Why Language Matters for Theory of Mind

Edited by

Janet Wilde Astington

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Preface

This volume originated in a conference that was held at the University of Toronto in April 2002. The conference followed from two earlier ones organized at the University of Toronto: Developing Theories of Mind in 1986 and Developing Theories of Intention in 1997 (Astington, Harris, & Olson, 1988; Zelazo, Astington, & Olson, 1999). This third conference, Why Language Matters for Theory of Mind, took up an important issue that was left open following the earlier meetings. It concerns the developmental interdependence of theory of mind and language.

Recent work has shown strong relations between children's linguistic abilities and their understanding of mind. The conference provided a forum for an international group of scholars to explore these relations and to consider the role of language in children's developing theories of mind. Some researchers argue that an understanding of mind is innate but children cannot express their understanding until a certain level of cognitive and linguistic development is achieved. In contrast, many researchers argue that language actually contributes to the development of children's understanding of mind. However, because language simultaneously serves different functions—such as representation and communication—disagreement arises over the role that language plays. The papers presented at the conference considered the links between language and theory of mind from both representational and communicational perspectives, drawing on research from a variety of populations (e.g., typically developing children, children with autism, deaf children, nonhuman primates). They were supplemented by a poster session that presented work related to the general theme, enlarging and enriching the research base of the conference. The aim of the conference, and of this volume, is to reconcile and combine insights from various

viewpoints, by treating different explanations of why language matters for theory of mind as complementary accounts rather than as competing hypotheses.

The conference could not have taken place, nor would the volume exist, without the contributions of many people, to all of whom we are extremely grateful. First and foremost, we thank the authors, whose presentations, discussions, and arguments at the conference got the project off to a fine start. We thank them, too, for staying the course as the volume was created. The poster presenters and members of the audience—too numerous to list here—added to the conference discussions and convinced us that the volume was a worthwhile venture. We also thank the many members of our department—the Department of Human Development and Applied Psychology, Ontario Institute for Studies in Education, University of Toronto (OISE/UT)—who helped in a great number of ways. Two graduate students, Eva Filippova and Mary Thelander, and an administrative assistant, Christine Davidson, formed the organizing committee for the conference, along with the two of us. Faculty members Jenny Jenkins, Jan Pelletier, Joan Peskin, and Keith Oatley chaired the conference sessions, and David Olson and Chris Moore were talented discussants at the conference close. Our business officers, Mary Macri and Toni Luke-Gervais, helped us to manage the conference budget. Our students—Terri Barriault, Ingrid Braun, Julie Comay, Karen Milligan, Kevin Runions, and Anita Zijdemans—provided conference hospitality and answered our technical questions. In addition, we are grateful for technical help that came from outside the Department: David Torre recorded the proceedings and Mark Sabbagh made sure the projection equipment worked as it should.

Funding support from various sources made it possible for us to host the conference and to invite a considerable number of international participants. We are very grateful to the Department of Human Development and Applied Psychology, OISE/UT; the Laidlaw Research Centre at the Institute of Child Study, OISE/UT; the Centre for Applied Cognitive Science, OISE/UT; the Connaught Committee of the University of Toronto; and the Social Sciences and Humanities Research Council of Canada. We also thank Paul Perron, Principal of University College, who provided a splendid location for the conference, and his assistant, Lynette Beron, who helped with the arrangements.

As work on the volume progressed we received further support for which we are extremely grateful. We thank all those who discussed the issues with us as we edited the chapters: Chris Moore, David Olson, Ana Perez Leroux, Jan Pelletier, Joan Peskin, and Phil Zelazo; as well as the students in our research group: Lisa Ain, Ingrid Braun, Thomas Chan, Julie Comay, Eva Filippova, Keelan Kane, Jonathan Leef, Belèn Pascual, Mary Thelander, and Rebecca Wells Jopling. We also thank the administrative staff who helped with technical matters, particularly Denese Coulbeck and Rosslyn Zulla. We are grateful to Catharine Carlin at Oxford University Press for enthusiastically embracing the project when it

was first proposed, and for providing editorial support along the way, with her assistant, Jennifer Rappaport. Keith Faivre has been extremely helpful as production editor, expediting the appearance of the volume.

Finally, we dedicate this volume to the children whose developing theories of mind have inspired our work over the past few years: Jodie's son, Santiago, and Janet's grandchildren, Becky, Cameron, and Steven.

Janet Wilde Astington
Jodie A. Baird
Toronto, September 2004

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Why Language Matters for Theory of Mind

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1 Introduction: Why Language Matters

Janet Wilde Astington and Jodie A. Baird

The present volume originated in a conference that was held at the University of Toronto in April 2002. Sixteen years earlier, a number of the authors included here had participated in the Oxford conference "Children's Early Concept of Mind" and/or the Toronto conference "Developing Theories of Mind" that together, along with the publication resulting from the two conferences (Astington, Harris, & Olson, 1988), helped to establish children's theory of mind as a new, lively, and important area of research in developmental psychology. "Theory of mind" became the way researchers referred to children's understanding of people as mental beings who have beliefs, desires, emotions, and intentions and whose actions and interactions can be interpreted and explained by taking account of these mental states. The gradual development of children's theory of mind, particularly during the early years, is by now well described in the literature, and we have some information regarding the antecedents, correlates, and sequelae of its development, in both typically developing and special populations, particularly deaf children and children with autism. What is still lacking, however, though not for want of debate on the topic, is a decisive explanation of how children acquire this understanding. Recent work in the area has shown strong relations between children's linguistic abilities and their theory of mind. The purpose of the present volume is to thoroughly explore the role of language in theory-of-mind development. Why does language matter for theory of mind?

The Multifaceted Nature of Theory of Mind

Despite our confident use of "theory of mind" in the previous paragraph, we should acknowledge that the term itself was controversial at the beginning and

has only become more so as time has gone by, to the point where it is now something of a Humpty Dumpty word, in the Lewis Carroll sense (Astington, 1998): "'When *I* use a word,' Humpty Dumpty said in rather a scornful tone, 'it means just what I choose it to mean—neither more nor less'" (Carroll, 1872, p. 124). Perhaps we exaggerate—theory of mind cannot mean just anything—although it does have considerably broad scope.

