Maternal Epistemological Perspectives and Variations in Mental State Talk

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Purpose: This study examined how complexity of maternal epistemological beliefs predicted mothers' and children's talk about the mind.
Method: Twenty-eight mothers of 5- to 10-year-olds completed a measure of receptive vocabulary, and mothers and children participated in a storytelling task specifically designed to elicit talk about the mind. Their use of mental state terms to encode pragmatic functions and mothers' epistemologies were assessed and compared.
Results: Maternal mental state talk and amount of talk increased with epistemological complexity. With the number of utterances held constant, mothers with simple, dualistic perspectives of knowledge used mental states more often to direct interaction; mothers with more complex epistemologies used mental states more often to encourage child reflection. Mothers with the less complex perspective underperformed on the receptive vocabulary measure in comparison to others. Children's amount of talk and use of a variety of mental state terms also increased with maternal epistemological complexity. The amount of talk and mental state terms produced by mothers and children frequently persisted after the effects of maternal receptive vocabulary were removed.
Conclusions: Maternal epistemologies predict several qualities of mothers' and children's mental state talk that may contribute to children's developing theory of mind.

KEY WORDS: epistemology, mother–child interaction, mental state, theory of mind, maternal beliefs

As young children acquire a theory of mind (ToM), they come to understand that "people not only have thoughts and beliefs, but also that thoughts and beliefs are crucial to explaining why people do things" (Bartsch & Wellman, 1995, p. 144). Although the basis and nature of this development have been debated (for a thorough description of the history and development of different theoretical perspectives, see Carpendale & Lewis, 2006), social-constructivists emphasize the importance of the child's language-learning environment and argue that children acquire a ToM by internalizing the meanings that are co-constructed between interlocutors during language-mediated social interactions (e.g., Carpendale & Lewis, 2006; Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, & Berridge, 1996). From this Vygotskian perspective, children are apprentices who learn through interactions with adults and more competent language users (Rogoff, 1990) not only more numerous and more sophisticated words for conversing about the mind but also how to interpret, organize, and evaluate the contents of the mind. This approach also emphasizes the importance of cultural beliefs in shaping the use of language (Rogoff, 1990) to support the development of such higher mental processes.

Heath (1982) reminds us that "the culture children learn as they grow up is, in fact, 'ways of taking' meaning from the environment" (p. 12). The

ways children take from the environment to facilitate ToM development rely heavily on information that flows from beliefs that are communicated to the child indirectly and implicitly (Peskin & Astington, 2003). Language and discourse are critical tools for the child's construction of the social world because it is frequently through language that social action is generated (Schieffelin & Ochs, 1986) and beliefs are transmitted.

Our research examines the relationship between mothers' belief systems about the nature of knowledge (i.e., epistemological beliefs) and the language environment that mothers create with their children that may be important to ToM development. We expect that mothers' own epistemological assumptions—that is, their beliefs about the nature and origins of knowledge and truth, influence dimensions of the content and structure of mothers' talk that have been related to children's ToM development. Our studies are correlational in nature, falling short of examining the causal links that we propose. However, they were designed to establish a framework to guide future research on the causal connections between maternal epistemology, language environment, and child ToM development.

Epistemological Beliefs and the Language-Learning Environment

Parents' belief systems have been called the "starting point for all experiences the parent has with the child" (McGillicuddy-DeLisi & Sigel, 1995, p. 340), acting as filters through which behavior is organized and interpreted (e.g., Harkness & Super, 1996; Pomerleau, Malcuit, & Sabatier, 1991). An extensive body of research has documented the ways in which parents' belief systems influence the manner in which parents structure their caregiving interactions (verbal and nonverbal) and collaborate in children's socialization (e.g., Guttentag, Pedrosa-Josic, Landry, Smith, & Swank, 2006; Harkness & Super, 1996; Sigel & McGillicuddy-DeLisi, 2002). These powerful parenting belief systems are multiply determined and transactional in nature, but they have been demonstrated to reflect, in part, parents' own cognitive complexity (e.g., Miller-Loncar, Landry, Smith, & Swank, 1997; Sameroff & Feil, 1985). In particular, the complexity of parents' beliefs about knowledge—their epistemological perspectives—appears to be important in shaping parenting strategies and behaviors.

Epistemological assumptions and their development have been examined from varied research and theoretical perspectives (e.g., see Hofer & Pintrich, 1997, 2002). Although there is some disagreement about the specific timing and endpoint, there is general consensus on the nature of the developmental change involved and the notion that not every adult has or will ever achieve the developmental endpoint (the complexity of development varies as a function of experience; e.g., Pintrich, 2002). Epistemological perspectives have been shown to continue developing through adolescence and adulthood from cognitively simpler to more complex forms (e.g., Baxter Magolda, 1992, 2002; Belenky, Clinchy, Goldberger, & Tarule, 1986; Perry, 1970) although, as noted, individuals vary in the degree of complexity and nature of perspectives that they ultimately achieve based, at least in part, on their experiences (e.g., Belenky, Bond, & Weinstock, 1997; Bond, Belenky, & Weinstock, 2000).

Through extensive analyses of 135 women of diverse economic, ethnic, and educational backgrounds in the United States, Belenky et al. (1986) identified five qualitatively distinct epistemological perspectives that are summarized in Table 1: (a) *Silenced Knowers,* who perceive knowledge as something independent of human action or achievement and see themselves as relatively mindless, voiceless, and unable to make meaning of or communicate their experiences (e.g., "You can't really learn new stuff; you either know it or you don't. Some people just do and some just don't. I figure you just have to be happy with where things are at and you can't necessarily change them."); (b) *Received Knowers,* who view knowledge as something that is dualistic, absolute, and independent of the individual and that novices passively receive from experts without modification or interpretation (e.g., "Well, there's the right answers and there's what's wrong. You learn by listening and watching people who know the answers and doing whatever they do. You've got to learn to keep your own mouth shut and follow people who know what they're doing."); (c) *Subjective Knowers,* who conceive of knowledge and truth as highly personal, private, and essentially incommunicable and, as such, unable to be shared, evaluated, or developed with others (e.g., "No one else can really tell you what's a better or worse idea because everyone's ideas and opinions are as good as everyone else's. You can't judge people's ideas. How can you say one is better than the other?"); (d) *Procedural Knowers,* who envision that truth and knowledge can be developed, identified, evaluated, and communicated through systematic and replicable procedures (e.g., "You've got to look at ideas from all angles. Put them through the wringer and test if they meet the standards they need to, like what kind of evidence is there, and do different people agree, and how did they each arrive at the idea? It's better if people used different strategies and still arrived at the same idea; of course, some strategies are better than others."); and (e) *Constructed Knowers,* who perceive knowledge and truth to be human constructions that can be evaluated and refined and, simultaneously, are dynamic, contextual, and evolving (e.g., "The best knowledge comes when different people bounce ideas off each other and use their own backgrounds and information and build

Table 1. Epistemological perspectives of self and relation with child.

Epistemology	Mother's view of her mind and voice	Mother's view of child's mind and voice	Mother's view of child rearing
Silenced Knower	Feels stupid, mindless and voiceless; feels she can't teach others; words are weapons	Child as mindless and voiceless, unable to learn; child's feelings are dangerous, not understood	Use raw power to influence child; neither listen nor explain to child; much yelling; no dialogue; enforce absolute rules
Received Knower	Goal is to receive, store, and transmit without modifying information; learns through memorization and recitation	Child learns by listening to elders; should be seen but not heard; child needs to be molded and filled with information	Inform child through lectures; teach right and wrong using absolute rules, rewards, and punishments; emphasis on training and modeling
Subjective Knower	Discover inner voice; truth comes from inner voice and experience, not authorities; values individuality	Each child is unique and has own inner voice; delight in child's spontaneity	Let child think and speak for her/himself; laissez-fair; nonevaluative, nonjudgmental
Procedural Knower	Goal is to articulate and examine thoughts and feelings using procedures to evaluate and guide thinking	Child has thoughts and feelings to be developed; child can learn procedures for finding good answers	Ask for and provide reasoning and explanations; share processes behind each other's thinking
Constructed Knower	Can collaborate in construction of knowledge through dialogue with self and others; create new synthesis, not merely uncover information	Child has ability and reasonability to think through and make choices; can and should listen to heart and mind of self and others; inventor; artist and scientist	Draw out child's thoughts and feelings; ask questions and provide feedback; share, discuss, and evaluate each other's perspectives; challenge, think, revise, and plan together

Note. From Bond, L. A., Belenky, M. F., Weinstock, J. S., & Cook, T. (1996). Imagining and engaging one's children: Lessons from poor, rural, New England mothers." In S. Harkness & C. M. Super (Eds.), *Parents' cultural belief systems: Their origins, expressions, and consequences* (pp. 467–495). New York: Guilford. Reprinted with permission of Guilford Press.

on each other's ideas. We help sharpen those ideas and strengthen them using new strategies that we develop over time, like through history. What's true today may not be true tomorrow, but both were true for the time, and ideas have to be understood in their time; whether we mean to or not, I think we make better knowledge over time as we're exposed to each other's ideas and standards and sort of put them together to understand things in new ways.").

