CHAPTER 19

THE DEVELOPMENT OF KNOWING

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This chapter is meant to be about "knowing" (whatever, exactly, that is), and about how (one way or another) it supposedly develops across the life span. "Not nearly good enough," you could easily be thinking; or, less harshly, "probably not the most auspicious way of beginning." Who could blame you? Later on, perhaps, as page leads on to page, uncertainties of this caliber might well seem less jarring. Here, at the very outset, before things have hardly gotten under way, one ordinarily expects, and usually gets, more in the way of upfront clarity. As it is, however, and for reasons to which we will quickly come, little in the way of such front-end precision seems to be on offer when it comes to matters of "knowing." We all do, naturally enough, have a lot of impromptu things to say about knowing and knowledge, but as you will see, even among the experts from whom we might have hoped for more, there is surprisingly little in the way of real consensus concerning what knowing actually is, and even less consensus on how it develops. It remains a serious question whether knowing even qualifies as a bona fide psychological concept.

High on the list of problems with the concepts of knowledge and knowing is that they are so epistemically unforgiving. At least since Plato's *Meno* and *Theaetetus* (c. 400 B.C.), the so-called standard analysis of knowing demands that it be understood as something like "justified true belief" (Audi, 1999). All such easy "tripartite" talk aside, however, what remains is a preternaturally long and especially thorny list of perpetually unsettled philosophical questions. Included among these is whether being knowledgeable presupposes some defensible insight

into "how things really are," some capacity to recognize the "truth" should we encounter it, and whether we are able to reliably sort justifiable (i.e., epistemically good or permissible) from deontologically unjustifiable (i.e., epistemically bad or unwarrantable) beliefs. All of these disputed matters leave open the still further question of whose business it is to speak to such normative issues, and what we are all meant to do in the interim while such open questions are hopefully being settled.

Given standard divisions of labor, tradition has it that it is philosophers (not psychologists or related "cognitive scientists") who are meant to have, as part of their usual job description, the task of working out the defining features, substantive conditions, and limits of "justified true belief." Psychologists and cognitive scientists of varying sorts—whether because they are judged to be somehow lacking in the right stuff or are, otherwise, simply constitutionally reluctant to traffic in such matters—have characteristically tended to shy away from explicit talk of knowledge and knowing, and have ordinarily opted instead to focus their collective attention on a range of potentially more answerable, if no less contested, matters having to do with the holding of "beliefs." The same is true of this chapter.

BELIEFS AND BELIEFS ABOUT BELIEFS

Whether having elected to forego certain normative considerations regarding issues of knowing, and having chosen instead to refocus attention on more psychologically saturated matters having to do with believing, will ultimately succeed in allowing contemporary developmentalists to avoid some of philosophy's more vicious circles (see Overton, 2006) remains an open question. To take only one example, the whole point of talk about beliefs, as Davidson (1984) reminds us, is that beliefs can be, and often are, mistaken—a backdoor opportunity through which questions about how things "really are" once again threaten to enter. As such, research into matters of so-called false belief understanding (arguably the hot-button topic that has taken up the lion's share of things written on the subject of children's so-called developing theories of mind) automatically threatens to plunge us all back into those same murky justification waters that traditionally swirl around classical philosophic inquiries into knowledge and knowing. All such cautionary tales aside, however, and not withstanding the fact that there is also less than uniform agreement about what beliefs are and are not, it remains the case that talk of "belief," in contrast with talk of knowledge or knowing, is widely seen to hold the best promise of bringing the conversation about epistemic matters back to a domain of discourse in which

behavioral scientists are meant to be articulate, and where their traditional research tools and methods hold some hope of gaining traction.

On similar prospects, attention throughout this chapter is also turned away from disputed matters of knowing and redirected to issues of belief about belief, and about how they supposedly develop across the life span. What makes this otherwise promising shift in attention more problematic than it might otherwise be is that beliefs, whatever else they might be, are clearly not things in the world of the same ontological caliber as are, for example, heads and shoulders, knees and toes. No one, for instance, has ever seen a belief. Rather, beliefs would appear to require being understood as working parts of some larger "folk" or "commonsense" conception of mental life—parts that are closer to what philosophers of science have dubbed "hypothetical constructs" or, better still, "intervening variables"—imagined (some would say "theoretical") things whose existence we posit as parts of an explanatory system meant to help advance our appreciation of our own and one another's behavior, or even lack of behavior. Presumably, in a world where there was some direct link between what happened to us and what we did next, there would be no need for talk of beliefs. Things are, however, rarely this simple, and so we (or at least we as adults) are standardly given to imagining that there are, hidden somewhere behind our own eyes and the eyes of others, various internal "psychological states" that mediate our behaviors. Such mental states, we commonly assume, come in various stripes, including those typically understood as moods or values or affective dispositions, and so forth. Key among these supposed mental states are said to be "beliefs" that have been classically viewed as "dispositional psychological states"—possibly "propositional attitudes"—in virtue of which putative belief holders are thought to be disposed to assent to, or behave in accordance with, some proposition under consideration (Audi, 1999). A mere string of words that reads "Person X believes" (full stop) does not, therefore, constitute a well-formed sentence. Rather, to qualify as properly exemplifying such an epistemic attitude, the word *belief* requires being followed by some version of the word *that,* and then finished off by the listing out of some supposed propositional content (e.g., "Person X believes: *that* the cat is on the mat; *that* the moon is made of green cheese; *that* killing is wrong"). It is also commonly, although not universally (e.g., see Bickhard, 2006), supposed that the holders of such beliefs have somehow managed to form certain mental "representations" of the world—representations that may or may not actually accord with "reality." Without some appreciation of the possibility that beliefs may be, in some sense, mistakenly held, or are otherwise "false" or counterfactual, an important and apparently constitutive part of what it could possibly mean for something to be a belief would necessarily go missing.

The rationale for there being a chapter such as this rests on the broad expectation that there is an interesting developmental story to be told about how and when "beliefs" that satisfy some or all of the foregoing conditions are actually

formed, and how we come to act, not with reference to how the world actually is, but in terms of how we believe it to be. As such—and this is where the developmental story gains its primary foothold—it is widely imagined that, although those who are first credited with subscribing to such a notion of belief may be quite young (or at least "youngish"), others of a still younger age actually proceed differently by relying on something more prosaic—something perhaps as simple as appreciating that we are changed by the mere wear and tear of direct experience. Once in place, however, such notions of belief are thought to reference many different things, some of which have as their propositional content still other beliefs or other mental states, and thus are seen to legitimately bear on the topics of so-called mind reading, developing theories of mind, or the folk epistemologies that will prove so central to this chapter.

With regard to all of those emerging matters that actually do concern beliefs about mental life, and especially about peoples' changing beliefs about belief, it has been widely imagined that some or all of the following propositions hold:

1. There is some young age before which actually subscribing to various notions about beliefs is thought to be possible.
2. Those who are judged to be too young to actually represent their experience (or represent such things *as* being a particular way), although not held to be entirely uninformed about their environment, fail to behave in ways that warrant their being credited with employing any *bona fide* notions about beliefs.
3. There not only exists some developmental moment before which trafficking in beliefs is ontogenetically possible, but there is also some later and especially auspicious, watershed moment after which, in addition to acting in ways informed by experience, young persons can be fairly credited with holding to some beginning notion of beliefs about the material world, or (and there is a lot of confusion on this point) more complicated still, with having beliefs about their own and others' beliefs.
4. The newly acquired capacity to actually hold to ideas or beliefs about belief is either: (a) a singular, once-in-a-lifetime accomplishment such that, for ever afterward, all seemingly new insights about beliefs actually constitute minor procedural variations on what has already become a standard set of epistemic marching orders; or, alternatively, (b) an early step in a drawn out developmental process within which several distinguishable steps divide later from earlier insights into what holding to a belief could possibly mean.
5. There is some usually less auspicious moment in the course of epistemic development after which it is "all over but the shouting"; a time subsequent to which every seemingly new thing having to do with

beliefs that may appear on the ontogenetic scene is, on closer inspection, really and truly no more than the endless cranking out of still older ways of thinking about the knowing relation, plus (perhaps) a certain theoretically uninteresting measure of experiential water under the dam.

One could, more or less effortlessly, go on extending this presuppositional list to almost any length, but with these few planks already in place, the foundational platform supporting most of the weight of the available literature concerned with epistemic development has already assumed its signature form. What naturally follows from such a lining out of foundational assumptions—what most readers especially want to know—are straightforward answers to an equally short list of compelling questions. When, for example, would it be fair to say that young persons actually acquire their first fledgling insights into that belief-driven and representationally dominated world in which ordinary adults ordinarily live? Once "in the game," exactly how many interesting, qualitatively distinct levels, or steps or stages separate the first from the last of such insights? If there is some developmental trajectory to be seen in all of this, then what drives it or causes its wheels to come off? Is there some likely age (4 or 8 or 16, or perhaps in late adulthood) after which any subsequent questions about epistemic development become fundamentally uninteresting? Again, it would be easily possible to also further elaborate this list, but it would hardly matter. Serious answers (i.e., answers about which there is real professional agreement—some "justified true belief") to even this small starter-set of questions simply do not exist, and convincing answers to just one of them would put us so far ahead of where things currently stand that to ask for more would seem greedy. That is the bad news.

Here is some other news that, as you will see, necessarily plays to mixed reviews. Despite having come from radically different theoretical orientations, and having used almost entirely nonoverlapping methodologies and study populations, the broad picture of the development of believing so far painted by almost every cognitive scientist who has set her or his hand to this task awkwardly turns out, against all odds, to be, if not identical, then at least eerily similar. That is, with surprisingly few exceptions, whole armies of researchers (some studying infants, others studying young adults, and everyone in-between) have ended up describing what seem suspiciously like the exact same set of developmental achievements.

Although this much in the way of apparent consensus has at least the outward trappings of a good thing, the fact that more or less interchangeable claims are all being made about radically different sorts of persons of radically different ages or developmental stations needs to be seen as deeply problematic. The watershed insight that others fervently hold to and act on beliefs that contradict our own has, for example, been argued to occur for the first time ever in persons as young as 13 or 15 months (Onishi & Baillargeon, 2005; Surian, Caldi, & Sperber, 2007; see also Buttelmann, Carpenter, & Tomasello, in press); no, that's not right, it's really 2 or perhaps 4; no, wait, it's 6, or maybe 8 years of age;

take that back, its really only true of young adolescents; sorry, wrong again, it's college sophomores; no, now we get it, it all happens in those last days of their postgraduate years (for review, see Chandler, Hallett, & Sokol, 2002). In this theater of confusion, the exits are definitely not clearly marked. Although more will need to be said on this later, what should be already apparent is that the difficult job facing anyone assigned the task of summarizing the wildly scattered, and radically disunified literature on epistemic development is faced with an especially difficult job—one that has less to do with getting the details of the story straight than with working out who it is, exactly, that the story is supposedly about.

BALKANIZATION AND THE COLLAPSE OF THE ONTOGENETIC EMPIRE

Tackling this assignment would, of course, prove to be a great deal simpler than it actually is if more of the various contributors to this literature had looked back over their shoulders at the claims of others who have studied still younger individuals, or, alternatively, had looked forward across the full life-span trajectory at all of those competing claims being put out by those whose work focuses on still older age groups. As it is, however, developmentalists, many sporting nonoverlapping and highly *balkanized* states of mind, keep asking more or less the same set of questions, and often unbeknown to one another, incredibly coming up with more or less the same answers. This, it seems clear enough, is not good news either. **"**Balkanization"—originally a geopolitical term intended to describe conflicts that arose in the aftermath of the bloody dissolution of what was once the Ottoman Empire—has subsequently come to refer not only to the process of dismantling once larger nation states into smaller and often hostile political bits and pieces, but also references other and broader forms of fragmentation or disintegration. The creation of "gated communities," the introduction of separate enclaves within the once seamless Internet, and the "silo-ing" of various public health services are all contemporary instances of such balkanization.

Developmentalists hardly need look far afield to find homegrown instances of the effects of such processes of balkanization. For all intents and purposes, students of infant cognition, for example, live on entirely separate conceptual planets from similarly degreed specialists whose work centers on the epistemic understanding of young adults, or even the "beliefs about beliefs" held by preschool and early school-aged children. Babes in arms, ruddy-cheeked children in short pants, and aspiring young adults are all treated, for every practical

purpose, as if they were not members of the same species. Nor, it would seem, are those who study them. Members of our breakaway and often warring scientific tribes regularly use entirely nonoverlapping methodologies, speak mutually uninterpretable languages, subscribe to different journals, and can and do easily spend whole professional lifetimes without ever experiencing a real encounter with bona fide members of other theoretically alien groups.

All of this could be all that anyone has a right to expect in a world so supersaturated with new information that "specializing" is generally understood not simply as a necessary evil, but as a positive mark of the maturity of one's field. That is, notwithstanding a certain fading but wistful nostalgia for earlier and simpler times–, we, as residents of the early 21st century, regularly imagine ourselves as no longer having the luxury of being broadly concerned about matters lying beyond the immediate purview of whatever restricted domain or specific age group about which we have become local experts.

Whatever one's attitude about such pressures toward increasing specialization, our hope for collective salvation—the thing commonly imagined to pull us all back from the brink of having our best efforts dissolve into fractured and incommensurable knowledge claims—is regularly seen to lie in the prospect that the final aggregation of all such atomic facts will ultimately add up to a more complete and, therefore, truer big picture. That is, however much merit there may prove to be in the "divide-and-conquer" strategy that increasingly drives our specialized subdisciplines, their cumulative success necessarily presupposes that the localized facts unearthed in any separate patch of inquiry must, at the very least, avoid the spectacle of directly contradicting other "facts" unearthed elsewhere. Awkwardly, this does not seem to be how things are currently shaping up. Rather, and all too frequently, each and every chapter intended to contribute to the full story of knowledge development appears to make more or less the same claims about the same epistemic accomplishment, while incomprehensibly attributing them to radically different age groups. To gain some understanding of how this unsuitable state of affairs might have arisen, it will prove useful to first step briefly back in time in an effort to examine the historical circumstances that have led us to our current theater of confusion.

SHORT HISTORICAL SKETCH

Even casual observation would appear to confirm that adults regularly operate in a world that requires them to mark the differences between their own and others' psychological lives. Perhaps just as obviously, infants seem to do little or none of this, and instead, regularly find themselves confused about who believes what, collapse "true" and "taken for true," and otherwise badly bungle

everything that naturally depends on even a fledgling reading of their own and others' mental states. Infants and toddlers, who do seemingly have some early insights about things such as referential pointing (e.g., Bretherton, 1991), and even the prospects for pretense (e.g., Leslie, 1988), still regularly confuse seeing with knowing, and act as if they can hardly imagine that others could conceivably subscribe to beliefs that are false (e.g., Wellman, Cross, & Watson, 2001). Those who are a bit older (e.g., preschoolers) are often not that much better at solving such "mind-reading" problems, and thus, although having noticed the possibilities of deception and "false beliefs," nevertheless go on behaving in ways that leave us questioning the future of sociability. Shortly into their early school years, those of 6 or 8 may begin to intuit something of the "interpretive" nature of knowing (Chandler & Carpendale, 1994; Chandler & Lalonde, 1996), but all of this seems to do little to advance their appreciation of the situated character of all beliefs. Through middle school, and on into adolescence, young people are notoriously bad at knowing about (or, perhaps, it is caring about) the thoughts and feelings of others (Selman, 1980). As if this were not enough, even young adults (one's own postsecondary students, for example) are themselves often insensitive to the conceptual differences that divide us, and often reflexively imagine that those who hold to beliefs different from their own are necessarily and sadly mistaken. Because all of this is so nakedly the case, effectively every celebrated account of human development offered up in the course of the last century has had something poignant to say regarding these age-related epistemic matters.

In a more perfect world, all of these resulting story fragments, painstakingly described by generation after generation of developmental scholars, would have, by now, already begun to coalesce into some overarching "grand narrative." As already hinted at, this is not the conceptual world in which we currently find ourselves. Instead, scholars of this or that age, or one or another theoretical persuasion, have all separately contributed to an account that, in the aggregate, simply fails to add up. Perhaps it is true that, in our present era, all such "grand narratives" actually deserve, as Lyotard (1984) and other postmodern theorists have argued, to be dead.

As a way of refusing such know-nothing conclusions, an alternative strategy—the one being urged here—is to proceed on the hope that, even if it is not currently possible to touch bottom (Bernstein, 1983), we can all still hope to keep afloat the thin prospect that, by carefully examining the diverse claims about epistemic development already on offer, it may still be possible to pick out certain continuous threads running through the scattered research materials currently available—threads that, on closer inspection, might well amount to a real and seamless story to be told. One way to begin such a search—a way taken up in the sections that immediately follow—is to first try to gain enough altitude to accomplish some bird's-eye view of the recent history of research into the problems of belief entitlement, all in the continuing hope that adulthood is not

simply childhood, plus accumulated experience. From such a heightened viewing distance, it is, we suggest, both possible and useful to identify what amounts to three such distinct and often contradictory story lines that may still add up to some overarching plot.

One of these prospects has to do with Piaget, and the mid-century sequelae of his and Inhelder's insights about childhood egocentrism (see Chandler, 2001 for a review). A second concerns the reputedly contradictory accounts put out by those self-proclaimed "theory theorists," whose work on false-belief understanding began by presuming that Piaget was largely mistaken on all counts (Gopnik, Meltzoff, & Kuhl, 1999). A third thread running through this loosely braided history turns on the seminal work of William Perry (1970), and what he had to say about the course of epistemic development in the lives of college students and other young adults. As a way of beginning, a brief analysis needs to be made about each of these competing historical strands.

Piaget and the Prospects of Childhood Egocentrism

What is perhaps the most well-known of these competing accounts of young people's changing conceptions of psychological life is owed to the seminal ideas of Piaget and Inhelder (1963/1948)—ideas that, during the 1960s and 1970s (the period that William Kessen [1996] dubbed "the decades of the rebirth of Piaget"), fueled a whole genre of research into the course of "social-cognitive" development. While triggering a broad array of different research programs, the attention of the hundreds of contributors to this literature was especially focused on so-called childhood egocentrism, and the range of slow to develop role- and perspective-taking competencies, the absence of which was thought to collectively act as a break on the wheel of preschoolers' and young school-aged children's social-emotional development. In those early days, well before subsequent, usually unwarranted, attacks, this broad program of research (including a whole *pharmikea* of studies of social, conceptual, affective, and visual perspective-taking competencies) was everywhere the talk of the town. An electronic search of the literature of the day yields well over a thousand "hits" that related childhood egocentrism to almost everything that children ordinarily do, or do badly. For the better part of 20 years, books and journal articles given over to such topics were commonplace, and the programs of various developmental congresses became dedicated conduits for any and everything to do with the shifting fortunes of children's supposed role-taking abilities.

If the early contributors to this role-taking literature had it right (for reviews, see Chandler, 1978; Chandler & Boyes, 1982; Elkind, 1985; Selman, 1980), then the focal problem facing young school-aged persons, as they struggle

to get a grip on their own and others' mental lives, all turn on an early developmental incapacity to set aside one's own thoughts and feelings while undertaking to properly infer the thoughts and feeling of others. Preschool children, it was commonly said—although, interestingly, not by Piaget and Inhelder—were, in virtue of their age, all thought to be more or less "egocentric," and, because of this cognitive limitation, were thought to have an especially tenuous grasp on the differences that divide various people's mental lives. To be sure, there were some investigators who, while working well inside the tent of the Piaget-inspired role- and perspective-taking research enterprise, introduced evidence meant to suggest that preschoolers were a lot more clever at "mind reading" than most were prepared to allow (for a review, see Chandler, 1978). It was, nevertheless, generally thought to be true that the weight of evidence indicated that, before entering the public school system, most young persons are strongly inclined to confuse the differences between what they and others thought they knew.

As a way of seeing what these investigators repeatedly saw, picture a pair of two 4-, 5-, or even 6-year olds thrown together in a psychologist's laboratory where they sit opposite one another at a common desk, and where they are asked to participate in a kind of board game. Call it a "referential communication" task, one in which each player has arrayed before them an identical checkerboard-like matrix of differently colored squares, as well as the same selection of differently shaped and colored bits and pieces. The job of the first, and later the other, of these children is to begin by filling up the matrix in front of her or him with some selection of the "shapes" at their disposal, whereas at the same time communicating about what they are doing in such a way that their partner could follow their lead and create an identical matrix on their own side of the table. Although the children working on this measurement task can see and hear one another, a low screen running down the middle of their shared table makes it impossible for them to see the board and pieces of their partner. The obvious point of this more or less straightforward assessment task is to determine how well young research participants of various ages can anticipate and take into account the informational needs of their partner. As it turns out, preschoolers and kindergartners are hopelessly bad at such tasks (Carpendale & Chandler, 1996). Preschool and kindergarten children commonly begin and end by saying especially unhelpful things like "I have one and I am putting it here," whereas their partner standardly responds with comments like "good" or "me too," all without any apparent appreciation that everything that they should be saying or need to know has been inadvertently left out. In the end, when the occluding screen is removed, both children in such procedures are typically flabbergasted that their respective matrices fail to look anything alike (Carpendale & Chandler).

Given that, on good authority, this is precisely what young children regularly do, how is this possible? How could two such children, who otherwise

manage their lives with some skill, regularly behave so stupidly? What could possibly be going on in their "unlettered" minds that could have led them to mistakenly imagine that they had both performed so well? Multiply research findings such as this hundreds of times and you will begin to approach the sense of warranted conviction that persuaded generations of developmentalists that they knew, on good evidential grounds, that children younger than 5 or 6 simply do not properly understand that others, differently situated than themselves, processed the world differently. Why else, everyone thought, did preschoolers so regularly imagine that their parents automatically knew of their worst misdeeds?

Now, in the perhaps more methodologically chastened era in which we currently live, many who were originally involved in amassing such evidence might well grudgingly agree that, once again, certain potentially confounding methodological matters may have crept in and prevented all of us from seeing everything as clearly as might have been done. Perhaps some such measures were unnecessarily linguistically encumbered. Perhaps a more sensitive set of assessment tasks would have inched back by some number of months the age at which perspective-taking and referential communication skills "really" do put in their first ontogenetic appearance? Still, and this is our point, it seems unlikely that all of those relatively "tough-minded" investigators of not so by-gone years— colleagues, some of whom are still among us and who originally and judiciously collected such data—were all deeply misled and so fundamentally mistaken. As it turns out, research participants younger than 5 or 6 (whoever's research participants they are) just do ordinarily appear to be "thick as posts" when it comes to the complicated business of keeping their own and other people's thoughts and feelings separate, and just do seem generally bad at working out what it is that others know or have a right to know. As any divorce lawyer could tell you, such shortcomings are not all that uncommon, even among persons decades older than 4 or 5 (e.g., Bernstein, Atance, Loftus, & Meltzoff, 2004; Birch & Bloom, 2007; Epley, 2008; Epley, Morewedge, & Keysar, 2004; Keysar, Lin, & Barr, 2003). As such, any account of epistemic development that failed to take such compelling evidence properly into account is simply poorer for not having done so.

Notwithstanding all of the vaguely supportive things just said about what is an increasingly "ancient" role- and perspective-taking literature, it is also equally true that at the heyday of this research enterprise, it occurred to certain of its contributors (e.g., Coie, Costanzo, & Farnhill, 1973; Flavell, 1974, 1977; Kurdek & Rodgon, 1975; Masangkay, et al., 1974; Mossler, Marvin, & Greenberg, 1976) to ask the up-until-then unspoken question: Do all of the diverse procedural ways and means of measuring what are deemed to be expressions of the same childhood egocentrism actually demonstrate one and the same thing? In short, is childhood egocentrism—the cognitive stuff that reputedly prevents young persons from achieving a mature grasp of their social or interpersonal circumstances—really the

"unitary construct" it has been held out to be? The short answer is "no." When all of these unifying hopes proved empirically unsupported (i.e., when multiple measures of childhood egocentrism turned out not to correlate; see, for example, Kurdek & Rodgon), the entire social-cognitive enterprise suddenly fell under suspicion, threatened bankruptcy, and, by the early 1980s, was fully into receivership (for a review, see Chandler & Boyles, 1982).

Study of Children's So-called Developing "Theories of Mind"

Owed, perhaps, to nature's tendency to abhor a vacuum, all of the loose equity that had been previously tied up in the increasingly moribund role-taking enterprise was quickly bought up by a new generation of investigators, a predominately "commonwealth consortium" of British, Australian, and Canadian researchers preoccupied, this time, with what came to be called the study of children's "developing theories of mind." Rising phoenix-like out of the still smoking ashes of the childhood egocentrism literature, this new collective enterprise, emboldened by its thin but real conceptual ties to British analytic philosophy, worked to distance itself from all things Piagetian. The rallying cry of this self-anointed group of "theory theorists" was that, rather than conflating their own and others' points of view, young school-aged children—children who, for as much as half of their young lifetimes, had already well appreciated the prospect of representational diversity—had been mistakenly judged to have failed one or another routine test of childhood egocentrism, all for no better reason than that these earlier measures were judged to be unnecessarily verbally encumbered (Perner, 1991). That is, children as young as 4 now came to be said to already grasp the prospect of so-called false beliefs, and thus already properly understood that putative knowledge is always a direct function of the slice of reality to which one had been exposed. In short, it was broadly maintained, on the basis of new and generally compelling evidence, that children as young as 4 had already undergone some largely unspecified, but age-graded transformation that miraculously causes the scales to fall from their eyes, allowing them to see for the first time the possibility of "representational diversity" and the potential corrigibility of beliefs. The signature claim of such theory-theorists was, then, that during their preschool years, young persons had already come to the insight that the whole point of talk about "beliefs" is that one's ideas (i.e., representations, interpretations, constructions) of the world can be, and often are, mistaken. All of this was, at the time, new news. Not just ordinary, run-of-the-mill local news, but for many a blinding new insight. There had always existed, hidden beneath the obfuscating surface structure of generations' worth of wrong-headed methodologies, new and compelling evidence that there existed a heretofore unrecognized joint in the body of child development; an auspicious and so far previously undetected watershed

moment before and after which everything was different. Who would have imagined that such a critical ontogenetic milestone was present at 4, and could have laid there for so long, trodden over, but unrecognized by countless generations of otherwise serious scholars—scholars who, perhaps because of their theory blindness, had failed to alert us all to what was now so painfully obvious?