The term "theory of mind" entered the developmental literature via at least two different routes. First, Wellman (1979, 1985), working in the area of metacognition, used it to refer to the child's conception of human cognition. Second, and probably better known, is Premack and Woodruff's (1978) use of the term in their investigation of primate cognition, when they defined it as a system of inferences that can be used to predict behavior by attributing mental states to individuals. This definition was quickly taken up and applied to children (Bretherton, McNew, & Beeghly-Smith, 1981; Wimmer & Perner, 1983) and even then it had broad scope—from Bretherton et al.'s study of infant communicative abilities to Wimmer and Perner's first description of the false-belief task and their discussion of the meta-representational ability that the task required. In the most precise use, theory of mind is a domain-specific, psychologically real structure, composed of an integrated set of mental-state concepts employed to explain and predict people's actions and interactions that is reorganized over time when faced with counterevidence to its predictions (Gopnik & Wellman, 1994). Researchers who hold this view have attempted to restrict its use to this sense, while other researchers who deny that children develop any theory about the mind have been careful to employ other terms, although sometimes acknowledging links to "theory of mind" hedged in scare quotes or footnotes (Astington, 1998). Despite all these efforts, however, theory of mind seems to be a term that refuses to be corralled.

Perhaps part of the problem is that "theory of mind" is used to refer to three different phenomena—a cognitive structure leading to certain abilities, an area of research investigating the development of these abilities, and a theoretical perspective explaining this development. There are other ways of referring to the research area and closely related areas, in which a wide variety of abilities are studied, and there are different ways in which the development of these abilities is explained (see table 1.1). While abilities, research areas, and theoretical explanations are different phenomena, they are obviously linked together, although we do not intend any one-to-one correspondence across rows in the three columns in table 1.1. At this point we merely want to indicate the broad range of phenomena that are included under the rubric "theory of mind" or are closely related to it.

A number of researchers (e.g., Hobson, 1991; Nelson, 1996) argue against any attribution of "theory of mind" to young children, viewing it as completely wrong as a description of, or even as a metaphor for, their attempts to make

Table 1.1 The Multifaceted Nature of Theory of Mind

Theory of Mind:

- cognitive structure leading to certain *abilities*
- *research area* investigating development of abilities
- *theoretical explanation* of development

Range of Abilities	Related Research Areas	Diverse Explanations
theory of mind	theory of mind	theory of mind
false-belief understanding	concept of mind	innate module
meta-representation	folk psychology	simulation
intentional stance	common-sense psychology	enculturation
belief-desire reasoning	understanding other minds	social construction, e.g., community of minds
mental-state attribution	social understanding	
mentalizing	social cognition	domain general developments, e.g., executive functions
mind-reading		
perspective-taking		
social intelligence		
social understanding		
social intuition		
social perception		
person perception		
intersubjectivity		

sense of the social world. However, on our view, Lillard (1998) is probably right in claiming that "theory of mind" is a useful term, and here to stay:

> the term is deeply entrenched and would not easily be abandoned, and in many ways serves us very well. It can be used to refer to simple infant interfacing of minds, or to complex adult understandings, or to anything in between . . . Because "theory of mind" is so versatile, arguing over its suitability will probably not be productive. (Lillard, 1998, p. 42)

Versatility may lead to ambiguity, however. "Theory of mind" is a broad term for a multifaceted system (see table 1.1). In considering the relation between theory of mind and language, we need to be clear which particular aspect(s) of theory of mind we are referring to, because different aspects of theory of mind may relate to language in different ways. It is fair to say that the authors of the various chapters in the present volume are not in complete agreement on how to apply the term "theory of mind" or on other issues. We regard this as part of the strength of the collection—there is sufficient agreement that we can focus on the core topic of why language matters, and sufficient disagreement that we can examine this issue from multiple points of view.

The Multifaceted Nature of Language

Like theory of mind, "language" too is a broad term—indeed, a broader term, although for our purposes in this volume, we do not need to consider all the details within its full range. However, there are some distinctions that we do need to make, at a number of levels, in order to consider language's relation to theory of mind. Perhaps the most fundamental distinction for our purpose is the functional one between representation and communication (see table 1.2). Many species represent and communicate, but only humans use one and the same system for both representing and communicating. Human language is used both as an intra-individual representational system, on the one hand, and as an inter-individual communication system, on the other. Representation, in this sense, is essentially equivalent to verbal thought (and when used in this way it includes only part of the full scope of the term "representation").

Communication, by definition, engages the child in dyadic interaction in discourse, which means that we must be careful to distinguish between children's own linguistic abilities and their linguistic environment (see table 1.2). First, children's linguistic abilities include their mastery of language structures (see next paragraph) and their competence in using these structures in communicative exchanges, that is, their pragmatic ability. Second, children's linguistic environment comprises the communicative exchanges in which they are involved as participants or bystanders, the stories and other books that are read to them, the songs that they hear, and so on. Obviously these two—individual competence and social context—are related to each other, but they may relate to theory of mind in different ways. The social context affects children's own linguistic abilities, and, indeed, their linguistic ability may affect their environment, in terms of the kinds of communications they receive. Nonetheless, one can consider the effects of the linguistic environment while controlling for individual differences in children's own linguistic competence.

Further distinctions can be made at a structural level. The basic distinction here is between form and meaning: phonology, morphology and syntax on the one hand and lexical and discourse semantics on the other. There is a great deal that could be said here, but we will not digress too far. In the present context of the relation between language and theory of mind, we first need to distinguish between language in general and mentalistic language in particular—that is, terms referring to the mind, to mental states and processes, for which verbs (e.g., *think, know, want*), rather than other parts of speech, are the most widely used (Astington & Pelletier, 1996; Astington & Peskin, 2004). Second, the structural distinction of importance with reference to mental verbs is the contrast between semantics and syntax (see table 1.2).