One's dominant epistemological perspective is probably affected by culture and context (e.g., Goldberger, 1996; Hofer, 2002), and some research suggests that epistemic status may not be strictly linear (e.g., Kuhn & Weinstock, 2002). However, research using Belenky et al.'s (1986) model has supported the view that transitions in epistemological perspectives within the western technological culture of the United States reveal a developmental sequence following the order noted previously (Belenky et al., 1986, 1997; Bond et al., 2000), with the exception of Silenced Knowing, which appears to arise in non-normative situations of extreme oppression (Belenky et al., 1986).

Research has documented the relationship between mothers' epistemological perspectives and their parenting concepts and behaviors. For example, Bond and Burns (2006) and Bond, Belenky, Weinstock, and Cook (1996) found evidence of such relationships in two very different

samples of mothers of preschool-aged children (one homogeneous sample of very low-income rural mothers with limited education, and a second more educationally and economically diverse sample). In both samples, mothers with more complex (vs. simpler) epistemological perspectives had less dualistic and more complex, multifaceted conceptions of child development (Bond & Burns, 2006) and were more likely to endorse rational authoritative (vs. authoritarian) parenting strategies (Bond & Burns, 2006; Bond et al., 1996), engage their children as active (vs. passive) participants in problem-solving tasks, and provide their children with more stimulating cognitive challenges during learning tasks (Bond et al., 1996). Moreover, among mothers from a homogeneous low-income, low educational level background, those with more complex epistemological perspectives used more semantically contingent verbal responding with their young children (Jimerson & Bond, 2001). Similarly, Holmes, Bond, and Byrne (2008) found that adolescents' reports of their mothers' interest, receptiveness, sensitivity, and generally positive communication patterns increased with maternal epistemological complexity independent of maternal educational level.

These findings provide evidence for the overall relationships between mothers' epistemological complexity and assumptions about children and childrearing strategies, independent of maternal education, that Bond et al. (1996) proposed (see Table 1). This is to be expected

because parents' assumptions about the roots of knowledge and its development are integral to their conceptualizations of child socialization and development. Assumptions about the nature of knowledge (and its relationship to human behavior and interaction) are believed to shape people's goals, expectations, and aspirations for themselves and for others; their interactions and interpretations of their own and others' behaviors; and the contexts that they create to support development (e.g., Belenky et al, 1997; Bond & Burns, 2006; Burns & Bond, 2004). What has not been examined is whether variation in maternal epistemological perspectives is associated with variation in aspects of children's language-learning environment that research has linked to supporting children's understanding of mind.

The Language-Learning Environment and Children's Understanding of Mind

Several studies have demonstrated a link between particular characteristics of the social and language-learning environment and children's understanding of the mind. These studies have been concerned with both semantic (e.g., feeling vs. cognitive talk) and pragmatic (i.e., the function served by the mental state) features of the linguistic input (Furrow, Moore, Davidge, & Chiasson, 1992). Research has demonstrated that the availability of and opportunity to engage with adults and older siblings relates to children's understanding of others' mental states (e.g., Dunn, Brown, & Beardsall, 1991; Jenkins, Turrell, Kogushi, Lollis, & Ross, 2003; Lewis et al., 1996). With few exceptions, the amount and quality of mental state input have also been shown to predict children's current and subsequent mental state term use (e.g., Furrow et al., 1992; Jenkins et al., 2003) and children's ToM outcomes (e.g., Meins et al., 2003; Ruffman, Slade, & Crowe, 2002; Taumoepeau & Ruffman, 2006). Qualities of mental state input that have been strongly linked to children's mental state term use and ToM competence include but are not limited to the diversity of themes encountered, the frequency of different pragmatic contexts of mental state talk, talk about the causes of thoughts and feelings (e.g., Dunn, 1994; Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Wellman & Lagattuta, 2004), talk that functions to direct the child's reflection on inner mental states (e.g., Furrow et al., 1992), and explicit prompts that ask the child to reflect on others' mental states (e.g., Ruffman, Perner, & Parkin, 1999). In broad terms, data such as these suggest the importance of early and frequent family conversations about the mind as well as specific qualities of mental state talk for facilitating children's knowledge of a variety of mental states.

One line of research has demonstrated that children whose mothers describe them in more mentalistic ways perform better on indices of ToM (de Rosnay, Pons, Harris, & Morrell, 2004; Meins, Fernyhough, Russell, & Clark-Carter, 1998; Meins et al., 2003). The approach in these studies has been to impute the degree of mothers' "mind-mindedness" on the basis of their proclivity to treat the young child "as an individual with a mind, capable of intentional behavior" (Meins et al., 2002, p. 1716). This suggests that caregivers' conceptions of the child as an active interpreter contribute to the structure and quality of the language-learning environment. However, these investigations have focused on maternal behaviors and the nature of the linguistic input and stop short of examining the nature or complexity of mothers' thought and reasoning. Our research addresses this gap by examining the relationship between mothers' epistemological complexity and the linguistic input they provide to their children.

As Astington (2001) argued, the quality of language input is critical to children's ToM development in that it provides "the means by which children become aware of beliefs, both content and attitude" (p. 686). Indeed, language is the most significant source of information about inner mental worlds. What has rarely been addressed is how differences in the use of mental state terms reveal variation in how people construe and attach significance to mental states. This study examined for the first time whether mothers' belief systems—in particular, their beliefs about knowledge (i.e., epistemological perspectives)—predict such variation that, in turn, relates to the child's language-learning environment so important to ToM.

Hypotheses and Preliminary Study

We expect that mothers' epistemological perspectives influence the language-learning environments that mothers create with their children—in particular, the amount and quality of mental state talk that, according to research, is likely to affect children's use of mental state talk (and developing ToM). This is because mothers' epistemological perspectives presumably underlie mothers' conceptions of children's processes of learning and development as well as mothers' beliefs about the subjects of their communications with their children (e.g., oneself, one's child, and other people).

As an initial step in investigating these links, we conducted a preliminary study in which we assessed, compared, and predicted associations between maternal epistemological complexity and mothers' and children's amount and quality of mental state terms. The preliminary study made use of a subsample (see Jimerson & Bond, 2001) from a larger set of archival data (Belenky et al., 1997; Bond & Burns, 2006) observing 38 mothers engaging their 3- to 6-year-old children in brief teaching episodes. The mothers, aged 18–34 years, had limited education, lived at or below poverty as defined by

the state of Vermont, and had been recruited because they were identified as having little family support and as being at risk for abuse or neglect of the children or under unusual stress. Each mother–child dyad was videotaped at home during two teaching tasks in which the mother was asked to "help her child learn how to" build a specific structure using Legos (Task 1) and put together a puzzle (Task 2). These interactions were videotaped, transcribed, and coded reliably for the presence of a variety of mental state functions and overall amount of talk (using the same operationalizations described in the study reported in the Hypotheses and Preliminary Study subsection.

Mental state term use was infrequent in this sample of mothers and children during the semistructured teaching tasks. This is not surprising, insofar as recruitment for this preliminary study had focused specifically on women who felt "silent," with simple, concrete epistemological perspectives. Moreover, with no specific encouragement to reference the mind, the teaching context in this study may have directed these mothers' attention to the teaching task outcome rather than process, de-emphasizing reference to the mind. Thus, the combination of concrete maternal epistemology and the mother–child teaching contexts probably diminished the occurrence of mental state talk.

Despite these constraints and a lack of variation in amount of maternal talk, analyses revealed that Subjective Knowers, who conceptualize knowledge as lodged within the individual, tended to reference inner mental states more than did Silenced women, who imagined knowledge and truth as something that could be neither discovered nor acquired and transmitted. In addition, children of mothers with the most complex perspectives (i.e., Subjective Knowing mothers) talked almost twice as much as children of Silenced and Received Knowing mothers. This finding may reflect Bond et al.'s (1996) conclusion that mothers with more complex beliefs about knowledge more actively engage their children in adult-mediated interactions as equal conversational partners as a way to support their children in discovering their own truths.

The pre-established method and data set in this preliminary study (in particular, the interactional context, the limited range of mothers' epistemological perspectives, and the young ages of their children) may have diminished the opportunity to observe references to mental states and examine more fully the relationship between mothers' epistemologies and mothers' and children's use of mental state terms. Therefore, the present study was designed to (a) overcome these constraints by examining these relationships in a sample of mothers representing a wider range of epistemological perspectives during interactions with older children in a context specifically designed to elicit maximum amounts of mental state talk and (b) examine whether differences in word use are a product of the content of a belief system rather than a semantic repertoire by adding an assessment of maternal receptive vocabulary.

