



Radu J. Bogdan

MINDING MINDS

Minding Minds

Minding Minds

Radu J. Bogdan

*Evolving a Reflexive Mind
by Interpreting Others*

A Bradford Book
The MIT Press
Cambridge, Massachusetts
London, England

© 2000 Massachusetts Institute of Technology

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, and information storage and retrieval) without permission in writing from the publisher.

This book was set in Times Roman by Wellington Graphics and was printed and bound in the United States of America.

First printing, 2000.

Library of Congress Cataloging-in-Publication Data

Bogdan, Radu J.

Minding minds : evolving a reflexive mind by interpreting others / Radu J. Bogdan.
p. cm.

“A Bradford book.”

Includes bibliographical references and index.

ISBN 0-262-02467-5 (hardcover : alk. paper)

1. Philosophy of mind. 2. Self-knowledge, Theory of. 3. Other minds (Theory of knowledge) 4. Metacognition. I. Title.

BD418.3.B63 2000

128'.2—dc21

99-30174

CIP

We need to conceptualize how the development of a child's own mind is bound up with her increasingly sophisticated awareness of other minds. . . . The very structure and functioning of the mind may alter as a result of new understandings about the mind itself.

Hobson, *Autism and the Development of Mind*

Contents

Preface ix

Introduction 1

- 1 The Theme 1
- 2 Motivation 3
- 3 Lines of Argument 3
- 4 Level of Analysis 4
- 5 Plan 5
- 6 Polemical Side 7

PART I

Socializing the Mind

Chapter 1

Tales of Many Minds 13

- 1 Workers versus Socializers 14
- 2 Kinds of Socialized Minds 22
- 3 Society in Mind 26
- 4 Mind in Society 32

Chapter 2

Minding Others 37

- 1 Interpretation as Mind Designer 37
- 2 Cause to Cause 42
- 3 Thoughtful Partnership 56
- 4 Thinking of Others 59

Chapter 3**Unique Development, Unique Mind 67**

-
- 1 Primate Development 67
 - 2 Sentimental Bonding 72
 - 3 Topical Predication 77

PART II**Minding Itself****Chapter 4****The Reflexive Mind 85**

-
- 1 The Infrastructure 86
 - 2 Scheming to Metamind 92
 - 3 Task Emulation 98

Chapter 5**Situated Minding 103**

-
- 1 Minds That Do and Minds That Don't 103
 - 2 Metaintentionality 105
 - 3 Getting in Touch 114

Chapter 6**Unsituated Metaminding 129**

-
- 1 Two Routes to Attitudes 129
 - 2 Explicit Metathought 137
 - 3 The Turn to Self 144

Chapter 7**Mind Unification 153**

-
- 1 Holding Minds in Mind 153
 - 2 All Together Now 160
 - 3 Afterthoughts 169

Chapter 8**Parting Thoughts 175**

-
- 1 Hints from Autism 175
 - 2 Adding Up 185
 - 3 Subtracting: Outstanding Questions 187

Contents

ix

Notes 191

References 199

Index 213

Preface

This is a book about mental reflexivity or metamentation, which is the ability to think about thoughts. Metamentation may be rightly regarded as the crown jewel of the human mind, underpinning reflexive consciousness, deliberation, moral judgment, self-evaluation, the ability to think ahead by judging hypotheses and possible scenarios, and much more. Aside from various hints and insights found in works on consciousness and propositional attitudes, relatively little in philosophy or psychology has been written specifically about what metamentation actually consists in and even less about how it came about and why. So I decided to take a closer look. But the decision was largely predetermined. Some years ago I became intrigued by commonsense psychology and sensed that much more is at stake than transpired from the philosophical debates around its truth or falsity or mere utility. I thought that the best way to understand commonsense psychology was to explore its evolutionary roots and rationale. Anticipated by a few papers, the result was a book called *Interpreting Minds* (Bogdan 1997). My interest in the subject overlapped in time with a remarkable explosion of psychological and evolutionary research in this area, sampled in that book and to some extent in this one. While working on the earlier book and assimilating the growing interdisciplinary literature, I began to suspect that commonsense psychology or the naive theory of mind, which I prefer to abbreviate as *interpretation*, not only organizes and lubricates the social life of primates but might be essentially involved in the design of their minds.

The present book is the fruit of that suspicion. For some time it has been apparent to some developmental psychologists that interpretation designs several mental abilities, such as understanding word reference, communication, cultural learning, and more. This book adds mental reflexivity to that list. It should thus come as no surprise that my thinking on these matters is heavily indebted to the psychological and evolutionary work on animal and child interpretation and to some of the distinguished workers in these fields

who commented on my work, privately or publicly, or with whom I had the privilege to talk or correspond. No matter how fragmentary or extended, these contacts have been enormously helpful. So it is with great pleasure and gratitude that I thank Sue Leekam, Paul Harris, Josef Perner, Anne-Nelly Perret-Clermont, Danny Povinelli, and Mike Tomasello.

With the same pleasure and gratitude I turn to my philosophical friends and colleagues who shared my interest in the multifaceted story of interpretation and metamentation and took time to hear me out and voice their reactions. In the hope that I do not omit too many, I would like to thank Martin Davies, Dan Dennett, Pascal Engel, Alvin Goldman, Harvey Green, Pierre Jacob, Keith Lehrer, Carolyn Morillo, Norton Nelkin, François Recanati, Dan Sperber, Sorin Vieru, and Ping Tian. Bits and pieces of this essay have been tried out on various audiences, which must be thanked collectively but no less warmly: philosophers gathered in Caen at the 1997 colloquium of the European Society for Analytic Philosophy; members of the philosophy departments at the universities of Bern (Gerhard Seel in particular), Geneva (Kevin Mulligan in particular); Neuchâtel (Daniel Schulthess in particular); the theory-of-mind group at the University of Kent at Canterbury (Sue Leekam in particular); and my regular and faithful audiences for many years, students and colleagues alike, at the University of Bucharest, Tulane University, and the University of New Orleans.

Finally, my heartfelt debts are to those who got directly and substantially involved with this manuscript. As always, Carolyn Morillo read every chapter and verse, left no suspicious-looking stone unturned, voiced skepticism when skepticism was due, and all the while cheered me on. As always, saying “Thanks, Carolyn!” is saying too little. So is saying “Thanks, Dan!” Aside from being a constant and lively inspiration for and discussant of my meta-evolutionary ruminations about the mind, Dan Dennett took a good look at an early version and provided timely observations and suggestions for the next versions, and for that and for his unfailing encouragement I am immensely grateful. Warm thanks also to my former doctoral student and now a college professor in Beijing, Ping Tian, who shared my preoccupations for several years. Her own dissertation (Tian 1996) tackled some of the issues I was thinking about and that was very stimulative, as were her remarks on this text. I am indebted to Eric Schwitzbegel for a much appreciated blend of philosophical and psychological sophistication in detailed and helpful comments and to several anonymous reviewers for their hard work and keen observations, and to one in particular whose call for intuitive props led to Mom and Mim, the real heroes of the second part of this essay.

The MIT Press team once again did a terrific job. A good division of labor between two Amys made the editorial sailing smooth and efficient. Constant in her interest in my work, Dr. Amy Brand encouraged this book project and provided guidance and support during its gestation, as she did during past collaborations. Amy Yeager handled well and cheerfully the interim details of a laborious process. Warmest thanks to you, Amy, and to you, Amy! Thanks also to Alan Thwaites for his fine editing and excellent suggestions.

Catalina minded my mind in more ways than one, and so did her art. One of her works, sampled on the cover, illustrates that, as do my love and deepest gratitude.

Minding Minds

Introduction

1 The Theme

The theme of this essay is rather simple, though its demonstration is not. It is that humans think reflexively or metamentally *because*—and often *in the forms* in which—they interpret each other. In this essay ‘metamental’ means ‘about mental’, and ‘reflexive mind’ means ‘a mind thinking about its own thoughts.’ To think reflexively or metamentally is to think about one’s thoughts deliberately and explicitly, as in my thinking that my current thoughts about metamentation are right. Thinking about thoughts requires understanding thoughts as thoughts, as mental structures that represent; it also requires an ability to relate thoughts to other thoughts and to recognize such interthought relations. Since metamentation is essential to and uniquely distinctive of human minds, the idea that it originates in interpreting other minds can be encapsulated in the slogan that minds are minded because minds mind minds. This word play translates thus: minds evolve into reflexive minds because they mind other minds—where ‘minding other minds’ means interacting and bonding with other minds, being concerned or curious about them, representing their relations to the world, manipulating and using these relations for some purpose, and the like. All of this amounts (in my terminology) to *interpreting* other minds in social contexts of cooperation, communication, education, politics, and so on. It follows that *intermental* relations among individuals, handled by a distinct competence for interpretation, are essential to the evolution of abilities to represent the *intramental* relations among thoughts typical of a reflexive mind.