Some researchers argue that children's developing theory of mind is dependent on their acquisition of the semantics—that is, the meaning—of particular

Table 1.2 The Multifaceted Nature of Language

Language					
Functions			Structures		
Representation (*verbal thought*)	Communication (*discourse*)		Language in general	Mental terms, particularly verbs	
	Pragmatics (*individual ability*)	Linguistic environment (*social context*)		Semantics (*lexical terms for mental states*)	Syntax (*sentential complements of mental verbs*)

lexical items that are used to refer to the mind—to mental states and mental activities (Bartsch & Wellman, 1995; Olson, 1988; Peterson & Siegal, 2000). Other researchers put more emphasis on the syntactic structures in which mental terms are used (de Villiers & de Villiers, 2000; Tager-Flusberg, 2000). Mental verbs frequently occur as the main verb in a complex sentence that has a subordinate clause (called a sentential complement) as its grammatical object; for example, "Maxi thinks that the chocolate is in the cupboard," "He wants to have some." Such constructions allow for a separation of the attitude and content of a person's mental state: the attitude denotes what kind of mental state it is (belief, desire, and so on), and the content describes what the mental state is about. Importantly, some mental verbs allow a false sentence to be embedded in a true one. In conversation, two people might say, for example: "The chocolate is in the cupboard"—"No, it's in the drawer." Obviously, if one of these sentences is true, then the other is false. However, when each sentence is embedded under a mental verb in a complex sentence, then both (complex) sentences can be true: "Maxi thinks *the chocolate is in the cupboard*" and "Mother knows *it's in the drawer*" (sentential complements italicized). Thus, this syntactic structure provides the format needed to represent beliefs as false.

Development of Theory of Mind: Why Language Matters

The previous two sections make it apparent that both theory of mind and language are broad, multifaceted systems. Each has many components, leading to the possibility of different relations among different components, and also the possibility of change in these relations over developmental time, as well as individual differences in the relations. The one point that is completely clear is that it is not at all a simple picture; indeed, to claim merely that there is a relation

between language and theory of mind is so oversimplified as to be virtually useless. Certainly, the rich collection of chapters in the present volume does not present a simple picture. Rather, it gives a kaleidoscopic view of the complexity of the relation between language and theory of mind. Further, and most important, it provides a variety of answers to the question of why language matters for theory of mind.

There is obviously an assumption embedded here—that is, that language does matter for theory-of-mind development. When we first decided to organize the conference that led to this volume, we thought of asking the question "Does language matter for theory of mind?," which is undoubtedly the prior question. However, probably no one would dispute the suggestion that language does matter, at least in some sense. In a trivial way, language matters because it is a fundamental human capacity that permeates almost everything that humans do. As Chris Moore (2002) said in the final discussion session of the conference, the critical question is whether there is anything special about theory of mind that requires language and, relatedly, whether there is anything special about language that allows theory of mind to develop. Language is involved in many aspects of conceptual development; the question is, what is special about its role in theory-of-mind development?

No Special Role for Language

From a number of different perspectives, language has no special role. First, nativist modularity theorists propose that theory of mind is innately specified but not evident until a certain level of linguistic and cognitive development is achieved (Fodor, 1992). A related argument, which does not necessarily assume innateness or modularity for theory of mind, is that language's role is only at a superficial level because many theory-of-mind tasks are verbal tasks, such that successful task performance requires a certain level of language ability (Chandler, Fritz, & Hala, 1989). Meanwhile, other researchers, also denying innateness or modularity, argue that theory-of-mind abilities rest on domain general cognitive operations that require language for their implementation (Frye, Zelazo, & Palfai, 1995). Finally, others see the role of language as no more than a natural way of providing children with the information they require for constructing a theory of mind (Gopnik & Wellman, 1994; Perner, 2000).

On the other hand, however, a large group of theorists ascribes a more fundamental, causal role to language in the development of theory of mind, particularly during the toddler and preschool period (18 months to 5 or 6 years of age), when both language and theory of mind are rapidly developing and intricately connected. We briefly summarize those positions here, without giving details of the evidence that supports each view—this follows in the rest of the volume.

A Role for Conversational Pragmatics

Some researchers argue that children's participation in conversation is critical to theory-of-mind development. Dunn and her colleagues, in an important early paper (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991), showed that 2-year-olds' naturalistically observed conversational experiences are related to their understanding of other minds when they are 3 years old. Children whose mothers had talked to them about people's feelings and about causal relations and who themselves who had talked about feelings were more likely, seven months later, to give satisfactory explanations of behaviors premised on false beliefs. Harris (1999) points out that in conversational exchanges children are frequently exposed to the fact that different people know different things. They realize that they themselves know things that others don't know, and conversely, other people have information that is new to them. Harris argues that this experience of information exchange, of discovering that other people know something different, leads children to an understanding of people as epistemic subjects and an awareness that there are different points of view on the same material world.

A Role for Lexical Semantics

Other researchers emphasize that it is in conversation that children acquire concepts of mental states, such as belief, desire, intention, and so on (Bartsch & Wellman, 1995; Olson, 1988; Peterson & Siegal, 2000). Conversation provides a means of abstracting these underlying mental-state concepts from the conversation because the concepts are semantically encoded in the language of the culture. When they are 2 and 3 years old, children begin to acquire specific lexical terms that are used to refer to mental states: first perception, emotion, and desire terms (e.g., *see, look, happy, sad, like, love, want*) and then cognition terms (e.g., *know, think, remember*) (Bartsch & Wellman, 1995; Bretherton & Beeghly, 1982). Parents use these words in talking to their child about the child's own experiences. Importantly, parents also use the same terms to talk about other people's experiences, so that children are able to map other people's experiences onto their own and so come to attribute mental states to the self and others (Astington, 1996). In this way, children's phenomenal experience leads them to conceptual understanding because language allows for a level of abstraction that can support concepts about unobservable mental states.