One way of getting a grip on the proper importance attached to the new discoveries of this "theories-of-mind" cabal is, as Dennett (1978) suggested, to imagine this: Imagine yourself, years ago, on the boardwalk of England's Brighton Beach. Near the water's edge you see a crowd—mostly children—gathered around the striped tent of a traveling Punch and Judy show. Punch is standing by as Judy rummages through a large steamer trunk. Suddenly, Judy slips and falls into the trunk. Punch, quick to seize any opportunity to get rid of her at last, clamps the lid resoundingly shut. Muttering something about needing to find a bit of rope to lash the trunk shut, Punch then exits stage-left. While Punch is off-stage, Judy succeeds in freeing herself from the trunk and surreptitiously sneaks away (stage-right). Punch (none the wiser) returns, secures everything with his rope, and pointlessly attempts to push the now-empty trunk over the edge of the stage/cliff. Quick to get the point, the older children in the audience are beside themselves, laughing and ridiculing Punch for stupidly believing to be true what they themselves grandly know to be false. Other, mostly younger children—children presumably younger than 4—look on in bewilderment and are not amused. In all of this you have the germ of what Dennett (1978) described as a "minimally complex" measure—a "litmus test," if you will—for sorting out who should and should not be credited with at least a fledging "theory of mind." All of this is convincing and especially important, regardless of whether it tells us anything of significance about Piaget's and others' different claims about childhood egocentrism.

In the more than two decades since Heinz Wimmer and Josef Perner first published their now classic 1983 article, taking up Dennett's challenge to find a "minimally complex" measure of children's developing "theories of mind," some two dozen books, and several thousand journal articles and conference presentations have appeared, the great bulk of which make it plain that 4-year-olds are simply better at solving standard false belief puzzles than are their still younger counterparts. What is widely called into question, however, is whether their doing so ought to be counted as evidence for the existence of some new, heretofore undiscovered joint in the body of human development. Offering up some opinion about all of this, and about whether "false belief understanding" is or is not the singular watershed event that it is standardly held up as being (i.e., whether it does, in fact, arrive de novo and without precedent, and whether, once in place, it actually marks the real end of epistemic development) will be the subject of much that needs to be said here. In particular, it will prove important to open up the question whether other, so far unmentioned, transformations in epistemic thought also evolve during either infancy or the middle-school years.

William Perry and the College Counseling Movement: Epistemic Development Grows Up

While all of the above was happening, elsewhere, on an entirely different intellectual planet far, far away, an entirely separate breed of cognitive development researchers—individuals primarily concerned with the epistemic growth of college students and young adults—had already been hard at work for most of two score years attempting to verify or extend or rewrite the seminal work of the Harvard educator William Perry (1970). If all of our earlier comments about the fractious and distressingly balkanized nature of research into the life-span course of epistemic development are accurate, then many who are reading these lines (especially those whose insights into matters of belief entitlement are owed exclusively to Piaget and subsequent generations of "theory theorists") may well be hearing Perry's name for the first time. If true, that is especially unfortunate. As it turns out, Perry conducted one of the relatively few truly longitudinal studies of young people's (in his case, male Harvard undergraduate) developing notions of belief entitlement. What he did, over a period of decades, was to individually meet with successive waves of students during each of their four undergraduate years, and to interview them at length about their ideas concerning where knowledge comes from, how truth is established, and how one is meant to react in the face of competing knowledge claims. On his account, these students followed a predictable sequence of steps or stages, beginning with a strictly objectivistic view of the knowing process. As they aged, or as their education progressed, these same students were shown to pass through a series of intermediate levels according to which some or all putative knowledge claims were first dismissed as unassuageably person-relative matters of taste or opinion, before eventually progressing to a view that saw knowledge as the arbitrated outcome of various "evaluativistic" efforts to pit better against worse reasons to believe (Kuhn, 1991). In the decades following the 1970 publication of his book *Forms of Intellectual and Ethical Development in the College Years,* successive generations of educators and college counselors found in Perry's writing a new way of accounting for many of the intellectual struggles that commonly arise in the course of students being exposed to an ever-expanding diet of new ideas. As a result, a long list of investigators have undertaken studies and reported findings that, for the most part, qualify rather than broadly challenge the general outline of Perry's original claims. Some (e.g., Benack & Basseches, 1989; Commons et al., 1989; Sinnot, 1989) have suggested that Perry's description of the shift from realism to relativism may count as the next logical step in Piaget's developmental framework. Using modest variations on Perry's scheme, still others such as Kuhn (e.g., Kuhn, 1991; Kuhn, Amsel, and O'Laughlin, 1988) and Kitchener and King (e.g., King & Kitchener, 1994; Kitchener & King, 1981) have examined a broader range of age groups than did Perry, whereas others still (e.g., Belenky, Clinchy,

Goldberger, & Tarule,1986) have explored the interesting question of whether movement through such epistemic stages is somehow "gendered," and so different for young men and women. Not surprisingly, given all of these efforts, there is a William Perry Society that meets biannually and always attracts more than a thousand participants, and whole journals that are largely given over to publishing Perry-related research.

FINDING SOME FOLLOWABLE PATH THROUGH ALL OF THE INCOMMENSURABLE THINGS COMMONLY SAID ABOUT THE PROCESS OF BELIEF ENTITLEMENT

Given all of the competing claims that have so far been listed out concerning the possible ontogeny of beliefs about beliefs, it should already be clear enough that, if there is some developmental pathway connecting these various dots, it will not be easily found lying about. Rather, coming to some fuller account about the full course of epistemic development, if possible at all, will require sorting through the details of numerous competing and often contradictory claims about what exactly happens, and when. To do this will require some sort of road map with some assigned starting point and some ideas about where to head next. Although, given the level of disagreement that is afoot, the choice of any such jumping-off place will necessarily be a bit arbitrary, the spot that we have chosen is on that densely populated patch of literature concerned with the study of children's so-called theory of mind. High on any list of the reasons driving this choice are the following facts: (1) the developmental accomplishment said to mark the first appearance of legitimate, "theory-like" ideas about beliefs is widely held out to be a "watershed" moment such that still younger children fail to qualify; and (2) once such *true* beliefs about beliefs are in evidence, then all of the fundamental architecture responsible for governing subsequent epistemic development is said to be in place. A possible virtue of this fundamentally antidevelopmental claim is that it drives an explicit stake in the ground, marking out a clear before and after. We use this marker as an organizational tool for lining out a sequence of three major chapter headings. First, in Part I, we attempt to make clear what has been intended by talk of children's developing theories of mind, presenting along the way key research findings that have been judged to give legitimacy to such theorizing. In Part II, we explore various claims and lines of evidence concerning

children still younger than the celebrated watershed age of 3 ~HF or 4, all in an effort to examine what we take to be the suspect claim that infants and toddlers are actually bereft of anything that would qualify as a working (and perhaps theory-like) understanding of their own and others' mental lives. Here research on deception, lying, pretense, and various referential actions are selectively reviewed. Having at least partially covered the relevant research literatures dealing with the epistemic accomplishments of infant and preschool children, we turn, in Part III, to an examination of what is said to happen in the early school years and beyond. Because what needs to be said in the final section concerns events unfolding across the remaining nine tenths of the life span, this section is subdivided into two parts: Part IIIA concerns research involving middle-school children, with a special focus on what has been termed their "interpretive theories of mind"; and Part IIIB summarizes some of the research on epistemic development in adolescence and young adulthood. The final Conclusion section identifies whatever developmental threads appear to run through the whole of this scattered literature, and, if better fleshed out, could contribute to an eventual life-span account of the topic of belief entitlement.

PART I: CHILDREN'S DEVELOPING THEORIES OF MIND—A PRIMER

<u>Piagetian Background</u>

Given that the theories-of-mind literature "arose like a phoenix" from the presumably discredited ashes of Piaget's earlier account of childhood egocentrism, it easily could have happened that serious efforts might have been made to rehabilitate all of those things that seemingly went wrong with first-generation studies of social role taking. After all, studies of childhood egocentrism had been the "bread and butter" of child development for most of a generation. As things have turned out, however, there was seen to be less merit in any such backward glance than might have been expected. The key reason that (at least in this case) knowledge about past "mistakes" seems to do such a poor job of preventing us from repeating them is that much of the received knowledge about Piaget's views concerning childhood egocentrism is, if not seriously mistaken, at least a poor and badly anglicized version of what Piaget and Inhelder actually had to say on this subject in their classic 1948 book *The Child's Conception of Space*. True enough, this volume did serve to prime the pumps of more than a hundred studies that all involved the use of some variation on Piaget and Inhelder's classic "Test of Three Mountains" (for a detailed review of this literature, see Chandler, 2001). Beyond serving as a procedural template, however, little of the original message that

Piaget and Inhelder worked to convey appears to have actually survived its North Americanization.

Rather than constituting an across-the-board indictment of the egocentric ways of preschoolers and young school-aged children, as is commonly claimed, or a search for some singular witching hour when the clouds of egocentrism were meant to lift, *The Child's Conception of Space* actually offers up a wide-ranging account of young people's early success at and only gradual progress toward the eventual achievement of an adult-like understanding of the spatial relations that exist between the objects that make up one's visual field. That is, rather than having been written off as hopelessly egocentric, even the youngest of Piaget and Inhelder's research participants were actually described as already having achieved a surprisingly sophisticated grasp of the difference between their own and other people's perspectives, just as other older participants were characterized as continuing to struggle with the coordination of such multiple perspectives well into their early adolescent years. In short, in the account of childhood egocentrism that Piaget and Inhelder actually provided, no threshold moments are offered, no age is specified before which egocentrism is the rule, or after which it was assumed to have disappeared entirely from the epistemic landscape. Instead, the whole affair is refreshingly portrayed as a rather drawn-out developmental process spread out across most of the childhood years; a process with no salutary, watershed moments anywhere in sight; and with no lines drawn in the sand that, if wrongly stepped across, could easily provoke the sort of infighting that later generations of psychometrically more punctilious role-taking and theory theorists were evidently spoiling for.

All such turning of the tables notwithstanding, by the time the 1970s had run their course, and as it came to be increasingly clear that the sundry ways of measuring social and conceptual, and affective and spatial perspective taking actually had little to do with one another, what Piaget and Inhelder may or may not have originally said about childhood egocentrism no longer seemed particularly pertinent. What mattered instead was that whatever they did or did not say was automatically taken to be yesterday's badly mistaken news. Given this Whiggish form of presentist historiography, the stage for the emergence of the then "new" theories-of-mind enterprise seemed well and truly set.

False Belief Understanding and Other "Minimally Complex" Measures of Children's "Developing" Theories of Mind

The signature publication that is widely held out as both a capstone on Piaget and Inhelder's presumably discredited past, and a signpost for the theories-

of-mind enterprise still to come, was Premack and Woodruff's 1978 article, "Does the Chimpanzee Have a Theory of Mind?" published in *Behavioral and Brain Sciences*. Clearly, the common expectation of the day was that, on the prospect that "lower" animals may also have some "theory-like" understanding of mental life, any inclination to deny some counterpart theory of mind to preschoolers would need to count as churlish and withholding at best. That is, with everyone rooting for the prospect that young children were at least as complex as their nearest neighbors on some lower branch of the evolutionary tree, expectations were naturally high that your typical preschooler would also be shown to legitimately harbor some workable theory of mind.

As a consequence of such expectations, Premack and Woodruff's now classic *Behavioral and Brain Sciences* "target article"— which concluded that chimpanzees do, in fact, have something akin to a "theory of mind" (but see Premack, 1988, for a later retraction)—seems to have done exactly what a proper target article is optimally meant to do—it drew a lot of fire, friendly and otherwise. That is, it drew an amazingly long list of some 27 commentaries, contributed by a wide-ranging international roster of well-positioned philosophers, psychologists, and sundry cognitive scientists, the large bulk of whom viewed the results presented by Premack and Woodruff as a harbinger of what was to come.

What has subsequently been marked as the most generative of these several commentaries was a submission by Daniel Dennett (1978), entitled "Beliefs about Beliefs." What was especially memorable about Dennett's short commentary is that it included what he described as the minimally complex experimental paradigm necessary to successfully impute a theory of mind. What, in particular, Dennett claimed was that anyone wishing to ascribe some theory of mind to an "organism" would need to demonstrate: (1) that Y believes that H believes that *p;* (2) that Y believes that H desires that *q;* and (3) that Y infers from his or her belief in (1) and (2) that H will do some observable thing *x*. As a case in point, it might be: (1) that You (Y) believe that Homer (H) believes that *(p)* there is beer in the refrigerator; (2) that You believe that Homer desires/wants *(q)* a beer; and (3) that, given (1) and (2), You believe that Homer will *(x)* go to the refrigerator, where he believes that the beer is kept, and get one. Dennett went on to caution that various things can complicate such an otherwise straightforward experimental arrangement. One of these arises when (as is often the case) *p* is true (e.g., when Homer is right in assuming that there actually is beer in the fridge). Under such fortuitous circumstances, Y might well anticipate that H would do *x* (i.e., go to the refrigerator) for any number of reasons (such as he is drawn to refrigerators like a magnet), none of which need have anything to do with imagined mental states such as beliefs. The way around such eventualities is to further arrange things experimentally such that H's doing *x* only makes sense if it is also imagined that H harbors a "false belief" about the likely consequences of doing *x* (by arranging, for example, that the refrigerator is stripped of beer, but doing so in a way that leaves

H unaware of this "unexpected transfer"). Under such experimental circumstances, it might still be imagined (assuming that Y had the capacity to entertain the possibility of false beliefs) that Homer will be expected to go to the refrigerator anyway, given that he is likely laboring under the misapprehension that there is still beer there to be had. All of this amounts to a seemingly roundabout, but methodologically well-oiled, way of demonstrating that some Y (e.g., you, or some child subject) does or does not subscribe to the "theory" that, true or false, Homer and others all behave with reference to the way they have come to "believe" the world is, rather than how it might objectively be.

Persuaded by the stringency of the semantically dense, but otherwise straightforward arguments put forward by Dennett, the large bulk of subsequent theory-theorists have chosen to follow his methodological recommendations and have put into play various tests of "false belief understanding," purposely built to require only minimal responses on the part of target subjects. By the late 1980s and early 1990s, publications dealing with such measures of false belief understanding, and related aspects of children's so-called developing theories of mind, had reached something of a fever pitch. In the 4-year window between 1988 and 1991, for example, there appeared, in rapid succession, a total of at least 10 volumes devoted to this common theme. The year 1988, for instance, saw the publication of both Astington, Harris, and Olson's flagship volume *Developing Theories of Mind,* and Dunn's *The Beginnings of Social Understanding.* In 1989, Harris's *Children and Emotion: The Development of Psychological Understanding,* Forguson's *Common Sense,* and Frith's book *Autism: Explaining the Enigma* all appeared. The year 1990 saw the publication, not only of Bruner's more generic *Acts of Meaning,* but also Wellman's *The Child's Theory of Mind;* immediately followed in 1991 by Carey and Gelman's *Epigenesis of Mind: Essays in Biology and Knowledge,* Frye and Moore's *Children's Theories of Mind,* and Whiten's *Natural Theories of Mind.* More than half of this long list of books is edited volumes and contains more than 50 chapters by authors who became regular contributors to the mushrooming theory-of-mind literature. Many of these same authors appear again in a 1991 special theories-of-mind issue of the *British Journal of Developmental Psychology,* further swelling the ranks of what was already more than a hundred related journal articles, and perhaps double that number of presentations to learned societies.

All of this early upheaval was, of course, hardly the end of it. A rough machine count of articles given over, in whole or part, to matters pertaining to various folk psychologies of mental life, so-called mind reading, and children's developing theories of mind all published in the intervening 20 years now easily exceeds 4,000! In extreme cases such as this, words like *deluge* and *maelstrom*— words that we are sometimes guilty of bandying about much too casually— actually do seem to apply.

Although this onslaught of published articles has obviously been viewed as welcome news by many of theory of mind's most avid "boosters," it also serves to create an impossible task for anyone—anyone such as ourselves—faced with the task of trying to say something interestingly synoptic about all of these speckled efforts. What, in the absence of a better alternative, we are reduced to here is more simply compiling—not a bona fide review, but, rather, something more on the order of *Cliff's Notes*—something that will, at best, provide a kind of "Traveler's Guide" (Moses & Chandler, 1992) to this runaway theories-of-mind literature.

Quick Reprise of "Standard" Tests of False Belief

Without imagining that any particular set of measures of false belief understanding is somehow coextensive with the full range of potential markers of children's growing appreciation of mental life (why not, for example, also include an account of children's developing understanding of mental-state terms, or referential communication skills, or deception, or pretense, or the telling of lies, to name only a few), it is, nevertheless, also true that an understanding of the possibility of false belief has served as a paradigm case for (and for many is all but definitional of) what having a theory of mind could possibly be taken to mean. For such reasons, special attention is focused here on Wimmer and Perner's (1983) so-called unexpected transfer task, and the claims that these and subsequent authors have made on its behalf.

In their now classic measure of false belief understanding, Wimmer and Perner presented children with a set of illustrated stories in which a protagonist acquired a false belief about an object's location by virtue of not having seen (as the child participants clearly saw) that object being surreptitiously moved from one place to another.

Picture a puppet theater outfitted with two cabinets, A and B, two doll figures meant to represent "Maxi" and his mother, together with a chocolate bar they are bringing back from the store. Together, Maxi and his mother place the chocolate in cabinet A. Later, while he is outside playing, and consequently in no position to be any the wiser, Maxi's mother (operating with no intent to deceive) moves the chocolate to the second cabinet B. On Maxi's return, child participants, who had witnessed all of these events, were asked to predict where, on his return, Maxi would look for his chocolate, or otherwise think it might be.

Remarkably, children younger than, first 6, but later 5, and eventually 4, typically failed to take account of the difference between the true (i.e., updated) location of the chocolate and what Maxi otherwise has every reason to believe (on earlier, but now outdated evidence) concerning its whereabouts. That is, children younger than what eventually turned out to be 4 were reported to confuse their

own more up-to-date knowledge concerning the current location of the chocolate with the now mistaken belief appropriate to Maxi. In short, such young children seemingly found themselves unable to entertain the possibility that they would think one thing and Maxi another. By contrast, children older than 4 routinely responded in ways indicative of their new-found appreciation that, out of ignorance about the "unexpected change" in the location of the chocolate, Maxi would proceed on his now false belief that the chocolate remained back in cabinet A where he had put it.

In the more than quarter of a century that has passed since Wimmer and Perner first published their results, the main outlines of their findings have been widely replicated, and young children's difficulties with such "unexpected transfer" tasks have been shown to persist in the face of at least some significant task simplifications (e.g., for a review, see Carpendale & Lewis, 2006). As a result, few have seriously doubted that 4-year-olds do standardly pass such false belief tests, just as young 3-year-olds regularly do not.

What *is* subject to especially serious doubts, however, are all of the far-reaching conclusions that Wimmer and Perner (and subsequent theory-theorists) have wished to draw from such data. Altogether, three such large-scale doubts will be focused on in the course of this chapter, but only the last of these are the focus here in the balance of Part I.

The first of these concerns centers on the view, staunchly defended by most theory-theorists, that children who fail such "unexpected transfer" and later "unexpected contents" tests (Gopnik & Astington, 1988; Perner, Leekam, & Wimmer, 1987) actually suffer from some across-the-board cognitive "deficit" that not only deeply undermines their ability to entertain the possibility of false belief, but also renders children of 3 years and still younger children fundamentally incapable of appreciating the representational nature of mental experience, of adopting an intentional stance, or of otherwise joining in with those of 4 years in understanding the representational nature of mental life. The task of reporting on the work and contrary claims of other investigators who often share with theory-theorists an abiding interest in the folk psychologies of young persons, but who reject the notion that young preschoolers suffer some cognitive deficit that categorically denies them access to anything like a bona fide belief about belief is the subject of Part II.

The second major bone of contention picked with Wimmer and Perner and subsequent theory-theorists (e.g., Gopnik, et al., 1999; Meltzoff & Gopnik, 1993; Perner, 1991; Ruffman, Olson, & Astington, 1991; Wellman, 1990) turns on their common claim that once an appreciation of the possibility of false belief is well in place, usually sometime around 4 years of age, such children can be fairly credited with a theory-like understanding of the mind that is adult-like in all of its essential characteristics. Although some quantitative improvements in fluency and

proficiency are envisioned, and some progression from novice to expert status is tolerated in such "one miracle" views, all possibilities of further qualitative transformations in the architectural structure of such mentalist theories are ruled out of court. In direct opposition to all such views, other contributors to the literature on epistemic development have rejected all such claims of singularity, and have undertaken to identify various other different and later-occurring mental models. Part III of this chapter is given over to a discussion of these subsequent turns of the epistemic wheel.

The third set of broad concerns that have been raised by critics of the theory-theory enterprise—concerns that are voiced in what still remains of this Part I—are neither about whether children younger than 4 already possess some or all of the competencies differently measured by various tests of false belief understanding, nor are they focused on whether there is continuing epistemic development beyond the fourth year. Rather, the concerns we now turn our attention to here are of a different and more root-and-branch sort—concerns that grow out of certain faults that are found with the whole theory-theory enterprise. As detailed here, these larger caliber concerns can be seen to turn on a small handful of foundational assumptions common to most theory-theorists. Included on this short list are what we call the "theory" question, the "developmental" question, and the "agency" question.

The "Theory" Question

High on the list of the things that have especially rankled those looking on from outside of the theory-of-mind tent has been the stubborn insistence among the theories-theorists that what they are studying actually warrants being called children's "theories" of mental life in the first place. Perhaps as a result of professional lifetimes often spent in the service of trying to educate undergraduates about what holding to a theory might conceivably mean, or more generally, because it has seemed to many to be much too much of a stretch to credit preschoolers, who still have difficulty in speaking in full sentences, with anything as toplofty as an already adult-like theory of mind, even onlookers who are otherwise broadly sympathetic often bridal, wishing that there were some less grand-eloquent way of framing the whole theories-of-mind enterprise.

Although there is, perhaps, an element of rightness in such disgruntlement, such critics would appear to be right, but not necessarily for the right reason. Although claims to the effect that children subscribe to such "theories" are commonplace, it is important to appreciate that such talk does not come out of nowhere. Rather, imagining that persons of every stripe necessarily rely on some more or less implicit "theory" about mental matters participates in a long and distinguished philosophical tradition.

In a continuing effort to slip the leash on the various "other minds problems" endemic to Cartesian dualism, and working to avoid a certain circularity inherent in the "verificationist accounts" of meaning promoted by philosophical behaviorists such as Ryle (1949), a long list of late 20th century philosophers of mind (e.g., Armstrong, 1968; Lewis, 1972; Morton, 1980; Putnam, 1960; Stich, 1996) have effectively promoted the idea that the meanings of mental-state terms are not best given individually or exclusively by observable behaviors. Instead, proponents of such "functionalist" accounts have argued that mental-state terms get their meaning collectively through their association with clusters of related terms, all of which are embedded within a common empirical theory. As they bear on efforts to explicate notions of "belief" or "desire," for example, such functionalist accounts promote the view that we all construct various commonsense or folk psychologies that, in ways not unlike the operations of scientific theories, allow us to explain certain regularities between stimuli and responses.

Certain "eliminativist" versions of such broadly functional accounts have been used in the service of arguing that commonsense or folk psychologies are not only theories but massively mistaken and untenable theories that deserve to be eliminated outright (e.g., Churchland, 1981). More commonly, however, a growing consortium of philosophers of mind, psychologists, and other cognitive scientists (e.g., Stich & Nichols, 2003) have pushed forward the idea that, because the meaning of ordinary mental state terms is best determined by the role they play in commonsense psychological theories, anyone committed to the serious developmental study of beliefs must, necessarily, attempt to make plain what particular theory or theories of mind young people actually use.

Among the contemporary psychologists who defend this view, perhaps the most clearly spoken has been Wellman (2002), who, together with some of his close collaborators (e.g., Gopnik & Wellman, 1994; Wellman & Bartsch, 1988), has worked to make plain what he describes as "three theory-relevant features" (Wellman, 1988, p. 67)—features that are supposedly common to any and all theories. He argued that all who subscribe to a theory share "a basic conception of what phenomena are encompassed by the theory; a sense of how these phenomena and propositions about them are mutually interdependent; and, consequently, what counts as a relevant and informative explanation of changes and relationships [sic] among the various phenomena" (Wellman, 1988, p. 66). According to Morton (1980), "theory-theory" is the contention that, at least in the case of ordinary adults, our knowledge of the mental world—the realm of beliefs, desires, intentions, thoughts, and so on—is a theory, a naive or undisciplined theory, even, perhaps, as Forguson (1989) suggests a "theorette," but a theory nonetheless. It is Wellman's contention, and that of all of the theory-theorists discussed here (e.g., Gopnik et al., 1999), that after a certain not yet fully agreed on but still tender age, children do come to subscribe to such a mentalistic theory.

Right or wrong, this has proved to be a very productive idea. If, as we are told that they should, theories are to be judged, not by some correspondence to the illusive "truth," but by their capacity to promote serious research, then theory-theory is clearly on the short list of the very best theories psychology has dreamed up. Perhaps Russell (1992) was more right than he knew or intended when he quipped that theory-theory is "so good that they had to name it twice." Perhaps all of those who find any talk of "children's developing theories of mind" sticking in their craw should just get over it.

That is not the problem. The real problem lies in automatically proceeding as though any account of children's developing insights about mental life must necessarily be a "representational" theory. This is hardly the case. Piaget, for example, had it that young children make it through most of their so-called sensorimotor period without "representing" anything at all. Enthusiasts of such representational theories should, of course, be entitled to a certain leeway in how forcefully they intend to press their point, but even serious readers of the theory-of-mind literature could be forgiven for coming away with the idea that young children automatically "have" a representational theory of mind in just the same way that they have heads, shoulders, knees, and toes. What makes this not only unfortunate but misleading is, of course, that there is no shortage of equally interesting alternative explanations afoot (see Bickhard, 2006, for a review of this literature). Perhaps the most serious of these contenders has come to be known as "simulation theory."

Rather than imagining that children in short pants are running about inventing and putting into practice elaborate mentalistic theories, it is considerably more plausible, many (e.g., Davies & Stone, 1995; Goldman, 1989; Gordon, 1986; Harris, 2006; Johnson, 1988; Markman, Klein, & Suhr, 2009) have argued, that children's success at predicting and explaining what others will think and do is not the result of a rich body of well-theorized information about the mind, but comes about instead by means of a process of projective simulation—by first imagining "stepping into the shoes" of the other and then figuring out what they themselves would perceive, think, or feel in that circumstance. As such, proponents of this view tend to place special emphasis on children's introspective access to their own mental states, arguing that phenomenological awareness of such states provides a rich source of information about the mind that does not rely on theoretical inferences.