Method
Participants

Data were obtained from 28 native English-speaking dyads (26 Caucasians and 2 second-generation Hispanics) living in west central Florida. The dyads consisted of mothers aged 27–45 years ($M = 34.5$, $SD = 5.4$) and their children (14 boys, 14 girls), aged 5;3 (years;months) to 10;3 ($M = 8;0$, $SD = 1.4$). None of the children had ever been diagnosed with a language-learning disability. Combined annual household incomes ranged from less than \$5,000/year to more than \$50,000/year ($M = \$17,500$, $SD = \$9,202$), which indicates that this sample is largely low-income. Mothers' highest completed year of education ranged from 10th grade to 4 years of college ($M = 13$; $SD = 1.4$). Epistemological groups did not differ ($p > .10$) on any demographic variable (i.e., maternal and child age, household income, and maternal education). Moreover, mothers were relatively equally distributed as having urban ($n = 10$), suburban ($n = 9$), and rural ($n = 9$) upbringings.

Measures and Materials

The Ways of Knowing Interview. The Ways of Knowing Interview (WAYS; Belenky et al., 1986) was used to examine epistemological perspectives. This semistructured interview was originally developed with a sample of 135 women from highly diverse educational, socioeconomic, and ethnic backgrounds. The WAYS asks the respondent a specific series of structured open-ended questions concerning the nature of knowledge and truth in general and about herself as a knower and thinker; for example, it asks "Can you say that some answers are better than others?" "What would make an opinion better than another?" "How do you go about understanding new things?" "How do you know what's right or true?" The interviewer follows a script of core questions, using follow-up probes when necessary, to elicit elaboration and clarification of the interviewee's perspective. Each interview is transcribed in full (removing identifying information) and coded into 1 of 17 theoretically possible ordinal levels. These coding levels reflect a primary code for the dominant epistemological perspective that appears (Silenced, Received, Subjective, Procedural, and Constructed, as described in the introduction) and, if relevant, a secondary code noting an emerging or a residual perspective. For example, Level 1 is Silenced, Level 2 is Silenced with Received Knowing emerging, Level 3 is Silenced and Received Knowing equally present, Level 4

is Received Knowing with some Silenced remaining, Level 5 is Received Knowing, Level 6 is Received Knowing with Subjective emerging, and so on (see Weinstock's [1989] coding manual for further details on coding and examples).

In the coding process, each coder tries to identify the most complex epistemological perspective that is clearly articulated. It is understood that "individuals often have available to them, and make use of, a variety of epistemological assumptions in different contexts" (Weinstock, 1989, p. 110). In particular, individuals with more complex epistemologies may rely on simpler perspectives in certain situations (e.g., in trying to decide what to do about a car that breaks down with increasing frequency, a complex thinker who is disinterested in and knows nothing about cars may simply rely on the recommendation of a single expert, the car dealership, to figure out how to proceed rather than delving into more complex strategies for identifying the "best" course of action). The WAYS coder does not ignore evidence of less complex perspectives described by the respondent. However, the clear expression of a more complex set of assumptions is taken to mean that the individual has some understanding of more complex ways of thinking about knowing. Therefore, each coder begins by carefully reading a transcript in its entirety in order to grasp the general context and overall tenor of the dialogue between interviewer and respondent. The coder then rereads the transcript and codes each statement, portion of a statement, or cluster of statements that conveys an identifiable epistemological perspective. This constitutes what is known as a *response unit*. The response unit may be a single idea unit (e.g., a single answer to a "what" statement, containing a verb that forms the core of an idea that may be elaborated upon with one or more pieces of information (Gould & Dixon, 1993; Warren, Nicholas, & Trabasso, 1979). For example, the sentence, "In the end, the teacher, as the expert, knows the real answer—the truth" would be noted in isolation as reflecting Received Knowing. However, the goal of the interviewer is to probe the respondent to articulate as fully as possible the nature of her or his thinking in order to identify its most complex forms. Statement codes are revised to indicate more complex reasoning when contiguous or subsequent response units that refer directly back to the original response unit reveal more complex assumptions. For example, coders revise the code from Received to Subjective Knowing if the respondent states, "In the end, the teacher, as the expert, knows the real answer—the truth. But then, I guess her truth might be different than mine. In the end, we each have our own truth and should rely on what is right for us."

After assigning an epistemology code to each response unit in the interview, the coder identifies an overall code for the respondent's epistemological perspective.

An individual's dominant epistemological perspective is one that reflects more than 60% of the response units; a secondary code is assigned to reflect epistemological assumptions that refer to 30%–40% of the individual's response units. In fact, it is quite rare that precise calculations are critical because dominant and secondary perspectives generally are quite apparent.

Participants qualifying for the present study ranged from Level 2 to Level 13 (i.e., from Silenced with Received emerging to Pure Procedural Knowing). Following assignment to an epistemological category using the WAYS, participants were identified as follows: (a) four Silenced Knowing mothers (WAYS Levels 2–4; two with sons and two with daughters ages 6;8–9;9, $M = 8;6$); (b) twelve Received Knowing mothers (WAYS Level 5; seven with sons and five with daughters ages 5;3–10;3, $M = 8;0$); (c) seven Subjective Knowing mothers (WAYS Levels 6–9; two with sons and five with daughters ages 5;5–8;5, $M = 7;2$); and (d) five Procedural Knowing mothers (WAYS Levels 10–13; three with sons and two with daughters ages 6;8–10;1, $M = 8;8$). None of the mothers scored at Levels 14–17 (i.e., none had 30% or more idea units reflecting Constructed Knowing).

The WAYS epistemology interviews were coded by a research assistant who had been trained by an experienced coder to a level of agreement of $\kappa = .80$. The research assistant was blind to the study's hypotheses and to participants' performance on other measures. For the purposes of the present analyses, participants were grouped into one of four epistemological groups: (a) any Silenced group (Levels 2–4), (b) pure Received group (Level 5), and (c) any Subjective (Levels 6–9) and any Procedural (Levels 10–13). Thus, there was some epistemological variation within the groups because they were derived from collapsing contiguous scores.

Assessment of mental state terms. Bretherton and Beeghly's (1982) classification of terms in the talk of 28-month-old children was used as the basis for identifying the presence of mental state terms. These terms encompass a broad range of states and include reference to emotion (e.g., joy, fear), cognitions (e.g., knowledge, memory), perceptions (e.g., look, see, listen), physiology (e.g., hunger, thirst), volition and ability (e.g., have to, need), and moral judgment (e.g., good, naughty). Because the goals of this study necessitated a coding scheme appropriate to talk of mothers and older children interacting in variable contexts, we extended the framework to include a more inclusive range of mental state terms. Thus, a number of cognitive terms (e.g., *focus, concentrate, confused, sure, recognize, study* [as in "*study* this picture"]) and emotion terms (e.g., *care, sorry, hurt*) were also counted.

Although Bretherton and Beeghly's (1982) classification system was used to facilitate the identification of

mental state terms, this system was not used to conduct our actual analysis; rather, mental state terms were analyzed according to their pragmatic function. To identify pragmatic function, a coding scheme (see Table 2) was adapted from Furrow et al. (1992, who borrowed from Shatz, Wellman, & Silber, 1983). The original Furrow et al. (1992) scheme used five mutually exclusive and exhaustive categories: mental state reference (which corresponds to our category of true mental state), modulation of assertion, directing interaction, directing reflection, and other. We adapted the Furrow et al. scheme by first collapsing the category of modulation of assertion into the "other" category because it occurred infrequently. Second, given the interactional context, it was sometimes necessary to extend some operational definitions to achieve high reliability while preserving the underlying idea behind each category.[1] In particular, our coding category "other" (see Table 2) functioned to capture mental state functions that did not belong in the three primary categories; it was considered a residual code that captured variable and sometimes unknown mental state functions. As such, data for this category were not analyzed independently. Rather, the frequency of mental state functions coded as "other" was added to the frequencies of mental states from the three primary codes, yielding a composite score for the combined number of mental states.

It was possible for two or more mental states to occur in the same communication unit (C-unit; e.g., "I *thought* the piece went here but now I *see* that it doesn't"). Because the pragmatic use of mental states within the utterance was of interest in this study (as opposed to the frequency of different lexical items), C-units with more than one mental state were coded as having a single pragmatic function (here, to encode a contrastive as a true mental state; see Table 2). Following Shatz et al. (1983), coders attended to the context in the ongoing interaction and interpreted the function of the utterance "by considering what generally seemed to be happening in the interaction and the meaning of the sentences preceding and following the sentence with a mental [state term]" (p. 306). The two coders showed high agreement on categorization into the four mental state categories (true, directing interaction, directing reflection, other), $\kappa = .84$.

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[1]There is not agreement as to whether all uses of mental terms necessarily reference mental states. For example, idiomatic and conversational uses like "Ya know what?" may be meant to gain attention and not to reference the mental state "know." Some researchers (e.g., Shatz et al., 1983) advocate omission of these kinds of utterances from analysis because the usage is deemed nonmental. Other researchers (e.g., Scholnick, 1987) argue that not all such conversational uses should be ignored because they do, indeed, refer to inner mental states despite their more regulatory nature. For the purposes of this study, all prototypical conversational and idiomatic expressions were included but were relegated to the category of "other."