I take ‘interpretation’ to be a convenient, short, and grammatically flexible label for what is known in philosophy as commonsense or folk psychology and in psychology as theory of mind, mindreading, or naive psychology. Interpreting is a cognitive rapport between an interpreter (she, in this book) and a subject (he), whereby she represents his mind-world relations from the

simplest, such as seeing or wanting, to complex propositional attitudes, such as desiring, believing, or intending, and factors these representations into her goal policies and strategies for action. Interpretation first evolved by natural selection to enable such factoring, thereby promoting the biological interests of the interpreter. So construed, interpretation was naturally selected among primates as a battery of practical skills that precede language and advanced thinking by a long evolutionary shot. In human ontogenesis the grip of natural selection gradually weakens and is replaced by forces of culture, whose grip on the mind may nevertheless be as universal and coercive as that of nature. This means that the emergence of mental reflexivity out of interpretation (and other enabling factors) should be understood as both evolution by natural selection (in early phylogenetic and ontogenetic stages) *and* development under cultural constraints (in later ontogenetic stages).

The idea that metamentation evolved out of interpretation is an exaggeration but not an extravagant one. It is an exaggeration because interpretation is not the sole reason for, and not the sole designer of, metamentation. Language is also a key player, although its mastery owes much to interpretation. It is an exaggeration also because the metamentation indebted to interpretation need not be all the metamentation there is. There are forms of thinking about pictures and sentences that may approximate reflexivity without interpretation, or without much of it, as the case of intelligent autism suggests. More important, the idea that reflexivity evolved out of interpretation is an exaggeration because also involved, crucially, were the abilities to pursue goals by imagining, planning, and solving problems—in short, mental advance work or mental rehearsal. Indeed, I will argue that metamentation begins as *interpretation mentally rehearsed*. Interpretation and mental rehearsal are thus the two pillars on which rests the construction of the primate mind and of its upper metamental floors in particular. A third pillar, equally vital, originates in a mutual physiological regulation between human infants and mothers and soon takes the form of comment-topic protoconversation or topical predication, as I will call it. This is a human development that moves interpretation from its earlier and narrower subject-world focus to a new triangular mind-world-mind pattern of mental sharing in which two individuals (interpreter and subject) share attitudes and information about items of common interest. It is in this pattern of mental sharing that interpretation conspires with mental rehearsal to develop metamentation. Soon after its emergence out of mutual regulation, topical predication is absorbed into communication with and interpretation of others. This is why, for all practical purposes, this third pillar will be counted here as part of interpretation.

Yet the notion that metamentation evolved out of interpretation is not extravagant, because the basic skills needed to think explicitly about or in

terms of other thoughts could not have emerged from any source or cognitive ability other than interpretation and can actually be reliably traced back to it both in primate evolution and child development. The patterns required for metamentation can be found solely in the domain of interpretation and are intelligible only as tasks of interpretation. Along with language, mental rehearsal brings these patterns inside the mind and makes them explicit objects of representation and manipulation. This is what this essay endeavors to demonstrate. The demonstration has a motivation worth making explicit, since it may run counter to prevailing views on the relation between mind and interpretation.

2 Motivation

In an earlier work I developed an evolutionary account of interpretation as a practically motivated adaptation (Bogdan 1997). That work left me with (at least) one puzzle that this essay tries to solve. The puzzle grew out of a familiar but troubling observation, which is that figuring out and explaining what people think and do is what interpretation does well and cognitive science doesn't, at least not yet. Hence the oft-heard proposal that cognitive science should tap the folk wisdom of interpretation for a better understanding of the mind. If the assumption behind this proposal is that interpreters have a tacit, naive but largely true knowledge of mental architectures (programs and functional mechanisms) that cognitive science lacks, then the strategy of tapping folk wisdom is a nonstarter. I argued elsewhere that the naive knowledge interpreters have of minds seems indifferent to and silent about mental architectures (Bogdan 1985, 1991b, 1993, 1994), for good evolutionary reasons (Bogdan 1997). Yet there is something else to tap in interpretation to get a scientific grip on human mentation. It is the decisive role that interpretation played in the evolution of primate minds. It is a historical fact (documented below) that interpretation coevolved with primate mentation, and there is a growing body of theory and evidence indicating that interpretation may have been heavily implicated in the design of many faculties of the primate mind. A study of that coevolution could then guide and enrich the understanding of primate minds. This essay pursues that promissory note in the narrow but crucial area of reflexive thinking. And it does so as follows.

3 Lines of Argument

The demonstration will run along three converging lines. The convergence is crucial because no single line could carry the whole weight of the thesis. One line is *conceptual*. It explores the structural similarity, and at times

isomorphism, between the tasks of interpretation and those of metamentation. To illuminate this conceptual parallel, I distinguish several key metamental tasks and analyze them in terms of categories and schemes required to handle the tasks. These categories and schemes turn out to represent objects of interpretation at different evolutionary stages. Hence the second, *evolutionary* line of argument. Its thrust is that interpretation is the chief model or blueprint for the categories and schemes of reflexive thinking. To make the idea plausible and biologically ground it, I begin with the background hypothesis, enjoying growing though not unchallenged influence, that primate social life was more apt—and more likely than foraging, tool use or other mechanical activities, directed at the physical world—to have fueled and molded the evolution of primate minds. Since primate social life selected for interpretation, more than for anything else, interpretation emerged as the mental activity most effective in the evolution of primate mentation. The phylogenetic and ontogenetic record favors this diagnosis, since it identifies the pressures for interpretive know-how as the strongest during primate childhood and suggests that metamental skills correlate consistently with skills for interpretation.

This brings in the third, *psychological* line of argument. Although drawing on some interspecies comparisons, the psychological story told below is mostly human, mostly developmental, and focused on checking when, how, and why advances in child interpretation precede, link up with, and facilitate, if not cause advances in, metamentation. Besides joining independent sources of evidence, the link between evolution and psychology has a further significance in this essay. The evolutionary debate over the primacy of physical work versus social life in driving primate mentation has a psychological echo in the developmental debate over the primacy of mechanical action (Piaget) versus social interaction (Vygotsky) in the formation of the child's mind. I think the echo is not fortuitous, not because phylogeny would recapitulate ontogeny, but because of a significant correlation (explored in chapter 3) between the unusually long and adult-dependent human childhood and the unique mind that results. This mental uniqueness seems to owe a good deal to the equally unique texture of the social and cultural surround in which human kids grow up and mature their mental faculties.

4 Level of Analysis

These converging lines of analysis will be pitched mostly at the level of the *tasks* executed (what is done) in interpretation and metamentation, and will remain silent about programs and brain mechanisms (how it is done). I often talk of programs or skills but think of them in terms of their tasks, not in terms of the nuts and bolts of their operation. The focal thesis—that metamen-

tation evolved out of the interpretation at work in mental rehearsal—should therefore be understood and judged in terms of tasks: it is the tasks of metamentation, however executed, that emulated those of interpretation. Pitching an evolutionary analysis at the level of tasks may look controversial and risky in the light of the widely shared belief that evolution selects for programs or mechanisms. This is true of the targets of selection but not of the *reasons* for selection. Selection is for *what* programs or mechanisms *do* that results in reproductive fitness, and what they do can be aptly and fruitfully analyzed in terms of tasks. I find a task analysis apt because evolutionary biology is a science of functions, in particular of functions that become adaptations, and adaptations can be fruitfully described in terms of tasks. I also find a task analysis apt because cognitive scientists often discern tasks before figuring out the underlying programs and mechanisms (as happened, for example, in the cases of grammar and vision). I think that the current understanding of interpretation and metamentation is at such a stage.

Another methodological choice needs to be noted. The demonstration attempted by bringing together data and arguments from evolution, development, and conceptual analysis is going to be inductive or rather detective, as it looks for a variety of clues that reveal patterns of interpretive tasks that metamorphosed into forms of metamentation. Although interdisciplinary in scope and indebted to empirical data, the demonstration is largely theoretical and often speculative. Scientists also speculate, often boldly, particularly in fields such as those covered in this book, but their speculations tend to be narrow, constrained leaps from domain-specific data, accepted theories, and other authoritative sources. (So they cite a lot.) My sort of speculation is less domain-specific, more global and integrative, more philosophical, as it looks for patterns and connections often lacking firm and narrow empirical moorings. (So I cite less. Often whole pages may go by without a citation. Sorry about that.) Yet this sort of speculation is worth pursuing and may yield benefits because the current understanding of the reflexive mind, still limited and fragmented, is unlikely to emerge from any single, compartmentalized precinct of cognitive science. The reflexive mind is a hard puzzle, one of the hardest, precisely because it may be the outcome of independent developments somehow strung together by interpretation. The story of this outcome will unfold as follows.