Stich and Nichols (2003) try to convey how such a simulation approach might work by analogy to the problem of trying to work out how some new airplane design might work in certain wind conditions. One way to proceed, they suggest, would be to derive a prediction from aeronautical theory, together with various particulars about the plane in question. Another would be to build a model of the plane, put it in a wind tunnel that reproduces the wind conditions in question, and then simply observe how the model behaves—a strategy that does

not require a rich body of theory. Simulation theorists maintain that we can act as our own wind tunnel. All that is required to predict what another person's mind will do, especially if it is supposed that that person's mind is similar to one's own, is to imagine that such an individual would do and think as we would under similar circumstances. All of this, plus some capacity to go "off-line," and to imagine or "pretend" to have beliefs and desires different from one's own, is enough, such simulation theorists argue, to get the same result as theory-theorists, but without all of the excess "theoretical baggage."

The point here is not to necessarily plump for simulation theory at the expense of theory-theory. Rather, we only mean to emphasize that available accounts of children's theories of mind are not objective descriptions of how the world actually is, but are, rather, "theories" about how the world is, in active competition with other and different theories. Consequently, if you don't fancy talk about young children's mentalistic "theories," then there are other alternatives from which to freely choose.

The "Developmental" Question

Although most of the several thousand publications broadly concerned with the possibility of false belief understanding that have appeared since the early 1980s are about children, and thus constitute a contribution to "child psychology," few of these efforts qualify as truly "developmental" studies, all for the reason that they fail to satisfy even the minimal condition of entertaining the possibility that development actually unfolds in real time. Instead, most champion what amounts to a singular, "one miracle" view of change by paradigm revolution—that is, a "now-you-see-it, now-you-don't," one-off, salutary sort of accounting strategy that imagines the process of becoming representational as arriving without prefix and as having no sequel—a process, if you can still call it that, which effectively "begins and ends all in the same breath."

Clearly, as we have tried to show, the new proud-as-punch insight that effectively binds together all card-carrying members of the theories-of-mind group has been the renunciation of Piaget and all of his supposed "powers" (e.g., Gopnik et al., 1999). Most particularly, they have objected to Piaget and Inhelder's allegedly mistaken insistence that, well into their adolescence, young school-aged children continue to suffer a persistently egocentric frame of mind. Quite to the contrary, all seriously committed theory-theorists have insisted instead that preschoolers of 3 ~HF or 4 already subscribe to an epistemic view that makes adult-like beliefs about beliefs (including false beliefs) fully available to them (e.g., Perner, 1991; Wellman et al., 2001).

As if it were not enough to have declined to see in the epistemic struggles of young school-aged children anything that might oblige a re-envisioning of the

folk epistemologies attributable to those living beyond the familiar 5- to 7-year shift (Chandler & Lalonde, 1996), theory-theorists have also gone the second mile by attributing to toddlers, and other preschoolers still younger than 3 ~HF or 4, a disqualifying "conceptual deficit" (e.g., Perner et al., 1987)—one that reputedly renders the world of mental representation essentially opaque. Having so completely truncated their search pattern both fore and aft, theory-theorists have come to be seen by many as guilty of having so thoroughly narrowed the focus of their research attention that all conceivable forms of epistemic growth and development end up collapsed onto a single and ultimately nondevelopmental vanishing point.

It is true, of course, that several key contributors to the theories-of-mind literature have speculated about and collected evidence pertaining to what are described as developmentally later occurring "beliefs about beliefs about belief" (see Harris, 2006, for a review). In one such series of studies, for example, it was shown that, although 4-year-old's were perfectly able to unpack nested situations concerning Mary's beliefs about John's beliefs about the location of an ice-cream truck, only children of 7 or 8 could get their minds successfully wrapped around multiply embedded problems involving Mary's beliefs about John's beliefs about Mary's beliefs concerning the location of the truck (Perner & Wimmer, 1985). These and related studies, to be discussed more fully later in this chapter, are commonly brought out whenever there is a felt need to defend against the accusation that theory-theory lacks a developmental dimension.

It is also the case that some potential developmental scope may have been added by theorists such as Wellman (1990; Wellman & Liu, 2004) and Perner (1991), both of whom have written importantly about some of what might go on before 4. For his part, Wellman has developed an elaborate theory about how, before acquiring any effective understanding about the possibility of false beliefs, even young 3-year-olds understand and mentally operate on notions of "desire." In short, Wellman defends the view that before first using anything like a standard "belief-desire psychology," they already have in place at least half of that story (e.g., Wellman & Liu, 2004).

Although certainly aware of the problem, what Wellman's postulated "Desire Psychology" does not effectively address is what Duhem (1906/1962) called the problem of *holism.* According to this widely accepted view, our various mentalistic concepts, including various intentional states such as beliefs and desires, cannot be treated in isolation. Rather, all of these concepts need to be seen as entrenched in a common network of related concepts. Thus, as Armstrong (1981) has argued, "The corresponding concepts must be introduced together or not at all" (p. 24). On this view, concepts of desire, denuded of necessarily associated beliefs, would be fundamentally nonsensical (Bennett, 1978). For example, it is not clear what it would mean to say that Homer wanted a beer unless one was also prepared to say that he knew what a beer was. By such more holistic

lights, our concepts of belief and desire necessarily come as a "package deal" and must necessarily share a yoked developmental history. On this account, it would then not be possible for a genuine conception of desire to be in place before a corresponding conception of belief. The upshot of all of this would seem to be that theory-theory is back where it started, that is, with a well-marketed set of assumptions about a particular watershed achievement, but little or nothing to say about what might have come before or might come after (Chandler, 2001).

More generally, it is worth noting that, seen through the eyes of many theory-theorists (e.g., Gopnik, 1991; Gopnik & Wellman, 1992; Morton, 1980), any later-life changes that might conceivably occur in young people's conceptions of mental life would need to be understood as instances of some revolutionary "paradigm shift"—a shift of the sort often thought to mark the slow, episodic course of scientific theory change (Kuhn, 1970). Given that theory-theorists are generally committed to the view that there is no real qualitative light between the theory of mind subscribed to by 4-year-olds and that held by your average adult, it is hard to imagine where the requisite incommensurabilities required to spark such a paradigm revolution might come from, or how any of us would be able to recognize such revolutionary changes if they were to somehow occur. Interestingly, rather than taking scientific change as a source model for ontogenetic change, developmentalists such as Piaget (1972/1965) have tended to move in the opposite direction by taking children as source models for science. Although this is perhaps not the place to attempt to arbitrate between these contrasting views, it should at least be clear enough that, although nothing about theory-theory would lead us to expect epistemic growth beyond the preschool years, more constructivist accounts of the sort promoted by Piaget do provide some grounds for hope that the ontogenetic study of epistemic change across the life span may impact on our collective efforts to better understand scientific change (Chapman, 1988; Garcia, 1987; Murray, 1979).

The "Agency" Question

The thrust of this concern over precisely when, in the course of development, growing persons can be fairly credited with a 'mature' theory of mind turns on the child-as-scientist metaphor that has dominated the theory-theory enterprise, and the "causal" language that commonly attends it. More specifically, it is argued (e.g., Blasi, 1995; Bickhard, 2006; Carpendale & Chandler, 1996; Greenwood, 1989; Russell, 1996) that, in its push to situate children's conceptions of others' beliefs and desires within a "scientistic" framework of folk psychological "laws" (e.g., Gopnik & Wellman, 1994), the theories-of-mind enterprise has promoted an impoverished conception of agency, that, to borrow from the Enlightenment philosopher Thomas Reid (1788/1863), works to wrongly locate the "active powers of man" (sic.) outside of, or external to, the individual.

Bandura (1986, p. 12) similarly characterizes such accounts as promoting only a notion of "mechanical agency" where all activity or movement originates from outside of persons. The upshot of such an externalist view, as Blasi (1995, p. 235) points out, is that "the idea that knowledge belongs to, [and] is an intrinsic possession of the conscious person, who intentionally pursues it" is lost, and all talk of subjectivity, at least as it is commonly understood to operate in the personal construction of meaning, takes a back seat to more "object-centered" notions that work to reduce genuine interpretive diversity to mundane instances of simple ignorance and *mis*interpretation (see Carpendale & Chandler, 1996, p. 1693). Although some of the evidence required to show this more clearly better belongs to Part III of this account, where attention is focused on the distinction between passive "copy theories" and more active "interpretive" conceptions of mental life (Chandler & Boyes, 1982), it will hopefully be enough to point out here that all standard "unexpected transfer tasks" succeed in driving a wedge between one and another representation of the world by simply gerrymandering access to information so that some target person (Maxi, for example) is left in ignorance, whereas the subject himself or herself is better informed.

What remains more or less hidden in the background of this description is exactly where such a "copy theory of mind" leaves children in terms of their understanding of the source of the mind's activity and their consequent notions of epistemic agency. A copy theory, we would argue, naturally leads children to view epistemic agency as originating outside, or external to, the individual. This follows from the fact that, based on such a view, the mind is, as Rorty (1979) claims, no more than a "mirror of nature" that essentially reflects internally on the mind's eye what can be seen externally in the world outside our skins. Although some (e.g., Perner & Davies, 1991) have claimed that the mind, even in this evident state of passive accommodation, is nevertheless "doing" something, it is no more "active," we would counter, than is any other mirror or reflective surface when light strikes it. The mind's activity, in this case, is neither a process that is initiated nor controlled by an active subject, and is akin instead to what philosophers of action (e.g., Frankfurt, 1988; Taylor, 1966; Velleman, 2000) have characterized as behavioral *re*-actions, or mere internal events, that pale by comparison with more "full-blooded" (Velleman, 1993) and "meaningful" (Moya, 1990) real *actions* belonging to, and initiated by, autonomous, self-moving agents. For the young copy-theorist, mental life amounts to "psychological and physiological *events*" that, as Velleman (1993) notes, may be said to "take place inside a person," but then (and here's the catch) "the person serves merely as the arena for these events: he takes no active part" (p. 189). In other words, for those children who hold a copy theory of mind, it is best to say that they recognize the mere *activities* of epistemic "patients" rather than the meaning-making *actions* of knowing "agents" (Sokol & Chandler, 2003).

Questions about all of these disputed matters abound. Why, except for certain persnickety methodological considerations, are "true" beliefs not just as interesting, for example, as those that happen to be "false"? Are chimpanzees really a hard enough case? What about our cats, dogs, and goldfish, or, still closer to our hearts, our infant children? Given that your average adult lives late into their 70s, and that children of 4 are commonly credited with having a theory of mind that is already adult-like in all of its major particulars, what are we all meant to be doing epistemically in the remaining 70 plus years of our lives? Is that all there is? There is every reason to suppose that any complete list of such uncertain and disputed matters could, in principle, be extended almost indefinitely.

PART II: IS THERE METAREPRESENTATIONAL LIFE BEFORE AGE 4?

Given a quarter-century's worth of near and far replications of Wimmer and Perner's 1983 initial results, whether children younger than 4 years can or cannot pass "standard" tests of false belief understanding is neither particularly open nor, we suggest, especially interesting. What is of theoretical moment, however, is whether there is some early age before which beliefs about beliefs can otherwise be shown to be possible, and whether theory-theorists' own theoretically charged reasons, and not some other reading of the evidence, best fit the generally agreed-on fact that children older than "X" are typically successful and children younger than "Y" unsuccessful in navigating the intricacies of standardized "unexpected transfer" tasks.

Boosters and Scoffers

Among the groups of strange bedfellows that have assembled around these empirical and interpretive challenges, two, in particular, stand out as sufficiently oppositional in character to allow some real light to pass between them. The catechetical claim common to the historically first and most orthodox of these groups—call them the *Scoffers*—is that there really exists an early stretch of developmental time before which nothing about young people's behavior warrants their being credited with anything like a bona fide theory of mind—a supposedly "mind-blind" period (typically said to occupy the first 3 or 4 years of a child's life) that then gives way, at some decisive watershed moment, to what are essentially adult-like insights about the representational nature of mental life.

Although practitioners of this "one miracle" view tend to be unified in their common condemnation of more "gradualist" alternatives, there is among them room for important differences of opinion about what constitutes a truly "minimally complex" set of methods for indexing the exact age of onset of children's first and purportedly last theory of mind. Consequently, among the crowd currently taking issue with the claim that 4-year-olds, but not still younger children, already subscribe to a truly representational theory of mind, there is a subset of otherwise committed *Scoffers* who, although seemingly comfortable with the enterprise of specifying some exact age at which true representations of representations first become possible, is, nevertheless, still prepared to quibble over whether this happens to be at age 4 or some still earlier age (for a review, see Carpendale & Lewis, 2006). The shared hope of this reformist wing of the *Scoffer* group is that by holding to the same demanding standards of proof subscribed to by more orthodox theory-theorists, it will be possible to lower even further the age at which research participants are ordinarily seen to "pass" such procedures.

Standing out in sharp contrast with this *Scoffer* group of theory-theorists, there also exists a second, but more loosely organized, assemblage of *Boosters* that all participate in the common view that children much younger than 4 have already achieved and effectively practice some real, if fledgling, understanding of epistemic life. The reservations that representatives of this *Booster* group generally hold about classic theory-theory tend to be of a broad and transcendental sort that leads them to object, not just to the particular claim that children younger than 4 lack a genuine theory of mind, but to any line of evidence purporting to specify any other age before which some important modicum of representational complexity can be said to be at least tacitly present. In its most orthodox form—practiced by those whom Olson (1993) calls "intentional realists"—various neonativist *Boosters* (e.g., Fodor, 1987; Leslie, 1987; Macnamara, 1989) argue that nothing as "powerful" as a truly representational system could possibly arise out of an antecedent system of less complexity, and so some nascent, perhaps modularized, beliefs about belief are said to have existed from the outset. For example, Fodor (1987) writes:

> Here is what I would have done if I had been faced with this problem in designing Homo sapiens. I would have made a knowledge of commonsense Homo sapiens psychology innate; that way nobody would have to spend time learning it…The empirical evidence that God did it the way I would have isn't, in fact unimpressive. (p. 132).

Still others (e.g., Dunn, 1991), spurred on by the discovery of so many previously unrecognized capabilities on the part of the very young, tend to also be deeply suspicious of all categorical claims about what children cannot even begin to do, especially when such claims are based on an inability to pass some artfully arranged laboratory procedure. As such, representatives of this *Booster* group tend

to be somewhat dismissive of the whole false belief assessment enterprise that has spawned so much of the present theory-of-mind literature. Operating instead in full recognition of the lurking possibility that their own commitments to greater ecological validity come equipped with some heightened risk for errors made on the side of leniency, such investigators, nevertheless, typically see methodological trade-offs that err on the side of the in situ as generally preferable to the more pristine process of holding out until the last possible false-positive dog is dead.

Finally, among this loosely federated *Booster* group, there are those (and here we mean to especially count ourselves) whose first commitment is to the working principle that nothing, or next to nothing, in the ontogenetic course ever truly qualifies as a bona fide one-trick pony, capable of arriving on the scene without antecedent or departing without constantly changing structural consequences. By this way of reckoning, anything that is alleged to simply "pop up" at the age of 4, or any other age, and that is subsequently imagined to go on being relentlessly self-same through subsequent thick and thin, automatically falls under suspicion.

Unlike their *Scoffer* counterparts, whose collective efforts have been, at least historically, unified by a common methodological commitment to some variant of standard "unexpected change" and "unexpected transfer" measures of false belief understanding, *Boosters* have not tended to rally around any single assessment strategy. Rather, they have variously used sundry measures of deception, pretense, and referential communication as methodological vehicles for getting at young children's early insights into mental life. Representative examples drawn from this scattered body of research are lined out under the broad heading of *Deception, Lying, Pretense, Referential Behavior, and Other Markers of Early Insights into Mental Life.* Before any of this, however, attention is first turned to the efforts of those who have tinkered with more standard measures of false belief understanding, all in the hope of better identifying whatever lower bound threshold there may be in children's earliest beliefs about beliefs.

Bending over Backward to Lower the Bar on False Belief Understanding

As skilled Limbo dancers are well aware, success at lowering the bar depends on just how far one is prepared to bend over backward. In this case, various efforts to pick out the lower bound of false belief understanding have all involved inventing modified methods and procedures calculated to remove incidental impediments that might work to prevent young children from demonstrating their best understanding of other people's earliest beliefs about belief. By working to denude such measures of unnecessary mental-state terms (Moore, Pure, & Furrow, 1990), by allowing respondents to simply point (rather

than explain in words) where Maxi would first search for his chocolate (Siegal & Beattie, 1991), by carefully rehearsing the plot lines of the various story problems used (Lewis, 1994), by otherwise providing children with various memory aids (Mitchell & Lacohee, 1991), or by otherwise modifying these tasks in ways meant to more fully engage the interests of young subjects (Hala & Chandler, 1993a, 1993b, 1996; Moses, 1993; Wellman & Banerjee, 1991), more or less everyone who has worked to strip standard false-belief measures of their unessential processing requirements has found the same thing—children as young as 3 years standardly demonstrate an understanding of the possibility of false beliefs.

For similar reasons, Wellman and colleagues (Wellman, et. al., 2001) worked to draw attention to the fact that our collective theoretical interests are, or should be, in children's understanding of true belief, and that the common preoccupation in the literature with false belief understanding is primarily owed to methodological difficulties encountered in attempting to distinguish actions that are based on beliefs that are true from actions that implicate no representations of beliefs at all. As such, if it were methodologically possible to determine with some confidence that young children's understanding of their own and others' actions are, in fact, belief driven, even though these beliefs happened to be true, then it would be possible to eliminate many of the awkward procedural steps required to orchestrate standard false belief scenarios. Through a series of 10 interrelated studies, Wellman and his colleagues worked to overcome various confounds associated with inquiring about true (as opposed to false) beliefs and, in the process, found that children as young as 3 performed at or near ceiling levels.

In brief, it would appear that the problems in false belief understanding encountered by children younger than 4 are not due to some conceptual deficit, or lack of understanding of false beliefs per se, but are better laid at the door of various other processing limitations, including executive function limitations, language problems, natural biases, or difficulties with counterfactual reasoning (for studies demonstrating these links, and for reviews of this extensive literature, see Jacques and Markovitch, Chapter 13 of this volume and also see, for example, Bloom & German, 2002; Carlson, Moses, & Claxton, 2004; Carpendale & Lewis, 2006; German & Leslie, 2000; Harris, 1991; Milligan, Astington, & Dack, 2007; Moses, 1993; Muller, Zelazo, & Imrisek, 2005; Zelazo, 2000).

The broad conclusion that belief reasoning makes significant demands on various cognitive processes—demands that call into question whether so-called classic measures of false belief understanding are, as advertised, minimally complex—is further supported by correlations between belief reasoning and executive functioning in adults (e.g., German & Hehman, 2006), and by evidence that belief reasoning is impaired if executive functions are disrupted because of brain injury (e.g., Samson, Apperly, Kathirgamanathan, & Humphreys, 2005). Taken together, what these and other related findings show is that, by simplifying various task requirements, or eliminating various troublesome procedural

complications associated with standard "unexpected change" and "unexpected transfer" false belief tasks, it is possible to systematically lower the age at which young children first give evidence of understanding the intentional nature of beliefs, both true and false.

The general thrust of these several rehabilitative efforts has, then, been to show that there is something psychometrically inhospitable about standard false belief measures that oblige young preschoolers to sit through verbally saturated, third party, "as-if" narratives concerning matters in which they have no personal stake, all as a prelude to answering a barrage of temporally ill-marked, hypothetical, and computationally complex questions that regularly pit children's known salience biases against their otherwise good intelligence. Alternatively, by simply taking steps to further clarify or to better temporally mark the questions being posed, by better equating the salience of both false and true beliefs (Mitchell & Lacohee, 1991; Zaitchik, 1991), by working to reduce the memory load and other computational demands of the usual story narratives (Lewis, 1994), or by otherwise modifying these tasks in ways meant to more fully engage the interest of young subjects (Chandler, Fritz, & Hala, 1989; Hala & Chandler, 1993a, 1993b, 1996; Hala, Chandler, & Fritz, 1991; Moses, 1993; Wellman & Banerjee, 1991), it is clearly possible to show that if there is a special witching hour when young children first acquire an understanding of the possibility of false beliefs, it most likely occurs nearer 3 than 4 years of age.

It remains true, of course, that children who are 4 and older typically do a better job of understanding others' false beliefs, and of remembering their own false beliefs than do their still younger counterparts, often without the benefit of the various procedural modifications just described. For many orthodox theory-theorists, all that such boundary-altering findings are dismissively said to show is that, when given "special assistance," somewhat younger research participants can be "artificially" helped to succeed on tasks that they would normally fail (e.g., Wellman et al., 2001). What each reader will need to decide for himself or herself is whether it is the so-called standard measures of false belief understanding, or the various procedural variations just reported here, that should be judged as most indicative of children's natural abilities. In weighing these alternatives, it is, perhaps, useful to also factor into one's judgments the fact that adults also frequently experience difficulties of their own in sorting out what they and others believe (e.g., see Birch, 2005; Birch & Bernstein, 2007; Birch & Bloom, 2003, 2004; Bernstein, et al., 2004; Epley et al., 2004; Keysar et al., 2003; Royzman, Cassidy, & Baron, 2003).

Whatever you, as a reader, choose to conclude about the likely merits of any or all of the methodological and procedural modifications offered up as a way of "improving" on more traditional measures of false belief understanding, and whether you are convinced that false belief understanding occurs at age 4 or much earlier, what you will likely have still more difficulty with is the prospect to which

we now turn attention: A working theory of mind may well be available even to infant children, and possibly even to various nonhuman animals, all of whom have especially limited resources for language and executive control. For instance, Onishi and Baillargeon (2005) report that 15-month-old infants look longer when an agent with a false belief acts as if she has a true belief (see also Surian et al., 2007). *Similarly,* chimpanzees (who got all of this started in the first place) are known to exploit what a dominant competitor sees, or "believes," to obtain food without threat from the more dominant chimp (Hare, Call, & Tomasello, 2001; Tomasello, Call, & Hare, 2003). Not surprisingly, these findings are controversial. Some have argued, for instance, that such evidence shows that infants understand false beliefs, whereas similar evidence in nonhuman primates has been viewed as indicators of perception and knowledge understanding, but not beliefs (e.g., Call & Tomasello, 2008). Still leaner interpretations of these findings have also been provided (see Penn & Povinelli, 2007; Perner & Ruffman, 2005).

Leaving nonhuman primates aside, what are we to make of the possibility that infants and children much younger than 3 or 4 might be more competent at reasoning about mental life than the classic literature on false belief understanding would lead one to believe? Is there other evidence to suggest that before age 3 or 4 children should be credited with some understanding of mental activity? Are the differences between infants and older children simply ones of degree? Are there two separate mental-state reasoning systems, one that is dependent on language and executive abilities, and another that relies on more automatic processes? These are the kinds of questions we turn to in the following section.

Deception, Lying, Pretense, Referential Behavior, and Other Markers of Early Insights into Mental Life

Since the 1980s, charter members of what we have called the *Booster* group have collectively pointed to an impressively long list of early arising competencies, each of which, when taken piecemeal, pose some serious, if limited, challenge to the delayed onset view, and when combined, collectively constitute a rather impressive challenge to any would-be *Scoffer*. Any such list of possible challenges to the claim that only 4-year-olds appreciate the propositional nature of their own and others' representations would include the facts that, well in advance of any supposed 48-month-watershed, still younger children are uncommonly good at the following tasks: (1) taking active steps to disinform others by purposefully leading them into beliefs that are patently false (e.g., Chandler et al., 1989, Hala & Chandler, 1993a, 1993b, 1996); (2) engaging in elaborate acts of social pretense that arguably require a working understanding of the distinction between things and their possible counterfactual representations (e.g., Dunn &

Dale, 1984; Leslie, 1987); (3) salting their usual talk with mental-state terms that attach to their own and others' belief states (e.g., Bretherton, 1991); (4) behaving cooperatively and competently with others in ways that seem difficult to interpret without crediting them with knowledge of true belief states (e.g., Dunn, 1991; Reddy, 1990); (5) grasping the referential intent of adults interested to teach them the meaning of various words (e.g., Baldwin et al., 1996; Bloom, 2000; Tomasello & Barton, 1994); and (6) declaratively pointing to interesting matters that lay outside another's perceptual field (e.g., Astington, 1993;; Bretherton, 1991; Bretherton & Beeghly, 1982). Although none of these claims is free of controversy, or somehow immune to a host of possible reductive reinterpretations, the combined weight of these various demonstrations, some of which present evidence of an ability to appreciate representation as representation in infant children hardly able to walk or talk, would seem to be enough to cause anyone not already fully committed to a delayed onset view to seriously rethink their position. In difficult situations such as this, the open question is always, "Would a lie help?"

Lies and Deceit

We are not of one mind about lies and deceits. Notwithstanding the fact that bearing false witness easily made it into Judeo-Christianity's top 10 "thou shall nots" (Exodus 20: 2–17), few among us are entirely free of the sin of pride about having successfully lied our way out of some tightly painted corner, or having privately admired the elegance of some especially well-crafted deceit. Not to put too fine a point on it, pulling off a good lie or deceit is widely (although rarely publicly) counted as a point in one's intellectual favor. Taking someone in— pulling the wool over their eyes, so to speak—clearly requires skills, including the skillful reading of other people's mental states.

It seems intuitively compelling that certain well-placed lies or acts of deceit, especially those purposely built to lead others to take as true what is known to be false, offer something close to proof positive that the young deceivers who author them must have at least some working understanding of the possibility of false belief, and thus deserve to be credited with some bona fide theory of mind. Coupled with this evident link, if not an identity relation, between deceit and false belief understanding is the fact that there is a good deal of at least anecdotal evidence indicating that the ability to use mental-state terms, to perpetrate lies and deceits (Dunn, 1991; Dunn & Munn, 1985; Reddy 1990), and to recognize them in the actions of others (e.g., Lewis, Stanger, & Sullivan, 1989), first come to children at a surprisingly young age.