Peabody Picture Vocabulary Test–III. The Peabody Picture Vocabulary Test–III (PPVT-III; Dunn & Dunn, 1997) was administered in the standard fashion to serve as a measure of mothers' receptive vocabulary. This measure was standardized on 875 males and females aged 17–90+ years who were selected to represent U.S. population statistics in terms of education, ethnicity, socioeconomic status, and urban/rural living (Dunn & Dunn, 1997). Independent psychometric assessment (Williams & Wang, 1997) indicated that this test has high internal reliability and convergent and discriminative validity.

Story discussion stimuli. Twelve illustrations were selected (six for mothers to use when constructing stories and six for children to use when constructing stories) on the basis of pilot work. A total of 25 illustrations were examined by one preschool teacher and two second grade teachers who were also mothers of young children. The 25 illustrations, borrowed with permission from several children's books, depicted characters in various contexts expressing different emotions (and, presumably, thoughts). Following an introduction to the purpose of the study and instruction as to what the illustrations were intended to elicit, the teachers used a five-point Likert scale to rate each illustration independently on the degree to which it was likely to elicit mental state terms (i.e., thinking and feeling terms). The 12 most highly rated illustrations were then presented to two of the three original raters, who were asked to collaborate in sorting the illustrations into a group for mothers versus a group for children to use while constructing stories.

Procedure

All dyads were recruited using the University of South Florida's Louis de la Parte Florida Mental Health Institute's database. The database included mothers who, the previous year, received federal aid (i.e., supplementary security income [SSI], aid for families with dependent children [AFDC], Medicaid, and/or Medicare) and responded to a brief confidential mail-in questionnaire that solicited contact information as well as information on ethnicity, child age, and disability. Eighty-three of 89 qualifying dyads could be reached by mail with the contact information provided. The purpose, procedure, and compensation ($40 USD) for the study were outlined in an initial contact letter. A total of 31 mothers (37%) responded affirmatively to the invitation. Two of them did not ultimately participate due to a geographical move. Data for an additional dyad were dropped from analyses because the child was not attending an age-appropriate grade level and was suspected of having a language-learning disability. Respondents did not differ from nonrespondents on the basis of child age and ethnicity. Individual socioeconomic data were not available

Table 2. Operational definitions for mental state functions (adapted from Furrow et al., 1992).

Category	Definition and examples
True Mental State	The topic is the true inner mental state of the speaker, listener, or third person and refers to thoughts, memories, knowledge, desires, or emotions (e.g., "She doesn't really *know* that," or "She is *sad*"), certainty and uncertainty (e.g., "I'm not *sure*"), and "know how" (e.g., "I *know* how to play this game"). Following Furrow et al. (1992) and Shatz et al. (1983), contrastives, which denoted a discrepancy between a mental state and reality, were also included (e.g., "I *thought* he was nice but he's not").
Directing Interaction	An utterance makes use of a mental state to encourage a verbal or nonverbal action (e.g., "I don't *understand*. Say that again?") and can be given in a declarative or interrogative form. The idea behind the category is that the utterance could serve either to motivate the listener to carry out the action specified or to provide the listener with information about the action that the speaker was carrying out.
Directing Reflection	An utterance is made in reference to information or an action but does not specify it directly. Utterances, therefore, are usually in the form of wh- questions or wh- complements that encourage the listener to reflect on actions or information (e.g., "How is she *feeling* right now?").
Other	An utterance containing a mental state term cannot be placed in the above categories. Repetitions and imitations, modulations of assertion (e.g., "Oh, you *think* it's gone?" said to a speaker who says "It's gone"), affect expression in the absence of a true mental state ("She's *crying*" or "He's *frowing*"), and conversational (e.g., "Ya *know* what?") and rhetorical uses (e.g., "You *know* what this is? [no pause] It's a moving van") were included.

through the database, precluding comparisons between respondents and nonrespondents on such variables.

The first author conducted the assessments in each participant's home during a single session lasting approximately 1–1.5 hours. Because mothers' epistemological status was not coded prior to administering the full battery of measures for this study and we wished to avoid a potential confound between epistemological perspective and task order, the order of tasks was fixed for all participants as follows: (a) brief demographic survey, (b) the WAYS, (c) the PPVT-III, and (d) a videotaped mother–child storytelling activity. During the storytelling task, first mothers and then children were asked to make up short stories using their own set of six illustrations presented in random order. The following oral instructions to mothers and children were designed to elicit mental state terms:

> We want to see how you talk to your mom/child about thoughts and feelings. Here is a picture of people doing things. Take a minute and look at the picture and then make up a story to tell to your mom/child. When you are thinking about what might be happening, try to think about how the people in the pictures are feeling or thinking. Talk with your mom/child about why the people in the picture look, feel, or think a certain way. Spend as much time on each one as you want, and when you're finished with the picture, just let me know and I'll hand you the next one.

If a mother asked questions of the experimenter during the storytelling, she was told that there was no "right way" to conduct the task and that she should continue because she was "doing fine." No additional prompting was offered to mothers or children.

Transcription and Coding

Transcriptions of mother–child teaching interactions. Videotapes were transcribed in full by the first author and were checked and revised by a second coder who was masked to the purpose and hypotheses of the study. C-units were then identified as the structural unit of analysis. A *C-unit* is defined as a main clause plus all subordinate clauses or nonclausal structures that are attached to or embedded within it and include all functional units that do not have clausal status (e.g., "Yeah, OK"; Loban, 1976). Transcripts included all audible utterances and notation for inaudible utterances and all significant nonverbal behaviors. Borrowing from Kaye and Charney (1980), *significant nonverbal behaviors* were defined as "any act that had a potential connection to the other person (whether or not that connection was actually met by the other) or [was] a salient independent act to which the other *might* have responded … all pointing, nodding, or shaking of the head, questioning intonation, significant gestures, significant gazes, and visual orienting to where the other had pointed" (p. 214). All transcripts were checked by an additional masked coder using these criteria.

Agreement was calculated using a randomly selected one-third of transcripts that included both mothers' and children's storytelling (*n* = 9 dyads). Procedures for identifying C-units resulted in 94.6% point-to-point agreement. Interrater reliability was established using a randomly

drawn one-third of transcripts (n = 9 dyads) for the categories of mental state terms. Cohen's kappa was .84, which is excellent.

Results

Descriptive Analyses

Across epistemologies, on average, mothers produced 146.7 C-units and 73.39 total mental state terms. On average, children produced 103.6 C-units and 34.43 total mental state terms. Across epistemological categories, mothers used primarily true mental state terms (M = 30.64) and, to a lesser extent, mental state terms to direct reflection (M = 7.9) and to direct interaction (M = 7.71). Children also used primarily true mental state references (M = 16.61) and less often used mental states to direct interaction (M = 1.29) and direct reflection (M = 0.43).

Inferential Analyses

A common procedure is to examine frequency data as proportions by dividing frequencies by the number of words, tokens, or utterances. After applying this operation to the mental state data, most of the differences in mental state uses by maternal epistemology disappeared, consistent with at least one previous investigation examining mental state terms (e.g., Jenkins et al., 2003). However, the primary problem with creating proportions by dividing by some index of amount of talk is that the proportion is often correlated with (and contaminated by) both the variable of interest (i.e., the numerator; amount of mental state talk) and the nuisance variable (the denominator; amount of talk), which is not surprising given that a proportion is wholly dependent upon the numerator and denominator from which it is derived. As such, it has been argued that this operation does not actually "control" for nuisance variance and may lead to more seriously flawed conclusions than would no adjustment (Hutchins, Brannick, Bryant, & Silliman, 2005). Indeed, for much of our data, the proportions correlated with the numerators or denominators (or both), raising concerns of over- or underadjustment. Thus, guided by the recommendations of Hutchins et al. (2005), amount of talk was examined so that frequencies of mental state functions could be understood in the context of such variation. In addition, when (and only when) analyses indicated group differences in amount of talk, frequencies of mental state uses were examined in a fixed language sample size in order to control amount of talk.

These data, which were based on relatively small and uneven sample sizes, met all assumptions governing the use of analysis of variance (ANOVA) except homogeneity of variance ($p < .05$). Accordingly, Welch ANOVAs were conducted to correct for uneven variances. All mothers' and children's data and eta squared effect size estimates are presented in Table 3.

As Table 3 illustrates, the frequency of C-units as well as every measure of mothers' mental state term use (the dependent variables) increased with epistemological complexity (the independent variable), with substantial effect sizes of .25 to .58. Tukey's post hoc tests ($p < .05$) revealed differences between each group of knowers in the predicted directions, except between Received and Subjective Knowers. Thus, mothers' use of mental state

Table 3. Mean mother and child scores (*SD*) and analyses of variance (ANOVAs) by mother's epistemology, Study 2.