5 Plan

The essay is divided in two parts. The first sketches the evolutionary background of interpretation as stimulus and shaper of metamentation, the second charts key moments of this coevolutionary saga in terms of a comparative task

analysis. Chapter 1 argues that the phylogenetic and ontogenetic routes to metamentation begin in primate social life and the minds adapted to it. Among sundry kinds of socialized minds, only the human mind has the potential to turn reflexive. Why? Because of *how* it socializes. It is mind socialization through internalization of interpersonal relations during childhood. This hypothesis, first proposed by Lev Vygotsky, goes in the right direction but not far enough. This diagnosis sets the stage for chapter 2, where interpretation is found to be the missing link in the Vygotsky's story. Interpretation has solid and far-reaching evolutionary credentials among primates and is systematically implicated in the evolution of primate mentation in general and of thinking in particular. This later implication serves as a launching pad for metamentation, roughly as follows.

Social primates interact by generating and exploiting causal relations among themselves. So they must represent social causation under appropriate categories and schemes. Since interactions among primates are handled by interpretation, primate causal knowledge is represented under interpretive categories and schemes of subject-world relations. Mental rehearsal of social action involves manipulation of causal representations of subject-world relations. These representations are projected imaginatively and often calculated off-line. At some point late in human childhood, when the process is applied to one-self, conditions become ripe for developing categories and schemes for coding and mixing other-world and self-world relations as mental representations. Metamentation is just around the ontogenetic corner.

These developments occur only in the minds of human children and are responsible for the uniqueness of the resulting adult minds. Why? Chapter 3 argues that the answer should be sought in development itself. The human mind is unique because so is its development. Primate development is special in being very slow and adult-dependent, but its human version also involves a unique biophysiological regulation between infant and mother that grounds a give-and-take form of sentimental bonding and communication of emotions and experiences. Such sentimental bonding forms the basis for a truly novel ability, topical predication, which interpretation uses to design communication by shared meaning, language acquisition, and eventually metamentation. Thus concludes the first part of the essay.

The next four chapters chart the developmental progression from sentimental bonding to metamentation in conceptual, evolutionary, and psychological terms. Chapter 4 sets the stage by providing a conceptual profile of metamentation in terms that reveal its evolutionary complicity with interpretation. Metamentation operates through a battery of routines or sequences of tasks. The routines are decomposed into categories and schemes of representation that are objects of interpretation at different stages in the evolution of primate

minds. To simplify, but not by too much, this is to say that the abilities to represent metathoughts, as units of metamentation, evolved out of the abilities to represent triangular mind-world-mind relations, as units of interpretation. The stages of this evolution are surveyed in the subsequent chapters.

Chapter 5 is about situated interpretation and its earliest contributions to the edifice of metamentation. Situated interpretation is perceptually immersed in the here and now and has an interactive version in apes and an intersubjective one in human children. At this stage, the interpretational contributors to metamentation are the grasp of intentionality (or a good portion of it), apparently a primate-wide ability, and sentimental minding by sharing and communicating about emotions and experiences, a unique human specialty. Chapter 6 turns to unsituated interpretation and its contributions to metamentation: the category of propositional attitudes emulated by that of explicit metathought (the atom of metamentation) and the turn to self-interpretation, which discloses one's own attitudes as mind-world relations, on a par with those of others. Chapter 7 examines the ability to hold many minds in mind, by iterating attitude attributions and embedding some in others, and also the abilities to format attitudes in common terms and integrate across domains the information represented in the contents of attitudes. The result is a unified mind that can traffic in explicit representations about whatever interests it—an accomplishment that is new and surprising from an evolutionary standpoint.

Chapter 8 wraps things up. It construes autism as providing overall empirical confirmation for the main thesis: autistic people fail at metamentation because, and possibly to the extent that, they fail at interpretation; even those who master most of the skills of language, formal reasoning, and public representations fail to extend this mastery to the mental representations of others and themselves, and thus fail to become reflexive thinkers. After a look-back review of the argument for that conjecture, the essay concludes with a forward look at a few outstanding questions.

Since these chapters tell a constructive and gradually built story and give relatively little space to critical exegesis of and comparisons with other views, I thought it would help to indicate from the outset how the reader could relate this story to other major positions on the relation of interpretation to metamentation.

6 Polemical Side

Besides its constructive role, the tripartite basis of my story—evolutionary, psychological, and conceptual—also has polemical import. I take my readership to fall into three groups: opponents, fellow travelers, and undecided. I do not expect any group to accept the thesis of this essay as is or be persuaded

by a single line of argument. Since the undecided are likely to decide relative to how opponents are argued out of their positions and how fellow travelers are persuaded to see it my way, it's going to be between the latter two groups.

The opponents must be shown that in primate evolution and particularly child development, alternative routes do not add up to reflexivity either empirically or conceptually. Several such routes can be envisioned. Those steeped in the rationalist tradition may assume that mental reflexivity is an innate gift, perhaps built into the brain architecture and maturing on its own. Even though some basic skills of interpretation seem innate in primates, the late development of metamentation in human childhood, mostly under the impact of language and culture, speaks against this innatist assumption. Followers of Jean Piaget may argue that metamentation develops out of formal abilities for logical and mathematical reasoning, these in turn developing out of sensorimotor schemes for physical action. Here the conceptual line is as effective as the empirical: there is nothing in those formal abilities or the more basic action schemes to serve as models for metamentation.

Language may also look sufficient to afford metamentation: thoughts are encoded linguistically and thus are frozen and stable enough to be subject to mental scrutiny, often by means of further thoughts linguistically encoded. This gambit, necessary to making thoughts explicit (in the ways required by metamentation) and linked to other thoughts, is far from sufficient. As this essay will endeavor to show, thoughts link up reflexively with other thoughts in ways and for reasons that are independent of language and are not exhausted by its rules and constraints, whether semantic or syntactic; topical predication is one such prominent example. Autistic people may handle well large fragments of language yet fail to predicate topically and to metamentate. Also telling is the fact that young children master language years before they metamentate. Finally, it may be thought that metamentation draws solely on abilities to plan or solve problems, but again higher primates and young children may be capable of such exploits without metamentating. Even mental rehearsal with linguistic expressions is not going to be enough; autistic people with reasonable language abilities might be able to mentally rehearse, but again they fail to metamentate normally. The missing link in all these theoretical schemes is intersubjective interpretation.

Ironically, it is the fellow travelers (perhaps the largest group) that may pose a greater challenge. For many of them may think (in a 'What's the big deal?' manner) that the evolution of metamentation out of interpretation is no surprise and no mystery, since, after all, interpreters naively theorize about perceptions, desires or, indeed, thoughts. That is what makes them interpreters. On some accounts, interpreters think about their mental states even before

thinking of those of others. Interpreters, then, would be reflexive thinkers by definition. Yet, there are good reasons to think that interpreters as such are not reflexive thinkers and certainly not by definition. Metamentation is the *joint* product of several developments (interpretation, topical predication, mental rehearsal), so metamentation can't be just interpretation or be derived solely from interpretation. Although interpretation provides the key tasks emulated by metamentation, the emulation is possible only because of these other contributions. It takes a probing look at evolution and development, not a definition or even a theory of interpretation, to prove this point and to show that the journey from interpretation to metamentation is no foregone conclusion. Apes may be credited with some interpretation, but they do not metamentate. Metamentation emerges late in human childhood, even though children have been interpreters, topical predicators, and mental rehearsers for several years.

Even the conceptual story is not as simple and straightforward as it may seem. The fact that interpretation is in general about mind-world relations and, in its intersubjective version, about mind-world-mind relations does not entail that thinkers think about their thoughts in the same ways or that they inherit metamentation from interpretation. The conceptual entailment is surely not visible to those philosophers and psychologists who envision a reflexive access to one's thoughts that is based on internal experiences (introspectionists) or practical-reasoning abilities (simulationists) and does not emulate the interpretation of others. Also important is the historical fact, again revealed only by evolution and development, that initially interpretation was not about *mind*-world, let alone mind-world-mind, relations. Apes and young human children represent only observable *subject*-world relations—such as gazing, seeing or being angry at something—whose mental component is meager and implicit. The mental component grows and becomes more explicit in later childhood when propositional attitudes are mastered, but even the categories of propositional attitudes are far from representing mental states in general, far from representing them reflexively, and far from originating in self-ascription. The turn to self-interpretation is a late development in childhood, and its explanation does not follow from just having the ability to interpret propositional attitudes, as many fellow travellers (and most philosophers) believe. When interpretation turns to self, it opens the way to, and provides a model for, metamentation. Yet even that process is not as obvious, simple, and predetermined as it may seem. There are still many variables needed to bring it to fruition. All in all, then, the fellow traveler may have at least as many reasons as the opponent or the undecided to read on. All are welcome.