None of this has escaped the watchful eye of typical theory-theorists, most of whom have been quick to appreciate that if any important part of such naturalistic evidence about the alleged deceits of infants and young preschoolers is allowed to stand, then still further efforts to go on endlessly replicating standard

measures of false belief understanding become pointless, and all claims about a mysterious watershed in false belief understanding said to emerge at age 4 will need to be abandoned. The battle lines are, therefore, clearly drawn. Either toddlers do sometimes behave deceitfully, and do so with a clear intent to cause others to believe to be true what they themselves know to be false (thus necessitating a dramatic rewriting of theory-theory as we have come to know it), or alternatively, perhaps such children are simply repeating things they have heard others say, regurgitating social scripts and routines, or mindlessly going through the motions of these games for the sheer pleasure of the responses they get from others. What follows is an attempt to line out available evidence on both sides of this controversy, beginning with the deflationary arguments standardly run by classic theory-theorists.

Before turning to these competing accounts, however, one quick clarification is in order. Hopefully it is already clear enough that what is at stake here has nothing to do with whether persons of any given age are or are not skillful liars. In fact, evidence that young children are terrible (often comical) liars and regularly fail in their attempts to deceive is abundant. They deny, for example, having eaten the cookies despite being smeared with chocolate and cookie crumbs, they "hide" under the couch without bothering to tuck in their protruding feet, and they regularly bumble the parts that would actually make for convincing lies. Such preschoolers are similarly notorious for their transparent and patently self-serving attempts to rewrite history in accordance with their own liking (e.g., LaFerniere, 1988; Vasek, 1988), and are otherwise quick to confuse ignorance-based mistakes with lies, or to wrongly imagine that deceit can be measured by its distance from the truth and the amount of punishment it draws. As Piaget reported (1965/1932), for example, even 5- and 6-year-olds believe that a lie about a 100-pound canary is twice as bad, and deserves twice as much punishment, as does a lie about a 50-pound canary. Bloom (2004) relays a related story about a 3-year-old who having been repeatedly told to keep the existence of a pie a secret from the guest of honor, walked up to him and shrieked, "There is no pie!" Clearly, if you wanted to draft someone to carry off a good lie on your behalf, it would not be wise to choose a young child.

What all of these examples help to show is that precisely where appropriate definitional lines ought to be drawn will ultimately depend on what sorts of research questions one aims to answer. For certain investigations, what is of most interest are the ages at which young persons begin to grasp the "tells" or "give-aways" that otherwise prevent them from being accomplished liars. A lifetime could obviously be spent in honing such Machiavellian skills. None of this, however, is to the present point, in so far as this point turns on the broad question of when in their development children are first capable of entertaining the very possibility of deceit, however badly equipped they may be to *successfully* pull off such a trick. All that having been said, what is it exactly that standard-issue

theory-theorists find so wanting in what others have been quick (perhaps too quick) to see as early evidence of bona fide lying and deception?

Defending the Ramparts of Theory-Theory Against Childish Lies and Deceits

Not surprisingly, an important part of the work of shoring up the ramparts of theory-theory against the possible incursion of childish lies and deceits has involved taking pages from the book meant to ward off similar threats of possible acts of deception in other species (see Mitchell & Thompson, 1986; Whiten, 1991). It is worth remembering, in this context, that Premack and Woodruff's seminal 1978 article, "Does the Chimpanzee Have a Theory of Mind? was all about the prospect that, by acting deceitfully, our nearest primate relatives might also possess an appreciation of the possibility of false belief. It is also relevant that, rather than simply arising out of nowhere, Premack and Woodruff's classic article actually bookends some four-score years during which comparative psychologists were left staring down the mussel of Lloyd Morgan's 19th-century "canon of parsimony"—a weapon [sic.] leveled against interpretive excesses that entreated ethologists of the day to abandon their suspect anthropomorphic ways and to "in no case interpret an action as the outcome of the exercise of a higher physical faculty, if it can be interpreted as the outcome of one standing lower in the psychological scale" (Morgan, 1894, p. 54).

Consider, for example, Dennett's (1987) often repeated example of "Ashley's dog" that, with the definite aim of getting interlopers out of its favorite armchair, routinely applied the ruse of scratching at the door, "as if" it needed to be let out. Of course when it comes to dogs, which do not otherwise seem to especially bristle with further evidence of deceptive intent, those who most live in fear of being felled by Morgan's canon are perhaps within their rights for worrying over the prospect that all this scratching is nothing more than the automatic result of some well-oiled contingent association between still earlier scratching and subsequently finding one's chair empty. That is, it is perhaps enough in such cases to simply assume that this or that seemingly deceptive behavior has been unwittingly associated with some favorable outcome, and thus simply executed without any recognition of what others may or may not be thinking about.

As you will have guessed, none of those who routinely keep track of such seemingly deceitful behavior on the part of animals or young children is required to read such events in exactly the same way. Some (e.g., standard theory-theorists) elect to opt for a reductive reading of such evidence—one that guarantees that they will never be duped into prematurely labeling something as truly deceptive when it is not. At the same time, the real world to which children are apprenticed needs to be seen as riddled with deceit (Anderson, 1986), and any analytical strategy that

denies them the early prospect of participating in such charades runs the risk for confusing interpretive caution with an exaggerated fear of type 1 error. As William James (1910) aimed to show, there are worse things that can happen to a man [sic.] in this world than to be duped.

All such to-ing and fro-ing notwithstanding, it obviously remains judicious to exercise appropriate methodological cautions in deciding what should and should not be seen to legitimately qualify as deception. At a minimum, such cautions would need to include, as Sweetser (1987) suggests, the promotion of the idea that all bona fide instances of deceit must, necessarily, involve assertions that: "a) are false quite apart from any telling; b) that are understood to be false by those putting them forward (by whatever means); and c) that are promoted with the full intent of leading credulous others into false beliefs about some true state of affairs" (p. 59). It is simply not enough to merely say or do on purpose something that coincidentally happens to be false to qualify as being authentically deceptive. Rather, if you want your actions to qualify as uncontested instances of deceit, you must also appreciate that you are purposefully misrepresenting some real truth of the matter, all with the aim of actively misinforming others by leading them into some false belief.

Having adopted some variation on such attempts at methodological rigor, a large number of investigators have reported that they failed to come up with convincing evidence that 2- and 3-year-olds are capable of deceit. LaFreniere (1988), Selman (1980), and Shultz and Cloghess (1981), to name only a few, reported that their young preschool subjects regularly failed to lie or otherwise act deceptively in various laboratory-based competitive game situations. As interesting as all of this is, it remains unclear, however, whether such reported failures were the result of some real, foundational inability to deceive, or were instead the by-products of failures on the part of these young research participants to appreciate how behaving deceptively might have been of service to them in what were generally novel and heavily rule-bound games. As with other equally rigorous laboratory-based practices, the methods applied in these studies also offered few response options to those who might have otherwise been inclined to deceive, provided little in the way of license for those uncertain about what was and was not permissible, and generally made it hard to weigh the likelihood of being caught. In this context, Lewis et al. (1989) report, for example, that the lion's share of their 3-year-old subjects were actually quick to attempt what appeared to be difficult to verify lies when asked whether they had touched a forbidden toy. All in all, then, few, if any, of the studies that have aimed to play methodological "hard ball" could be said to have effectively laid the groundwork for bringing prospective liars and deceivers out of the closet.

In response to such criticisms, first Russell (1989) and then Russell, Mauthner, Sharpe, and Tidswell (1991), and Peskin (1992) each took special pains to develop procedures that not only implicated respondents' own best interests, but

also excused them from the necessity of explaining themselves in words. All of these tasks involved preschoolers in a seemingly simple game that only required them to point incorrectly as a way of misinforming an opponent. In most of these cases, 3- and 4-year-olds were required to first express their own preferences for one or the other of two items (e.g., decorative stickers). The twist in this "game" was that subjects had to compete with a puppet who got first pick and who always kept for himself whichever sticker the child indicated that he or she preferred. For an adult, the obvious way out of this situation would be to lie about one's true preferences, thereby promoting the false belief that the preferred sticker was the opposite of their own real choice. As things turned out, only a few 4-year-olds, and almost no 3-year-olds, were able to use such a strategy for misinforming others about their true preferences. Rather, trial after trial, these young children continued to act against their own best interests.

In response to these findings, all of which clearly support a standard theory-theory interpretation, Chandler and his colleagues (e.g., Chandler et al., 1989; Chandler & Hala, 1994; Hala & Chandler, 1993a, 1993b, 1996; Hala et al., 1991) argued that such studies required respondents not only to behave deceptively, but to also respond in ways that ran counter to their own initial impulses, a capacity that subsequent studies of executive functioning suggest is slow to develop.

In response to this limitation, Chandler and his colleagues undertook a series of more than a dozen studies that also required children to act deceptively in their own best interests, but not in ways that obliged them to misrepresent their own interests. In the first half of these experiments, a hide-and-seek game was fashioned in which 2 ~HF- to 5-year-old children were encouraged to hide a treasure in one of a series of differently colored containers, with the "help" of a push-toy doll that left tell-tale footprints clearly marking out its movements across a white playing surface. Faced with this dilemma, subjects could undertake to deceive a returning opponent by lying, by wiping away incriminating evidence of the doll's progress across the playing surface, by laying additional sets of false and misleading trails to empty containers, or by using various combinations of all of these strategies. Although there was some evidence of building competence with increasing age, 70 percent of even the young 2 ~HF-year-olds in these studies took active steps to misinform their opponent by laying false trails to empty containers. They also wiped up offending tracks, behaved surreptitiously, occasionally lied, and in more than half the cases, gave credible explanations for their having done so. Clearly, if such evidence is left to stand, then false belief understanding has a considerably earlier age of onset than the 4 years that is more generally insisted on. Clearly, these were fighting words.

Two groups (Ruffman, Olson, Ash, & Keenan, 1993; Sodian, 1991) quickly responded with hide-and-seek studies of their own, and others still (e.g., Wellman, 1990) reacted only with words. Perhaps not surprisingly, the new evidence offered in rebuttal ended up exactly matching the unshakable faith these theory-theorists

are known to maintain in the rightness of the proposition that only 4-year-olds, but not still younger children, have any real comprehension of the possibility of false belief. In one of these studies (Sodian), 3- to 5- year-olds were told an elaborate story about good and bad puppets that needed help or hindering, but were allowed only a single means of acting deceptively. In the other study (Ruffman et al., 1993), children were offered the opportunity to trick a Mr. Bubby, whose forbidden cookies could be approached only by crossing a field of spilled flour. The options available to the puppet figures of this study boiled down to whether they tracked through the flour while wearing their own or someone else's shoes. Deception, in this case, turned on keeping all of this straight while working it out that Mr. Bubby might be misled by a plan that involved stealing the cookies while wearing someone else's oversized shoes. Given enough tangled rope, children can, it would appear, be made to hang themselves using almost any sufficiently twisted procedure. Small wonder, then, that such purported replications of the work of Chandler and colleagues have seemingly failed to show any evidence of the early onset of deception.

As a way of strengthening the theory-theory case, Wellman (1990) suggested, for example, that the intention of the typical 2- and 3-year-olds in Chandler and company's studies (Hala et al., 1991; Chandler & Hala, 1994; Hala & Chandler, 1996) was not, as it would appear, to actively misinform an opponent by laying false trails to empty containers, but was, more simply, to rid himself or herself of a competitor: "His actions essentially say 'go away', not 'believe this mistaken information so that you will go away.'" p. 265. Similarly, but somewhat less extravagantly, Sodian (1991) has suggested that Chandler et al.'s subjects were simply caught up in the fun of making and wiping up of tracks, and might well have behaved similarly if they were trying to help rather than hinder.

As a way of countering these reductive readings of their work, Hala, Chandler, and Fritz (1991) undertook a second series of studies that were intended, not only to replicate their earlier findings, but for the following means: (1) making room for a direct test of the seemingly extravagant possibility that their successful subjects were simply undertaking to manipulate the behaviors and not the beliefs of their opponents; and (2) ensuring that these same respondents would actually behave differently if instructed to help rather than mislead an opponent. What, in particular, was done in these studies was to arrange things in such a way that it was up to these young subjects themselves (rather than a puppet figure) to move the equivalent of the standard chocolate bar in an otherwise standard Maxi task from its original container A into some new container B, all for reasons that were clearly meant to be deceptive in intent, that is, to "hide" the chocolate from Maxi. The common finding across all of these studies was that young 3-year-olds almost always succeeded in their deceptive hiding efforts, and did so for the express and openly stated purpose of leading others into false beliefs. That is, the new 3-year-old subjects in this second series of studies not only explicitly indicated that their

efforts would lead others into definite false beliefs, but dutifully helped rather than hindered others when asked to do so. All of this, we suggest, goes some considerable distance in showing that children as young as 2 ~HF or 3 years of age can and do regularly take definite and deceptive steps to lead others into false beliefs. Clearly, then, young children cannot be counted among those who you can fool all of the time, nor are they quite as innocent as certain earlier talk about "pure as the undriven snow" or "unblemished as the newborn lamb" might lead you to expect. A young child can very well trick you, and will do so if your guard is not up. Perhaps, given all of this, the developmental window during which young persons begin their slow progress toward a mature theory of mind is actually a good deal wider than first-generation theory-theorists have insisted.

Pretend Play as a Marker of Mental-State Understanding

Like both false belief understanding and intentional efforts to deceive, the ability to meaningfully engage in pretend play is widely thought to similarly mark an important milestone in young children's growing understanding of their own and other's mental lives. Pretending, for example, that a banana is a telephone, or making some sort of playful sense out of seeing someone else do so, would be impossible, it has been argued (e.g., Leslie, 1987), unless or until some wedge had already been driven between how things are presumed to actually be, on the one hand, and how one might playfully imagine them to be, on the other. Among the unsettled questions to be taken up in this section are: What ought to count as bona fide instances of pretense? When, in the usual course of ontogenetic developments, do such acts of pretense first occur? And what sort of mental model or theory of mind would need to be in place before such acts of pretense could be reasonably understood?

An important driver in the debate over how such questions might best be answered turns on the age at which young children first appreciate and participate in such acts of pretense. Although any precise answer to this question naturally depends on what is assumed to count as pretense, there is a great deal of observational evidence to suggest that, between 18 and 24 months of age (e.g., Leslie, 1987; Piaget, 1962/1945), many children already actively participate in what looks very much like shared acts of pretense. Still others (e.g., Bosco, Friedman, & Leslie, 2006; Fenson & Ramsay, 1981; Onishi, Baillargeon, & Leslie, 2007; Walker-Andrews & Kahana-Kalman, 1999) have argued that such evidence is already to be had as early as the 15th or 16th month.

If any of these claims are right, then such evidence poses a serious problem for anyone committed to the view that children younger than 3 or 4 sport a "cognitive deficit" that robs them of the very possibility of a representational or mentalistic understanding of the mind. That is, (a) if children are otherwise said to be of preschool age before having a reliable grip on the earliest possibility of false

belief, and (b) if, before they are half of that age, these same children already happily participate in acts of pretense, then, (c) unless such claims about the early onset of pretense are seriously mistaken, or otherwise mean something different than is commonly supposed, anyone committed to the view that false belief understanding provides the best and truest "litmus test" of an introductory-level theory of mind would have some tall explaining to do. Given all of these star-crossed possibilities, how, you might well ask, have standard-issue theory-theorists undertaken to dodge this bullet, and how successful have they been in doing so?

Efforts to beat back the implications of the apparent early onset of pretense have generally taken one or the other of two general forms. The first of these (call it the Behavioral Gambit) proceeds by arguing that those actions routinely held up as evidence for the early onset of pretense are, in fact, little more than a kind of mindless pantomime and, consequently, do not actually signal anything of special moment about young children's representational understanding of mental life. Clearly, the possible success of this sort of salvage operation turns on somehow winning the argument that what (to the untrained eye) look like full-blown acts of pretense—acts that come equipped with all of their commonly associated mentalist overtones—are, in fact, better understood as examples of some less representationally encumbered form of "protopretense" that may look like, but, nevertheless, falls short of constituting genuine acts of pretense.

The second of these defensive maneuvers (referred to here as the Decoupling Gambit) consists of first stipulating to the fact that children as young as 15 or 18 months can, after all, engage in bona fide acts of pretense (and that such acts of pretense do mark an important advance in young children's fledgling grasp of mental life), whereas still insisting that such behaviors, nevertheless, fall importantly short of the sort of representational competencies required to hold to a fully representational theory of mind. Each of these separate attempts to slip the leash on the theory-altering implications of pretense is taken up separately next.

Behavioral Gambit

What is generally held up as the best available evidence in support of the first of these strategies—the one given over to discounting the possibility that what preschoolers actually intend by their fledgling acts of pretense is not the same thing as what we would mean if we were the ones doing the pretending—is the work of Lillard and her colleagues (e.g., Lillard, 1993, 1994, 2001; Lillard & Flavell, 1992). The thrust of Lillard's program of research has been to show that young children's pretend behaviors are importantly different from those of still older children and adults, all because such early instances of "protopretense" are actually devoid of any usual reference to, or reliance on, the mental goings-on of those whose behavioral acts they seek to imitate.

The usual form that this work has taken has been to show that, for children who could not otherwise pass a standard measure of false belief (and even for many 4- and 5-year-olds who could), it is typically enough, in order to brand a target's behavior as an act of "pretense," to recognize certain behavioral similarities between the pretender and the "pretendee." Such children, it is said, wrongly believed that someone hopping like a rabbit is actually pretending to be a rabbit, even when such target individuals are pointedly said not to be thinking about rabbits while hard at work doing their hopping (Lillard, 1993). The presumptive point of this inquiry was to determine whether mental representations or actions are more important in the framing of preschool children's judgments concerning whether a particular behavior is or is not a case of pretense. In response to such questions, Lillard reports that the majority of 4-year-olds, and a significant minority of 5-year-olds, claimed that the target child was pretending to be a rabbit, even though he or she knows nothing about rabbits. Lillard (1996) also demonstrated that many 4- and 5-year-old children classify pretense together with physical activities such as clapping one's hands, rather than mental activities such as thinking. It is not until age 7 to 8, she has argued, that most children responded like adult subjects to such tasks, by insisting that pretense actions involved mental activities. What Lillard took away from such demonstrations is that, whatever young preschoolers standardly understand pretense to be, it is all largely behavioral in character and does not include any of the mental modeling presupposed by a more adult-like appreciation of what pretense ordinarily entails. These findings, and others like them, have led Lillard to argue that, rather than understanding pretense as mental representation, children's earliest understandings of pretense actually amount to no more than "acting as if."

It is, of course, one thing to argue that (for preschoolers at least) labeling an action as an instance of pretense is not the same thing as embellishing such an act with mentalistic overtones, and quite another to specify what it is, then, that such young persons actually take such acts of pretense to be. According to Lillard (1994) and other advocates of such behavioral accounts of pretense (e.g., Nichols & Stich, 2000, 2003), children younger than 4 or 5 typically regard others as behaving "as if" a specific scenario were true, or as behaving in a way that would be appropriate if a specific scenario were true. On this account, to engage in and to recognize pretense in others, one need *not* draw on any representational understanding at all; these takes require only an ability to appreciate that, in certain instances (e.g., pretending that a broom is a horse), people behave in a way that would be appropriate if the broom were a horse (e.g., by straddling it and exclaiming "Giddy-up!").

Such attempts to substitute "as-if" scenarios for other more mentally encumbered notions of pretense have not escaped criticism. One such critique centers on the question of how it is that young children determine which instances of behavior denote pretense and which do not. Simple appeals to the fact that some

such behaviors (e.g., galloping a broom, talking into a banana) would stand out as odd or inappropriate were they not somehow marked as acts of pretense will hardly do. As Friedman and Leslie (2007) note, our lives are full of inappropriate actions caused by false beliefs, accidents, simple ignorance, and so forth, none of which is routinely mistaken for acts of pretense. We would all be surprised, for example, if a preschooler mistakenly imagined that a classmate who accidentally spilled his or her juice was pretending to be a fireman or was behaving "as if" the juice were a waterfall. On such grounds, Friedman and Leslie argue that "behaving as if" can include virtually any action at all, and that behavioral theories such as those of Lillard (1994) or Nichols and Stich (2000, 2003) are inadequate explanations of how children manage to avoid regularly confusing various nonpretend behaviors with genuine instances of pretense, mistakes for which, they claim, there is no evidence at all.

Such criticisms have not gone unanswered. In addition to sometimes being inappropriate, acts of pretense have also been shown to be marked by certain specific behavioral cues or mannerisms such as exaggerated motions, "knowing" looks, smirks, and intonation changes (Dias & Harris, 1990; Lillard & Witherington, 2004; Piaget, 1962/1945; Richert & Lillard, 2004). One potential way, then, of rescuing various behavioral accounts from the "Whoa, too-broad-it-can't-separate-pretense-from-other-actions" critique spelled out earlier has been to assert that the recognition of these cues help young children to differentiate the "real" world from the world of pretense (e.g., Lillard & Witherington, 2004).

Against such views, others have argued that the existence of such "giveaway" cues actually poses an even greater threat to behavioral accounts of pretense. Friedman and Leslie (2007) suggest that the presence of such cues has the effect of actually decreasing the extent to which pretense behaviors match the behavior being pantomimed. Take, for example, a mother who pretends that some object, such as a Lego block, is a cookie: She may pick up the block with a wink or a smile, make exaggerated mouth movements and exclamations (Mmm…Good!) when placing the block near (but not in) her mouth, and so on. According to Freidman and Leslie, however, all such exaggerated behaviors only serve to decrease the extent to which the mother behaves *as if* the block really was a cookie. As such, the extent to which such "mannerism markers" of pretense help or hinder behavioral accounts of pretense remains unclear.

Decoupling Gambit

In contrast with researchers who posit that early pretense is initially understood as a special sort of behavior rather than a special sort of mentalizing, Leslie (1987) argues that as soon as children begin to engage in or otherwise appreciate acts of pretense, it can be shown that they understand such acts as necessarily implicating mental states. Indeed, he argues that pretense is the first

clear sign of an ability to understand another's mental states. Early pretense, on his account, requires the same cognitive machinery implicated in any understanding of beliefs as representations—"innate," "modularized" machinery that he terms the "theory of mind mechanism," or TOMM—machinery assumed to come online through a combination of biological maturation and exogenous influences. According to Leslie's version of metarepresentation, toddlers' understanding of what telephones are called or used for is not "contaminated" by observing their mothers talking into bananas because the TOMM allows them to decouple their primary representations of bananas from their secondary representations of bananas as telephones. Primary representations are veridical representations of the world (e.g., "It is raining" when, in fact, it is raining.). Secondary representations, such as beliefs about beliefs, are different from primary representations because they are said to be "decoupled" from reality and do not carry the same truth value that primary representations do (e.g., Mom mistakenly thinks or believes or pretends it is raining). According to Leslie, the TOMM is the presumptive cognitive system required to allow for the embedding of primary representations into secondary representations (e.g., Mom is pretending the banana is a telephone), thereby isolating or decoupling them from reality.

People are, of course, often locked away for making up similarly elaborate stories about previously unheard of machinery whirring away inside their heads. What sets Leslie's imagined TOMM apart from such indictable offenses is that, in addition to laying out a hypothesized blueprint descriptive of the sorts of machinery that would theoretically need to be in place if pretense were to function as it is known to do, his account also anticipates other empirical relations that might not have otherwise been anticipated. One such example is that Leslie's model provides a promising (although often contested) account of what goes awry in development in children with autism. Children with autism do not spontaneously engage in pretend play (Baron-Cohen, 1987, 1995; Ungerer & Sigman, 1981) and typically fail false-belief tasks (e.g., Baron-Cohen, Leslie, & Frith, 1985). These findings have led Leslie and others (e.g., Baron-Cohen, 1995) to posit that autism is the result of a specific impairment or "characteristic breakdown" in the TOMM.

The point in rehearsing even this much of Leslie's generally well-known TOMM is not to necessarily advocate its use, but to illustrate the point that children's early appreciation of pretense need not automatically lead to attempts to entirely redescribe it in behavioral terms. Assuming that pretense under some description is here to stay, it seems important to take it seriously.

Taking Pretense Seriously

In addition to all of those whose ideological commitments to the proposition that children younger than 4 are, because of some presumed cognitive

deficit, structurally excluded from the possibility of engaging in genuine acts of pretense, there also has been a long list of others who have, in one way or another, assigned special importance to the fact that, like false beliefs, pretense also seems to imply some capacity to envision and act on propositions that are known to be untrue (e.g., Flavell 1988; Fodor, 1992; Forguson & Gopnik, 1988). In Paul Harris's (1991, 1995) simulation account, for instance, the child is said to learn about others' mental states through a capacity to simulate or pretend about nonexistent situations. As such, for Harris and other "simulation" theorists, pretense is not only another manifestation of counterfactual reasoning, it is also a description of the primary means by which full participation in adult-like versions of some folk psychology eventually come about.

Still others, less inclined to see pretense as a burr under the saddle of their theory building efforts, have accumulated data showing that children who engage in more pretend play, or role enactment, or are otherwise "fantasy predisposed," show more advanced performance on theory-of-mind tasks than do their less fantasy-predisposed counterparts (Dunn, 1993; Jenkins & Astington, 1993; Taylor & Carlson, 1997). Moreover, individuals with autism, who show marked deficits in other theory-of-mind tasks, have also been shown to fail to engage in pretend play (Baron-Cohen et al., 1985). More extravagant still, recent neuroimaging work also supports some link between pretense and theory of mind by showing that brain regions typically associated with theory-of-mind reasoning are likewise activated when adults watch pretend scenarios (German, Niehaus, Roarty, Giesbrecht, & Miller, 2004).

Although suggestive, none of these bits of correlational evidence showing links between pretense and theory of mind successfully addresses the provocative question of whether early manifestations of pretense are precursors to, or previously unheralded expressions of, a bona fide theory of mind. As such, the reader is awkwardly left to wonder whether the existence of developmentally early outcroppings of pretense should cause us to worry over, or congratulate, our favorite candidate account of the emergence of mentalistic or representational theory of mind.