Data	Silenced (*n* = 4)	Received (*n* = 12)	Subjective (*n* = 7)	Procedural (*n* = 5)	F(3, 24)	p	η²
	Mother's epistemological perspective M (SD)			
			Mother data				
Number: True mental state	9.00 (3.56)	23.25 (8.48)	31.00 (20.15)	65.20 (27.27)	10.96	.001	.58
Number: Directing interaction	1.50 (1.73)	6.25 (4.20)	7.86 (6.87)	16.00 (3.67)	7.76	.001	.50
Number: Directing reflection	3.25 (4.57)	4.58 (3.75)	10.57 (16.32)	16.20 (3.56)	3.10	.035	.25
Number: Combined states	24.00 (10.03)	56.17 (20.36)	72.14 (57.63)	156.00 (48.98)	11.01	.001	.58
Number C-units	48.50 (18.27)	119.83 (52.08)	133.29 (97.92)	308.60 (114.18)	10.23	.001	.56
PPVT-III standard score	76.00 (34.91)	91.00 (18.70)	97.00 (9.06)	106.00 (7.43)	5.41	.006	.46
			Child data				
Number: True mental state	10.25 (8.66)	14.17 (5.22)	16.71 (12.38)	27.40 (14.60)	2.87	.05	.26
Number: Directing interaction	.75 (.96)	1.17 (1.64)	1.00 (1.41)	2.40 (1.95)	1.09	.37	—
Number: Directing reflection	.00 (.00)	.42 (1.16)	.00 (.00)	1.40 (2.61)	1.28	.30	—
Number: Combined states	21.75 (16.09)	29.08 (9.23)	34.00 (16.26)	58.00 (21.56)	5.76	.01	.42
Number C-units	53.00 (32.59)	86.00 (33.04)	92.00 (54.91)	202.80 (71.74)	9.52	.01	.46

Note. Em dashes indicate data not applicable. C-units = communication units; PPVT-III = Peabody Picture Vocabulary Test, Third Edition.

terms generally increased with epistemological complexity, as did mothers' amount of talk.

A one-way ANOVA of maternal epistemology on mothers' PPVT-III standard scores showed a main effect for epistemology (see Table 3). Tukey's post hoc tests ($p < .01$) revealed that Silenced Knowers underperformed Received, Subjective, and Procedural Knowers. To examine differences in amount of talk and mental state talk independently of receptive vocabulary (i.e., PPVT-III scores), analyses of covariance (ANCOVAs), which may be appropriately applied in the context of a quasi-experimental design (Overall & Woodward, 1977), revealed that when partialing the effects of receptive vocabulary, differences by epistemology (the independent variable) persisted for the dependent variables: amount of talk, $F(3, 23) = 6.67, p = .002$; number of references to true mental states, $F(3, 23) = 7.10, p = .002$; mental states to direct interaction, $F(3, 23) = 5.90, p = .004$; and combined mental states, $F(3, 23) = 5.57, p = .004$. Following a Bonferroni correction to control for family-wise error, all of these effects for the ANCOVAs for the mothers' data remained significant.

Five one-way ANOVAs of maternal epistemology (the independent variable) on frequency of children's use of mental state terms and amount of talk (C-units; the dependent variables) revealed main effects for mothers' epistemology on frequency of children's true mental states, frequency of combined mental states, and amount of talk (operationalized by the total number of C-units produced; see Table 3). Post hoc tests revealed higher rates of all dependent variables among children of Procedural than Silenced or Received Knowers ($p < .05$), in line with our hypothesis. Again, effect sizes were relatively large, ranging from .26 to .46. To examine differences in children's amount of talk and mental state talk independently of their mothers' receptive vocabulary (i.e., PPVT-III scores), ANCOVAs revealed that differences by maternal epistemology (the independent variable) persisted for amount of talk, $F(3, 23) = 7.01, p = .002$; the frequency of references to true mental states, $F(3, 23) = 3.55, p = .01$; and the frequency of combined mental states, $F(3, 23) = 4.66, p = .008$. Following a Bonferroni correction to control for family-wise error, all of these effects for ANCOVAs for the children's data remained significant.

Because variations in the use of mental state terms by mothers and children paralleled variations in their overall amount of talk (C-units produced), frequencies of mental state types were examined in a fixed language sample size. To standardize the language samples, the number of C-units produced by the dyad evidencing the least amount of talk (in this case, 60 C-units total) was identified. For this dyad (a Silenced Knower and her child), the mother produced 22 C-units during her storytelling and 8 C-units during her child's storytelling, and the child produced 15 C-units during each. Therefore,

the equivalent number of C-units produced by mothers and children during each storytelling task was analyzed alone. Note that although this procedure ensured an equal number of C-units being analyzed for each dyad for each storytelling procedure, it had the disadvantage of leading to language samples that were relatively small. Also, interaction times and the number and nature of stimulus pictures that facilitated the storytelling varied from one dyad to another when language samples were standardized.

With the number of C-units held constant, Welch ANOVAs revealed no differences in the mental state terms produced among children. However, main effects for the independent variable of epistemology emerged for the dependent variables of mothers' production of mental state terms to direct interaction, $F(3, 24) = 9.12, p = .003$, and direct reflection, $F(3, 24) = 16.67, p = .001$. Interestingly, post hoc tests ($p < .05$) revealed that Received Knowing mothers used more mental states to direct interaction ($M = 3.8$) than did Silenced ($M = 1.5$), Subjective ($M = 1.4$), and Procedural Knowers ($M = 2.2$). Procedural and Subjective Knowing mothers used more mental states to direct reflection ($M = 3.8$ and $M = 3.9$, respectively) than did Silenced ($M = 0.0$) and Received Knowing mothers ($M = 0.9$). These findings accounted for 30% ($\eta^2 = .30$) of the variation in the number of mental states to direct interaction and approximately 53% ($\eta^2 = .53$) of the variation in the number of mental states to direct reflection. Following a Bonferroni correction to control for family-wise error, all effects for data on the standardized language samples remained significant.

Finally, a series of Pearson product–moment correlations was conducted on the standard language sample size data to explore relations between the frequencies of mothers' and children's uses of mental state references. Mothers' productions of true mental states and mental states to direct reflection were positively associated with children's combined mental state references ($r = .41$, $p < .05$, and $r = .45, p < .05$, respectively). Following a Bonferroni correction to control for family-wise error, these relations were no longer statistically significant.

Qualitative Portraits of Individual Mothers

The statistical results demonstrated some support for the hypothesized relationship between maternal epistemologies and mothers' and children's linguistic productions. Examination of individual narratives revealed more about these mother–child interactions at a stylistic level. Accordingly, excerpts are offered to complement the inferential analyses and provide a more comprehensive portrait of the mother–child interactions. Four mothers who most clearly articulated their respective Silenced, Received, Subjective, and Procedural perspectives during the epistemological interview were chosen for illustrative

purposes here.[2] Brief descriptions of each woman's responses to the epistemological interview precede each qualitative excerpt to provide a context for understanding the dialogue.

A Silenced Knower. One mother articulated the greatest degree of Silence in her responses to the epistemological interview. When asked about her experiences as a learner, she reported that "learning was hard," that she was "not a good learner," that she was "not book smart," and that she did not feel confident but rather "embarrassed" and "stupid." When asked to elaborate, she offered an example saying that "like, if I didn't understand something that I was reading and you would ask the teacher, they would embarrass you in front of the class. So I would just sit there and not ask anymore, so I would fail." She related that children learned as she did—through seeing and doing and not through the words of others. In her view, children "grasp quicker visually than [they] will to talk." Characteristically, this mother also reported that in her personal relationships, she had been "really used and abused" and that friends were "few and far between." When asked what she did when she didn't understand something, she replied "I've caught myself with certain things that really like bother me, or ya know, you'll really want to say something but yet I won't. Instead of getting in a hassle about it or whatever, I just shut up."

In telling stories to her daughter (age 6;2), this mother responded to an illustration of a mother walking down a hallway carrying an infant at night; the mother and infant are seen through the open door of the room of a little girl who sits up in bed to watch.

M: Um baby brother's really **sick** [other].

M: And mom's walking him in the hallway.

M: And he keeps **crying** and **crying**. [other]

M: And she's looking out the door to **see** if he's **OK**. [other]

This mother is cursory in her narrative. With little sense of the potential to learn through dialogue, there is little reason to use turn-passing devices. The mother does not seem to expect the child's participation. She does not solicit reaction or input from the child and does not elaborate on her own account or try to evaluate the child's understanding or engagement.

The daughter was then asked to tell a story about a picture in which a little boy is sitting on his mother's lap in a toy store and reaching for toys while looking tearfully to his mother.

[2]Mothers' and children's dialogue is parsed into C-units, and all interruptions (denoted with ellipses), inaudible utterances (denoted by XXX), and quoted dialogue (set off as block text) are included, as are significant nonverbal behaviors (e.g., "pointing" and "laughing" set off in parentheses) in order to convey the flavor of the interaction. Mental states are bolded, and codes are given in brackets. The storytelling corresponding to the first illustration was selected in each case.

C: He was told not to get toy [sic].

C: And he's **crying**. [other]

C: And the toys are on the ground.

The child's account is like her mother's in that it is also brief with no solicitation of feedback or verbal exchange. Both narratives also highlight a lack of reference to *inner* mental states. Rather than describe the characters in terms of their thoughts and feelings, this dyad used mental states to refer to the observable manifestations (e.g., crying) of such inner states, without explicitly drawing attention to the inner mental states that might generate them.