References

- Akhtar, N., and Tomasello, M. 1998. Intersubjectivity in Early Language Learning and Use. In S. Braten (ed.), *Intersubjectivity and Emotional Communication*. Cambridge: Cambridge University Press.
- Alexander, R. G. 1990a. *How Did Humans Evolve?* Special Publication no. 1. Museum of Zoology, University of Michigan.
- Alexander, R. D. 1990b. Epigenetic Rules and Darwinian Algorithms. *Ethology and Sociobiology* 11: 241–303.
- Armstrong, D. 1968. *A Materialist Theory of Mind*. New York: Humanities Press.
- Astington, J. W., and Gopnik, A. 1988. Knowing You've Changed Your Mind: Children's Understanding of Representational Change. In J. W. Astington et al. (eds.), *Developing Theories of Mind*. Cambridge: Cambridge University Press.
- Austin, J. L. 1961. *Philosophical Papers*. Oxford: Oxford University Press.
- Baillargeon, R., Kotovsky, L., and Needham, A. 1995. The Acquisition of Physical Knowledge in Infancy. In D. Sperber, D. Premack, and A. Premack (eds.), *Causal Cognition*. Oxford: Oxford University Press.
- Bakeman, R., and Adamson, L. B. 1984. Coordinating Attention to People and Objects in Mother-Infant and Peer-Infant Interaction. *Child Development* 55: 1278–1289.
- Bard, K. A. 1990. "Social Tool Use" by Free-Ranging Orangutans. In S. T. Parker and K. R. Gibson (eds.), *"Language" and Intelligence in Monkeys and Apes*. Cambridge: Cambridge University Press.
- Barkow, J. H., Cosmides, L., and Tooby, J. (eds.). 1992 *The Adapted Mind*. New York: Oxford University Press.
- Baron-Cohen, S. 1991. Precursors to a Theory of Mind: Understanding Attention in Others. In A. Whiten (ed.), *Natural Theories of Mind*. Oxford: Blackwell.
- Baron-Cohen, S. 1995. *Mindblindness*. Cambridge: MIT Press.
- Baron-Cohen, S. 1996. Can Children with Autism Integrate First and Third Person Representations? *Behavioral and Brain Sciences* 19: 123–124.
- Baron-Cohen, S., and Bolton P. 1993. *Autism: The Facts*. Oxford: Oxford University Press.
- Barresi, J., and Moore, C. 1966. Intentional Relations and Social Understanding. *Behavioral and Brain Sciences* 19: 107–122.

- Barton, R. A., and Dunbar, R. I. M. 1997. Evolution of the Social Brain. In A. Whiten and R. W. Byrne (eds.), *Machiavellian Intelligence II*. Cambridge: Cambridge University Press.
- Bartsch, K., and Wellman, H. M. 1995. *Children Talk about the Mind*. Oxford: Oxford University Press.
- Bateson, M. C. 1979. The Epigenesis of Conversational Interaction. In M. Bullowa (ed.), *Before Speech*. Cambridge: Cambridge University Press.
- Beck, B. B. 1980. *Animal Tool Behavior*. New York: Garland.
- Bjorklund, D. F. 1995. *Children's Thinking*. Pacific Grove: Brooks/Cole.
- Block, N. 1995. On a Confusion about a Function of Consciousness. *Behavioral and Brain Sciences* 18: 227–247.
- Bloom, L. 1993. *The Transition from Infancy to Language*. Cambridge: Cambridge University Press.
- Bloom, P. 1997. Intentionality and Word Learning. *Trends in Cognitive Science* 1: 9–12.
- Boesch, C., and Boesch, H. 1984. Mental Map in Wild Chimpanzee. *Primates* 25: 160–170.
- Bogdan, R. J. 1985. The Intentional Stance Reexamined. *Behavioral and Brain Sciences* 8: 759–760.
- Bogdan, R. J. 1987. Mind, Content, and Information. *Synthese* 70: 205–277.
- Bogdan, R. J. 1988. Information and Semantic Cognition. *Mind and Language* 3: 81–122.
- Bogdan, R. J. 1989a. Does Semantics Run the Psyche? *Philosophy and Phenomenological Research* 49: 687–700.
- Bogdan, R. J. 1989b. What Do We Need Concepts For? *Mind and Language* 4: 17–23.
- Bogdan, R. J. (ed.). 1991a. *Mind and Common Sense*. Cambridge: Cambridge University Press.
- Bogdan, R. J. 1991b. Common Sense Naturalized. In R. J. Bogdan (ed.), *Mind and Common Sense*. Cambridge: Cambridge University Press.
- Bogdan, R. J. 1993. The Architectural Nonchalance of Commonsense Psychology. *Mind and Language* 8: 189–205.
- Bogdan, R. J. 1994. *Grounds for Cognition*. Hillsdale, N.J.: Erlbaum.
- Bogdan, R. J. 1995. The Epistemological Illusion. *Behavioral and Brain Sciences* 18: 390–391.
- Bogdan, R. J. 1997. *Interpreting Minds*. Cambridge: MIT Press.
- Bonner, J. T. 1980. *The Evolution of Culture in Animals*. Princeton: Princeton University Press.
- Bowlby, J. 1982. *Attachment*. New York: Basic Books.
- Braitenberg, V. 1984. *Vehicles*. Cambridge: MIT Press.
- Bremner, J. G. 1988. *Infancy*. Oxford: Blackwell.
- Bruner, J. 1983. *Child's Talk*. New York: Norton.

- Bruner, J. 1990. *Acts of Meaning*. Cambridge: Harvard University Press.
- Bruner, J. 1995. From Joint Attention to the Meeting of Minds. In C. Moore and P. J. Dunham (eds.), *Joint Attention*. Hillsdale, N.J.: Erlbaum.
- Bruner, J., and Feldman, C. 1993. Theories of Mind and the Problem of Autism. In Baron-Cohen et al. (eds.), *Understanding Other Minds*. Oxford: Oxford University Press.
- Butterworth, G. 1991. The Ontogeny and Phylogeny of Joint Visual Attention. In A. Whiten (ed.), *Natural Theories of Mind*. Oxford: Blackwell.
- Butterworth, G. 1995. Origins of Mind in Perception and Action. In C. Moore and P. Dunham (eds.), *Joint Attention*. Hillsdale, N.J.: Erlbaum.
- Byrne, R. W. 1995. The Ape Legacy: The Evolution of Machiavellian Intelligence and Anticipatory Interactive Planning. In E. N. Goody (ed.), *Social Intelligence and Interaction*. Cambridge: Cambridge University Press.
- Byrne, R. W. 1997. The Technical Intelligence Hypothesis. In A. Whiten and R. W. Byrne (eds.), *Machiavellian Intelligence II*. Cambridge: Cambridge University Press.
- Byrne, R. W., and Whiten, A. (eds.). 1988. *Machiavellian Intelligence*. Oxford: Oxford University Press.
- Byrne, R. W., and Whiten, A. 1991. Computation and Mindreading in Primate Tactical Deception. In A. Whiten (ed.), *Natural Theories of Mind*. Oxford: Blackwell.
- Calvin, W. H. 1993. The Unitary Hypothesis: A Common Neural Circuitry for Novel Manipulations, Language, Plan-Ahead, and Throwing? In K. Gibson and T. Ingold (eds.), *Tools, Language, and Cognition in Human Evolution*. Cambridge: Cambridge University Press.
- Carey, S. 1985. *Conceptual Change in Childhood*. Cambridge: MIT Press.
- Carrithers, M. 1991. Narrativity: Mindreading and Making Societies. In A. Whiten (ed.), *Natural Theories of Mind*. Oxford: Blackwell.
- Carrithers, M. 1995. Stories in the Social and Mental Life of People. In E. N. Goody (ed.), *Social Intelligence and Interaction*. Cambridge: Cambridge University Press.
- Carruthers, P. 1996. *Language, Thought, and Consciousness*. Cambridge: Cambridge University Press.
- Cartwright, N. 1983. *How the Laws of Physics Lie*. Oxford: Oxford University Press.
- Chandler, M. J. 1988. Doubt and Developing Theories of Mind. In J. W. Astington et al. (eds.), *Developing Theories of Mind*. Cambridge: Cambridge University Press.
- Chandler, M. J., and Hala, S. 1994. The Role of Personal Involvement in the Assessment of Early False Belief Skills. In C. Lewis and P. Mitchell (eds.), *Children's Early Understanding of Mind*. Hillsdale, N.J.: Erlbaum.
- Changeux, J.-P. 1985. *The Neuronal Man*. Oxford: Oxford University Press.
- Cheney, D. L., and Seyfarth, R. M. 1990. *How Monkeys See the World*. Chicago: University of Chicago Press.
- Chisholm, J. S. 1988. Toward a Developmental Evolutionary Ecology of Humans. In K. B. MacDonald (ed.), *Sociobiological Perspectives on Human Development*. New York: Springer-Verlag.