Referential Behaviors and Other Potential Markers of Early Insights into Beliefs about Belief

Infants seem to show some rather sophisticated abilities suggestive of the operation of some naïve or "folk" psychology from very early in development. For example, infants seem to construe humans, and human-like agents, as special, or uniquely different from inanimate objects. Six-month-old infants are not surprised (as evidenced by longer looking times) if people move without making contact with other objects in their environment, but they are surprised if inanimate objects do the same (Spelke, Phillips, & Woodward, 1995). Six-month-old infants expect

a human arm to behave in a goal-directed manner (i.e., following the same goal over time), but do not expect a mechanical arm to be goal oriented (Woodward, 1998). At 9 months of age, infants seem surprised if agents act in an irrational manner to achieve their goal (Csibra et al., 1999) and interpret new goal-directed actions based on previously witnessed behavior (Kuhlmeier, Wynn, & Bloom, 2003). Furthermore, when an object moves out of sight, 12-month-old infants try to reach toward its place of disappearance. In contrast, when a person moves out of sight, infants vocalize (Legerstee, 1992). Also at 12 months, infants will orient in the same direction as a novel agent that either has a face or acts contingently with them, but not one that acts in a random manner. These findings suggest that infants perceive that the agents with a face and the agents that acted contingently with them had attentional, and perhaps intentional, states (Johnson, Slaughter, & Carey, 1998).

Also around 1 year of age, an infant can point where he wants his social partner (e.g., his mother) to look. Interestingly, by around 15 months of age, the infant will first check to see that his mother is looking at him or her before pointing (Astington, 1993). But what, if anything, does this tell us about the infant's understanding of knowledge? Do such children understand that people's behaviors are governed, not simply by what is in the visible physical world, but also by an invisible world of mental activity; one that may be incomplete or even in conflict with reality? Does such a child know that his mother won't know he is pointing if she isn't looking; that not everyone knows what he knows? Does he know that perception can lead to knowledge, or more specifically that, in this case, it is "looking" that will lead to knowing rather than, for example, smelling or tasting?

Whatever the answer to such questions is, at around 18 months of age, it becomes increasingly difficult to deny that infants have at least a rudimentary understanding of the minds of others. For instance, at this age, infants understand that someone else can have desires that are inconsistent with their own. In one study, for example, an experimenter demonstrated that she likes broccoli but does not like crackers. When she then stuck out her hand indicating that she wanted something, 18-month-olds, but not 14-month-olds, tended to give her broccoli, even though this was inconsistent with their own preference for crackers (Repacholi & Gopnik, 1997).

Similarly, children at least as young as 2 understand that one's emotional reaction is governed by whether the outcome of an event is consistent with his or her desire, rather than the outcome per se that leads to an emotion. For example, 2-year-olds were able to judge that a boy who was looking for his rabbit would be sad if he found his dog, whereas a boy who was looking for his dog would be happy if he found his dog. That is, such children do not assume that emotions are inherent to the object or situation—that everyone would be happy to find a dog (Wellman, 1990).

At 18 months, infants will also "imitate" the action a person intended to perform even though he was unsuccessful (e.g., pulling the ends off a dumbbell). That is, they can infer what the person wanted to do and perform this action even though they have never seen that action performed. They do not, however, engage in such behavior when they see the same actions performed by a machine (Meltzoff, 1995). Thus, by 18 months, if not before, infants appreciate that human action, but not mechanical action, is governed by underlying mental states such as goals and intentions.

Children at this age, and perhaps earlier, also use their understanding of the mental states of others to facilitate word learning (see Bloom, 2000, for a review). For instance, 18-month-old children will use the direction of the speaker's gaze as a cue to the referent of a new word (Baldwin, 1991). This is the case even if the children are attending to a different object when the word is spoken. They do not assume that the word applies to the object that they themselves are attending to. Instead, they use the speaker's direction of gaze as a cue to what that person intended to refer.

Tomasello and Barton (1994) explored a different role of theory of mind in word learning. In their study, 24-month-olds were presented with an array of five buckets each containing a novel object. The children heard the experimenter say, "Let's find the 'toma.' Where's the 'toma'?" Then the experimenter withdrew an object from the first bucket and scowled, placing it back in the bucket. This was repeated for a second bucket. On retrieving an object from the bucket, the experimenter held it up and exclaimed excitedly, "Ah!", before continuing to pick up objects from the remaining buckets. The contents of all of the buckets were then emptied out and the children were then asked to find the "toma." Children regularly selected the object that the experimenter seemed pleased with, despite the fact that it was not the last object that they saw and not the first. To succeed at such a task, they could not simply rely on the speaker's direction of gaze. Instead, it required being sensitive to the speaker's goal and cues as to when it was achieved.

Thus far, we have provided an abbreviated review of the literature on children's early understanding of mental states such as goals, intentions, and desires. But what about their understanding of knowledge and belief states? At the very least, 2-year-olds have some basic understanding that familiarity or experience tends to correlate with knowing, whereas never seeing or being absent leads to ignorance. For example, if a speaker uses a proper name (e.g., "There's Jessie.") ambiguously in the presence of two individuals, one she has "played with before" and one she has "never seen before," children as young as 2 assume the proper name applies to the individual with whom the speaker is familiar. The same assumption is not made when a common noun is used (e.g., "There's the dog."). These results suggest that, by 2 years of age, children have a rudimentary appreciation of how knowledge is acquired—that someone cannot know about an

individual's unobservable properties, such as their proper name, without prior experience with that individual (Birch & Bloom, 2002).

Similarly, if a 2-year-old's mother is absent when an attractive toy is placed onto a high shelf, the child will gesture toward the toy when she returns more so than if the mother was present when the toy was hidden. Again, these results demonstrate that children as young as 2 have a rudimentary understanding of how knowledge is acquired; they appreciate that if the mother was absent when the toy was moved, she is unlikely (or at least less likely) to know about the toy's new location (O'Neill, 1996).

Also by 2 years of age, children are able to ensure that when showing an adult a picture it is facing toward them (Lempers, Flavell, & Flavell, 1977). By 18 months, Perner (1991) grants them some awareness of others' mental states that he denies to younger children. He and his colleagues gave 18-month-olds a task that they were unlikely to have encountered in a natural setting, such as showing an adult a picture fixed inside the bottom of a hollow cube. When children first showed these pictures to an adult, they tried to show them in such a way that they themselves could also see the picture. For example, some of them would hold the cube down low, and tilt it back and forth between themselves and the adult. Perner suggests that because they are just coming to an understanding that looking leads to seeing, they give themselves the same visual experience as the adult to assure themselves that the adult sees the picture. Other experimental work (e.g., Pillow, 1989) has shown that by the age of 3, children understand that looking leads to knowing and will attribute knowledge of a box's contents to someone who has looked inside the box and ignorance of the contents to someone who has not looked (see Robinson, 2000, for a review).

Of course, in some sense, even very young children know how information is acquired. If we pointed to two identical toys on the shelf and asked a toddler to bring us the wet one, not the dry one, it is doubtful she would just stare at the toys. More likely she would touch the toys to determine which one is wet. Does this mean she knows that knowledge about an object's moisture content is best garnered through tactile observation rather than visual observation? It depends on your meaning of knowing.

In summary, across all of the sundry efforts cited earlier to either repair the evident shortcomings of once standard tests of false belief understanding or to look elsewhere within young children's rich repertoires of social communicative practices, the conclusion best afforded by the available evidence is that the claim that only 4-year-olds deserve to be credited with a capacity to represent their own and others' representation is simply misleading. Rather, there now seems to be sufficient evidence to suggest that the task of first coming to a working understanding of their own and others' mental lives—a theory of mind, if you will—involves a developmental process that reaches back all the way to some

especially early moment in the developmental course. At the very least, the development of representational competence and beliefs about beliefs is not a process that can be fairly said to begin without precedent at something like 4 years of age. What this conclusion leaves still untouched, however, and what remains to be unpacked in Part III of this chapter is what further development has in store concerning the subsequent achievements of other even more grown-up representational views about belief formation and the management of competing knowledge claims.

PART IIIA: IS THERE EPISTEMIC DEVELOPMENT AFTER AGE 4?

It will not have escaped notice that, despite having already moved well past the midpoint of this chapter, there has been, at least so far, little or no mention of anyone older than 4 or 5—a shortcoming that we now mean to work to belatedly repair. Success here will not come easily. Spending so much of our page allotment in detailing research involving children still too young to read or write was not, however, an entirely free choice. As it is, something like 9 of 10 of the studies in the existing literature just are about such young children, and to describe things differently would have constituted another kind of arbitrary. If responsibility for this lopsided arrangement is to be taken on, it is, perhaps, best worn by all those wellspring specialists who attach special gravitas to anything and everything that happens to occur early rather than late in the developmental course. On this familiar account, the die of human affairs is said to be cast uncommonly early, and anyone holding out real hope of getting in on the scientific ground floor would do well to avoid getting caught up in the tangled business of whatever circumstance-driven matters happen next. Quick to buy into this "early-good, later-bad" mentality, those studying the early course of epistemic development have taken this message perhaps too much to heart, regularly imagining that what is of most interest is over and done with before children are out of short pants.

Notwithstanding what has, then, been a broad fascination with all things early occurring, there are, nevertheless, two notable exceptions to what has otherwise been an exception-less rule of thumb. The first of these, detailed below, concerns the efforts of those scattered few whose work follows closely on the heals of that of more classical theory-theorists. What sets this new rump group of investigators apart from other more mainstream theorists of mind is not that their study samples are all that much older, but the difference hinges instead on their shared conviction that the achievement of simple false belief understanding is not the last real turn of the epistemic wheel.

By contrast, members of the second and last of these two working groups to be discussed here tend to live in a developmental world seemingly light-years removed from the usual orbit of theory-theorists and their critics—a world occupied primarily by college undergraduates and the occasional young adult or precocious adolescent. These research efforts, described earlier as having as their collective center of gravity the inspirational work of William Perry (1970), are briefly summarized in Part IIIB, the final substantive section in this chapter.

The handful of researchers who have elected to study young persons marginally older than 4 or 5 tend to fall into one or the other of three small groups, arrayed along a continuum running from near to far extensions of the now familiar theory-of-mind enterprise. The first and most proximate of these includes the work of stalwart theory-theorists such as Perner (1988) and Perner and Wimmer (1985), who, although still committed to the views that false belief understanding heralds, not only the first but also the last real revolution in the course of human epistemic growth, remain open to the thin prospect that these same unitary capacities can, nevertheless, become self-embedding, or otherwise recursively stacked one on the other in ways that allow for the possibility of higher order beliefs about beliefs about beliefs. Call such studies explorations into the possibility of *false beliefs squared.*

The second of these research forays extrudes just beyond what Chandler and Sokol (1999) have called "the usually impenetrable thicket of self-citations that otherwise ring in the theory-of-mind literature," by exploring the prospect that false belief understanding may vary, not simply as a function of information access, but as a result of other more personalized factors such as attitudes and values and prejudices. Call these studies, primarily owed to Pillow and his colleagues (e.g., Pillow, 1991, 1999; Pillow & Weed, 1995), forays into the study of *misinterpretation.*

Finally, there is a small, but more radical, subset of studies, all predicated on the assumption that standard measures of false belief understanding are mistaken in their claims, all as a result of having restricted their focus to only those occasional instances of representational diversity in which different onlookers have access to *different* information. Proponents of this more differentiated account (e.g., Carpendale, 1995; Carpendale & Chandler, 1996; Chandler & Carpendale, 1998; Chandler & Lalonde, 1996; Lalonde & Chandler, 2002) have generally promoted the view that simple ignorance-driven false belief understanding, although perhaps marking a real qualitative juncture in young people's early beliefs about beliefs, is perhaps not the first, and certainly not the last, such major architectural shift in the course of epistemic development. Because this line of research is especially focused on how young persons attempt to make sense of instances of representational diversity that cannot be laid solely at the door of different experiences, but is owed instead to whatever endogenous factors ordinarily lead persons to "interpret" the *same* information differently, this

work will be lined out under the heading *Children's Interpretive Theories of Mind.* In what immediately follows, each of these distinctive programs of research is taken up in turn.

False Beliefs Squared

Few are inclined to doubt that there are differences in the ways that preschoolers and adults think about the mind. What is open to dispute is the particular shape such differences are imagined to take. Traditional theory theorists such as Wimmer and Perner (1983), who are committed to the view that all of the major planks that make up the platform on which representational life necessarily rests are fundamentally in place by 4 years of age, have left themselves only limited maneuvering room for imagining the possible shapes that beliefs about beliefs might take. Beyond easy claims about growing expertise, one of the few remaining options left open is to imagine that, as they grow older, people newly acquire the capacity to not only hold to beliefs about beliefs, but to recursively embed such thoughts in ways that enable them to have beliefs about beliefs about beliefs, and so on. The fundamental move here is captured by Augustus de Morgan's (1872/1915) expansion of Jonathan Swift's *On Poetry: A Rhapsody:*

> Great fleas have little fleas upon their backs to bite 'em, and little fleas have lesser fleas, and so ad infinitum. And the great fleas themselves, in turn, have greater fleas to go on, while these again have greater still, and greater still, and so on. (p. 377)

To the extent that some such process is actually afoot in the course of epistemic development, it would follow that older persons can still be said to differ from their younger counterparts, all without the necessity of introducing a whole new layer of cognitive machinery.

As a way of putting this hypothesis to the test, Perner and Wimmer (1985) told children a story about John and Mary and an ice-cream van. Both John and Mary see an ice-cream van at the park and go back to their respective homes to get spending money. On his way home, John discovers that the ice-cream van has moved to the church. What he doesn't know is that Mary has also been informed that the van is now at the church. When asked where John would think that Mary would think the ice-cream van now is, many of the 6- and 7-year-olds succeeded in reporting that John would "correctly" think that Mary thinks that the van is still at the park, whereas still younger children tended to fail by indicating that she somehow mysteriously knew the van has made its way to the church. On the basis of such results, Perner and Wimmer have laid claim to having discovered the future course of epistemic development—it is recursions all the way down.

In an earlier study, Flavell, Botkin, Fry, Wright, and Jarvis (1968) provided a related example of how some such recursive process might play out, by asking

7- to 17-year-olds to solve a competitive strategy puzzle that involved their trying to outthink an opponent in a kind of shell game. The game involved two inverted cups, one labeled with one nickel and the other with two nickels. In each case, the cups covered the same number of nickels indicated by the money glued to their top. The game consisted of encouraging participants to "remove the money from under one or the other cup," all as a way of limiting the winnings of their opponent, who was allowed to keep whatever money was found beneath the cup he or she picked up. Importantly, the participants were told that their opponents knew that they would be taking the money from one of the cups. Given these arrangements, the majority of 7- to 10-year-olds simply assumed that their opponents would choose the cup with the most nickels. However, from age 11 on, many began to use various strategies that involved recursively thinking about the other person's thoughts (e.g., "he's gonna know we're gonna take the most money out so I took the small one"—the one-nickel cup; Flavell et al., 1968, p. 47). What even the oldest of these participants failed to appreciate was the impossibility of knowing where the reiterative wheel turning in the other person's mind might stop spinning. Had they recognized that no amount of "mind reading" could solve this problem, they would, of course, have always chosen the two-nickel cup.

The limitations of such recursive thought processes are entertainingly captured by a contest of wits between the thief Vizzini and the swashbuckling Man in black in S. Morgenstern's classic tale of *The Princess Bride.* As a way of settling the fate of Princess Buttercup, The Man in Black persuades Vizzini to enter into an intellectual duel to the death requiring them to choose between two identical goblets of wine, one of which the Man in Black had presumably laced with the tasteless and odorless poison "Iocaine." Vizzini is meant to chose, then both will drink and one will die. Vizzini, who prides himself on his intellectual prowess, quickly agrees to this battle of wits. Excerpts from Vizzini's tortuous line of reasoning read like this:

> But it's so simple. All I have to do is divine it from what I know of you. Are you the sort of man who would put the poison into his own goblet or his enemy's. Now, a clever man would put the poison into his own goblet because he would know that only a great fool would reach for what he was given. I am not a great fool so I can clearly not choose the wine in front of me…But you must have known I was not a great fool; you would have counted on it, so I can clearly not choose the wine in front of you. [He reasons further that] Iocaine comes from Australia. As everyone knows, Australia is entirely peopled with criminals. And criminals are used to having people not trust them, as you are not trusted by me. So, I can clearly not choose the wine in front of you. And you must have suspected I would have known the powder's origin, so I can clearly not choose the wine in front of me…

Finally, a half dozen more turns of contorted logic later, Vizzini makes up his mind and they both drink. Moments later, Vizzini lies dead because the Man in Black, having carefully cultivated an immunity to Iocaine, has poisoned both glasses. Whatever else may be true about this vignette, two things are clear enough. The first is that Vizzini is older than, and does not think like, a young 4- or 7-year old. The second is that, had he lived, Vizzini, perhaps like us all, obviously still had room for intellectual growth—room to discover (among other things) that there is more to epistemic maturity than endlessly stacking one recursive thought on another.

Not only are there good reasons, therefore, to suppose that there is more to epistemic maturity than endlessly stacking one recursive thought on another, there is also evidence to suggest that even 4- and 5-year-olds can successfully navigate such nested problems when spared some of the burdens of keeping such details simultaneously in mind. Sullivan, Zaitchik, and Tager-Flusberg (1994) hypothesized, and found, that by shortening Perner and Wimmer's (1985) recursive story problems, and otherwise reducing the cognitive demands of their task (e.g., adding a memory aid and a deceptive component), 90% of 5 ~HF-year-olds and 40% of 4-year-olds passed these tasks. The implication drawn by these authors was that, not only do such multiple-recursion tasks not portend the real future of epistemic development, but they do not even generate evidence that children older than 4 actually use some qualitatively different, higher order form of reasoning not already on display among preschool children.

Despite the apparent failures of Perner and Wimmer's (1985) assessment procedure in picking out what might be the next real turn of the epistemic wheel, one should not automatically assume that all other candidate possibilities will necessarily suffer the same fate. Two such prospects are considered in the balance of this section. One of these is owed to the work of Pillow and his colleagues (e.g., Pillow, 1988; 1989; 1991; 1995), and concerns the role that children come to assign to person-attributes in accounting for acts of interpretation and misinterpretation. The second involves the emergence of what has come to be termed children's *interpretive* or *constructivist* theories of mind.

Notions of Interpretation and Misinterpretation

A frequent and widely accepted claim in theories-of-mind circles is that young children are first committed to a "causal," or passive (Pillow, 1988, 1995), conception of the knowing process. On this account, persons younger than 4 begin their epistemic journey by effectively treating their own and others' minds as "passive recorders" that simply "bear the scars of information which has been embossed upon them" (Chandler & Boyes, 1982, p. 391). That is, before understanding the interpretive or constructive or subjective nature of knowing, children seem to conceptualize knowledge as simply given, and consequently

equally available to anyone and everyone with eyes to see things as they objectively are.

More mature conceptions of the mind, by contrast, are seen to go beyond understanding knowledge as a direct function of perceptual access, and involve instead an appreciation that knowledge is somehow interpretive, in that the mind itself influences how the world is experienced. That is, in addition to appreciating that two "minds" exposed to different things will suffer different representations or beliefs about the world, children must also come to realize that two minds exposed to one-and-the-same-thing can, and often do, arrive at different representations. This distinction is well captured by what Searle (1983) called the "mind-to-world" versus "world-to-mind" direction of fit between thinkers and the things they think about.

As Flavell (1988) has argued, a key marker of children's emerging theories of mind is that those who can be said to have such a theory necessarily exhibit a robust appreciation of the "one-to-many" relations that exist between objects in the world and their many possible representations of them. That is, most, if not all, theory-of-mind researchers contend that the crucial feature of a mature theory-of-mind—the thing that makes it a *representational* theory of mind in the first place—is the insight that minds may represent what is objectively identical in subjectively different ways. Thus, it is critical to ensure that research participants actually demonstrate an awareness that one and the same object, event, or state of affairs can legitimately create different beliefs to empirically test whether children of a given age actually do subscribe to an adult-like representational theory of mind.

Given all of this, the open question is whether the experimental measures of false belief understanding commonly reported in the literature meet this simple test. It would seem that they do not. Rather, such measures all turn on the existence of carefully engineered discrepancies in perceptual access (i.e., Maxi is always absent when the critical transfer of his chocolate occurs). As a result, the contradictory beliefs held, for example, by Maxi and the child participant in standard false belief tasks are plainly *not* beliefs about the *same* event or state of affairs, and, consequently, there is no need for participants to represent the "same" situation in two different ways. Rather, in all of these cases, there are two different beliefs because there are two different objects of belief. Under these or similar assessment circumstances, all that is required to demonstrate an understanding of the possibility of false belief is for participants to realize that anyone not currently informed about all the relevant facts will, all things equal, be mistaken. As such, rather than providing foundational insight into the "one-many" relations between things in the world and their possible representation, ignorance-based false-belief tasks only reveal an understanding of how different events and states of affairs in the external world dictate how different beliefs are formed.

To make this especially clear, imagine (together with Chandler & Sokol, 1999) two couples, the Wimmers and the Perners, who all go to the same movie. At some ill-chosen moment in the plot line of the film, one of the Wimmers goes out for popcorn. Later, they end up arguing over the meaning of what they saw. By contrast, the Perners remain glued to their seats throughout the film but also exit in sharp disagreement about what they had both seen together from curtain to credits. Clearly, the Wimmers are in a situation not unlike that of Maxi and the usual respondents in standard false belief tasks who each have access to differing amounts of information, and the basis of any disagreements that they might have are easily laid at the door of the fact that going out to play, or out for popcorn, at the wrong moment can often lead to false beliefs. By contrast, the Perners are also in disagreement, but this time about the meaning of events they both saw clearly—a situation that more closely approximates an ideal test case of what Flavell had in mind by talk of a "one-to-many" relation between objects and their many possible representations.

If traditional false belief tasks only tap into "ignorance-based" or "perceptual access-driven" beliefs, then *what* is needed, one might well ask, to measure children's understanding of the more subjective and interpretive kinds of beliefs of the sort illustrated by the Perners in the foregoing movie scenario? And *when* do children begin to develop an early understanding of the interpretive nature of knowledge?

Study of Misinterpretation

One reason two minds might construe the same event differently is because of differences in the histories or preexisting biases belonging to one or both of the people in question. That adults ordinarily appreciate this fact is evidenced, for example, in the fact that those with personal connections to a defendant are not allowed to serve on that person's jury, just as peer reviewers are expected to recuse themselves when asked to judge manuscripts or grant submissions of former students, friends, and immediate colleagues (Mills & Keil, 2008).

One line of research meant to address children's understanding of the role of such preexisting biases was pursued by Pillow (1991; Pillow & Weed, 1995). In short, what Pillow demonstrated was that 5-, 6-, and 7-year-olds, but not still younger children, seem to appreciate that people's likes and dislikes will dictate how they end up viewing a range of morally and factually ambiguous events. Joan, for example, a story character in one of Pillow's studies, is shown holding a doll in front of a donation box containing toys for poor children. The open question is how other story characters, Cathy (who likes Joan) and Sarah (who thinks Joan is a troublemaker), will view this ambiguous event. Perhaps not surprisingly, 7- and 8-year-olds anticipated that Joan's behavior might be read differently by these two

onlookers. By contrast, 5- and 6-year-olds were much less likely to anticipate that prior beliefs might influence interpretations of this event.

When it comes to understanding how two minds can construe the same event differently, there are obviously a number of dimensions of subjectivity that children must appreciate. For instance, Mills and Keil (2005) examined children's developing cynicism regarding others' self-interested beliefs, finding that by second grade, children first begin discounting others' self-interested statements regarding the outcomes of contests, because they recognize that such statements may be skewed by personal motivations. It is also around this age that children have been shown to recognize that a person's personality traits can influence their perspectives (Gnepp & Chilamkurti, 1988; Heyman & Gelman, 1999; Yuill & Pearson, 1998). Similarly, by fourth grade, children also apparently know to discount self-report as a source of information for learning about evaluative traits in others, suggesting that they realize that desires to be viewed in a positive manner can contaminate such reports (e.g., Heyman, Fu, & Lee, 2007; Heyman & Legare, 2005). Again, by fourth grade, and to a limited extent in second grade, children also appear to appreciate that the same state of affairs can be interpreted differently because of favoritism, or one's personal relationships or connections. For instance, they appreciate that the parent of one of the contestants in a dance contest might come to different conclusions as to who is the best dancer than would a judge who did not have any personal relationships with the dancers (Mills & Keil, 2008).

Children must also come to realize that the degree to which two minds can differ in their evaluations of the same state of affairs depends on contextual factors. That is, they must come to appreciate that certain situations allow for more variability in interpretation than others. For instance, Mills and Keil (2008) suggest that even kindergartners appreciate that judging who won a footrace or spelling bee leaves much less room for preexisting biases to worm their way in than does judging who should win an art or beauty contest, suggesting that even young school-aged children recognize that beauty is "in the eye of the beholder."

What this leaves untouched, however, are all of those matters of interpretation that revolve around issues of legitimacy. That is, it is one thing for young children to anticipate the possibility of misinterpretation, and something quite different to imagine that two individuals may hold to different but equally warrantable beliefs. It is this second dimension of interpretation that we turn to next.

Children's Interpretive Theory of Mind

What seems largely missing from the studies just cited is some better means of capturing the changing ways in which developing persons actually imagine

where frank matters of personal bias leave off, and where some range of legitimate interpretations might reasonably begin.

One expression of such more fully fledged matters of interpretation can be seen in two programs of research that test young persons' awareness that different minds can legitimately interpret the same event differently. In one such research program, Carpendale (1995) and Carpendale and Chandler (1996) focused attention on a small class of stimuli that, whether by nature or design, tend to have the special feature of reliably prompting two especially compelling interpretations. Homophones are instances of this class for the obvious reason that they ordinarily promote just two distinct interpretations, as do certain line drawings such as Jastrow's (1900) famous duck-rabbit and Bugelski's (1960) rat-man drawings, which each share the common property of being easily taken to be one or the other of two distinctively different things.

In these study sequences, 5- to 8-year-olds (all of whom had been shown to easily succeed on a standard measure of false belief understanding) were given problems involving such ambiguous stimuli. Despite the fact that all of these subjects were able to "see" for themselves both of the alternative meanings offered, only the 7- and 8-year-olds, and not the 5- or 6-year-olds, were able to regularly *acknowledge* the legitimacy of the two different interpretations offered by two different puppet figures. This was true despite the fact that, young or old, these same subjects found no difficulty in crediting different characters with the right to exercise different likes and dislikes regarding matters of taste.