A Received Knower. When asked to reflect upon her experiences as a learner, this woman reported that she had always considered herself a "good learner" through listening and receiving the words of others. She stated that she thought of herself primarily as a listener and that she was "only a talker, ya know, to get my facts known." When asked what she would do if she disagreed with an authority figure (e.g., a teacher), she stated that "I'd just assume that the teacher was right because they know more than me." When asked what she would do in a situation where she did not understand something, she reported that she would "ask questions, if you ask them to explain it more, you're gonna learn from it eventually." Because Received Knowers see the source of knowledge as external and the process of knowledge acquisition as passive, listening and attending to the words of authorities are of utmost importance to secure the right answers and singular truths.

In telling a story to her daughter (age 8;11), this mother responded to a picture in which a little girl leans against a bed holding her face in her hands. The girl has a worried or confused expression as she looks upon a swaddled newborn; a mother in the background looks through boxes of baby clothes.

M: Once upon a time there was a little girl named Nicole.

M: And her mommy brought home a new baby.

M: Nicole wasn't too **sure** about the new baby so she was kind of **sad**. [true]

M: But as she **looked at** the baby she **realized** … [true]

C: I didn't **notice** the baby (points to picture). [true]

M: Yeah there (points).

C: I didn't **notice**. [other]

M: She **realized** that having a new little sister could really be pretty cool. [other]

M: And then she started **worrying** about being a **good** big sister. [true]

M: But do you **know** what happened in the end? [other]

M: Nicole did her very best.

M: And she was the **greatest** big sister of all. [other]

C: Yeah Mommy! (claps)

This Received Knower interacts with her child in a way that contrasts with the Silenced Knower in both quantitative and qualitative ways. Not only does she direct more talk toward her child during storytelling, but she also constructs the narrative using highly familiar schema content (e.g., "Once upon a time," "The end"). The story begins with an introduction to the characters, includes a description of a dilemma, and concludes with a resolution. The story recounts a temporally and causally related sequence of events and makes explicit the inner mental states of protagonists. However, the mother's use of elaboration is minimal. Only once does she respond contingently to her child's initiations, and when so doing, she does not expand upon them, perhaps because she does not see such expansion as relevant to either the content of the story or to the development of her child's understanding. Consistent with the notion that knowledge is received and absolute, this narrative is a monologue delivered by the mother for the child's consumption, and it is designed to stand independent of ancillary talk.

In the child's storytelling task, the daughter tells a story about a picture in which one girl chases another, and they each cast shadows on a wall (in the image of a dinosaur and pig, respectively); the room is in disarray, cluttered with books, toys, and furniture.

C: Once upon a time there was a girl named Nicole and her sister Gigi.

C: She was **scared** of monsters and all those kind of baby stuff. [true]

C: Her sister made a really really **bad** thing with her hands a monster with her hand and just **scared** her sister. [true]

C: Her mom eventually came in …

M: Who?

C: Who?

M: You said her sister **scared** her made bad things with her hands and **scared** her sister away. [directing interaction]

C: What are you talking about?

M: Ok, you just didn't explain who, who …

M: I was **confused**. [directing interaction]

C: OK, Nicole walked in the doorway.

C: Eventually her mom came in and said *stop it Nicole you're not, you can't do this all the time*.

C: *You're gonna **have to** stop it*. [other]

C: *Or I'm gonna **have to** do something*. [other]

C: The end.

The child's narrative style resembles her mother's in that it uses storybook schema and recounts a temporally and causally related sequence of events. Note that the mother pays attention solely to the clarity of the child's description of events; she interrupts her child to clarify a sequence through the use of mental states to direct interaction. This suggests that this mother is focusing on her child's ability to express a logically sound narrative and values some narrative forms over others.

A Subjective Knower. One woman most clearly and consistently articulated a Subjective way of knowing. Like the Received Knower, she was confident in her ability to learn; however, she saw the source of knowledge as internal rather than external. When asked whether there was anyone in her life who influenced the way she thought, she stated that when her first child was born, "there were lots of people telling me what to do and how to do it" but ultimately "you get all the information that you need from yourself, ya know, from just the motivation that you have; you look to yourself even if you don't know how to do it." She believes that it is neither appropriate nor possible to judge others because others have their own set of life experiences and their own "lens" through which they view the world, and no one's perspective is better than anybody else's; views are merely different.

This mother told the following story to her daughter (age 5;9) using the same picture described earlier of a girl watching a baby as her mother sorts through a box of clothes.

M: OK, this is a story about a big sister someone kind of like you with a little baby brother.

M: She just had a baby brother.

M: And mommy is picking out clothes for the baby brother because she just got a package from Mimi with a bunch of clothes in it.

M: Ya **know** how we get packages from Mimi with clothes in it? [other]

M: And she's **sad** because the package is only baby clothes. [true]

M: It doesn't have clothes for her so she's kind of **sad** (whispers). [other]

M: She **wishes** that that Mimi would have sent to her. [true]

M: So she doesn't get anything XXX (whispers).

M: Maybe the next box will have all stuff for her.

M: 'cuz he doesn't **care** he's the baby. [true]

M: What do you **think**? [directing reflection]

C: I **think** it's gonna be a girl. [true]

M: You **think** that's a girl? [other]

C: Mmmhmm.

M: Why?

C: Because of the eyelashes (points).

M: How do you **see** eyelashes? (looking at picture) [other]

This woman's daughter told her the following story in response to an illustration of a little boy who begins to spill the juice he carries on a tray when he enters a door and startles a cat who jumps with a scared expression.

C: I **think** that he's getting breakfast. [true]

C: And he's spilling his juice.

M: He's spilling on the kitty.

M: What was the kitty doing?

C: **Scared**. [true]

M: Oh I see, you **think** the kitty's scared why? [directing reflection]

C: Because kitties don't **like** to get wet. [true]

M: Kitties don't **like** to get wet? [other]

C: No.

M: How do you **know**? [direction reflection]

C: Because I wet some kitties before.

M: You got kitties wet before? (laughs)

M: You did that?

M: And did he **like** it? [directing reflection]

C: (shakes head)

M: Well what's he **afraid** of getting wet for? [directing reflection]

M: Why do you **think** he's **afraid** of getting wet? [other]

M: What's going to get him wet?

C: Juice.

M: Oh juice, you don't **think** kitties like juice? [other]

M: Maybe they don't **mind** getting juice on them. [true]

M: They just **mind** getting water on them. [true]

M: **Think** so? [directing reflection]

C: No.

M: Well, what was this kid doing? (pointing)

C: Getting some breakfast.

M: I **know**. [true]

M: But how come XXX

M: You **think** he went in there to spill the juice on the kitty? [directing reflection]

C: Uh uh …

M: What do you **think** made the juice fall? [directing reflection]

C: The door.

M: You **think** the door did it? [other]

M: Or you **think** the kitty did it? [other]

C: I **think** the kitty. [other]

M: The kitty why?

C: Because the kitty is XXX

M: Maybe the door **scared** the kitty. [true]

M: The kitty jumped and made the juice fall.

M: Is that possible?

C: (nods)

M: So whose fault is it, the kitty or the door?

M: You still **think** it's the kitty's fault? [directing reflection]

C: Mmmhmm.

M: What are you going to do?

C: Spank him.

M: You're gonna spank the kitty 'cuz he's **scared**? [directing reflection]

M: Hmm.

Not only is this Subjective Knowing mother more talkative than the Silenced and Received Knowing mothers, but the quality of her talk appears more conversational by contrast, and she expects and asks for the child's input. Like the Received Knower, she too constructs a temporally and causally related sequence of events and makes explicit the inner mental states of the characters, but she elaborates upon them by drawing on the child's personal experience. She also follows up on the child's initiations and allows her daughter to determine, to some extent, the direction of the dialogue. By offering alternative interpretations, asking clarifying questions, and prompting the child to elaborate on the reasons behind her thinking, this mother's efforts appear to be centered on guiding her child in discovering, articulating, and elaborating the child's tacit understandings. Consistent with this, the mother makes frequent use of mental states to direct the child's reflection. Moreover, although this mother tries to guide her child to the mother's own interpretation of events using recasts, her daughter ultimately arrives at an alternate interpretation that the mother does not correct.

A Procedural Knower. Characteristic of Procedural Knowers, this woman rejected absolutism and pure subjectivism, seeing knowledge as neither individualistic nor immediately accessible but rather as something that can be discovered only through effort and systematic examination. In response to the question, "Can there be more than one answer that is really right?" this mother responded by referring to these aspects of Procedural Knowing:

Things aren't just black and white ya know? You have to look at things from everyone else's perspective but just 'cuz you can understand where they're coming from doesn't mean that they're right because there are degrees of right and wrong … Well not everything is black and white and it depends on the subject too; I mean there's certain things that are black and white …. But with other things, like opinions, you have to listen and understand someone's point of view. But that doesn't mean their opinion is valid. I could say "Yeah, I understand where you're coming from and also understand that you're wrong!" And with other things you can debate and research and think about things until you think you know the answer … It just completely depends on what you're talking about. Sometimes you can get answers from teachers but not all the time … cuz they're people, they're fallible. And sometimes you can talk through things with friends or students that disagree with you. And that helps because you might say, "Oh, I made them think about this in a new way, or wow, I never thought about it that way before," because seeing how they get answers can help.