Certainly, such conceptual understanding takes some time to develop. Nelson (1996) points out that young children's use of mental terms does not, at least at first, indicate that they understand the mental concepts to which those terms refer. Rather, she makes the Wittgenstein argument that children use these terms before they know the meaning of them and then they acquire meaning from use. That is, over time children's use of mental-state terms facilitates their

ability to reflect upon and label their own mental states, as well as fosters their understanding of the mental states of others.

A Role for Complementation Syntax

Importantly, participation in conversation leads to an understanding of perspective and an awareness of mental states. But is this sufficient to allow for metarepresentational interpretations of human behavior, as required, for example, in the false-belief task? Other researchers argue that it is not; they put less emphasis on the importance of semantics—the terms and concepts encountered in conversation—and more on the syntactic structures that are required to attribute different points of view using mental terms. As discussed earlier, mental verbs occur as the main verb in a complex sentence that has a subordinate clause—the sentential complement—as its grammatical object. Children use such complement constructions almost as soon as they start to produce mental verbs, that is, at 2 years of age (Bartsch & Wellman, 1995; Bloom, Rispoli, Gartner, & Hafitz, 1989). However, Diessel and Tomasello (2001) show that this early use is formulaic and argue that it does not provide evidence of mastery of complement syntax. In support of this argument, comprehension of complements is not mastered until a year or two later, when it predicts children's performance on false-belief tasks (de Villiers & Pyers, 2002). Thus, de Villiers and de Villiers (2000) argue that the acquisition of the syntactic ability to understand sentential complements underlies the development of false-belief understanding. In particular, the verb *say*, which provides overt evidence for the falsity of the complement in cases where what is said is known to be untrue, may bootstrap an understanding of complements for *think*, because *say* and *think* are used in the same discourse contexts. A training study (Lohmann & Tomasello, 2003) supports the general argument of the importance of complement syntax but gives no support to the particular role of *say*. However, naturalistic evidence does provide some support: at an early stage, while *think* complement use is only formulaic, *say* is flexibly used in more diverse complement forms (Diessel & Tomasello, 2001).

Roles Combined in Synergy

Something written more than ten years ago is no less true today: "When we attempt to separate the various theoretical positions in this way we always risk oversimplification. Many particular theorists' views combine different aspects of the accounts we have described here, and at the risk of sounding like wishy-washy liberals, there is some level at which they must all be true" (Astington & Gopnik, 1991, p. 25). Wishy-washy liberalism is a hard trait to throw off. We take the same position here—putting all of the preceding together, the whole is more than the sum of the parts. The explanations summarized earlier are not in

competition but cohere to give a more complete explanation of why language matters for theory of mind. Pragmatic ability allows children to participate in communicative exchanges, where they hear mental terms used with sentential complements. From this experience, they acquire awareness of points of view, concepts of mental states, and mastery of the syntax for representing false beliefs. Both the social environment that provides this cultural input and the child's own cognitive resources that make use of it are needed for the child's theory of mind to develop. All this is true, though simplistic in its brevity. The remainder of the volume spells out these ideas in full detail.

Overview of the Volume

Part I: Communication and Social Understanding

Children acquire social understanding (or theory of mind) as participants in the social world, which is primarily a mental world—a community of minds (Nelson, Plesa, & Henseler, 1998; Nelson, Skwerer, Goldman, Henseler, Presler, & Walkenfeld, 2003). Participation in this world depends on communication, which is facilitated as children's linguistic abilities develop. Thus, through language, children gain access to the mental world and become part of the community of minds. They discover how minds interact—that beliefs can be changed, desires can be created, and emotions can be invoked in linguistic exchanges. The significance of communicative development emphasizes the importance of pragmatics to theory-of-mind development, and, reciprocally, early theory-of-mind abilities are important to the development of communicative competence.

The contributors to the first set of chapters take this social-cultural approach to theory-of-mind development and its relation to language. Katherine Nelson leads the endeavor in chapter 2, in which she reconceptualizes the acquisition of a "theory of mind" as entering into a "community of minds," where language plays a central role. This reconceptualization is necessary, Nelson argues, because theory of mind is too narrowly construed as a separate cognitive domain to the exclusion of domain general achievements (including language, memory, inference) and social experiences (such as attachment, play, and conversation). Moreover, Nelson argues that the developmental process some researchers claim to explain advances in children's theory of mind—namely theory construction and revision—is unwarranted. Thus, Nelson proposes to replace the theory metaphor with the notion of "community of minds," and she argues that entering into the community of minds is a developmental process made possible through language.

Language matters, Nelson argues, because to understand other minds is to participate in a communally shared belief system about human goals, motivations,

and values. Nelson makes a special case for the emergence of the representational function of language that allows children to go beyond their own private thoughts and beliefs to consider the thoughts and beliefs of others. This is a Vygotskian view, in which children's experience with external verbal representations in social discourse supports the development of internal verbal representation. In particular, Nelson finds that children's receptive language ability—as exercised, for example, in listening to stories—is especially important for the development of the representational function of language and, thus, for children's entry into the community of minds.

In chapter 3, Judy Dunn and Marcia Brophy focus on the communicational aspect of language and its role in children's developing theory of mind. Like Nelson, they presume that participation in communicative exchanges underlies theory-of-mind development. However, and most important, they argue that the nature and efficacy of the communicative exchange is influenced by the quality of the relationship between the communicative participants. They propose that children's communicative experiences within close, familiar relationships play a central role in the development of understanding mind and emotion. According to Dunn and Brophy, it is through the experience of communication within close, dyadic relationships that children gain entry into the community of minds that Nelson describes. Dunn and Brophy find support for their argument in research on individual differences. For example, they report that children's participation in discourse about mental states predicts later differences in theory-of-mind understanding, over and above other contributing factors such as cooperative play.