In a second such study sequence, Chandler and Lalonde (1996; Lalonde, 1996) took the different tack of choosing as test items stimuli drawn from that general class of fundamentally amorphous stimuli that include Rorschach ink blots, and clouds and puddles of spilled milk, all of which easily afford an almost infinite variety of defensibly different interpretive possibilities. More particularly, the specific stimuli chosen for inclusion were part of a set of cryptic puzzle pictures originally popularized by the cartoonist Roger Price (1953). Such drawings are perhaps better illustrated than explained. Figure 19.1, for example, depicts a variation on a so-called droodle originally published by Price over the caption "A ship arriving too late to save a drowning witch." The humor in this and related drawings by Price uniformly turns on the fact that, given the restricted view offered, it would be farfetched to imagine that anyone could ever intuit the larger scene of which the droodle itself is only a fractional part. Once alerted by the captions, however, these otherwise nondescript fragments fall into place, and it becomes possible to imagine—even difficult not to imagine—that they are other than fractional parts of what is now understood to be a partially obscured larger drawing.

Figure 19.1~MS"A ship arriving too late to save a drowning witch."

[Ch19F01]

Several things especially recommend the use of these materials in the study of the development of children's emerging understanding of the interpretive character of mental life. One of these is that, when stripped of their captions, these drawings are sufficiently ambiguous that, at least for adults, it is not just "conceivable" that two different persons might interpret them differently, but something more like a felt necessity.

In close agreement with the findings of the Carpendale (1995) and Carpendale and Chandler (1996) studies, a half-dozen experiments utilizing these droodle materials (e.g., Chandler & Lalonde, 1996) all make it clear that 7-year-olds, but not still younger subjects, appreciate the possibility that two different doll figures might somehow be within their rights to find different meanings in one and the same ill-defined stimulus event. Younger children of 5 or 6, by contrast, predictably showed themselves committed to the immature proposition that, no matter how vague the task, each and every ambiguous event still allows for one and only one legitimate "interpretation."

Taken together, these two study sets provide support for the conclusion that false belief understanding is demonstrably different from the conceptually distinct ability to eventually appreciate that one and the same stimulus event can be open to more than one legitimate interpretation. By focusing attention on stimuli that especially call out for two equally compelling interpretations, or that easily afford almost any interpretation at all, the series of studies just summarized likely provides a lower bound estimate of children's earliest insights into the interpretive nature of knowing. For this reason, it is unlikely that this is really the end of the story. Instead, there are good reasons to suppose that what 7- or 8-year-old children know about interpretation is only a first chapter in a continuing developmental story that, in all likelihood, extends at least through adolescence, and very likely into adulthood as well (e.g., Chandler, 1987). The research to which we now turn in Part IIIB is representative of the efforts of many whose work provides strong evidence of just such a continuing trajectory in epistemic development.

PART IIIB: EPISTEMIC DEVELOPMENT BEYOND THE CHILDHOOD YEARS

Given the summary findings reported in Part IIIA, many of which support the emergence of something like an "interpretive theory of mind" in the early school years—findings that call into deep question the suspect "one miracle view" that age 4 is somehow both the first and last watershed moment in the course of epistemic development—the obvious follow-up question is, given all of that, what, if anything, happens next? That is, assuming that some fledgling insights into the interpretive or constructive nature of knowing really do put in an appearance as early as the primary-school years, then, is that all there is? Could it really be the case that young school-aged children already have in hand all of the important intellectual tools necessary to work out a lifetime's worth of hard epistemic problems? Is it really the case that everything else is just a matter of getting up to speed? Why, otherwise, do we, as parents or teachers, work so hard to alert everyone to the multiply-perspectival nature of human experience ("How would you like it if your sister put *your* pigtails in the ink well?"), and why do we keep on insisting that people achieve some specified "age of majority" before being entrusted to hold high office, or to otherwise manage their own and others' affairs? And more to the present point, why should there otherwise exist, as we now mean to show, a substantial research enterprise, stretching back over at least the last 40 years, all given over to detailing what happens next in the subsequent course of epistemic development?

Outside of the restricted theory-theory compound, most remain confident that children of 6 or 8 often make a poor job of many "mind-reading" tasks that require them to carefully sort out who believes what, and for what reason. It is also widely assumed that still older persons are not only generally more efficient at dealing with some of these same problem-solving tasks, but that they approach them in radically different ways. As a way of understanding such hypothesized age-graded differences, a minimum of two broad possibilities are seen to present themselves. The *first* of these boils down to the observation that there are a whole lot of experiences and opportunities for practice that school-aged children have not yet had, and so it is thought to be at least conceivably the case that whatever subsequent changes do still occur in their later arriving beliefs about beliefs may be because of the simple fact that practice sometimes makes perfect. With rare exception (e.g., see Schommer, 1990, 1993), few contributors to the available literature on epistemic development have, however, opted for this generally mundane prospect.

Rather, the lion's share of the concerned research community has chosen instead for a second class of possibilities, all of which share a commitment to the general prospect that there actually arises in the subsequent course of cognitive development some qualitatively different ways of thinking about thinking—something that your typical shiny-faced school child still does not get.

Oddly, working out *what* it is, exactly, that supposedly happens next seems not to have been generally seen to be the problem. Almost everyone involved in the so-called personal epistemologies literature (for a review, see Hofer & Pintrich, 1997) would appear to be in broad agreement that, once young persons have come to appreciate that all knowledge claims necessarily bear rifling marks laid down by the particular minds through which they pass, what most remains to be understood is *how* developing persons actually go about the business of identifying serviceable criteria for sorting better from worse ideas. Although a lot of the details about how all of this is accomplished remain open to dispute, the real bone of contention that contributors to this literature have been actively worrying over the last 40-plus years has been (somewhat disappointedly) the more pedestrian question of not *what* but *when* it is, exactly, that such newer insights first occur.

Although there is nothing especially unusual about finding developmentalists squabbling over the particular threshold moment at which some new achievement is thought to first appear, what is especially unseemly and uncommonly strange in this case is the extravagant array of candidate ages that have been seriously proposed for this same inaugural role. Modest differences of professional opinion, such as to whether a given developmental accomplishment first occurs at age 3 or 5, can, perhaps, be written off to measurement error or sample variability. This is not like that. Rather, as we mean to show, various contributors to the literature on personal epistemologies have presented evidence meant to demonstrate that, if not at age 2 or 4 or 6, then the next and last turn of the epistemic wheel actually occurs at age 8 or 16 or 32 (for a review, see Chandler et al., 2002).

Although there are, no doubt, occasions on which certain kinds of disagreements of this magnitude prove to be all to the good, this is not one of them. Rather, what you have here is a deeply problematic situation in which largely indistinguishable claims are being made about individuals of wildly different ages. Given this level of radical disagreement, a fair-minded reader could easily come away from an exhaustive review of this literature justifiably convinced that young people reach epistemic maturity at just about any age you might care to imagine. In the end, unless some reconciliatory explanation of these seeming disparities can be put forth, somebody—actually several somebody(s)—implicated in this ramshackle literature will obviously need to take back a lot of what they have mistakenly said about the ensuing course of epistemic development. Working out precisely who it is that, in the end, will need to do all

of this radical retracting or revising is not a job that can be completed inside the confines of this chapter. What is obvious, however, is that any hope of assisting readers in moving toward some judgment of their own necessarily depends on gaining some oversight of exactly what sorts of claims are actually on offer.

As a way of advancing this agenda, we mean to do four quick things. First, it will be useful to begin by saying something synoptic about the touchstone work of William Perry (1970), who, it is widely acknowledged, almost single-handedly jump-started what has gone on to become a veritable cottage industry given over to the study of epistemic development in the lives of college students and young adults. Having laid this groundwork, we will proceed to detail some of the largely "in-house" efforts of others, who, although generally in close accord with the broad outlines of Perry's scheme, nevertheless argue that people are actually slower to achieve epistemic maturity than Perry imagined (e.g., King & Kitchener, 1994, 2002; Kitchener & King, 1981). Finally, we will consider the work of others who have insisted that, well before their college years, adolescents, and even preadolescents have already arrived at some or all of these same epistemic insights considerably earlier than Perry seemed to think possible. Some of these (e.g., Clinchy, 2002; Kuhn & Weinstock, 2002) have understood their own efforts as downward extensions of Perry's earlier work, whereas others (e.g., Boyes & Chandler, 1992; Broughton, 1978; Chandler, 1987; Chandler, Boyes, & Ball, 1990; Mansfield & Clinchy, 1997; Reich, Oser, & Valentin, 1994) have largely positioned themselves well outside of Perry's usual tent. In the end, all of this will be followed by a Summary section, in which we venture a reading of all of these divergent claims and findings—one that is intended to describe a common developmental arc that begins in infancy and runs all the way to adulthood.

William Perry's *Forms of Intellectual and Ethical Development in the College Years: A Scheme*

Perhaps the earliest and still most authoritative voice in the mounting chorus of investigators who have contributed to the literature on epistemic development in late adolescence and early adulthood is William Perry (1970). In a way that was largely without precedence, Perry conducted a series of short longitudinal studies in which he repeatedly interviewed cohorts of Harvard undergraduates (then all male students) concerning their changing views about the process of belief entitlement. That is, he interviewed them at length during each of their 4 undergraduate years, pressing them for answers about where knowledge comes from, how it is best authenticated, and what we are to do when confronted with competing knowledge claims.

Drawing on these interview protocols, Perry concluded that these students followed what, at the limit, was a nine-level developmental process. The first of

these levels was said to begin with a strictly "objectivistic" view of the knowing process—a view according to which the truth of any matter is thought to be at least potentially available to anyone with the eyes to see reality for what it actually is. Through the next two levels, this extreme objectivist position was qualified by the growing suspicion that some so-called experts may actually distort the truth because of their own potentially correctable biases. At level 4, Perry described a more qualitative shift within which at least some contested knowledge claims are unmasked as mere matters of arbitrary personal opinion about which everyone is imagined to be equally entitled to their own views. At level 5, a stage of unbridled skepticism, resolvable issues of truth and falsity come to be seen as rare exceptions to the no-rule rule, with everything else understood to be unassuageably personally relative. Levels 6 through 9 are described as sequential steps toward achieving reasoned "commitments" in an uncertain world. Although it was never Perry's view that everyone arrived at university necessarily sporting the first of these epistemic stances, or proceeded at the same pace through his various periods, his stagelike theory (especially levels 1–6) has, nevertheless, come to be broadly viewed as something of a template for progress through the course of a liberal arts education.

Much of the special appeal of what Perry had to say about his elite sample of college undergraduates arises out of the fact that most academics are quick to recognize their own students (if not themselves) in his accounts. Many "freshmen," it would seem, are, just as Perry described, naive realists—objectivists at heart—hopelessly committed to the idea that somewhere, waiting in the wings, there is a brute fact capable of resolving any competing knowledge claim. Similarly, who among us would fail, on reading Perry, to be reminded of all of those "multiplicitists" and uncommitted "relativists" who have riled their way through our second- and third-year classes, smugly insisting that everything is a matter of opinion. Since Perry's (1970) *Forms of Intellectual and Ethical Development in the College Years: A Scheme,* the large bulk of what a great number of others have gone on to add can, without serious prejudice, be characterized as an elaborate footnote to Perry's original and richly textured account. Together with many others, a following army of educators or college counselors has, for example, created not only a William Perry Society, but also something of a college counseling industry based on his work. Motivated primarily by the conviction that much of the business of postsecondary education naturally turns on the course of epistemic development, a long train of such investigators have explored various ways in which such epistemic matters need to be taken into account in the following ways: (1) guiding efforts in the areas of student counseling or curricular reform (for a review, see Hofer & Pintrich, 1997); (2) identifying pedagogic practices that especially promote or frustrate epistemic development (e.g., Schommer, 1990, 1993); (3) determining how epistemic level might influence the choice of one as opposed to another area of study (Paulsen &

Wells, 1998); and (4) in deciding whether the course of epistemic development unfolds differently in persons with and without the benefit of a college education (Kuhn, 1991). Over and above these and other content-bearing matters, still others have developed various paper-and-pencil tests meant to help avoid the necessity of conducting lengthy interviews of the sort that consumed so much of Perry's time (see Hofer & Pintrich, 1997, for a review of these various psychometric efforts).

Perhaps the closest thing to a palace revolt among those otherwise traveling well within the orbit of Perry's scheme has been the work of those who, out of concern that Perry's research participants (like those of Kohlberg) were exclusively Harvard undergraduate male students, have challenged the legitimacy of generalizing from his original elite male sample to college populations, in general, and to female students, in particular (e.g., Baxter Magolda, 1992; Baxter Magolda & Porterfield, 1985; Belenky, Clinchy, Goldberger, & Tarule, 1986; Clinchy, 2002; Moore, 1994). Although providing important caveats to Perry's model, the findings of these investigators have generally qualified, rather than broadly challenged, the general outline of his original scheme.

Driven by various practical concerns, and by the largely untested conviction that they were already working on the ground floor, the large majority of these close camp-followers have, as a consequence, had little or nothing to say about what might have transpired in the years before college admission, and have shown even less interest in detailing the sorts of cognitive limitations that are presumably responsible for preventing still younger persons from having already moved beyond the sorry absolutist and objectivist state thought to characterize standard-issue college freshmen.

Late-Game Changes in Epistemic Development

Perhaps because Perry's original account made room for a total of nine supposed stages in the course of epistemic development, and because few college undergraduates seem to manage to make it beyond stages 5 or 6, a considerable number of investigators whose work orbits at greater or lesser distance from the gravitational center of Perry's model have chosen to include still older respondents in their research (e.g., Hofer & Pintrich, 1997; King, 1977; King & Kitchener, 1994, 2002; Kuhn, 1991). Clearly, the most tenacious of this group has been Kitchener and King (e.g., see King & Kitchener, 2002), who have contributed to the epistemic development literature since the 1970s, and who, as early as 1994, report having tested in excess of 1,700 high-school, college-aged, and still older graduate students using their so-called Reflective Judgment Interview. Though conceding (as did Perry, 1970) that epistemic development begins before the college years, these authors generally agree that the most highly developed levels are reached by only a few people—more often than not by the occasional advanced doctoral student. Be this as it may, the evidence in hand does little to

encourage the belief that this continuing program of research will tell us anything new about the early course of epistemic development.

Like Kitchener and King, Kuhn and her colleagues (Kuhn, 1991; Kuhn, Amsel, & O'Loughlin, 1988; Kuhn, Weinstock, and Flaton, 1994) have also explored dimensions of epistemic reasoning in respondents beyond the usual college years—research that is primarily about argumentative reasoning regarding various ill-formed, but everyday social problems, and thus only partially overlaps with the work of Perry scholars. Kuhn's 1991 book, which usefully focuses on subjects in their 40s and 60s, as well as more usual 20-year-olds, is relevant to this discussion primarily for the reason that no clear age differences were observed in the frequency with which these broad samples of subjects endorsed what Kuhn and her colleagues described as absolutist, multiplist, and evaluative epistemic views. There is, of course, a spotty literature concerned with the late-arriving matter of "wisdom" (e.g., Holliday & Chandler, 1986; Karelitz, Jarvin, & Sternberg, Chapter 23 of this volume; Sternberg, 1990), but the bulk of this work is intellectually isolated, and more of a carbuncle on, than a living part of, more traditional developmental theory. In keeping with the work emanating more directly from Perry's model, however, there is a body of evidence generated by Kuhn and others suggesting that the inherently subjective or interpretive nature of the knowing process is evident for the first time only among their 12th graders, and is only found to be well consolidated in their sample of graduate student subjects. Although Kuhn and her colleagues do make efforts to interpret progress through their proposed stage sequence as turning on the achievement of something like Piagetian Formal Operations (Inhelder & Piaget, 1958), these data, like those of Kitchener and King, contain little to suggest that epistemic development gets seriously off the ground before the college years.

Epistemic Development in the Adolescent and Preadolescent Years

Although, as just outlined, only a small fraction of the many studies concerned with possible changes in the natural epistemologies of young adults have also included samples of primary- or secondary-school students, fewer still were undertaken with any serious expectation that such young persons would score beyond the lowest entry levels in Perry's nine-level scheme. Not surprisingly, most of these studies proved themselves right. By contrast, there does exist a scattered and still smaller handful of studies, most of which have their intellectual roots in soil different from that which has nourished work in the Perry tradition and which were undertaken by investigators often full of hopes that such young persons might have already made real progress toward epistemic maturity. Advocates of this second, "early-onset" position, although often in agreement

about little else, all appear broadly committed to these ideas: (1) that progress in epistemic understanding is a fundamental part of all social-cognitive development (Broughton, 1978); (2) that an awareness of representational diversity is a natural by-product of fading egocentrism and the growth of those role-taking abilities common to the middle-school years (Elkind, 1967; Selman, 1980); and (3) that the capacities for abstraction and the metarepresentational skills that help to define early Formal Operational thought likely make important contributions to a growing appreciation of the ineluctably subjective nature of knowledge (e.g., Boyes & Chandler, 1992; Chandler, 1975, 1987, 1988; Chandler et al., 1990).

As a result of these shared assumptions, advocates of such "early-onset" views have been quick to argue that there is nothing in principle to prevent young adolescents from coming to some, if not all, of the same insights about the subjective nature of belief entitlement that those working within the Perry tradition have reserved for only the most deserving of college graduates. Of course, there is likely no end to the list of possible mitigating factors that might intrude to prevent the typical adolescent from *always* showcasing his best epistemic insights, but this is not, these investigators have argued, the same thing as supposing that such young persons are bereft of any such intuitions until they make their way to the college of their choice.

What is obviously needed, if such "early-onset" views are to make any headway, is some line of evidence that shows that real flesh-and-blood adolescents actually do, as a matter of empirical fact, possess at least some of the epistemic abilities otherwise thought to be reserved for young and not so young adults. Some of this evidence on offer (e.g., Chandler et al., 1990) is owed to efforts meant to better ensure that the contested knowledge claims involved, not just bookish matters of fact under the control of "experts," but familiar and "live" issues of serious personal concern to young people (e.g., whether 16-year-olds are responsible enough to drive). Under these more favorable assessment conditions, Boyes and Chandler (1992) and Chandler et al. (1990) found that more than half of the 8th through 12th graders they tested already gave evidence of a clear appreciation of the relativized or subjective nature of beliefs, whereas fewer than a third responded in ways that still betrayed anything like a consistently "objectivist," or "absolutist," or "naively realistic" commitment to the idea that there is always some singular truth hiding behind every difference of opinion.

In a related series of studies, Oser and Reich (e.g., Oser & Reich, 1987; Reich, 1998), working with groups of 9- to 22-year-old Swiss youths, similarly report that recognition of the active contribution of the knower to the known begins to emerge in preadolescence, and that even the youngest of these recognized the contribution of internal and external features of the knowing process. Much earlier, Broughton (1978) found similar evidence of "nascent skepticism" among 12-year-olds, and reported that, by age 18, his respondents regularly voiced the view that knowing is a "constructive" enterprise guaranteed

only by social convention. Clinchy and Mansfield (1985, 1986) and Mansfield and Clinchy (1997) similarly tracked the "natural epistemologies" of young persons—this time from their preschool years through adolescence—and report that children as young as 4 already realize that knowledge is not simply absorbed, but is rather constructed by people with individual personalities and unique pasts; that as many as half of their 7-year-olds, and nearly all of their 10-year-olds, believed that diversity of opinion was legitimate; and that between 9 and 13 participants in their studies regularly came to "portray the knower as an active constructer, rather than a passive receiver of knowledge" (Mansfield & Clinchy, 1997, p. 1). As they put it, "by 13, not a single objectivist was left" (Mansfield & Clinchy, p. 10) in their sample. Although using a sharply different set of methodologies, Schwanenflugel, Fabricius, and their colleagues (e.g., Schwanenflugel, Fabricius, & Noyes, 1996) also report that children of 8 or 10 years of age regularly "move toward a constructivist theory of mind" in which they recognize that the same event may legitimately be interpreted differently. Similarly, Kuhn and Weinstock (2002) have also demonstrated that, particularly in domains removed from the imagined certainty of "hard" or impersonal facts, even middle-school children are often quick to entertain the possibility that equally well-informed others are free to differ in their beliefs about what is right or true. Related research by Smith, Maclin, Houghton, and Hennessey (2000) has gone further by suggesting that even grade 6 students can begin to appreciate the constructive nature of "scientific thinking" if they receive the right kind of prior instruction. Finally, Walton (2000), who examined the epistemological expressions present in the spontaneous utterances of kindergarten through fourth-grade children, reports that, in talking about knowing and believing, all of her especially young subjects commonly used epistemological expressions that concerned uncertainty, contrasting knowledge with belief.

Although it would be possible to go on piling up more examples, the general point made by all of the investigators cited in this context is that preadolescents and adolescents do not appear obliged to hang back until they have entered college before observing that people take note of, and struggle to comprehend, what they take to be legitimate interpretive diversity.

Summary

However encouraging or discouraging one might find having all of the foregoing evidence of early epistemic development paraded about, it is important not to lose sight of the numerous arguments previously rehearsed in Part II, all of which have repeatedly been taken as proof positive that, by age 5 or earlier, young children who can pass tests of false belief have already begun "to understand knowledge as representation with all its essential characteristics" (Perner, 1991, p. 275); already appreciate that beliefs are "active interpretations or construals of

them from a given perspective" (Meltzoff & Gopnik, 1993, p. 335); already hold to "an interpretive or constructive understanding of representation" (Wellman, 1990, p. 244); and have already acquired the view that the contents of mental life are actively constructed "on the basis of inference and subject biases, misrepresentations, and active interpretations" (Wellman & Hickling, 1994, p. 1578).

Given these, together with all of the other competing sets of knowledge claims so far rehearsed about the ontogenetic course of everyone's emerging understanding of competing knowledge claims, one could hardly have hoped for more complete research coverage. That is, some *200-plus* citations later, it is by now obvious that small armies of dedicated researchers have painstakingly explored the epistemic insights of just about every conceivable age group between 6 months and 60 years. That is the good news. The bad news is that they all make more or less the same claim: group X (where X is defined as persons of whatever age group one happens to be studying) is the first age group to ever give evidence of an appreciation of the constructive nature of belief formation. In the following Conclusion section, an attempt is made to find a congruous explanation for this tendency of the epistemic research community to endlessly repeat itself, while describing every age group imaginable.

CONCLUSION

The strong conclusion to which the preceding pages lead is that epistemic development both begins and ends more or less whenever one likes to imagine. Clearly, this is not nearly good enough. How can whole armies of investigators soberly insist that the full warp and woof of epistemic development fully transpires within the confines of just exactly that particular idiosyncratic patch of the full life course on which their own professional careers have come to roost? Isn't this all just too self-serving, chaotic, and caviler?

What we mean to put on offer here, in response to all of this balkanized caprice, is a candidate way of potentially unsnarling at least some of these tangled bits and pieces—of somehow lining them all up end for end. This attempt to posit something of a developmental arc begins with two facts and ends with a third. Fact one is that, from a surprisingly early age, young children appear to have a remarkably precocious understanding of the fact that not everyone likes or values precisely the same thing. As various investigators whose work has already been reviewed help to make clear (e.g., Flavell, Flavell, Green, & Moses, 1990; Repacholi & Gopnik, 1997), somewhere between 18 and 36 months, children already seem to appreciate that cats like cat food and we don't, whereas at least some adults like broccoli better than the goldfish crackers children themselves

tend to prefer. Do things, can things, in the personal preference department get a lot better than this? Regardless of whether they do, the domain of personal tastes seems not to be a place that encourages holding out any special hopes of finding evidence of steady epistemic growth.

More or less the same prospects seem to apply to young people's early thoughts about competing knowledge claims, especially as they apply to so-called matters of brute fact. Neither the fact that the cat is or is not on the mat, nor the exact location of Maxi's chocolate, appear to be the sort of thing about which equally well-informed persons are likely to disagree. As it is, a close reading of the evidence concerning young children's understanding of false beliefs would suggest that, despite all of the importance attached to matters of "representational diversity," there actually appears to be no such thing, or at least nothing that is not directly owed to carefully gerrymandered differences in informational access. Once again, then, it is hardly surprising that epistemic development (at least in so far as it is indexed by ignorance-driven false beliefs) occurs early and then never goes anywhere at all.

Given all of this, the only unexplored place to search for possible evidence for such age-graded change is, we suggest, in the shifting ways that persons of every age work to understand what John Searle (1983) and others (e.g., Elgin, 1989; Hanson, 1958; Kuhn, 1970; Rorty, 1979) have described as "social" or "institutional" facts. The trouble with suggesting this is, of course, that next to nothing has so far been said about the possibility that there exists some as yet unexamined class of epistemically relevant matters that are neither brute facts nor matters of personal taste—something like whatever it might mean to speak of "social" facts. What immediately follows, then, is some 11th-hour attempt to explicitly introduce this category of possibilities—the only remaining place, we mean to suggest, that epistemic development has any real hope of gaining much new ground.

The question of what, if anything, might be sandwiched between "objective" beliefs concerning brute facts, on the one hand, and issues of largely arbitrary personal taste, on the other, has been answered in a variety of only partially overlapping ways. By some accounts, this interstitial space is occupied by a confusing variety of other things variously labeled "opinions," "sentiments," "convictions," among others—mental objects that, according to Webster's dictionary, are said to constitute belief-like entities that are greater than a mere "impression" and less than an instance of "positive knowledge."

Alternatively, and without turning our backs on such matters of opinion, it is also possible to envision a still broader class of "social facts" that have been widely understood to shoulder their way between brute facts and residual mental attitudes such as matters of tastes. Putnam (1987), for example, among others (e.g., Elgin, 1989; Hanson, 1958; Kuhn, 1970; Latour 1993; Overton, 2006; Rorty,

1979; Searle, 1983), has argued strenuously against any two-note fact-value dichotomy and in favor of an alternative view that seeks to arrange various forms of knowledge along a rough continuum, the bulk of which is taken up with so-called social facts of the middle range. That is, facts that, although still thought to be true or false, seem not to hinge on evident sense-based data, but are instead socially constructed. It is not, for example, a simple matter of opinion as to whom won the most recent World Series. It is, instead, an already decided matter of fact on which careers and heavy money turn. At the same time, however, questions about what is to count as a "run," as opposed to an "out," or how many "innings" make up a game, are widely agreed-on facts, but not facts of the same caliber as are those about whether lead is heavier (or has a higher atomic number) than tin.