Rejecting both Received and Subjective Knowing, this mother describes the origins of knowledge in highly complex ways and reviews some strategies to unearth, refine, and evaluate understanding. This mother told the following story to her son (age 9;6) about a picture in which a little boy is clutching several stuffed animals in a toy store while the mother pulls on a giraffe that he is holding so that the giraffe begins to tear; a ragged stuffed cat lies in the periphery, and the boy's face expresses angry protest.

M: Oh what's this?

C: That looks like

M: I would say someone is in a store.

C: Trying to steal?

M: Nah, I don't **think** he's trying to steal. [other]

C: He **wants** all those. [true]

M: Yep, I **think** he **wants** all of those. [other]

C: Yeah he's XXX I **guess**. [other]

M: Grabbing them all.

C: Yeah, grabbing all the animals up.

C: They're like *Oh no oh get me outta here*

M: (laughs)

C: And then he's like *yeah XXX*

M: Well, I **think** sometimes kids go into stores. [true]

M: And they **see** things that they **want**. [true]

M: And they usually **want** a lot. [true]

M: And sometimes parents can't always …

C: Afford it?

M: Well they can't afford it.

M: But sometimes ya **know** when you go into a store we're going in to buy, say, food. [other]

M: We're not going in to buy toys so it's not a time for toys, right?

C: Mmmhmm.

M: Mmmhmm.

M: We do that sometimes right?

M: Yeah.

M: We **have to** make deals when we go places? [other]

C: And then it looks like he's going *rrrrr I'm gonna bite you.*

M: Yeah he looks pretty **angry** doesn't he? [directing reflection]

C: And his hair's messy.

M: Yep and his eyes look his eyebrows are all scrunched down.

M: And the giraffe looks a little **scared** though doesn't he? [directing reflection]

C: Mmmhmm, so does the dog.

M: The dog, yeah.

C: And the bird

M: What about this? (points)

C: A cat.

M: Is it a new cat or is it an old cat?

C: An old cat.

M: You **think** maybe that was his old cat? [directing reflection]

C: Yeah.

M: Maybe he got to the store and **saw** all these new things and didn't **want** his old cat anymore. [true]

M: That's pretty **sad**, huh? [true]

M: Do you have some old toys that you **like**? [directing reflection]

C: Mmmhmm.

M: Some old stuffed animals that you keep?

C: (nods)

M: Yeah what about [your brother]?

M: Does he have one?

C: Yeah.

M: He's got one special one that he always **sleeps** with doesn't he? [other]

C: Mmmhmm.

M: He would be **sad** if it left, huh? [directing reflection]

C: (nods)

M: Mmmhmm.

C: And that looks like our old dog just about to jump out on him.

M: Yeah that's a cute animal isn't it? (points)

M: And a fish.

C: **Look at** the clown (points) XXX. [directing interaction]

M: Mmmhmm.

C: And **look at** the alligator (pointing). [directing interaction]

M: He's real **scary** (whispers). [other]

M: So what do you **think** about that? [directing reflection]

C: What?

M: This, what do you **think**? [other]

C: What is that? (points)

M: Looks like an ear maybe.

C: That looks like a ram.

C: He's got the legs and the head and everything.

M: Yeah, it could be.

C: Well, I **think** that kid should get punished. [true]

M: Punched?

C: Punished (laughs).

M: Oh (laughs) punished—how come, because he doesn't **want** his old toy anymore? [directing reflection]

C: No because he's being very rude to his mom.

M: Yeah.

C: And he's **wanting** like all these things. [true]

C: And he's like very **angry**. [true]

M: Well, **maybe** he just needs to be **reminded** that that's not why they're there. [true]

M: Or what else?

M: That he could pick one new thing.

C: Instead of five.

M: Instead of all of them 'cuz that's an awful lot to get yeah.

M: What do you **think** you'd do if you were the dad? [directing reflection]

C: **I'd** give him a spanking. [other]

M: You would?

C: Mmmhmm.

M: How come?

C: 'Cuz he's not following directions.

C: And it looks like they're about to rip.

M: Well, what about like **maybe** a time out? [other]

C: Yeah.

M: That would work.

C: Mmmhmm.

C: Shall we go onto the next?

This woman's child tells the following story in response to the picture described earlier of girls chasing each other and casting shadows of a dinosaur and pig on the wall.

M: So, tell me about this one.

C: Well, I **know** that sister is like a T-Rex. [true]

C: And that sister is like …

M: Me?

C: Mmmhmm

M: (laughs)

C: And then now it's like she's so **mad** she's gonna' chase her around and then like gonna **hurt** her. [true]

M: Uh-huh so she's **feeling** how? [directing reflection]

C: Very very very **mad.** [true]

M: And this sister's **feeling** how? [directing reflection]

C: **Sad**. [true]

M: **Sad**? [other]

C: Mmmhmm.

M: Just **sad** or does she have any other **feelings**? [directing reflection]

C: She's **feeling**, I don't **know**. [true]

C: I don't **know**. [other]

M: If you had a T-Rex chasing after you how would you **feel**? [directing interaction]

C: **Surprised**? [true]

M: No (laughs) well it would be really **surprising** though wouldn't it? [other]

C: Mmmhmm.

M: Come on it begins with an 's'.

C: I don't **know**. [true]

M: **Scared**. [true]

C: OK.

M: She looks a little **scared**. [other]

C: A little **scared**? [other]

C: She looks a little **scared**? [other]

C: She looks major **scared**! [other]

M: So she's not just **sad** then? [directing reflection]

C: Mmmhmm.

M: **Sad** is a little different than **scared**. [true]

C: Mmmhmm.

M: **Scared** is when you're **afraid** of something. [true]

M: **Sad** is when something makes you **unhappy** or something. [true]

M: What else would happen to make you **sad**? [directing reflection]

M: If somebody died.

M: Or you got **hurt**. [other]

M: Or you lost a favorite toy.

M: That would make you **sad**. [true]

M: But **scared** would be your brother chasing after you or … [true]

C: Now **look at** the room (pointing). [directing interaction]

C: It's messy.

M: Yeah it's still cleaner than yours, right?

C: Mmmhmm, but it looks like that XXX

M: I'd still take it.

M: What else would make you **afraid** and **scared**? [directing reflection]

M: Almost getting into an accident.

C: If a psycho was chasing after you.

M: Yeah so there are lots of things that make you feel **scared** or make you…[true]

C: Or if you get shot you'd be **scared**. [true]

M: Uh oh, how would that make me **feel**? [directing reflection]

C: **Sad**. [true]

M: Right **sad** very good. [other]

The narratives of this Procedural Knowing mother and child differ dramatically from the others in several respects. Obvious at once is the sheer amount of talk that is exchanged. In qualitative terms and in contrast to the Silenced and Received Knowing mothers, the mother expects and prompts for the child's input. Like the Subjective Knowing mother, she too asks the child to draw on his own experiences when constructing the narrative. Most remarkable, however, is the way that this mother leads her child to identify, talk about, and distinguish between emotions through the use of a variety of mental state functions. By asking the child to consider multiple viewpoints, the different perspectives are fleshed out, and the etiology of emotions is made explicit. Note also that this mother does not simply supply the child with answers to questions. Rather, she scaffolds, gives hints, and attempts to guide the child so that he may draw distinctions and articulate conclusions on his own. She is also highly semantically contingent and treats the child as an equal conversational partner. All of the qualities of this interaction are predictable in light of the beliefs of a Procedural Knower. For her, dialogue is a tool for thinking through problems, and empathy and the consideration of multiple perspectives can be crucial to the development of understanding.

Discussion

Some support emerged for a positive relationship between epistemological complexity and mothers' use of mental state terms with their children. Although many differences were associated with sheer amount of talk, others were not. When amount of talk was allowed to vary, mothers with the most complex perspectives represented in this sample (Procedural Knowers) produced a greater number of all types of mental state references than did Subjective and Received Knowers who, in turn, produced significantly more of each than did Silenced Knowers. Data that speak to these absolute differences are particularly important in light of the findings that the frequency (as opposed to the proportion) of mothers' mental state utterances is strongly related to children's ToM development even after the effects of a number of potential mediators are accounted for (Ruffman et al., 2002). The sheer number of maternal mental state references is significant because each use has the potential to influence the developing ToM by providing additional data, occasions for shared meaning-making, and ways for "taking" (Heath, 1982, p. 12) from the language-learning environment. In this study, children of mothers with more complex epistemological perspectives were exposed to more dialogue and more mental state talk across a range of pragmatic functions and, thus, had more opportunities for participating in activities relevant to ToM development. The fact that children's use of true and overall mental state terms—an index of developing ToM—was also positively associated with mothers' epistemological complexity lends further support for this interpretation.