Importantly, Dunn and Brophy argue that in order to understand relations between theory of mind and language, children's language experiences must be examined not solely in terms of a cognitive skill or individual characteristic but also in terms of children's dyadic experiences. To illustrate: Dunn and Brophy report that the relationship quality between child and communicative partner is systematically related to the frequency with which they interact in contexts that are rich in discourse about mental states. Thus, the aspects of conversation that are relevant to theory of mind depend on characteristics of both child and interlocutor, and on the relationship between them.

In chapter 4, Paul Harris also emphasizes the importance of communicative exchanges in fostering children's understanding of mind. With respect to mother-child conversation, Harris makes the important point that a simple count of mental-state terms may not be the most sensitive measure of effective maternal input, although it may be a useful correlate. Various aspects of maternal input are likely to co-vary, including the frequency of use of mental terms, the frequency of use of sentential complements, and the pragmatic intent to introduce varying points of view into the conversation. Harris argues that it is the mother's pragmatic intent that is the effective source of variation in promoting theory-of-mind devel-

opment. In support of this suggestion, Harris cites two training studies (Hale & Tager-Flusberg, 2003; Lohmann & Tomasello, 2003), both of which indicate that conversation that emphasizes different points of view on one and the same object or event, without using mental terms or sentential complements, is sufficient to generate an improvement in children's performance on theory-of-mind tasks.

Harris also discusses the significance of pretend play in theory-of-mind development—in particular, the finding that role-taking abilities are related to children's performance on theory-of-mind tasks (e.g., Astington & Jenkins, 1995; Taylor & Carlson, 1997). He makes the intriguing suggestion that variation in conversational input to the child might interact with children's role-taking ability. Specifically, Harris suggests that certain types of conversation invite a subtle form of role-play by prompting children to imagine the world from another person's perspective. On this account, conversation and role-playing ability may unite to facilitate children's understanding of false belief and influence their social understanding more broadly.

Nelson, Dunn and Brophy, and Harris all explore ways in which children's participation in communicative exchanges mediates the development of a theory of mind. In chapter 5, Daniela O'Neill takes a different approach by exploring how children's theory of mind underlies their pragmatic competence in communicative exchanges. In particular, she summarizes a growing body of literature on children's ability to talk about new (as opposed to given, or known) information. O'Neill argues that in order to tailor their speech in an appropriate manner to include references to new information, children must take into account the mental states of the listener, for example, what he or she knows, does not know, or might want to know. Assessing information as new or given necessarily entails at least two communicative partners; thus, O'Neill finds a point of contact between her work and Nelson's idea of a "community of minds." In particular, O'Neill argues that children's ability to recognize topics that will be relevant to the listener is crucial for entering the community of minds.

Theory-of-mind abilities and pragmatic abilities are certainly closely related. Part of pragmatic competence is the ability to use and interpret language appropriately in social situations, by keeping track of listeners' and speakers' beliefs and intentions. Thus, it seems that pragmatics and theory of mind are related by definition. However, one could argue that understanding and awareness of belief and intention are part of theory of mind, and keeping track of them in language use is pragmatics—in which case one can then argue that theory-of-mind abilities underlie pragmatic abilities—which is the argument O'Neill makes.

Part II: Semantic Development and Mental-State Concepts

The chapters in the previous section focus, in varying ways, on how children's participation in communicative exchanges fosters their developing understanding

of the mental world. A fundamental question is: what mechanism allows children to develop an understanding of the mental world through participating in it? The mental world is a world of unobservable abstract entities, such as beliefs, desires, intentions, and emotions, that are revealed in facial expressions, talk, and behavior. One complexity that arises when trying to understand how children acquire mental-state concepts is the great variety of ways in which each of these concepts may be expressed. That is, mentalistic notions such as belief, desire, and intention do not stand in one-to-one relations with specific behavioral patterns. It may well be language that provides children with a means of abstracting the underlying mental-state concepts, semantically encoded in the language of their culture, from the variety of behaviors in the ongoing stream of social interaction—but how? The first two chapters in this part tackle this fundamental problem.

In chapter 6, Derek Montgomery questions how children come to understand the meaning of mental terms such as *think*, *know*, *want*, and *gonna*. He sets up a contrast between two perspectives on word learning—what he calls the ostension paradigm and the contextual view. The first sees children working out word-referent relations, mapping mental terms onto mental concepts, whereas the second (his view) holds that children figure out the practical functions mental terms serve in social contexts. The central idea of ostension is that word meaning is based on the referential relation between mental states, which are experienced privately and internally, and the verbal labels of those states. That is, children themselves have mentalistic experiences that they categorize and then label (*thinking* versus *wanting*, for example). Montgomery challenges the ostension paradigm and suggests instead that children derive the meaning of mental terms from routine social interactions with their caregivers. On his view, mentalistic language and its meaning grow out of interactive, preverbal exchanges—language games, as he calls them. He suggests that everyday language games—in which children are exposed to mental-state terms across related but different scenarios—promote their understanding of mental terms and concepts. For example, infants engage in a language game of desire, in which they communicate <u>that</u> they want something and <u>what</u> it is that they want. These games begin with infants' gestures and nonverbal vocalizations, which elicit mentalistic language from their caregivers such as "what do you *want*?" or "is this what you *want*?" Then children start to say "*want* x" as they gesture toward what they want, and, at a later stage, even in the absence of the wanted item. Thus, Montgomery maintains that mental terms, and hence mental concepts, acquire their meaning from the pragmatic roles they play in these early language games. It is in these communicative exchanges, he argues, that mental terms and concepts are socially constructed.