- Clark, A. 1998. Magic Words: How Language Augments Human Computation. In P. Carruthers and J. Boucher (eds.), *Language and Thought: Interdisciplinary Themes*. Cambridge: Cambridge University Press.
- Clark, E., and Clark, H. 1977. *Psychology and Language*. New York: Harcourt Brace.
- Collingwood, R. G. 1940. *An Essay on Metaphysics*. Oxford: Oxford University Press.
- Collins, A. 1987. *The Nature of Mental Things*. Notre Dame, Ind.: University of Notre Dame Press.
- Corkum, V., and Moore, C. 1995. Development of Joint Visual Attention in Infants. In C. Moore and P. J. Dunham (eds.), *Joint Attention*. Hillsdale, N.J.: Erlbaum.
- Cosmides, L., and Tooby, J. 1987. From Evolution to Behavior. In J. Dupré (ed.), *The Latest on the Best*. Cambridge: MIT Press.
- Costal, A. 1989. A Closer Look at "Direct Perception." In A. Gellaly, D. Rogers, and J. A. Sloboda (eds.), *Cognition and Social Worlds*. Oxford: Oxford University Press.
- Cummins, R. 1986. Inexplicit Information. In M. Brand and R. M. Harnish (eds.), *The Representation of Knowledge and Belief*. Tucson: University of Arizona Press.
- Cummins, D., and Allen, C. (eds.). 1998. *The Evolution of Mind*. Oxford: Oxford University Press.
- Currie, G. 1996. Simulation-Theory, Theory-Theory, and the Evidence from Autism. In P. Carruthers and P. K. Smith (eds.), *Theories of Theories of Mind*. Cambridge: Cambridge University Press.
- Damasio, Antonio, 1994. *Descartes' Error*. New York: Avon Books.
- D'Andrade, R. G. 1989. Cultural Cognition. In M. Posner (ed.), *Foundations of Cognitive Science*. Cambridge: MIT Press.
- Davies, M., and Stone, T. (eds.). 1995. *Mental Simulation*. Oxford: Blackwell.
- Dawkins, R. 1976. Hierarchical Organisation. In P. Bateson and J. Krebs, (eds.), *Growing Points in Ethology*. Cambridge: Cambridge University Press.
- Dennett, D. 1978. *Brainstorms*. Montgomery, Vt.: Bradford Books.
- Dennett, D. 1987. *The Intentional Stance*. Cambridge: MIT Press.
- Dennett, D. 1991. *Consciousness Explained*. New York: Simon and Schuster.
- Dennett, D. 1995. *Darwin's Dangerous Idea*. New York: Simon and Schuster.
- Dennett, D. 1996. *Kinds of Minds*. New York: Basic Books.
- De Waal, F. 1982. *Chimpanzee Politics*. Baltimore: Johns Hopkins University Press.
- De Waal, F. 1989. *Peacemaking among Primates*. Cambridge: Harvard University Press.
- Dickinson, A., and Shanks, D. 1995. Instrumental Action and Causal Representation. In D. Sperber, D. Premack, and A. J. Premack (eds.), *Causal Cognition*. Oxford: Oxford University Press.
- Dickstein, S., Thomson, R. A., Estes, D., Malkin, C., and Lamb, M. E. 1984. Social Referencing and the Security of Attachment. *Infant Behavior and Development* 7: 507–516.

- Donald, M. 1991. *Origins of the Modern Mind*. Cambridge: Harvard University Press.
- Dretske, F. 1972. Contrastive Statements. *Philosophical Review* 81: 411–437.
- Dretske, F. 1988. *Explaining Behavior*. Cambridge: MIT Press.
- Dretske, F. 1995. *Naturalizing the Mind*, Cambridge: MIT Press.
- Drew, P. 1995. Interaction Sequences and Anticipatory Interactive Planning. In E. N. Goody (ed.), *Social Intelligence and Interaction*. Cambridge: Cambridge University Press.
- Dunn, J. 1988. *The Beginnings of Social Understanding*. Oxford: Blackwell.
- Dunn, J. 1991. Understanding Others: Evidence from Naturalistic Studies of Children. In A. Whiten (ed.), *Natural Theories of Mind*. Oxford: Blackwell.
- Fernald, A. 1992. Human Maternal Vocalization to Infants as Biologically Relevant Signals. In J. Barkow, L. Cosmides, and J. Tooby (eds.), *The Adapted Mind*. Oxford: Oxford University Press.
- Flavell, J. H. 1988. The Development of Children's Knowledge about the Mind. In J. W. Astington et al. (eds.), *Developing Theories of Mind*. Cambridge: Cambridge University Press.
- Flavell, J. H., Green, F. L., and Flavell, E. R. 1995. *Young Children's Knowledge about Thinking*. Monographs of the Society for Research in Child Development, vol. 60, no. 1. Chicago: Society for Research in Child Development.
- Fodor, J. A. 1983. *Modularity of Mind*. Cambridge: MIT Press.
- Fodor, J. A. 1987. *Psychosemantics*. Cambridge: MIT Press.
- Fodor, J. A. 1992. A Theory of the Child's Theory of Mind. *Cognition* 44: 283–296.
- Forguson, L., and Gopnik, A. 1988. The Ontogeny of Common Sense. In J. W. Astington et al. (eds.), *Developing Theories of Mind*. Cambridge: Cambridge University Press.
- Frith, U. 1989. *Autism*. Oxford: Blackwell.
- Frith, U. 1997. The Neurocognitive Basis of Autism. *Trends in Cognitive Science* 1: 73–77.
- Frye, D., Zelazo, P. D., and Palfai, T. 1995. Theory of Mind and Rule-Based Reasoning. *Cognitive Development* 10: 483–527.
- Gasking, D. 1955. Causation and Recipes. *Mind* 64: 479–487.
- Gibson, K. R. 1993. Tool Use, Language, and Social Behavior in Relationship to Information Processing Capacities. In K. R. Gibson and T. Ingold (eds.), *Tools, Language, and Cognition in Human Evolution*. Cambridge: Cambridge University Press.
- Gibson, K. R., and Ingold, T. (eds.). 1993. *Tools, Language, and Cognition in Human Evolution*. Cambridge: Cambridge University Press.
- Gigerenzer, G. 1997. The Modularity of Social Intelligence. In A. Whiten, and R. W. Byrne (eds.), *Machiavellian Intelligence II*. Cambridge: Cambridge University Press.
- Goldman, A. 1993. The Psychology of Folk Psychology. *Behavioral and Brain Sciences* 16: 15–28.