Armed with such an account of social and institutional facts, it becomes potentially more understandable why some of the things once written off as mere values or tastes or opinions may actually have enough of a factual nature to begin bracketing them with beliefs about brute fact. In much the same way, other things that once counted as "brute" facts come to be revealed as institutional or social facts. For reasons such as this, the class of social facts would appear to grow at the expense of brute facts and matters of mere opinion. The same set of distinctions also potentially offers a way of better understanding why the literature on epistemic development appears so fractured and contradictory.

"Social Facts" as the Dark Horse in the Epistemic Race

The ordinary notion of a "dark horse" refers to instances of persons or things that surprisingly emerge, often at the last minute, from the back of the pack, and that rise to prominence after having been previously little considered. So-called social facts, we mean to argue, are like that. As it is, one could easily review a thousand journal articles having to do with early epistemic development without ever once encountering a whiff of the prospect that, in addition to personalized issues about what tastes best, or locally disputed matters of so-called brute facts, there actually exists a whole class of fact-bearing epistemic matters that require being arbitrated. Given that a good case has been made for the prospect that early epistemic development, particularly as it bears on disputes regarding either aesthetics or issues of raw facticity, is evidently short-lived, the possibility that there exists a third category involving novel matters of social or institutional facts that may have longer legs seems especially deserving of our attention.

Wholesale versus Retail Doubt

It is entirely possible, at least in principle, that the class of social facts exists as just described, but the way they come to be understood across development is no different from that followed for brute facts. That is, it could

happen that young people's grasp of social facts also involves some single watershed moment at which the possibility of false social beliefs is initially intuited, followed only by a gradualist lifetime spent building a repertoire of experiences and opportunities for practice. Were this to be the case, then classical theory theorists would be right on all counts, all claims about structural changes in epistemic development beyond the preschool years would once again become fraudulent, and scores of research programs described earlier would need to be seen as a waste of time. Before everyone rushes to prematurely cash in their developmental chips, however, all of the differences that potentially divide social facts from other matters of epistemic import must first be carefully considered. The most important of these, we suggest, turns on the fact that, although disputes about brute facts tend to be decided by appeals to sense-based evidence, disputes about social fact more often engender still more doubts, which are only temporarily held in check by the fact that children typically lack the cognitive wherewithal to take the "wholesale" measure of all of this generic uncertainty (Chandler, 1975, 1987).

This difference is owed to the fact that, although competing claims about matters of brute facts do turn up on occasion, most of these are easily written off to simple ignorance. On still other, and even rarer occasions when, for example, even experts in possession of all the facts continue to disagree, faith in the certainty of some more enlightened future where new facts will intrude to settle such contested matters is widely thought to be warranted by all of the "progress" otherwise happening all around us. That is, we ordinarily think of ourselves as entitled to certain local doubts about the truth of this or that particular "retail" matter, but to doubt too many brute facts all at once, including the truth of one's own experiences, is rare.

Competing matters of taste tend to be handled differently but no less confidently. We automatically expect that different people may differ in their beliefs about matters of taste. That is why we talk about issues of "personal" taste in the first place, and why it is so often mistakenly said that such matters are entirely lacking in epistemic content. If too many people failed to differ in this expected, even constitutive, way, then we would likely reassign such outlier cases by deciding that they were brute facts after all.

Differences of "opinion" about social or institutional facts are, however, a different matter entirely. Rather than rooting out competing knowledge claims, as is regularly assumed to be the proper thing to do with disputes concerning brute fact, here, in the case of social facts, increased knowledge and experience tends not to rid us of such competing views but to multiply them exponentially. In this sense, social facts are like matters of taste in that they often seem to invite disagreement. It is in this sense that social facts earn their dark horse status, shooting up the middle, as they do, between impossible to agree-on matters of taste, on the one hand, and ultimately settleable matters of brute fact, on the other.

As tends to be true of dark horses more generally, social facts often aggravate the status quo, and thus, at least initially, tend to be driven back. That is, perhaps, why young (and sometimes not so young) people often work so hard to empty out their own growing category of social facts by reassigning them, whenever possible, to the more stable categories of brute facts and matters of personal taste. We even have names for people who excel at this. Those who see a brute fact hidden behind every candidate social fact are often regarded as "dogmatists" (e.g., an ordained marriage just *is* a union between a man and a woman), whereas those who wish to regard *everything* as a matter of personal taste tend to be labeled as rabid "relativists."

We, as developing persons, could, in principle, go on dealing individually with every aspiring social fact that appeared on our own epistemic horizon by attempting to banish them to the less troublesome categories of taste and brute facticity, but there is no economy of scale to such a one-off, "retail" enterprise. Rather, what seems to happen is that as the number of contending social facts continues to grow, some developmental tipping point is reached when everything "turns turtle," when retail goes wholesale, and for better or worse, we convince ourselves that, in some measure, everything is a social fact.

Such turning points are often crisis moments. Having drunk from the poisoned well of generic doubt, Descartes, for example, described, on finding himself "forced to deny that there are determinate and unambiguous criteria for knowledge," that he was overtaken by a "dread of madness and chaos where nothing is fixed and where we can neither touch bottom nor support ourselves on the surface" (Bernstein, 1983, p. 18). Similarly, Hume (1938) reported that he became so wrought by what he perceived to be irreconcilable differences in human understanding that he was "ready to reject all belief and reason, and look upon no opinion ever as more likely than another" (p. 267). More positively, Lovejoy (1936) assigned to such experiences responsibility for a new appreciation for a "certain complicatedness" in our worlds, one that also allows for a measure of connoisseurship with regard to matters of taste (Gadamer, 1960/1982), and a way of regarding what were once held to be especially "brute" facts as drawing their meaning from the socially constructed paradigm in which they are situated.

The point in rehearsing these matters about social facts is not to proselytize for some particular metaphysical framework for helping others to recover from their "Cartesian anxiety" (Bernstein, 1983). Rather, our hope is to use these distinctions to sketch a possible descriptive framework within which all of the sundry investigators who have contributed to the literature on epistemic development might conceivably find a place. It is, we think, not helpful, and almost certainly wrong, to go down some cynical road casting doubts on the likelihood that the research participants in every study cited here did, in fact, do and say what has been claimed. The job, rather, is to envision a way in which all of these redundant

and (because they are said about persons of wildly different ages) contradictory claims can find some place.

The Cliff's Notes version of our claims goes something like this: (1) Even infant children evidently make certain baby steps toward eventual epistemic maturity by intuiting the legitimacy of at least personal tastes; (2) preschoolers, and quite possibly those much younger, because they come to grasp the possibility of false beliefs, begin prying open the door to acknowledging representational diversity, but only in the instance of what might be called "brute" facts, and only when the different knowledge claims they are prepared to acknowledge are seen as caused by differences in information access; (3) there is little evidence to suggest that there is much room for further development in the case of matters of either personal taste, or "brute" facts, at least until these are later "bracketed" and reunderstood in light of the constructive nature of all knowing; (4) the "executive functions" of early school-aged children allow them to engage in recursive patterns of thought, but these advances largely happen to the side of real epistemic growth; (5) during their middle-school years, young persons finally acquire some fledgling grasp of the real "interpretive" nature of the knowing process but are cognitively ill-prepared to grasp the wholesale implications of this retail discovery; (6) armed with whatever capacities for abstract thought that ordinarily accompany the move into adolescence, teenagers begin to drink from the poisoned well of generic doubt, and as a result are frequently catapulted into either regressive forms of dogmatic thinking, or enter some "moratorium" period especially marked by thoughts of radical relativism; (7) the "Cartesian anxiety" that often marks the adolescent years also helps to author new insights into the dark horse possibility that, in a sense, all facts are social facts, although some are less arguable or less worthy of being argued over than are others; and (8) with burgeoning adulthood, those who are about to or have already entered their college years slowly begin to reach back to and bracket some of their earlier absolutist thoughts about brute facts and know-nothing matters of taste, and slowly come to appreciate that, if there is an ineluctable subjective component to all knowledge claims, then it is necessary to begin hammering out criteria for sorting out better from worse ideas. Perhaps you will find all of this too accommodating, but it at least makes room for a very long list of competing knowledge claims about competing knowledge claims.

REFERENCES

Anderson, M. (1986). Cultural concatenation of deceit and secrecy. In R. W. Mitchell & N. S. Thompson (Eds.), *Deception: Perspectives on human and nonhuman deceit* (pp. 323–348). Albany, NY: State University of New York Press.

Armstrong, D. (1968). *A materialist theory of mind.* New York: Humanities Press.

Armstrong, D. M. (1981). The causal theory of the mind. In D. M. Armstrong (Ed.), *The nature of mind and other essays* (pp. 16–31). Ithaca, NY: Cornell University Press.

Astington, J. W. (1993). *The child's discovery of the mind.* Cambridge, MA: Harvard University Press.

Astington, J. W., Harris, P. L., & Olson, D. R. (1988). *Developing theories of mind.* New York: Cambridge University Press.

Audi, R. (1999). *The Cambridge dictionary of philosophy.* Cambridge: Cambridge University Press.

Baldwin, D. A. (1991). Infants' contribution to the achievement of joint reference. *Child Development, 62,* 875–890.

Baldwin, D. A., Markman, E. M., Bill, B., Desjardins, R. N., Irwin, R. N., & Tidball, G. (1996). Infants' reliance on a social criterion for establishing word-object relations. *Child Development, 67,* 3135–3153.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Baron-Cohen, S. (1987). Autism and symbolic play. *British Journal of Developmental Psychology, 5,* 139–148.

Baron-Cohen, S. (1995). *Mindblindness: an essay on autism and theory of mind.* Cambridge, MA: MIT Press.

Baron-Cohen, S., Leslie, A., & Frith, U. (1985). Does the autistic child have a "theory of mind"? *Cognition, 21,* 37–46.

Baxter Magolda, M. B. (1992). *Knowing and reasoning in college: Gender-related patterns in students' intellectual development.* San Francisco: Jossey Bass.

Baxter Magolda, M. B., & Porterfield, W. D. (1985). *Assessing intellectual development: The link between theory and practice.* Alexandria, VA: American College Personnel Association.

Bennett, J. (1978). Some remarks about concepts. *Behavioral and Brain Sciences, 4,* 557–560.

Belenky, M. F., Clinchy, B. M., Goldberger, N. R., & Tarule, J. M. (1986). *Women's way's of knowing: The development of self, voice and mind.* New York: Basic Books.

Benack, S., & Basseches, M. A. (1989). Dialectical thinking and relativistic epistemology: Their relation in adult development. In M. L. Commons, J. D. Sinnott, F. A. Richards, & C. Armon (Eds.), *Adult development: Comparisons and applications of developmental models* (pp. 95–109). New York: Praeger.

Bernstein, D. M., Atance, C., Loftus, G. R., & Meltzoff, A. N. (2004). We saw it all along: Visual hindsight bias in children and adults. *Psychological Science, 15,* 264–267.

Bernstein, R. (1983). *Beyond objectivism and relativism.* Philadelphia: University of Pennsylvania Press.

Bickhard, M. H. (2006). Developmental normativity and normative development. In L. Smith & J. Voneche (Eds.), *Norms in human development* (pp. 57–76). Cambridge: Cambridge University Press.

Birch, S. A. J. (2005). When knowledge is a curse: Children's and adults' mental state reasoning. *Current Directions in Psychological Science, 14,* 25–29.

Birch, S. A. J., & Bernstein, D. (2007). What kids can tell us about hindsight bias: A fundamental constraint on perspective-taking? *Social Cognition, 25,* 98–113.

Birch, S. A. J., & Bloom, P. (2002). Preschoolers are sensitive to the speaker's knowledge when learning proper names. *Child Development, 73,* 434–444.

Birch, S. A. J., & Bloom, P. (2003). Children are cursed: An asymmetric bias in mental-state attribution. *Psychological Science, 14,* 283–286.

Birch, S. A. J., & Bloom, P. (2004). Understanding children's and adults' limitations in mental state reasoning. *Trends in Cognitive Science, 8,* 255–260.

Birch, S. A. J., & Bloom, P. (2007). The curse of knowledge in reasoning about false beliefs. *Psychological Science, 18,* 382–386.

Blasi, A. (1995). Moral understanding and the moral personality: The process of moral integration. In W. M. Kurtines & J. L. Gewirts (Eds.), *Moral development: An introduction* (pp. 229–253). Boston: Allyn & Bacon.

Bloom, P. (2000). *How children learn the meanings of words.* Cambridge, MA: MIT Press.

Bloom, P. (2004). *Descartes' baby: How the science of child development explains what makes us human.* New York: Basic Books.

Bloom, P., & German, T. (2000). Two reasons to abandon the false belief task as a test of theory of mind. *Cognition, 77,* B25–B31.

Bosco, F. M., Friedman, O., & Leslie, A. M. (2006). Recognition of pretend and real actions in play by 1- and 2-year-olds: Early success and why they fail. *Cognitive Development, 21,* 3–10.

Boyes, M., & Chandler, M. J. (1992). Cognitive development, epistemic doubt, and identity formation in adolescence. *Journal of Youth and Adolescence, 21*(3), 277–304.

Bretherton, I. (1991). Intentional communication and the development of an understanding of mind. In D. Frye & C. Moore (Eds.), *Children's theories of mind: Mental states and social understanding.* Hillsdale, NJ: Erlbaum.

Bretherton, I., & Beeghly, M. (1982). Talking about internal states: The acquisition of an explicit Theory of Mind. *Developmental Psychology, 18,* 906–921.

Broughton, J. (1978). Development of concepts of self, mind, reality, and knowledge. *New Directions for Child Development, 1,* 70–100.

Bruner, J. (1990). *Acts of meaning.* Cambridge, MA: Harvard University Press.

Bugelski, B. R. (1960). *An introduction to the principles of psychology.* New York: Holt, Rinehart, and Winston.

Buttelmann, D., Carpenter, M., & Tomasello, M. (2009). Eighteen-month-old infants show false belief understanding in an active helping paradigm. *Cognition,* 112, 337-342.

Call, J., & Tomasello, M. (2008). Does the chimpanzee have a theory of mind? 30 years later. *Trends in Cognitive Science, 12,* 187–192.

Carey, S., & Gelman, R. (Eds.). (1991). *Epigenesis of mind: Essays in biology and knowledge.* Hillsdale, NJ: Erlbaum.

Carlson, S. M., Moses, L. J., & Claxton, L. J. (2004). Individual difference in executive functioning and theory of mind: An investigation of inhibitory control and planning ability. *Journal of Experimental Child Psychology, 87,* 299–319.

Carpendale, J. I. M. (1995). *On the distinction between false belief understanding and the acquisition of an interpretive theory of mind.* Unpublished doctoral dissertation, University of British Columbia, Vancouver, Canada.

Carpendale, J. I. M., & Chandler, M. J. (1996). On the distinction between false belief understanding and subscribing to an interpretive theory of mind. *Child Development, 67*(4), 1686–1706.

Carpendale, J. I. M., & Lewis, C. (2006). *How children develop social understanding.* Oxford: Blackwell Publishers.

Chandler, M. J. (1975). Relativism and the problem of epistemological loneliness. *Human Development, 18,* 171–180.

Chandler, M. J. (1978). Social cognition: A selected review of current research. In W. Overton & J. Gallagher (Eds.), *Knowledge and development: Yearbook of development epistemology.* New York: Plenum.

Chandler, M. J. (1987). The Othello effect: An essay on the emergence and eclipse of skeptical doubt. *Human Development, 30,* 137–159.

Chandler, M. J. (1988). Doubt and developing theories of mind. In J. W. Astington, P. L. Harris, and D. R. Olson (Eds.), *Developing theories of mind* (pp. 387–413). New York: Cambridge University Press.

Chandler, M. J. (2001). Perspective taking in the aftermath of theory-theory and the collapse of the social role-taking enterprise. In A. Tryphon & J. Voneche (Eds.), *Working with Piaget: Essays in honour of Barbel Inhelder* (pp. 39–63). London: Psychology Press.

Chandler, M. J., & Boyes, M. (1982). Social-cognitive development. In B. B. Wolman (Ed.), *Handbook of developmental psychology* (pp. 387–402). Englewood Cliffs, NJ: Prentice-Hall.

Chandler, M. J., Boyes, M. C., & Ball, L. (1990). Relativism and stations of epistemic doubt. *Journal of Experimental Child Psychology, 50,* 370–395.

Chandler, M. J., & Carpendale, J. I. M. (1994). Concerning the rumored falling to earth of Time's Arrow. *Psychological Inquiry, 5,* 245–248.

Chandler, M. J., & Carpendale, J. I. M. (1998). Inching toward a mature theory of mind. In M. Ferrari & R. Sternberg (Eds.), *Self-awareness: Its nature and development* (pp. 148–190). New York: Guilford Publications.

Chandler, M. J., Fritz, A. S., & Hala, S. M. (1989). Small scale deceit: Deception as a marker of 2-, 3- and 4-year-old's theories of mind. *Child Development, 60,* 1263–1277.

Chandler, M. J., & Hala, S. (1994). The role of personal involvement in the assessment of false belief skills. In C. Lewis & P. Mitchell (Eds.), *Origins of an understanding of mind.* Hove, United Kingdom: Erlbaum.

Chandler, M. J., Hallett, D., & Sokol, B. W. (2002). Competing claims about competing knowledge claims. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 145–168). Mahway, NJ: Lawrence Erlbaum Associates.

Chandler, M. J., & Lalonde, C. (1996). Shifting to an interpretive theory of mind: 5- to 7-year olds' changing conceptions of mental life. In A. J. Sameroff & M. M. Haith (Eds.), *The five to seven year shift: The age of reason and responsibility* (pp. 111–139). Chicago: University of Chicago Press.

Chandler, M. J., & Sokol, B. W. (1999). Representation once removed: Children's developing conceptions of representational life. In I. E. Sigel (Ed.), *Development of mental representation: Theories and applications* (pp. 201–230). Mahwah, NJ: Lawrence Erlbaum Associates.

Chapman, M. (1988). *Constructive evolution: Origins and development of Piaget's thought.* Cambridge: Cambridge University Press.

Churchland, P. (1981). Eliminative materialism and propositional attitudes. *Journal of Philosophy, 78,* 67–90.

Clinchy, B. M. (2002). Revisiting women's ways of knowing. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 63–87). Mahwah, NJ: Lawrence Erlbaum Associates.

Clinchy, B. M., & Mansfield, A. F. (1985, March). Justifications offered by children to support positions on issues of "fact" and "opinion." Paper presented that the 56th annual meeting of the (U.S.) Eastern Psychological Association, Philadelphia.

Clinchy, B. M., & Mansfield, A. F. (1986, May). The child's discovery of the role of the knower in the known. Paper presented that the 16th Annual Symposium of the Jean Piaget Society, Boston.

Coie, J. D., Costanzo, P. R., & Farnhill, D. (1973). Specific transitions in the development of spacial perspective-taking ability. *Developmental Psychology, 9,* 167–177.

Commons, M. L., Armon, C., Richards, F. A., Schrader, D. E., Farrell, E. W., Tappan, M. B., et al. (1989). A multidomain study of adult development. In M. L. Commons, J. D. Sinnott, F. A. Richards, & C. Armon (Eds.), *Adult development: Comparisons and applications of developmental models* (pp. 33–56). New York: Praeger.

Csibra G., Gergely, G., Biró, S., & Koós, O., & Brockbank, M. (1999). Goal-attribution without agency cues: The perception of 'pure reason' in infancy. *Cognition, 72,* 237–267.

Davidson, D. (1984). Thought and talk. In D. Davidson (Ed.), *Inquiries into truth and interpretation* (pp. 155–170). Oxford: Oxford University Press.

Davies, M., & Stone, T. (Eds.). (1995). *Folk Psychology.* Oxford: Blackwell.

De Morgan. A. (1872/1915). On poetry: A rhapsody. *A budget of paradoxes*. New York: Dover.

Dennett, D. C. (1978). Beliefs about beliefs. *Behavioral and Brain Sciences, 4,* 568–570.

Dennett, D. C. (1987). *The intentional stance.* Cambridge, MA: Bradford Books/MIT Press.

Dias, M. G., & Harris, P. L. (1990). The influence of the imagination on reasoning by young children. *British Journal of Developmental Psychology, 8,* 305–317.

Duhem, P. (1906/1962). *The aim and structure of physical theory.* New York: Atheneum.

Dunn, J. (1988). *The beginnings of social understanding.* Cambridge, MA: Harvard University Press.

Dunn, J. (1991). Understanding others: Evidence from naturalistic studies of children. In A. Whiten (Ed.), *Natural theories of mind. Evolution, development and simulation of everyday mindreading* (pp. 51–61). Oxford: Basil Blackwell.

Dunn, J. (1993). *Children's understanding of "other minds": Antecedents and later correlates in interaction with family and friends.* Paper presented at a Symposium at the Biennial Meeting of the Society for Research in Child Development, New Orleans, LA.

Dunn, J., & Dale, N. (1984). I a daddy: 2-year-olds' collaboration in joint pretend with sibling and with mother. In I. Bretherton (Ed.), *Symbolic play* (pp. 131–158). New York: Academic Press.

Dunn, J., & Munn, P. (1985). Becoming a family member: Family conflict and the development of social understanding in the second year. *Child Development, 56,* 764–774.

Elgin, C. (1989). The relativity of the fact and the objectivity of value. In M. Krausz (Ed.), *Relativism: Interpretation and confrontation* (pp. 86–98). Notre Dame, IN: University of Notre Dame Press.

Elkind, D. (1967). Egocentrism in adolescence. *Child Development, 38,* 1025–1034.

Elkind, D. (1985). Egocentrism redux. *Developmental Review, 5,* 218–226.

Epley, N. (2008). Solving the (real) other minds problem. *Social and Personality Psychology Compass, 2,* 1455–1474.

Epley, N., Morewedge, C. K., & Keysar, B. (2004). Perspective taking in children and adults: Equivalent egocentrism but differential correction. *Journal of Experimental Social Psychology, 40,* 760–768.

Fenson, L., & Ramsay, D. S. (1981). Effects of modeling action sequences on the play of twelve-, fifteen- and nineteen-month-old children. *Child Development, 52,* 1028–1036.

Flavell, J. (1974). The development of inferences about others. In T. Mischel (Ed.), *Understanding other persons.* Oxford: Blackwell, Basil, & Mott.

Flavell, J. (1977). *Cognitive development.* Englewood Cliffs, NJ: Prentice.

Flavell, J. H. (1988). The development of children's knowledge about the mind: From cognitive connections to mental representations. In J. W. Astington, P. L. Harris, & D. R. Olson

(Eds.), *Developing theories of mind* (pp. 244–267). New York: Cambridge University Press.

Flavell, J. H., Botkin, P. T., Fry, C. L., Wright, J. W., & Jarvis, P. E. (1968). *The development of role-taking and communication skills in children.* New York: John Wiley.

Flavell, J. H., Flavell, E. R., Green, F. L, & Moses, L. J. (1990). Young children's understanding of fact beliefs versus value beliefs. *Child Development, 61,* 915–928.

Fodor, J. A. (1987). *Psychosemantics: The problem of meaning in the philosophy of mind.* Cambridge, MA: Bradford Books/MIT Press.

Fodor, J. (1992). A theory of the child's theory of mind. *Cognition, 44,* 283–296.

Forguson, L. (1989). *Common sense.* London: Routledge.

Forguson, L., & Gopnik, A. (1988). The ontogeny of common sense. In J. W. Astington, P. L. Harris, & D. R. Olson (Eds.), *Developing theories of mind* (pp. 226–243). New York: Cambridge University Press.

Frankfurt, H. G. (1988). *The importance of what we care about: Philosophical essays.* Cambridge: Cambridge University Press.

Friedman, O., & Leslie, A. M. (2007). The conceptual underpinnings of pretense: Pretending is not 'behaving-as-if.' *Cognition, 105*(1), 103–124.

Frith, U. (1989). *Autism: Explaining the enigma.* Oxford: Blackwell.

Frye, D., & Moore, C. (1991). *Children's theories of mind.* Hillsdale, NJ: Erlbaum.

Gadamer, H. G. (1960/1982). *Truth and method.* New York: Seabury Press.

Garcia, R. (1987). Sociology of science and sociogenesis of knowledge. In B. Inhelder, D. de Caprona, & A. Cornu-Wells (Eds.), *Piaget today* (pp. 127–140). Hove, United Kingdom: Lawrence Erlbaum Associates.

German, T. P., & Hehman, J. A. (2006). Representational and executive selection resources in 'theory of mind': Evidence from compromised belief–desire reasoning in old age. *Cognition, 101,* 129–152.

German, T. P., & Leslie, A. M. (2000). Attending to and learning about mental states. In P. Mitchell & K. Riggs (Eds.), *Children's reasoning and the mind.* Hove, United Kingdom: Psychology Press.

German, T. P., Niehaus, J. L., Roarty, M. P., Giesbrecht, B., & Miller, M. B. (2004). Neural correlates of detecting pretense: Automatic engagement of intentional stance under covert conditions. *Journal of Cognitive Neuroscience, 16,* 1805–1817.

Gnepp, J., & Chilamkurti, C. (1988). Children's use of personality attributions to predict other people's emotional and behavioral reactions. *Child Development, 59,* 743–754.

Goldman, A. (1989). Interpretation psychologized. *Mind and Language, 4,* 161–185.

Gopnik, A. (1991, April). *Is the child's theory of mind really a theory?* Paper presented at the biennial meeting of the Society for Research in Child Development, Seattle, WA.

Gopnik, A., & Astington, J. W. (1988). Children's understanding of representational change and its relation to the understanding of false belief and the appearance-reality distinction. *Child Development, 59,* 26–37.

Gopnik, A., Meltzoff, A. N., & Kuhl, P. K. (1999). *The scientist in the crib: Minds, brains, and how children learn.* New York: William Morrow.

Gopnik, A., & Wellman, H. M. (1992). Why the child's theory of mind really is a theory. *Mind and Language, 7,* 145–171.

Gopnik, A., & Wellman, H. M. (1994). The theory theory. In L. A. Hirschfeld & S. A. Gelman (Eds.), *Mapping the mind: Domain specificity in cognition and culture* (pp. 257–293). New York: Cambridge University Press.

Gordon, R. M. (1986). Folk psychology as simulation. *Mind and Language, 1,* 158–171.

Greenwood, J. D. (1989). *Explanation and experiment in social psychological science: Realism and the social constitution of action.* New York: Springer-Verlag.

Hala, S., & Chandler, M. J. (1993a, March). *Intentional action and early false belief understanding.* Presented at the Biennial Meetings of The Society for Research in Child Development, New Orleans, LA.