Dare Baldwin and Megan Saylor (chapter 7) share Montgomery's view that mental-state concepts emerge in the context of social and linguistic interaction,

but they take a somewhat different stance on the issue of how this understanding develops. They draw on Gentner's work (e.g., Gentner & Ratterman, 1991) in suggesting that language may facilitate children's acquisition of mentalistic concepts by serving as an aid to analogical reasoning and inductive inference. That is, language invites children to compare different behaviors that otherwise they would not attempt to align, thus promoting inferences about nonobvious commonalities across distinct expressions of mental states, such as belief, desire, attention, and intention. Baldwin and Saylor review a large body of research that suggests that, in the realm of physical objects, infants use information provided in language to draw inferences about nonobvious commonalities. For example, upon hearing the same label applied to two different objects, infants are more likely to use their knowledge of one object to guide their exploration of the other object than if the objects are given different or no labels. Baldwin and Saylor argue that, in the realm of mental states, language may function similarly to facilitate children's abstraction of mentalistic concepts.

They discuss two different aspects of this process. First, following Grice (1957; see also O'Neill, this volume, chapter 5), they argue that language in general, used in conversation, is intricately linked to mentalistic concerns as it embodies communicative intent and intentional focus, taking into account and attempting to influence the beliefs and desires of the conversational participant. They discuss in some detail how references to absent objects may give children clues for learning about referential intent (through structure mapping and alignment). Second, and more specifically, mental terms may act as labels that invite recognition across different behaviors and situations, leading to the development of mentalistic concepts by the abstraction of commonalities across behaviors. This view is closer to the ostension paradigm, although they do not call it that. From Montgomery's perspective, one problem with this argument is that it does not answer what is, for him, the fundamental question of how infants come to recognize distinct sensations related to different mental states.

Baldwin and Saylor's hypothesis about the effects of mental-state vocabulary as labels that lead to the acquisition of mental-state concepts links to the next chapter (chapter 8), in which Sophie Jacques and Philip D. Zelazo also investigate the labeling function of language, in this case as an aid to cognitive flexibility. They reinterpret the relation between language and theory of mind in terms of language-related effects on cognitive flexibility. Central to their argument is the claim that most of the variance on theory-of-mind tasks can be attributed to the development of flexible perspective taking. Indeed, Jacques and Zelazo recast theory of mind as cognitive flexibility, arguing that, although theory of mind undoubtedly involves the acquisition of mental-state concepts, the use of these concepts necessarily involves cognitive flexibility—the ability to consider multiple representations of a single object or event. Jacques and Zelazo then go on to review a number of studies that demonstrate that

labeling relevant stimuli promotes children's cognitive flexibility, and they offer a number of suggestions for how labeling might similarly help theory-of-mind performance.

Despite clear evidence for the facilitative role of labeling in cognitive flexibility, Jacques and Zelazo are undecided regarding the precise mechanism by which labeling is effective. On the one hand, according to Zelazo's (1999) Levels of Consciousness model, labeling facilitates self-reflection, which in turn promotes flexible thought and action. On the other hand, Jacques argues that the arbitrary nature of labels is itself facilitative: because labels typically do not resemble their referents, they help create psychological distance between the symbol user and the external stimuli to which the symbols refer. Regardless of the mechanism, however, Jacques and Zelazo argue that labeling different perspectives in theory-of-mind tasks should benefit children's performance.

Jacques and Zelazo's hypothesis on the facilitative effects of labeling links directly to our chapter (Astington & Baird, chapter 9), in which we examine the influence of linguistic manipulations in the false-belief task on children's performance. Following Plaut and Karmiloff-Smith (1993), we hypothesize that the change-in-location false-belief task will be easier if children hear about but do not actually see the object transfer (because they will not be misled by the salience of reality) and that the task will be harder if children have to construct their own linguistic representation of the false belief, in conflict with the information presented in the visual display. To investigate this hypothesis, we compared children's performance on a standard version of the false-belief task (in which both verbal and visual representations were provided) with their performance on the verbal-only and visual-only versions described earlier. Across two studies, we found no evidence that these manipulations have any effect on children's false-belief task performance. The absence of condition differences surprised not only us but also Jacques and Zelazo (chapter 8), whose labeling hypothesis similarly would have predicted poorer performance on our visual-only version, which lacked a verbal narrative.

In an attempt to reconcile the absence of language-related condition differences in our studies, we go on to review other studies that manipulate verbal and visual information in the false-belief task. With respect to task versions that mask reality and thus should be easier for children, we find the evidence equivocal. Similarly, our review of nonverbal tasks does not indicate, as hypothesized, that these versions are more difficult. In the end, we conclude that children's false-belief task performance is not influenced by variations in the mode—visual, verbal, or both—in which the critical information is conveyed. Instead, we argue that language matters for false-belief understanding (and thus, theory of mind) because language supports the meta-representational model that underlies this understanding.

Part III: Syntactic Development and Mental-State Reasoning

The acquisition of mental-state concepts, discussed in the previous section, is fundamental to reasoning about mental states, which requires the representation of mental attitudes towards mental contents. As language develops, increased resources in syntactic structures provide the format required for such representation and thus, it is argued, syntactic development facilitates mental-state reasoning. A paradigm case of mental-state reasoning is that of reasoning about the behavioral consequences of holding a false belief. By investigating syntactic and other aspects of the linguistic input that are related to children's understanding of false belief, researchers have further explored the nature of the relation between language and theory of mind.

Jill de Villiers has been a central figure in this endeavor, proposing a theory of linguistic determinism (J. de Villiers, 1995) that has been refined and extended over the past decade (e.g., J. de Villiers & P. de Villiers, 2000, 2003). In chapter 10, she presents the most recent version of the theory, providing a summary of evidence in its favor and refuting some specific counterarguments. The theory posits that false-belief understanding crucially depends on mastery of the syntax of complementation. However, importantly, and perhaps more confusing to psychologists than to linguists, this syntactic development is not obvious at a surface level. First, it does not apply to all object complements, that is, it does not hold for desire [*want* + infinitive] in English. Second, nor does it apply to all tensed object complements [*that* + finite verb]; for example, it does not hold for [*want-that*] in German, and [*pretend-that*] in English, because these verbs take *irrealis* complements (i.e., about future or imaginary events). Rather, it applies only to belief and communication verbs, which take *realis* complements (i.e., about actual events). J. De Villiers posits that there is a Point-of-View (POV) marker on the complement clause, for belief and communication verbs, that is specified by the verb itself. That is, it is in some ways a semantic criterion, in so far as the POV feature is carried by the nature of the verb.