- Golinkoff, R. 1986. The Preverbal Negotiation of Failed Messages. In R. Golinkoff (ed.), *The Transition from Prelinguistic to Linguistic Communication*. Hillsdale, N.J.: Erlbaum.
- Gomez, J. C. 1990a. Primate Tactical Deception and Sensorimotor Social Intelligence. *Behavioral and Brain Sciences* 13: 414–415.
- Gomez, J. C. 1990b. The Emergence of Intentional Communication as a Problem-Solving Strategy in the Gorilla. In S. T. Parker and K. R. Gibson (eds.), *“Language” and Intelligence in Monkeys and Apes*. Cambridge: Cambridge University Press.
- Gomez, J. C. 1991. Visual Behavior as a Window for Reading the Mind of Others in Primates. In A. Whiten (ed.), *Natural Theories of Mind*. Oxford: Blackwell.
- Gomez, J. C. 1994. Mutual Awareness in Primate Communication: A Gricean Approach. In S. T. Parker et al. (eds.), *Self-Awareness in Animals and Humans*. Cambridge: Cambridge University Press.
- Gomez, J. C. 1996a. Second Person Intentional Relations and the Evolution of Social Understanding. *Behavioral and Brain Sciences* 19: 129–130.
- Gomez, J. C. 1996b. Ostensive Behavior in Great Apes: The Role of Eye Contact. In A. E. Russon et al. (eds.), *Reaching into Thought*. Cambridge: Cambridge University Press.
- Gomez, J. C. 1997. On the Nature and Origins of Meaning: The Humpty-Dumpty Hypothesis. Manuscript.
- Gomez, J. C. 1998a. Do Concepts of Intersubjectivity Apply to Nonhuman Primates? In S. Braten (ed.), *Intersubjective Communication and Emotion in Ontogeny*. Cambridge: Cambridge University Press.
- Gomez, J. C. 1998b. Some Thoughts about the Evolution of LADS. In P. Carruthers and J. Boucher (eds.), *Language and Thought: Interdisciplinary Themes*. Cambridge: Cambridge University Press.
- Gomez, J. C., Sarria, E., and Tamarit, J. 1993. The Comparative Study of Early Communication and Theories of Mind: Ontogeny, Phylogeny, and Pathology. In S. Baron-Cohen et al. (eds.), *Understanding Other Minds*. Oxford: Oxford University Press.
- Goody, E. N. 1995a. Introduction. In E. N. Goody(ed.), *Social Intelligence and Interaction*. Cambridge: Cambridge University Press.
- Goody, E. N. (ed.). 1995b. *Social Intelligence and Interaction*. Cambridge: Cambridge University Press.
- Gopnik, A. 1996. The Scientist as Child. *Philosophy of Science* 63: 485–514.
- Gopnik, A., and Meltzoff, A. N. 1997. *Words, Thoughts, and Theories*. Cambridge: MIT Press.
- Gopnik, A., and Wellman, H. M. 1992. Why the Child’s Theory of Mind Really Is a Theory. *Mind and Language* 7: 145–171.
- Gopnik, A., and Wellman, H. M. 1994. The Theory Theory. In L. A. Hirschfeld and S. A. Gelman (eds.), *Domain Specificity in Cognition and Culture*. Cambridge: Cambridge University Press.

- Gordon, R. M. 1995. Simulation without Introspection or Inference from Me to You. In M. Davies and T. Stone (eds.), *Mental Simulation*. Oxford: Blackwell.
- Greenfield, P. 1991. Language, Tools, and Brain: The Ontogeny and Phylogeny of Hierarchically Organized Behavior. *Behavioral and Brain Sciences* 14: 531–551.
- Happé, F. 1994. Communicative Competence and Theory of Mind in Autism. *Cognition* 48: 101–119.
- Happé, F., and Frith, U. 1992. How Autistics See the World. *Behavioral and Brain Sciences* 15: 159–160.
- Harcourt, A. H. 1988. Alliances in Contests and Social Intelligence. In J. W. Byrne and A. Whiten (eds.), *Machiavellian Intelligence*. Oxford: Oxford University Press.
- Harris, P. 1989. *Children and Emotion*. Oxford: Blackwell.
- Harris, P. 1991. The Work of Imagination. In A. Whiten (ed.), *Natural Theories of Mind*. Oxford: Blackwell.
- Harris, P. 1993. Pretending and Planning. In S. Baron-Cohen, S. Tager-Flusberg, and D. Cohen (eds.), *Understanding Other Minds*. Oxford: Oxford University Press.
- Harris, P. 1994. Understanding Pretence. In C. Lewis and P. Mitchell (eds.), *Children's Early Understanding of Mind*. Hillsdale, N.J.: Erlbaum.
- Harris, P. 1996. Desires, Beliefs, and Language. In P. Carruthers and P. K. Smith (eds.), *Theories of Theories of Mind*. Cambridge: Cambridge University Press.
- Heyes, C. M. 1998. Theory of Mind in Nonhuman Primates. *Behavioral and Brain Sciences* 21: 101–114.
- Hickman, M. 1987. The Pragmatics of Reference in Child Language. In M. Hickman (ed.), *Social and Functional Approaches to Language and Thought*. New York: Academic Press.
- Hirschfeld, L. A., and Gelman, S. A. (eds.). 1994. *Domain Specificity in Cognition and Culture*. Cambridge: Cambridge University Press.
- Hobson, P. 1993a. Understanding Persons: The Role of Affect. In S. Baron-Cohen et al. (eds.), *Understanding Other Minds*. Oxford: Oxford University Press.
- Hobson, R. P. 1993b. *Autism and the Development of Mind*. Hillsdale, N.J.: Erlbaum.
- Hobson, R. P. 1994. Perceiving Attitudes, Conceiving Minds. In C. Lewis and P. Mitchell (eds.), *Children's Early Understanding of Mind*. Hillsdale, N.J.: Erlbaum.
- Hofer, M. A. 1987. Early Social Relationships: A Psychobiologist's View. *Child Development* 58: 633–647.
- Howes, C., and Matheson, C. C. 1992. Sequences in the Development of Competent Play with Peers. *Developmental Psychology* 28: 961–974.
- Hume, D., 1756. *A Treatise of Human Nature*. Edited by L. A. Leiby-Bigge. Oxford: Oxford University Press, 1888.
- Humphrey, N. K. 1986. *The Inner Eye*. London: Faber and Faber.
- Humphrey, N. K. 1988. The Social Function of the Intellect. In R. W. Byrne and A. Whiten (eds.), *Machiavellian Intelligence*. Oxford: Oxford University Press. Originally published in 1976.

- Ingold, T. 1996. Social Relations, Human Ecology, and the Evolution of Culture. In A. Lock and C. Peters (eds.), *Handbook of Human Symbolic Evolution*. Oxford: Oxford University Press.
- Janicki, M. G., and Krebs, D. L. 1998. Evolutionary Approaches to Culture. In C. Crawford and D. L. Krebs (eds.), *Handbook of Evolutionary Psychology*. Mahwah, N.J.: Erlbaum.
- Jolly, A. 1988. Lemur Social Behavior and Primate Intelligence. In R. W. Byrne and A. Whiten (eds.), *Machiavellian Intelligence*. Oxford: Oxford University Press. Originally published in 1966.
- Karmiloff-Smith, A. 1992. *Beyond Modularity*. Cambridge: MIT Press.
- Kummer, H. 1988. Tripartite Relations in Hamadryas Baboons. In R. W. Byrne and A. Whiten (eds.), *Machiavellian Intelligence*. Oxford: Oxford University Press. Originally published in 1967.
- Kummer, H. 1995. Causal Knowledge in Animals. In D. Sperber, D. Premack, and A. J. Premack (eds.), *Causal Cognition*. Oxford: Oxford University Press.
- LeDoux, J. 1996. *The Emotional Brain*. New York: Simon and Schuster.
- Lehrer, K. 1997. *Self-Trust*. Oxford: Oxford University Press.
- Leondar, B. 1977. Hatching Plots: Genesis of Storymaking. In D. Perkins and B. Leondar (eds.), *The Arts and Cognition*. Baltimore: Johns Hopkins University Press.
- Leslie, A. M. 1988. Some Implications of Pretense for Mechanisms Underlying the Child's Theory of Mind. In J. W. Astington et al. (eds.), *Developing Theories of Mind*. Cambridge: Cambridge University Press.
- Leslie, A. M. 1991. The Theory of Mind Impairment in Autism. In A. Whiten (ed.), *Natural Theories of Mind*. Oxford: Blackwell.
- Leslie, A. M. 1994. ToMM, ToBy, and Agency. In L. Hirschfeld and S. A. Gelman (eds.), *Mapping the Mind*. Cambridge: Cambridge University Press.
- Leslie, A. M. 1995. A Theory of Agency. In D. Sperber, D. Premack, and A. Premack (eds.), *Causal Cognition*. Oxford: Oxford University Press.
- Leslie, A. M., and Roth, D. 1993. What Autism Teaches Us about Metarepresentation. In S. Baron-Cohen et al. (eds.), *Understanding Other Minds*. Oxford: Oxford University Press.
- Levinson, S. 1995. Interactional Biases in Human Thinking. In E. N. Goody (ed.), *Social Intelligence and Interaction*. Cambridge: Cambridge University Press.
- Lewis, C. 1994. Episodes, Events, and Narratives in the Child's Understanding of Mind. In C. Lewis and P. Mitchell (eds.), *Origins of an Understanding of Mind*. Hillsdale, N.J.: Erlbaum.
- Lewis, D. 1969. *Convention*. Cambridge: Harvard University Press.
- Lewis, D. 1972. Psychophysical and Theoretical Identifications. *Australian Journal of Philosophy* 50: 249–258.
- Lloyd, D. 1989. *Simple Minds*. Cambridge: MIT Press.
- Loar, B. 1981. *Mind and Meaning*. Cambridge: Cambridge University Press.
- Lock, A. 1980. *The Guided Reinvention of Language*. New York: Academic Press.