As Table 3 illustrates, the increase in mothers' mental state term use and amount of talk was particularly striking from Subjective to Procedural Knowers, the latter having the most complex perspectives in this study. In fact, Procedural Knowers typically produced at least double the mental state references of Subjective Knowers and nearly three or more times the number produced by Received and Silenced Knowers, respectively. These numbers are clearly driven by sheer amount of talk, but the large amount (not to mention the quality) of talk observed may, in turn, be driven by the fact that Procedural Knowers believe that people can mentally evaluate and refine knowledge through systematically integrating evidence from within and beyond the individual. Procedural Knowers see question-posing, affect, empathy, perspective taking, and dialogue as central to knowledge acquisition. Their stated goal is to articulate and examine various perspectives, thoughts, and feelings in order to evaluate and guide thinking. The Procedural Knowing mother is likely to ask for and provide reasoning and explanations, to share the processes behind her own and her child's thinking, and to see optimal child development

as highly contingent upon such interactions (Belenky et al., 1986; Bond et al., 1996). These kinds of exchanges were evident in the qualitative excerpts of Procedural Knowers offered here (as well as among others not quoted) and have been identified as central to children's developing ToM as well (Wellman & Lagattuta, 2004).

It also makes sense that mothers with the simplest epistemologies direct less talk and less mental state talk toward their children. For example, the interactions of Silenced Knowers are characterized by less dialogue and less shared meaning-making. Although this may relate, in part, to their relatively small lexical repertoire as evidenced by performance on the PPVT-III, epistemology group differences persist even after variation in receptive vocabulary is removed. Thus, it may be that the belief system of Silenced Knowers—their sense that people have little control over knowledge and its construction and transmission—contributes to the paucity of both talk and mental state talk in the storytelling context observed.

Although we did not pose specific hypotheses relating type of knower to use of particular mental state types, a highly interpretable set of findings did emerge. When sample size was held constant to control for amount of talk, Received Knowers (who conceive of knowledge as transmitted from authority to passive recipient) were more likely than others to use mental state terms to direct children's attention (e.g., "*Pay attention* to what I am saying" or "*Look at* this cat") and verbal behaviors (e.g., "I *think* you should talk about this little girl right here"). Subjective and Procedural Knowers, who value people's own personal reactions and analysis, used mental state terms more often than did others to direct the child's reflection. Thus, not only did maternal epistemological complexity relate to amount of talk and mental state talk overall, but some aspects of language use were specific to particular epistemologies in ways that were highly consistent with the content of those belief systems.

Although the quantitative analyses and qualitative excerpts provide evidence that children's amount of talk, amount of mental state talk, and style of talk mirrored their mothers' narrative uses, the specific pragmatic functions of mothers' and children's mental state term use were largely unrelated, as indicated by the correlational analyses of fixed language samples. It is not surprising that many pragmatic functions (e.g., the use of mental states to direct reflection) would be unrelated considering the roles that parents (mentors) versus children (apprentices) may assume during interaction and the asymmetries in knowledge, skills, and resources. At the same time, it is worth noting that the tendency for mothers to use both true mental states and mental states to direct reflection was associated with children's total mental state references, although not statistically significant once corrected for family-wise error. Interestingly,

Furrow et al. (1992), whose mental states coding scheme we used, found precisely the same results (without correcting for family-wise error). Therefore, it may be worth pursuing Furrow et al.'s (1992) contention that mothers' use of mental states that direct reflection is of special importance in the development of mental state talk because they "work to focus the children's attention on mental processes and thus foster a greater sensitivity on the part of children to the existence of mental states" (p. 628).

This study was the first to examine the relationships between mothers' epistemological beliefs and mothers' and children's talk about the mind. Previous research revealed that Silenced Knowing mothers provided fewer semantically contingent utterances to children (Jimerson & Bond, 2001), used more control-oriented strategies, and did not encourage children to actively construct understanding (Bond et al., 1996; Bond & Burns, 2006) compared to mothers with more complex epistemologies. In the current work, Silenced Knowers offered their children less talk, less mental talk, and less mental talk that directed reflection. Taken together, these studies identify a potential mechanism by which children of Silenced Knowers may acquire not only less good ToM outcomes but less good outcomes in a wide range of domains involving language, cognitive, social, and academic performance. Research has demonstrated that systematic intervention can promote epistemological development and constructive mother–child interaction strategies (Belenky et al., 1997; Bond et al., 2000). As Bond et al. (1996) illustrated, parent belief systems are self-sustaining; they "contribute to establishing contexts that reinforce and perpetuate the underlying assumptions and epistemologies" (p. 492). As such, they provide relatively enduring influences on children's development. Accordingly, investing in parents' epistemological development may be an investment in primary prevention of children's developmental difficulties (e.g., Bond & Burns, 1998).

This study examined a relatively small but unique sample recruited from primarily low-income households and identified by state agencies as needing support. One of its limitations was the absence of women with the most complex epistemological perspectives, making it impossible to examine the degree to which the full range of epistemological complexity is related to the dependent variables. Ideally, future research would include mothers with all epistemological perspectives, although this may require pre-assessing a large number of mothers, given that previous research has demonstrated that Constructed Knowing (or its analogous form as captured by other epistemological schemes) is represented by only a small portion of the population (e.g., Bond & Burns, 2006; King & Kitchener, 1994; Kuhn, 1991; Kuhn & Weinstock, 2002). In addition, future studies ideally would involve samples that are more diverse in terms of socioeconomic,

educational, and cultural background. Nevertheless, it is striking that even within our relatively small and homogeneous samples, maternal epistemology predicted both the amount and, in some respects, the linguistic character of the mother–child interaction. To the degree that epistemological perspectives vary with socioeconomic status (as children's ToM does; Cutting & Dunn, 1999), the findings may help explain related differences in developmental outcomes. However, attention to epistemological variation may also help us move beyond broad associations between socioeconomic status and developmental outcome to understand developmental variation *within* social and economic strata. Consistent with this notion are the findings that, among families of low social and economic status, key predictors of mothers' metacognitive language use in the home center around "parenting style, mothers' self-efficacy and mother and child affective and intellectual ability" (Thompson & Williams, 2006, p. 191), each of which may share variation with epistemological perspectives.

As we have noted, our study design did not permit determinations of causality; future longitudinal and intervention studies are needed to identify the sources and directions of effects. However, the associations established in this research suggest one *potential* set of causal relations to examine in future research: Maternal epistemological perspectives may shape the amount and quality of maternal mental state talk that, in turn, may influence children's conceptualizations and conversations about the mind. As others have noted (e.g., Harris, 2006), the findings that mothers' mental state use predicts later child ToM knowledge but not the reverse (Ruffman et al., 2002) and that this relation persists when earlier child ToM is controlled (de Rosnay et al., 2004) suggest that quality of maternal talk influences children's ToM development.

In light of these findings and the aforementioned body of evidence linking variation in features of the language-learning environment to children's ToM competence, there would seem to be sufficient support for singling out the quality of children's language-mediated social relationships as an important influence. However, this does not negate the richness of factors that ultimately may be involved (Carpendale & Lewis, 2006). Although parents' values and beliefs appear to be important contributors, it is well-accepted that the nature of the parent–child interaction is influenced by factors such as the parents' levels of stress, the depth of their social networks, and their economic circumstances, to name only a few (e.g., Goodnow & Collins, 1990). At the same time, the ways in which parents support their child's understanding of mind depend on and interact with characteristics of the child (e.g., temperament and social, cognitive, and language level; Carpendale & Lewis, 2006) that are multiply determined, transactionally

related to other factors, and involve hereditary factors (Hughes & Cutting, 1999).

Clearly, the factors that shape children's abilities to reason about the mind are many and diverse, and the processes involved are undoubtedly complex. Nonetheless, variance that may be explained by maternal epistemological perspectives may be particularly important both because it has not previously been considered and because epistemology can be promoted through systematic intervention (Belenky et al., 1997; Bond et al., 2000). The present findings may also help to explain earlier study outcomes that children whose mothers describe them in more mentalistic ways perform better on indices of ToM (de Rosnay et al., 2004; Meins et al., 1998, 2003) because epistemologies are logical antecedents of the quality of maternal talk.

Our argument for the importance of mothers' epistemological beliefs as a possible contributor to children's ToM development is consistent with Vygotskian-based arguments. From the social-constructivist perspective, skilled partners (such as mothers) help active apprentices to think and problem-solve by engaging in culturally organized activities (Rogoff, 1990). To the degree that epistemology contours mothers' interpretations of the problem-solving situation, their goals for the child's development and the strategies that they use to guide their child's participation in culturally relevant activities, epistemology can serve as a social context in which children ultimately acquire knowledge and skills.

In sum, our preliminary support for the relationship between mothers' epistemological beliefs and mothers' and children's talk about the mind suggests directions for future work on children's developing ToM and supportive language-learning environments within and outside the home. Of course, these relationships are complex and require that larger, more diverse samples, including children with language impairment, be studied in contexts that systematically vary goals and characteristics of the interlocutors with the aim of identifying causal linkages. However, given the power of parental belief systems and the overarching epistemological perspectives in which they are embedded, it is worthwhile to direct our attention to clarifying the relations among parents' overall belief systems, parenting belief systems, and parent–child interactions that contribute to variations in language and cognitive development.

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