S. Siegel</i>	
Definition of Reading Disability .....	45
Linguistic Skills and Reading .....	49
Conclusions .....	60
References .....	61
<b>Chapter 4 Language Comprehension and Cognitive Disorder in Autism .....</b>	<b>67</b>
<i>Catherine Lord</i>	
Studies of Comprehension in Persons with Autism .....	67
Relationship Between Language Comprehension and Other Behaviors .....	70
Theories of Cognitive Dysfunction in Autism.....	71
Overview and Conclusions.....	76
References .....	80
<b>Chapter 5 Cognitive Development in Autistic Children.....</b>	<b>83</b>
<i>Gayle I. Goldstein and David F. Lancy</i>	
Introduction .....	83
A Theoretical Framework for Autism.....	84
Methodological Considerations.....	90
Cognitive Development in Autistic Children .....	93
Final Considerations .....	103
References .....	106
<b>Chapter 6 Temperament and Attention as Components of a Transactional Approach to Development: Implications for Research and Clinical Services for the Atypical Child .....</b>	<b>113</b>
<i>Craig B. Liden, Thomas A. Clingan, and Theresa E. Laurie</i>	
Reductionism: Its Limitations as a Basis for Research and Clinical Approaches to the Atypical Child .....	114
The Transactional Model.....	117
Temperament and Attention: Neurobehavioral Modulators of Learning .....	118
An Integrated Clinical Model of Learning and Behavior .....	127

Summary and Implications.....	134
References .....	137
<b>Chapter 7 Atypical Infant Development: Interacting Neurological and Environmental Factors .....</b>	<b>143</b>
<i>Timothy F. Murphy</i>	
Introduction.....	143
Historical Foundation .....	143
Neurological Integrity.....	146
The Roles of Nature and Nurture .....	164
Conclusion.....	166
References .....	166
<b>Author Index .....</b>	<b>173</b>
<b>Subject Index.....</b>	<b>183</b>

## **Contributors**

**Thomas A. Clingan** Child Development Unit, Children's Hospital of Pittsburgh,  
Pittsburgh, Pennsylvania 15213, U.S.A.

**Gayle I. Goldstein** Department of Psychology, Arizona State University, Tempe,  
Arizona 85281, U.S.A.

**David F. Lancy** Department of Elementary Education, Utah State University,  
Logan, Utah 84322, U.S.A.

**Theresa E. Laurie** Transact Health Systems, Inc., Forbes Regional Health Center,  
Monroeville, Pennsylvania 15146, U.S.A.

**Craig B. Liden** Transact Health Systems, Inc., Forbes Regional Health Center,  
Monroeville, Pennsylvania 15146, U.S.A.

**Catherine Lord** Department of Psychology, Glenrose State Hospital, Edmonton,  
Alberta, Canada T5G 0B7.

**Franklin R. Manis** Department of Psychology, University of Southern California,  
University Park, Los Angeles, California 90007, U.S.A.

**Frederick J. Morrison** Department of Psychology, University of Alberta, Ed-  
monton, Alberta, Canada T6G 2E9.

**Timothy F. Murphy** Child Development Unit, Children's Hospital of Pittsburgh,  
Pittsburgh, Pennsylvania 15213, U.S.A.

**Linda S. Siegel** Department of Special Education, Ontario Institute for Studies  
in Education, Toronto, Ontario, Canada M5S 1V6.

**George Wolford** Department of Psychology, Dartmouth College, Hanover, New  
Hampshire 03755, U.S.A.