- Lock, A., and Peters, C. (eds.). 1996. *Handbook of Human Symbolic Evolution*. Oxford: Oxford University Press.
- Low, B. S. 1998. The Evolution of Human Life Histories. In C. Crawford and D. L. Krebs (eds.), *Handbook of Evolutionary Psychology*. Mahwah, N.J.: Erlbaum.
- Lunzer, E. A. 1979. The Development of Consciousness. In G. Underwood and R. Stevens (eds.), *Aspects of Consciousness*. New York: Academic Press.
- Luria, A. R. 1979. *The Making of Mind*. Cambridge: Harvard University Press.
- Mandler, J. 1988. How to Build a Better Baby. *Cognitive Development* 3: 113–136.
- McGinn, C. 1982. The Structure of Content. In A. Woodfield (ed.), *Thought and Object*. Oxford: Oxford University Press.
- McGrew, W. C. 1993. The Intelligent Use of Tools. In K. R. Gibson and T. Ingold (eds.), *Tools, Language, and Cognition in Human Evolution*. Cambridge: Cambridge University Press.
- Mead, G. H. 1934. *Mind, Self, and Society*. Chicago: University of Chicago Press.
- Mead, G. H. 1963. *Selected Writings*. Edited by Andrew J. Reck. Indianapolis: Bobbs-Merrill.
- Mellor, D. H. 1978. Conscious Belief. *Proceedings of the Aristotelian Society* 78: 87–101.
- Meltzoff, A., and Gopnik, A. 1993. The Role of Imitation in Understanding Persons and Developing a Theory of Mind. In S. Baron-Cohen et al. (eds.), *Understanding Other Minds*. Oxford: Oxford University Press.
- Messer, D., and Collis, G. 1996. Early Interaction and Cognitive Skills. In A. Lock and C. Peters (eds.), *Handbook of Human Symbolic Evolution*. Oxford: Oxford University Press.
- Mitchell, P. 1994. Realism and Early Conception of Mind. In C. Lewis and P. Mitchell (eds.), *Origins of an Understanding of Mind*. Hillsdale, N.J.: Erlbaum.
- Mithen, S. 1996. *The Prehistory of the Mind*. London: Thames and Hudson.
- Moore, C., and Dunham, P. J. (eds.). 1995. *Joint Attention*. Hillsdale, N.J.: Erlbaum.
- Morillo, C. 1995. *Contingent Creatures*. Lanham: Rowman and Littlefield.
- Mundy, P., Sigman, M., and Kasari, C. 1993. The Theory of Mind and Joint-Attention Deficits. In S. Baron-Cohen et al. (eds.), *Understanding Other Minds*. Oxford: Oxford University Press.
- Nelkin, N. 1995. *Consciousness and the Origins of Thought*. Cambridge: Cambridge University Press.
- Nelson, K. 1996. *Language in Cognitive Development*. Cambridge: Cambridge University Press.
- Newell, A., Rosenbloom, P. S., and Laird, J. E. 1989. Symbolic Architectures for Cognition. In M. Posner (ed.), *Foundations of Cognitive Science*. Cambridge: MIT Press.
- Ninio, A., and Snow, C. E. 1996. *Pragmatic Development*. Boulder: Westview Press.

- Olson, D. 1988. On the Origins of Beliefs and Other Intentional States in Children. In J. W. Astington et al. (eds.), *Developing Theories of Mind*. Cambridge: Cambridge University Press.
- Ozonoff, S., Pennington, S. J., and Rogers, S. J. 1991. Executive Function Deficits in High-Functioning Autistic Individuals. *Journal of Child Psychology and Psychiatry* 32: 1081–1106.
- Papprote, W., and Sinha, C. 1987. Functionalism and Language Development. In M. Hickman (ed.), *Social and Functional Approaches to Language and Thought*. New York: Academic Press.
- Parker, S. T., and Gibson, K. R. 1979. A Developmental Model for the Evolution of Language and Intelligence in Early Hominids. *Behavioral and Brain Sciences* 2: 367–408.
- Parker, S. T., and Milbrath, C. 1993. Higher Intelligence, Propositional Language, and Culture as Adaptations for Planning. In K. R. Gibson and T. Ingold (eds.), *Tools, Language, and Cognition in Human Evolution*. Cambridge: Cambridge University Press.
- Perner, J. 1991. *Understanding the Representational Mind*. Cambridge: MIT Press.
- Perner, J., and Lang, B. 1999. Theory of Mind and Executive Function: Is There a Developmental Relationship? In S. Baron-Cohen, S. Tager-Flusberg, and D. Cohen (eds.), *Understanding Other Minds*, 2nd edition. Oxford: Oxford University Press.
- Piaget, J. 1936. *La naissance de l'intelligence chez l'enfant*. Neuchâtel: Delachaux et Niestlée.
- Piaget, J. 1960. *The Psychology of Intelligence*. Totowa: Littlefield.
- Piaget, J. 1964. *Six études de psychologie*. Geneve: Editions Gonthier.
- Piaget, J. 1967. Les données génétiques de l'épistémologie physique. In J. Piaget (ed.), *Logique et connaissance scientifique*, Encyclopédie de la pléiade. Paris: Gallimard.
- Piaget, J. 1974. *Understanding Causality*. New York: Norton.
- Pipp, S. 1993. Infants' Knowledge of Self, Other, and Relationship. In U. Neisser (ed.), *The Perceived Self*. Cambridge: Cambridge University Press.
- Poulin-Dubois, D., and Shultz, T. 1988. The Development of the Understanding of Human Behavior. In J. W. Astington et al. (eds.), *Developing Theories of Mind*. Cambridge: Cambridge University Press.
- Povinelli, D. J. 1996. Chimpanzee Theory of Mind? In P. Carruthers and P. K. Smith (eds.), *Theories of Theories of Mind*. Cambridge: Cambridge University Press.
- Povinelli, D. J., and Eddy, T. J. 1996. *What Young Chimpanzees Know about Seeing*. Monographs of the Society for Research in Child Development, vol. 61, no. 3. Chicago: University of Chicago Press.
- Premack, D. 1988. 'Does the Chimpanzee Have a Theory of Mind?' Revisited. In R. W. Byrne and A. Whiten (eds.), *Machiavellian Intelligence*. Oxford: Oxford University Press.
- Premack, D. 1990. Do Infants Have a Theory of Self-Propelled Objects? *Cognition* 36: 1–16.

- Premack, D., and Premack A. 1995. Intention as Psychological Cause. In D. Sperber, D. Premack, and A. Premack (eds.), *Causal Cognition*. Oxford: Oxford University Press.
- Pylyshyn, Z. 1978. When Is Attribution of Belief Justified? *Behavioral and Brain Sciences* 4: 592–593.
- Pylyshyn, Z. 1984. *Computation and Cognition*. Cambridge: MIT Press.
- Pylyshyn, Z. 1989. Computing in Cognitive Science. In M. Posner (ed.), *Foundations of Cognitive Science*. Cambridge: MIT Press.
- Quiatt, D., and Reynolds, V. 1993. *Primate Behavior*. Cambridge: Cambridge University Press.
- Reiss, D., McCowan, B., and Marino, L. 1997. Communicative and Other Cognitive Characteristics of Bottlenose Dolphins. *Trends in Cognitive Science* 1: 140–145.
- Reynolds, P. C. 1993. The Complementation Theory of Language and Tool Use. In K. R. Gibson and T. Ingold (eds.), *Tools, Language, and Cognition in Human Evolution*. Cambridge: Cambridge University Press.
- Rogoff, B. 1990. *Apprenticeship in Thinking*. Oxford: Oxford University Press.
- Rosenthal, D. 1986. Two Concepts of Consciousness. *Philosophical Studies* 94: 329–359.
- Rosenthal, D. 1993. Thinking That One Thinks. In M. Davies and G. W. Humphreys (eds.), *Consciousness*. Oxford: Blackwell.
- Rozin, P. 1976. The Evolution of Intelligence and Access to the Cognitive Unconscious. In J. M. Sprague and A. N. Epstein (eds.), *Progress in Psychobiology and Physiological Psychology*. New York: Academic Press.
- Rumbaugh, D. M., and Savage-Rumbaugh, E. S. 1996. Biobehavioral Roots of Language. In B. M. Velichovsky and D. M. Rumbaugh (eds.), *Communicating Meaning*. Mahwah, N.J.: Erlbaum.
- Russell, J. 1996. *Agency: Its Role in Mental Development*. Hove: Erlbaum (UK) Taylor and Francis.
- Russell, J. (ed.). 1997. *Autism as an Executive Disorder*. Oxford: Oxford University Press.
- Sacks, O. 1994. A Neurologist's Notebook: An Anthropologist on Mars. *The New Yorker*, Dec. 27, 1993–Jan. 3, 1994.
- Savage-Rumbaugh, E. S. 1986. *Ape Language*. New York: Columbia University Press.
- Savage-Rumbaugh, E. S., and Lewin, R. 1994. *Kanzi*. New York: Wiley.
- Sellars, W. 1963. *Science, Perception, and Reality*. New York: Humanities Press.
- Siegler, R. S. 1991. *Children's Thinking*. Englewood Cliffs: Prentice-Hall.
- Simon, H., and Kaplan, C. A. 1989. Foundations of Cognitive Science. In M. Posner (ed.), *Foundations of Cognitive Science*. Cambridge: MIT Press.
- Sinha, C. 1996. The Role of Ontogenesis in Human Evolution and Development. In A. Lock and C. Peters (eds.), *Handbook of Human Symbolic Evolution*. Oxford: Oxford University Press.