Hala, S., & Chandler, M. J. (1993b). *Plans of action and 3-year-olds' understanding of false belief.* Presented at the Twenty-Third Annual Symposium of the Jean Piaget Society, Philadelphia.

Hala, S., & Chandler, M. J. (1996). The role of strategic planning in accessing false-belief understanding. *Child Development, 67,* 2948–2966.

Hala, S., Chandler, M. J., & Fritz, A. (1991). Fledgling theories of mind: Deception as a marker of 3-year-old's understanding of false belief. *Child Development, 62,* 83–97.

Hanson, N. R. (1958). *Patterns of discovery.* London: Cambridge University Press.

Hare, B., Call, J., & Tomasello, M. (2001). Do chimpanzees know what conspecifics know? *Animal Behaviour, 61,* 139–151.

Harris, P. (1991). The work of the imagination. In A. Whiten (Ed.), *Natural theories of mind.* Oxford: Blackwell.

Harris, P. (2006). Social cognition. In D. Kuhn & R. S. Siegler (Eds.), *Handbook of child psychology: Vol. 2. Cognition, perception, and language* (pp. 811–858). Hoboken, NJ: John Wiley & Sons, Inc.

Harris, P. L. (1989). *Children and emotion: The development of psychological understanding.* Oxford: Blackwell.

Harris, P. L. (1995). Imagining and pretending. In M. Davies & T. Stone (Eds.), *Mental simulation: Evaluations and applications* (pp. 170–184). Oxford: Blackwell.

Heyman, G. D., Fu, G., & Lee, K. (2007). Evaluating claims people make about themselves: The development of skepticism. *Child Development, 78*, 367–375.

Heyman, G. D., & Gelman, S. A. (1999). The use of trait labels in making psychological inferences. *Child Development, 70,* 604–619.

Heyman, G. D., & Legare, C. H. (2005). Children's evaluation of sources of information about traits. *Developmental Psychology, 41,* 636–647.

Hofer, B. K., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *Review of Educational Research, 67*(1), 88–140.

Holliday, S. G., & Chandler, M. J. (1986). Wisdom: Explorations in adult competence. *Contributions to Human Development, 17,* 1–100.

Hume, D. (1938). *An abstract of a treatise of human nature.* Cambridge: Cambridge University Press.

Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking.* London: Routledge & Kegan Paul.

James, W. (1910) *Psychology: The briefer course.* New York: Holt and Co.

Jastrow, J. (1900). *Fact and fable in psychology.* Boston: Houghton-Mifflin.

Jenkins, J. M., & Astington, J. W. (1993). *Cognitive, linguistic, and social factors associated with theory of mind development in young children.* Paper presented at the Biennial Meeting of the Society for Research in Child Development, New Orleans, LA.

Johnson, C. N. (1988). Theory of mind and the structure of conscious experience. In J. W. Astington, P. L. Harris, & D. R. Olson, (Eds.), *Developing theories of mind.* New York: Cambridge University Press.

Johnson, S., Slaughter, V., & Carey, S. (1998). Whose gaze will infants follow? The elicitation of gaze-following in 12-month-olds. *Developmental Science, 1,* 233–238.

Kessen, W. (1996). American psychology just before Piaget. *Psychological Science*, *7*(4), 196–199.

Keysar, B., Lin, S., & Barr, D. J. (2003). Limits on theory of mind use in adults. *Cognition, 89,* 25–41.

King, P. M. (1977). The development of reflective judgment and formal operational thinking in adolescents and young adults. *Dissertation Abstracts International, 38,* 7233A.

King, P. M., & Kitchener, K. S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults.* San Francisco: Jossey-Bass.

King, P. M., & Kitchener, K. S. (2002). The reflective judgment model: Twenty years of research on epistemic cognition (pp. 37–61). In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing.* Mahwah, NJ: Lawrence Erlbaum Associates.

Kitchener, K. S., & King, P. M. (1981). Reflective judgment: Concepts of justification and their relationship to age and education. *Journal of Applied Developmental Psychology, 2,* 89–116.

Kuhlmeier, V., Wynn, K., & Bloom, P. (2003). Attribution of dispositional states by 12-month-olds. *Psychological Science, 14,* 402–408.

Kuhn, D. (1991). *The skills of argument.* Cambridge: Cambridge University Press.

Kuhn, D., Amsel, E., & O'Loughlin, M. (1988). *The development of scientific thinking skills.* San Diego: Academic Press.

Kuhn, D., & Weinstock, M. (2002). The development of epistemological understanding. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 121–144). Mahwah, NJ: Lawrence Erlbaum Associates.

Kuhn, D., Weinstock, M., & Flaton, R. (1994). Historical reasoning as theory-evidence coordination. In M. Carretero & J. F. Voss (Eds.), *Cognitive and instructional processes in history and the social sciences* (pp. 377–401). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Kuhn, T. S. (1970). *The structure of scientific revolutions* (2nd ed.) Chicago: University of Chicago Press.

Kuhn, T. S. (1991). The natural and human sciences. In D. R. Hiley, J. F. Bohman, & R. Shusterman (Eds.), *The interpretive turn: Philosophy, science, culture* (pp. 17–24). Ithaca, NY: Cornell University Press.

Kurdek, L., & Rodgon, M. (1975). Perceptual, cognitive, and affective perspective taking in kindergarten through six-grade children. *Developmental Psychology, 11,* 643–650.

LaFreniere, P. (1988). The ontogeny of tactical deception in humans. In R. W. Byrne & A. Whiten (Eds.), *Machiavellian intelligence: Social expertise and the evolution of intellect in monkeys, apes, and humans* (pp. 238–252). Oxford: Clarendon Press.

Lalonde, C. E. (1996). *Children's understanding of the interpretive character of the mind.* Unpublished doctoral dissertation. University of British Columbia, Vancouver, British Columbia, Canada.

Lalonde, C. E., & Chandler, M. J. (2002). Children's understanding of interpretation. *New Ideas in Psychology: Special Issue on Folk Epistemology, 20,* 163–198.

Latour, B. (1993). *We have never been modern.* Cambridge, MA: Harvard University Press.

Legerstee, M. (1992). A review of the animate-inanimate distinction in infancy: Implications for models of social and cognitive knowing. *Early Development and Parenting, 1,* 57–67.

Lempers, J. D., Flavell, E. R., & Flavell, J. H. (1977). The development in very young children of tacit knowledge concerning visual perception. *Genetic Psychology Monographs, 95,* 3–53.

Leslie, A. (1988). Some implications of pretense for the development of theories of mind. In J. W. Astington, P. L. Harris, & D. R. Olson (Eds.), *Developing theories of mind* (pp. 19–46). New York: Cambridge University Press.

Leslie, A. M. (1987). Pretense and representation: The origins of "theory of mind." *Psychological Review, 94,* 412–426.

Lewis, C. (1994). Episodes, events, and narratives in the child's understanding of mind. In C. Lewis & P. Mitchell (Eds.), *Children's early understanding of mind: Origins and development* (pp. 457–480) Hove, United Kingdom: Erlbaum.

Lewis, D. (1972). Psychophysical and theoretical identifications. *Australian Journal of Philosophy, 50,* 249–258.

Lewis, M., Stanger, C., & Sullivan, M. W. (1989). Deception in 3-year-olds. *Developmental Psychology, 25,* 439–443.

Lillard, A. S. (1993) Young children's conceptualization of pretense: Action or mental representational state? *Child Development, 49,* 642–648.

Lillard, A. S. (1994). Making sense of pretence. In C. Lewis & P. Mitchell (Eds.), *Children's early understanding of mind: Origins and development.* Hove, United Kingdom: Lawrence Erlbaum.

Lillard, A. S. (1996). Body or mind: Children's categorizing of pretense. *Child Development, 67,* 1717–1734.

Lillard, A. S. (2001). Pretend play as twin earth: A socio-cognitive analysis. *Developmental Review, 21,* 495–531.

Lillard, A. S., & Flavell, J. H. (1992). Young children's understanding of different mental states. *Developmental Psychology, 28,* 626–634.

Lillard, A. S., & Witherington, D. S. (2004). Mothers' behavior modifications during pretense snacks and their possible signal value for toddlers. *Developmental Psychology, 40,* 95–113.

Lyotard, J. F. (1984). *The postmodern condition: A report on knowledge* (G. Bennington & B. Massiuri, Trans.). Minneapolis, MN: University of Minnesota Press.

Macnamara, J. (1989). Children as common sense psychologists. *Canadian Journal of Behavioural Science, 21,* 426–429.

Mansfield, A. F., & Clinchy, B. M. (1997, April 3). *Toward the integration of objectivity and subjectivity: A longitudinal study of epistemological development between the ages of 9 and 13.* Paper presented at the biennial meeting of the Society for Research in Child Development, Washington, DC.

Markman, K. D., Klein, W. M. P., & Suhr, J. A. (2009). *The handbook of imagination and mental simulation.* New York: Psychology Press.

Masangkay, Z. S., McCluskey, K. A., McIntyre, C. W., Sims-Knight, J., Vaughn, B. E., & Flavell, J. H. (1974). The early development of inferences about the visual percepts of others. *Child Development, 45,* 357–366.

Meltzoff, A. N. (1995). Understanding the intentions of others: Re-enactment of intended acts by 18-month-old children. *Developmental Psychology, 31,* 838–850.

Meltzoff, A. N., & Gopnik, A. (1993). The role of imitation in understanding persons and developing a theory of mind. In S. Baron-Cohen, H. Tager-Flusberg, & D. J. Cohen (Eds.), *Understanding other minds: Perspectives from autism* (pp. 335–366). Oxford: Oxford University Press.

Milligan, K., Astington, J. W., & Dack, L. A. (2007). Language and theory of mind: Meta-analysis of the relation between language ability and false-belief understanding. *Child Development, 77,* 622–646.

Mills, C. M., & Keil, F. C. (2005). The development of cynicism. *Psychological Science, 16,* 385–390.

Mills, C. M., & Keil, F. C. (2008). Children's developing notions of (im)partiality. *Cognition, 107,* 528–551.

Mitchell, P., & Lacohee, H. (1991) Children's understanding of false belief. *Cognition, 39,* 107–128.

Mitchell, R. W., & Thompson, N. S. (Eds.). (1986). *Deception: Perspectives on human and nonhuman deceit.* Albany, NY: State University of New York Press.

Moore, C., Pure, K., & Furrow, D. (1990). Children's under- standing of the modal expression of certainty and un-certainty and its relation to the development of a representational theory of mind. *Child Development, 61,* 722–730.

Moore, W. S. (1994). Student and faculty epistemology in the college classroom: The Perry schema of intellectual and ethical development. In K. W. Prichard & R. A Sawyer (Eds.), *Handbook of college teaching: Theory and applications* (pp. 45–67). Westport, CT: Greenwood Press.

Morgan, C. L. (1894). *An introduction to comparative psychology.* London: Walter Scott.

Morton, A. (1980). *Frames of mind.* Oxford: Clarendon Press.

Moses, L. (1993). Young children's understanding of belief constraints on intention. *Cognitive Development, 8,* 1–25.

Moses, L. J., & Chandler, M. J. (1992). Traveler's guide to children's theories of mind. *Psychological Inquiry, 3,* 286–301.

Mossler, D. G., Marvin, R. S., & Greenburg, M. T. (1976). Conceptual perspective taking in 2 to 6 year old children. *Developmental Psychology, 12*(1), 85–86.

Moya, C. J. (1990). *The philosophy of action: An introduction.* Cambridge: Polity Press.

Muller, U., Zelazo, D. P., & Imrisek, S. (2005).Executive function and children's understanding of false belief: How specific is the relation? *Cognitive Development, 20,* 173–189.

Murray, F. B. (1979). Preface. In F. B. Murray (Ed.), *The impact of Piagetian theory: On education, philosophy, psychiatry, and psychology* (pp. ix–xiii). Baltimore, MD: University Park Press.

Nichols, S., & Stich, S. (2000). A cognitive theory of pretense. *Cognition, 74,* 115–147.

Nichols, S., & Stich, S. (2003). *Mindreading: An integrated account of pretense, self-awareness and understanding other minds.* Oxford: Oxford University Press.

Olson, D. R. (1993). The development of representations: The origins of mental life. *Canadian Psychology, 34*(3), 293–306.

O'Neill, D. K. (1996). Two-year-old children's sensitivity to a parent's knowledge state when making requests. *Child Development, 67,* 659–677.

Onishi, K. H., & Baillargeon, R. (2005). Do 15-month-old infants understand false belief? *Science, 308,* 255–258.

Onishi, K. H., Baillargeon, R., & Leslie, A. M. (2007). 15-month-old infants detect violations in pretend scenarios. *Acta Psychologica, 124,* 106–128.

Oser, F. K., & Reich, K. H. (1987). The challenge of competing explanations: The development of thinking in terms of complementarity of "theories." *Human Development, 30,* 178–186.

Overton, W. F. (2006). Developmental psychology: Philosophy, concepts, methodology. In W. Damon & R. M. Lerner (Series Ed.) & R. M. Lerner (Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., pp. 18–88). New York: Wiley.

Paulsen M. B., & Wells C. T. (1998). Domain differences in the epistemological beliefs of college students. *Research in Higher Education, 39,* 365–384.

Penn, D., & Povinelli, D. J. (2007). Causal cognition in human and nonhuman animals: A comparative, critical review. *Annual Reviews of Psychology, 58,* 97–118.

Perner, J. (1988). Higher-order beliefs and intentions in children's understanding of social interaction. In J. W. Astington, P. L. Harris, & D. R. Olson (Eds.), *Developing theories of mind* (pp. 271–294). New York: Cambridge University Press.

Perner, J. (1991). *Understanding the representational mind.* Cambridge, MA: MIT Press.

Perner, J., & Davies, G. (1991). Understanding the mind as an active information processor: Do young children have a "copy theory of mind"? *Cognition*, *39*(1), 51–69.

Perner, J., Leekam, S. R., & Wimmer, H. (1987). Three-year-old's difficulty with false belief: The case for conceptual deficit. *British Journal of Developmental Psychology, 5,* 125–137.

Perner, J., & Ruffman, T. (2005). Infants' insight into the mind: How deep? *Science, 308,* 214–216.

Perner, J., & Wimmer, H. (1985). "John thinks that Mary thinks that…": Attribution of second-order beliefs by 5- to 10-year-old children. *Journal of Experimental Child Psychology, 39,* 437–471.

Perry, W. G. (1970). *Forms of intellectual and ethical development in the college years: A scheme.* New York: Holt, Rinehart, & Winston.

Peskin, J. (1992). Ruse and representation: On children's ability to conceal their intentions. *Developmental Psychology, 28,* 84–89.

Piaget, J. (1962/1945). *Play, dreams, and imitation in childhood.* New York: Norton.

Piaget, J. (1965/1932). *The moral judgment of the child.* New York: The Free Press.

Piaget, J. (1972/1965). *Insights and illusions of philosophy.* London: Routledge & Kegan Paul.

Piaget, J., & Inhelder, B. (1963/1948). *The child's conception of space* (F. J. Langdon & J. L. Lunzer, Trans.). London: Routledge & Kegan Paul.

Pillow, B. H. (1988). The development of children's beliefs about the mental world. *Merrill-Palmer Quarterly, 34,* 1–32.

Pillow, B. H. (1989). Early understanding of perception as a source of knowledge. *Journal of Experimental Child Psychology, 47,* 11–129.

Pillow, B. H. (1991). Children's understanding of biased social cognition. *Developmental Psychology, 27*(4), 539–551.

Pillow, B. H. (1995). Two trends in the development of conceptual perspective-taking: An elaboration of the passive-active hypothesis. *International Journal of Behavioural Development, 18*(4), 649–676.

Pillow, B. H. (1999). Epistemological development in adolescence and adulthood: A multidimensional framework. *Genetic, Social, and General Psychology Monographs, 125*(4), 413–432.

Pillow, B. H., & Weed, S. T. (1995). Children's understanding of biased interpretation: Generality and limitations. *British Journal of Developmental Psychology, 13,* 347–366.

Premack, D. (1988). 'Does the chimpanzee have a theory of mind?' Revisited. In W. Byrne & A. Whiten (Eds.), *Machiavellian intelligence. Social expertise and the evolution of intellect in monkeys, apes and humans* (pp. 160–179). Oxford: Clarendon Press.

Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *The Behavioral and Brain Sciences, 4,* 515–526.

Price, R. (1953). *Droodles.* New York: Simon & Schuster.

Putnam, H. (1960). Minds and Machines. In S. Hook (Ed.), *Dimensions of mind* (pp. 138–164). New York: New York University Press.

Putnam, H. (1987). *The many faces of realism.* LaSalle, IL: Open Court.

Reddy, V. (1990). Playing with others' expectations: teasing and mucking about in the first year. In A. Whiten (Ed.) *Natural theories of mind. Evolution, development and simulation of everyday mindreading* (pp. 143–158). Oxford: Basil Blackwell.

Reich, K. H. (1998, September 21–24). Relational and contextual reasoning and its relationships with other forms of thought. Poster presented at the 15th advanced course of the Archives Jean Piaget, Geneva, Switzerland.

Reich, K. H., Oser, F. K., & Valentin, P. (1994). Knowing why I now know better: Children's and youth's explanations of their worldview changes. *Journal of Research on Adolescence, 4*(1), 151–173.

Reid, T. (1863/1788). Essays on the active powers of man. In *The works of Thomas Reid, D.D.* (6th ed., Vol. 2, pp. 509–679). Edinburgh, United Kingdom: Maclachlan and Stewart.

Repacholi, B. M., & Gopnik, A. (1997). Early reasoning about desires: Evidence from 14- and 18-month-olds. *Developmental Psychology, 33*(1)*,* 12–21.

Richert, R. A., & Lillard, A. S. (2004). Observers' proficiency at identifying pretense acts based on behavioral cues. *Cognitive Development, 19*(2), 223–240.

Robinson, E. J. (2000). Belief and disbelief: Children's assessments of the reliability of sources of knowledge about the world. In K. P. Roberts & M. Blades (Eds.), *Children's source monitoring* (pp. 59–83). Mahwah, NJ: Erlbaum.

Rorty, R. (1979). *Philosophy and the mirror of nature.* Princeton, NJ: Princeton University Press.

Royzman, E. B., Cassidy, K. W., & Baron, J. (2003). "I know, you know": Epistemic egocentrism in children and adults. *Review of General Psychology, 7,* 38–65.

Ruffman, T., Olson, D. R., & Astington, J. W. (1991). Children's understanding of visual ambiguity. *British Journal of Developmental Psychology, 9,* 89–102.

Ruffman, T., Olson, D. R., Ash, T., & Keenan, T. (1993). The ABC's of deception: Do young children understand deception in the same way as adults? *Developmental Psychology, 29,* 74–87.

Russell, J. (1989) Cognisance and cognitive science. Part two: Towards an empirical psychology of cognisance. *Philosophical Psychology, 2,* 187–223.

Russell, J. (1992). The Theory-Theory: So good they named it twice? *Cognitive Development, 7,* 485–519.

Russell, J. (1996). *Agency: Its role in mental development.* Hove, United Kingdom: Erlbaum.

Russell, J., Mauthner, N., Sharpe, S., & Tidswell, T. (1991). The 'windows task' as a measure of strategic deception in preschoolers and autistic subjects. *British Journal of Developmental Psychology, 9,* 331–349.

Ryle, G. (1949). *The concept of mind.* London: Hutchinson.

Samson, D., Apperly, I. A., Kathirgamanathan, U., & Humphreys, G. W. (2005). Seeing it my way: A case of a selective deficit in inhibiting self-perspective, *Brain, 128,* 1102–1111.

Schommer, M. (1990). Effects of beliefs about the nature of knowledge on comprehension. *Journal of Educational Psychology, 82,* 498–504.

Schommer, M. (1993). Epistemological development and academic performance among secondary students. *Journal of Educational Psychology, 85*(3), 406–411.

Schwanenflugel, P. J., Fabricius, W. V., & Noyes, C. R. (1996). Developing organization of mental verbs: Evidence for the development of a constructivist theory of mind in middle childhood. *Cognitive Development, 11,* 265–294.

Searle, J. R. (1983). *Intentionality: An essay in the philosophy of mind.* Cambridge: Cambridge University Press.

Selman, R. L. (1980). An analysis of "pure" perspective taking: Games and the delights of deception. In R. L. Selman (Ed.), *The growth of interpersonal understanding: Developmental and clinical analyses* (pp. 49–68). New York: Academic Press.

Shultz, T. R., & Cloghess, K. (1981). Development of recursive awareness of intention. *Developmental Psychology, 17,* 456–471.

Siegal, M., & Beattie, K. (1991). Where to look first for children's knowledge of false beliefs. *Cognition, 38,* 1–12.

Sinnot, J. D. (1989). Life-span relativistic postformal thought: Methodology and data from everyday problem-solving studies. In M. L. Commons, J. D. Sinnott, F. A. Richards, & C. Armon (Eds.), *Adult development: Vol. 1. Comparisons and applications of developmental models* (pp. 239–278). New York: Praeger.

Smith, C. L., Maclin, D., Houghton, C., & Hennessey, M. G. (2000). Sixth-grade students' epistemologies of science: The impact of school science experiences on epistemological development. *Cognition and Instruction, 18*(3), 349–422.

Sodian, B. (1991). The development of deception in young children. *British Journal of Developmental Psychology, 9,* 173–188.

Sokol, B. W., & Chandler, M. J. (2003). Taking agency seriously in the theories-of-mind enterprise: Exploring children's understanding of interpretation and intention. *British Journal of Educational Psychology Monograph Series II, 2*(Development and Motivation), 125–136.

Spelke, E. S., Phillips, A., & Woodward, A. L. (1995). Infants' knowledge of object motion and human action. In D. Sperber, D. Premack, & A. J. Premack (Eds.), *Causal cognition: A multidisciplinary debate. Symposia of the Fyssen Foundation* (pp. 44–78). New York, NY: Oxford University Press.

Sternberg, R. (1990). *Wisdom: Its nature, origins, and development.* New York: Cambridge University Press.

Stich, S., & Nichols, S. (2003). Folk epistemology. In S. Stich & T. A. Warfield (Eds.), *The Blackwell guide to philosophy of mind* (pp. 235–255). Oxford: Basil Blackwell.

Stich, S. P. (1996). *Deconstructing the mind.* Oxford: Oxford University Press.

Sullivan, K., Zaitchik, D., & Tager-Flusberg, H. (1994). Preschoolers can attribute second-order beliefs. *Developmental Psychology, 30,* 395–402.

Surian, L., Caldi, S., & Sperber, D. (2007). Attribution of beliefs by 13-month-old infants. *Psychological Science, 18,* 580–586.

Sweetser, E. E. (1987). The definition of a lie: An examination of the folk models underlying a semantic prototype. In D. Holland & N. Quin (Eds.), *Cultural models in language and thought.* New York: Cambridge University Press.

Taylor, M., & Carlson, S. M. (1997). The relation between individual differences in fantasy and theory of mind. *Child Development, 68,* 436–455.

Taylor, R. (1966). *Action and purpose.* Englewood Cliffs, NJ: Prentice-Hall.

Tomasello, M., & Barton, M. (1994). Learning words in nonostensive contexts. *Developmetal Psychology, 30,* 639–650.

Tomasello, M., Call, J., & Hare, B. (2003). Chimpanzees understand psychological states—The question is which ones and to what extent. *Trends in Cognitive Sciences, 7*(4), 153–156.

Ungerer, J. A., & Sigman, M. (1981). Symbolic play and language comprehension in autistic children. *American Academy of Child Psychiatry, 20,* 318–337.

Vasek, M. E. (1988). Lying as a skill: The development of deception in children. In R. W. Mitchell & N. S. Thompson (Eds.), *Deception: Perspectives on human and nonhuman deceit* (pp. 271–292). Albany, NY: State University of New York Press.

Velleman, J. D. (1993). What happens when someone acts? In J. M. Fischer & M. Ravizza (Eds.), *Perspectives on moral responsibility* (pp. 188–210). Ithaca, NY: Cornell University Press.

Velleman, J. D. (2000). *The possibility of practical reason.* Oxford: Clarendon Press.

Walker-Andrews, A. S., & Kahana-Kalman, R. (1999). The understanding of pretence across the second year of life. *British Journal of Developmental Psychology, 17*(4), 523–536.

Walton, M. D. (2000). Say it's a lie or I'll punch you: Naïve epistemology in classroom conflict episodes. *Discourse Processes, (29)*2, 113–136.

Wellman, H. M. (1988). First steps in the child's theorizing about the mind. In J. W. Astington, P. L. Harris, & D. R. Olson (Eds.), *Developing theories of mind* (pp. 64–92). New York: Cambridge University Press.

Wellman, H. M. (1990). *The child's theory of mind.* Cambridge, MA: MIT Press.

Wellman, H. M. (2002). Understanding the psychological world: Developing a theory of mind. In U. Goswami (Ed.), *Handbook of childhood cognitive development* (pp. 167–187). Oxford: Blackwell.

Wellman, H. M., & Banerjee, M. (1991). Mind and emotion: Children's understanding of the emotional consequences of beliefs and desires. *British Journal of Developmental Psychology, 9,* 191–214.

Wellman, H. M., & Bartsch, K. (1988). Young children's reasoning about beliefs. *Cognition, 30,* 239–277.

Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development, 72,* 655–684.

Wellman, H. M., & Hickling, A. K. (1994). The mind's "I": Children's conceptions of the mind as an active agent. *Child Development, 65,* 1564–1580.

Wellman, H. M., & Liu, D. (2004). Scaling of theory of mind tasks. *Child Development, 75,* 523–541.

Whiten, A. (Ed.). (1991). *Natural theories of mind: Evolution, development, and simulation of everyday mindreading*. Cambridge, MA: Basil Blackwell.

Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition, 13,* 103–128.

Woodward, A. L. (1998). Infants selectively encode the goal object of an actor's reach. *Cognition, 6,* 1–34.

Yuill, N., & Pearson, A. (1998). The development of bases for trait attribution: Children's understanding of traits as causal mechanisms based on desire. *Developmental Psychology, 34,* 574–586.

Zaitchik, D. (1991). Is only seeing really believing?: Sources of the true belief in the false belief task. *Cognitive Development, 6,* 91–103.

Zelazo, P. D. (2000). Self-reflection and the development of consciously controlled processing. In P. Mitchell & K. Rigs (Eds.), *Children's reasoning and the mind* (pp. 445–469). Oxford: Blackwell.