De Villiers argues that desire verbs (e.g., *want*) and belief verbs (e.g., *think*) develop along radically different trajectories. Early on, children come to understand that desire verbs take *irrealis* complements, because noun phrase complements of verbs of desire are recognized as intensional (e.g., "I want a candy" yet there is no candy present). She maintains that children extend their understanding that the object of the verb is *irrealis* to the understanding that all complements of desire verbs are *irrealis*. Furthermore, the verb "pretend" is treated in the same way.

However, complements of verbs of belief are never treated as *irrealis*; at an early stage, before children understand that belief verbs open up a new POV domain, belief complements are treated as true *realis* clauses. A crucial stage

comes with the realization that complements embedded under the verb *think* can be false compared to the world. De Villiers claims that this comes about via analogy with the verb *say*. The two verbs are used in the same discourse contexts and are alike syntactically, and so they are placed in the same subclass. It is obvious that *say* takes false complements; that is, children have evidence that people's overt verbal expressions sometimes do not correspond to the way they themselves perceive the world to be. Children then extend this understanding to complements of the verb *think*. Thus, syntax provides a bootstrap from the overt evidence of falsity for complements of *say* to the possibility of false complements for *think*. The verb *want*, on the other hand, is not treated as analogous, because it clearly takes *irrealis* complements, whatever syntactic form they might have in different languages.

In chapter 11, Josef Perner, Petra Zauner, and Manuel Sprung present new data and review existing studies that they claim pose a challenge to J. de Villiers's theory. In particular, they take issue with de Villiers's emphasis on children's understanding of tensed *that*-complements as the key to understanding other minds and points of view.[1] Drawing on cross-linguistic data, Perner and his colleagues show that, regardless of whether a given language requires tensed *that*-complements to express beliefs and desires, children understand desires before beliefs. For example, German-speaking children understand and talk about desire substantially earlier than about belief, despite the fact that their language requires tensed *that*-complements to express both mental states. Chinese-speaking children similarly understand desire before belief, even though their language does not require tensed *that*-complements for either mental state. According to Perner et al., these findings challenge de Villiers's claims that the syntactic form of how we talk about the mind forms the basis for how we think about the mind.

Most important, Perner and his colleagues also point to a number of studies that show a correspondence between the age at which children understand differences in point of view in the context of conflicting desires and the age at which children understand differences in point of view in the context of false beliefs. The authors present these findings as an objection to de Villiers's argument that understanding point of view is derived from an understanding of the particular syntactic structure associated with belief verbs, which desire verbs do not share.

In some ways there is a close connection between J. de Villiers's (chapter 10) theory of POV markers and the theory of perspectival understanding that Perner and his colleagues put forward here. The question for us is how linguistic determinism and conceptual development are related. It depends in part on whether one assumes that the critical development is captured in the syntax or the semantics, and this depends on whether one takes syntax and semantics as an integrated whole, or separates syntax off and takes semantics and concepts as intertwined. De Villiers sees syntax and semantics as intricately entwined,

whereas for Perner semantics is part of conceptual development. At best, there may be no fundamental disagreement, but rather a linguist's and a psychologist's different but consonant views on the same issue.

This is an ongoing debate for which further data are provided in the next three chapters. First, however, Heidemarie Lohmann, Michael Tomasello, and Sonja Meyer (chapter 12) consider the early stages of pragmatic language acquisition before taking up the issue of syntax and semantics. They suggest that the relation between language and theory of mind is different depending on which aspect of social understanding is at issue (as we emphasized earlier in the present chapter). In particular, they argue that an appreciation of other persons as intentional agents—the first level of social understanding—is prerequisite for language acquisition. On their view, language arises from infants' growing ability in the second year of life to tune into others' communicative intentions. Then, children's use of language in social exchanges leads to an understanding of other persons as mental agents, whose behavior is governed by desires and beliefs, including ones that are false. Thus, at this later stage in development, language gives rise to a new level of social understanding.

Lohmann and her colleagues substantiate this claim with a training study aimed at developing false-belief reasoning. In particular, they report that both conversation about deceptive objects and training on the syntax of complementation (in the absence of deceptive objects) promote 3-year-olds' false-belief understanding. Moreover, the largest training effect occurred in a condition that combined conversation and complements. Lohmann and her colleagues therefore suggest that perspective-switching discourse and the syntax of sentential complements make independent contributions to theory-of-mind development. Importantly, the fact that manipulating the deceptive objects without any conversation about them was ineffective, leads to the conclusion that language is a necessary condition for children to make progress in their understanding of false beliefs, lending support to the claim that language plays a causal role in the ontogeny of social understanding.

The next two chapters report findings that are similar to those of Lohmann et al. and provide further illumination on the role of language by investigating the relation between language and theory-of-mind development in atypical populations. Linguistic, cognitive, and social development are closely correlated in typically developing children. Insight into the nature of their relationship and their relative influence on theory-of-mind development can be acquired from investigations in populations where the typical correlations are not found, such as deaf children whose language acquisition is delayed and children with autism, whose development is impaired in a number of ways.

In chapter 13, Peter de Villiers examines deaf children as a window on the role of language in theory-of-mind development. Deaf children, he argues, provide a strong test for the causal role of language, because many of them have

significantly delayed language acquisition but age-appropriate nonverbal intelligence and sociability. In his chapter, P. de Villiers compares the language and theory-of-mind abilities of two groups of deaf children: deaf children of hearing parents, whose language acquisition is delayed, and deaf children of deaf parents, whose language acquisition is not delayed. Across two studies, he finds that deaf children who acquire fluent sign language early are significantly better at reasoning about mental states than language-delayed deaf children. Indeed, the theory-of-mind development of deaf children with deaf parents is comparable to that of their typically developing hearing peers. In contrast, deaf children of hearing parents whose exposure to language (ASL or Oral) is delayed demonstrate significant delays in their mental-state reasoning. Importantly, P. de Villiers reports that both general verbal ability (vocabulary) and specific syntactic features of language (false complement structures) are independently predictive of false-belief reasoning in deaf children. Thus, P. de Villiers finds support for both the pragmatic theory of why language matters for theory of mind (e.g., Harris, this volume, chapter 4) and the theory that mastery of the syntax of complementation is what provides the representational mechanism for reasoning about false beliefs (e.g., J. de Villiers, this volume, chapter 10). P. de Villiers echoes our sentiment that these theories may be more complementary than exclusive.