- Slobin, D. 1990. The Development from Child Speaker to Native Speaker. In J. W. Stigler, R. A. Schwede, and G. Herdt (eds.), *Cultural Psychology*. Cambridge: Cambridge University Press.
- Sorce, J. F., Emde, R. N., Campos, J., and Klinnert, M. D. 1985. Maternal Emotional Signalling. *Developmental Psychology* 21: 195–200.
- Sperber, D. 1994. The Modularity of Thought and the Epidemiology of Representations. In L. A. Hirschfeld and S. A. Gelman (eds.), *Domain Specificity in Cognition and Culture*. Cambridge: Cambridge University Press.
- Sperber, D. 1997. Intuitive and Reflective Beliefs. *Mind and Language* 12: 67–83.
- Sperber, D., and Wilson, D. 1986. *Relevance*. Cambridge: Harvard University Press.
- Stich, S. 1983. *From Folk Psychology to Cognitive Science*. Cambridge: MIT Press.
- Stich, S., and Nichols, S. 1993. Second Thoughts on Simulation. In M. Davies and T. Stone (eds.), *Mental Simulation*. Oxford: Blackwell.
- Swettenham, J., Gomez, J. C., Baron-Cohen, S., and Walsh, S. 1996. What's Inside Someone's Head? *Cognitive Neuropsychiatry* 1: 73–88.
- Tager-Flusberg, H. 1993. What Language Reveals about the Understanding of Minds in Children with Autism. In S. Baron-Cohen, S. Tager-Flusberg, and D. Cohen (eds.), *Understanding Other Minds*. Oxford: Oxford University Press.
- Tian, P. 1996. The Modularity of Thinking and the Problem of Domain Inspecificity. Ph.D. thesis, Tulane University.
- Tomasello, M. 1993. On the Interpersonal Origins of Self-Concept. In U. Neisser (ed.), *The Perceived Self*. Cambridge: Cambridge University Press.
- Tomasello, M. 1995. Joint Attention as Social Cognition. In C. Moore and P. J. Dunham (eds.), *Joint Attention*. Hillsdale, N.J.: Erlbaum.
- Tomasello, M. 1996. The Cultural Roots of Language. In B. M. Velichovsky and D. M. Rumbaugh (eds.), *Communicating Meaning*. Mahwah, N.J.: Erlbaum.
- Tomasello, M. 1998. Uniquely Primate, Uniquely Human. *Developmental Science*.
- Tomasello, M., and Call, J. 1997. *Primate Cognition*. New York: Oxford University Press.
- Tomasello, M., Kruger, A. C., and Ratner, H. H. 1993. Cultural Learning. *Behavioral and Brain Sciences* 16: 495–511.
- Tooby, J., and Cosmides, L. 1990. The Past Explains the Present. *Ethology and Sociobiology* 11: 375–424.
- Tooby, J., and Cosmides, L. 1992. The Psychological Foundations of Culture. In J. Barkow, L. Cosmides, and J. Tooby (eds.), *The Adapted Mind*. New York: Oxford University Press.
- Trevarthen, C. 1979. Communication and Cooperation in Early Infancy. In M. Bullowa (ed.), *Before Speech*. Cambridge: Cambridge University Press.
- Trevarthen, C. 1993. The Self Born in Intersubjectivity. In U. Neisser (ed.), *The Perceived Self*. Cambridge: Cambridge University Press.

- Trevarthen, C., and Logotheti, K. 1989. Child and Culture: Genesis of Cooperative Knowing. In A. Gellatly, D. Rogers, and J. A. Sloboda (eds.), *Cognition and Social Worlds*. Oxford: Oxford University Press.
- Trivers, R. 1985. *Social Evolution*. Menlo Park: Benjamin Cummings.
- Van der Veer, R., and Valsiner, J., (eds.). 1994. *The Vygotsky Reader*. Oxford: Blackwell.
- Vauclair, J. 1984. Phylogenetic Approach to Object Manipulation in Human and Ape Infants. *Human Development* 27: 321–328.
- Vauclair, J. 1996. *Animal Cognition*. Cambridge: Harvard University Press.
- Vygotsky, L. S. 1981a. The Genesis of Higher Mental Functions. In J. V. Wertsch (ed.), *The Concept of Activity in Soviet Psychology*. Armonk: M. E. Sharpe. Originally but posthumously published in Russian, 1960.
- Vygotsky, L. S. 1981b. The Development of Higher Forms of Attention in Childhood. In J. V. Wertsch (ed.), *The Concept of Activity in Soviet Psychology*. Armonk: M. E. Sharpe. Originally published in Russian, 1929.
- Vygotsky, L. S. 1986. *Thought and Language*. Cambridge: MIT Press. Originally published in Russian, 1934.
- Wellman, H. 1990. *The Child's Theory of Mind*. Cambridge: MIT Press.
- Wertsch, J. V. (ed.). 1981. *The Concept of Activity in Soviet Psychology*. Armonk: M. E. Sharpe.
- Wertsch, J. V. 1985a. *Vygotsky and the Social Formation of Mind*. Cambridge: Harvard University Press.
- Wertsch, J. V. (ed.). 1985b. *Culture, Communication, and Cognition*. Cambridge: Cambridge University Press.
- Whiten, A., (ed.). 1991. *Natural Theories of Mind*. Oxford: Blackwell.
- Whiten, A. 1993. Evolving a Theory of Mind. In S. Baron-Cohen et al. (eds.), *Understanding Other Minds*. Oxford: Oxford University Press.
- Whiten, A. 1994. Grades of Mindreading. In C. Lewis and P. Mitchell (eds.), *Origins of an Understanding of Mind*. Hillsdale, N.J.: Erlbaum.
- Whiten, A. 1996. When Does Smart Behavior-Become Mind-Reading? In P. Carruthers and P. K. Smith (eds.), *Theories of Theories of Mind*. Cambridge: Cambridge University Press.
- Whiten, A. 1997. Evolutionary and Developmental Origins of the Mindreading System. In J. Langer and M. Killen (eds.), *Piaget, Evolution, and Development*. Mahwah, N.J.: Erlbaum
- Whiten, A., and Byrne, R. W. 1988a. The Manipulation of Attention in Primate Tactical Deception. In R. W. Byrne and A. Whiten (eds.), *Machiavellian Intelligence*. Oxford: Oxford University Press.
- Whiten, A., and Byrne, R. W. 1988b. Taking (Machiavellian) Intelligence Apart. In R. W. Byrne and A. Whiten (eds.), *Machiavellian Intelligence*. Oxford: Oxford University Press.

- Whiten, A., and Byrne, R. W. (eds.). 1997. *Machiavellian Intelligence II*. Cambridge: Cambridge University Press.
- Whiten, A., and Perner, J. 1991. Fundamental Issues in the Multidisciplinary Study of Mindreading. In A. Whiten (ed.), *Natural Theories of Mind*. Oxford: Blackwell.
- Williams, G. C. 1966. *Adaptation and Natural Selection*. Princeton: Princeton University Press.
- Wimmer, H., Hogrefe, J., and Sodian, B. 1988. A Second Stage in Children's Conception of Mental Life. In J. Astington et al. (eds.), *Developing Theories of Mind*. Cambridge: Cambridge University Press.
- Wittgenstein, L. 1953. *Philosophical Investigations*. Oxford: Blackwell.
- Wynn, T. 1988. Tools and the Evolution of Human Intelligence. In R. W. Byrne and A. Whiten (eds.), *Machiavellian Intelligence*. Oxford: Oxford University Press.
- Wynn, T. 1993. Layers of Thinking in Tool Behavior. In K. R. Gibson and T. Ingold (eds.), *Tools, Language, and Cognition in Human Evolution*. Cambridge: Cambridge University Press.
- Zimmerman, R. R., and Torrey, C. C. 1965. Ontogeny of Learning. In A. M. Schrier et al. (eds.), *Behavior of Non-human Primates*. New York: Academic Press.