The findings P. de Villiers reports in his chapter on deaf children bear a striking resemblance to the findings Helen Tager-Flusberg and Robert Joseph report in the next chapter (chapter 14) on individuals with autism. However, P. de Villiers notes an important difference between the theory-of-mind abilities of deaf children and those of individuals with autism. Although deaf children may rely on complex language for the mastery of false-belief understanding, other aspects of theory-of-mind reasoning are developed by deaf children much as they are in hearing children, despite language delays. For example, the ability to reason about desires and intentions and to engage in hide-and-seek deception games is spared in language-delayed deaf children. Individuals with autism, however, are severely impaired on tasks such as these.

Tager-Flusberg and Joseph examine autism as a window on the relation between language and theory of mind. It is well known that individuals with autism have deficits in both domains. However, despite these impairments, a small percentage of individuals with autism routinely pass theory-of-mind tasks, specifically, false-belief tasks. Tager-Flusberg and Joseph take a closer look at these individuals, focusing on the unique role language plays in facilitating their success on the false-belief task. Tager-Flusberg and Joseph argue that, for individuals with autism, language—in particular, knowledge of sentential complements—serves to bootstrap the meta-representational understanding of mental states necessary for success on false-belief tasks. In support of their view, Tager-Flusberg and Joseph present evidence from several cross-sectional studies and a

longitudinal study that indicates that language is the single most predictive factor of false-belief task performance among individuals with autism. In particular, they find that general language ability and specific knowledge of sentential complements play independent roles in explaining how some individuals with autism come to pass false-belief tasks, echoing P. de Villiers's and our arguments. Moreover, they report that knowledge of complements for verbs of communication (e.g., *say*) is uniquely important for this group, suggesting that, in order to succeed on false-belief tasks, individuals with autism depend on linguistic structures for representing conflict between what someone says and what is true in reality. This finding, albeit with a special population, provides support for J. de Villiers's (chapter 10) model of development, in which recognition of the possibility of false complements for *say* leads to understanding false complements for *think*.

At the end of the chapter, Tager-Flusberg and Joseph take up the question of why language matters for theory of mind in autism. Tager-Flusberg (2001) suggests that there are two components to theory of mind: social-perceptual abilities and social-cognitive understanding (reminiscent of the two levels that Lohmann et al. propose in chapter 12). The social-perceptual component builds on infants' innate preferences for human faces and social stimuli, whereas the social-cognitive component involves making inferences about the mental states that underlie social stimuli. In typically developing children, the two components are related; that is, social-cognitive understanding grows out of children's social-perceptual abilities. However, children with autism fundamentally lack the social-perceptual abilities of typically developing children. Tager-Flusberg and Joseph suggest that, in autism, language becomes an artificial route to social-cognitive understanding. That is, instead of developing a conceptual understanding of mental states grounded in social-perceptual abilities, children with autism learn, via language, to reason logically through false-belief tasks. Whether individuals with autism are capable of developing a genuinely intuitive understanding of the mind remains an open question.

Part IV: Conclusion

The research with atypical populations reported in the previous two chapters highlights the fact that the development of theory of mind and of language is influenced by both genetic and environmental factors. An important question is whether these factors are shared by theory of mind and language or are unique to one or the other. Moreover, the answer to this question may depend in part on developmental and individual differences in relations between the two, as Claire Hughes makes clear in chapter 15. She reports data from two twin studies conducted at two different times in development—3;6 years and 5;0 years. Both studies showed a strong correlation between general verbal ability and theory of mind,

in accord with many other studies in the literature. However, the twin study design provides a unique methodological perspective from which to investigate the nature of the relationship between language and theory of mind.

The first study, with a sample of 3-year-old twins, showed a large influence of genetic factors on theory of mind, with these having little overlap with genetic factors influencing verbal ability. This finding lends support to theories that propose genetic modularity for theory of mind. The second study, with a considerably larger sample of 5-year-old twins, provided a much greater possibility of detecting environmental effects because of the sample size. It did not replicate the first study's results regarding the importance of genetic factors (the genetic influence was small), but it did reveal a substantial environmental influence on theory of mind. Environmental factors accounted for a large proportion of the variance in theory of mind, and only genetic factors that were shared with verbal ability contributed to individual differences in theory of mind. The association between theory of mind and verbal ability was accounted for by common effects of shared genes, and the common effects of shared environment and socioeconomic status. Hughes concludes that there may be developmental change in the relative impact of genetic and environmental influences on individual differences in theory of mind. That is, genetic factors may play a limiting role in the earlier stages of theory-of-mind acquisition, with environmental factors becoming increasingly important as time goes by.

Hughes's idea that gene-environment effects may shift over developmental time fits nicely with the overall aim of this volume, which is to tell a developmental story about the relation of language and theory of mind. The overview of the chapters that we have given here provides only a snapshot of this relation and of why language matters. We invite you to turn to the chapters themselves for the whole big picture.

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Note

1. It is important to note that the studies reported (Perner, Sprung, Zauner, & Haider, 2003) were conducted in response to an earlier version of J. de Villiers's theory (de Villiers & de Villiers, 2000) that did not posit POV markers specified by the verb but distinguished between desire and belief on the basis of the clause structure of the complement (i.e., infinitival *to*-complements for desire versus tensed *that*-complements for belief).

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