

## **Theory of Mind Understanding in Narration: A Study among Children from Different Socioeconomic Backgrounds in India**

Nandita Babu  
Department of Psychology  
University of Delhi, India

### **Abstract**

This study investigates the theory of mind understanding as reflected in the narratives of children from families of low as well as high socioeconomic-status (SES). A group of 30 Hindi-speaking children from six to seven years of age and their mothers participated in this study. Children were asked to narrate six stories prompted by pictures and standard verbal probes. In addition, they were also administered false-belief tasks to assess their theory of mind understanding. Later, their mothers were asked to narrate three stories to their children. Content analysis of the stories indicated the frequency of occurrence of words referring to mental states such as emotion, intention, thought, belief, etc. The low and high SES children differ in their reference to the mental state of the protagonist in the stories narrated by them. The result was interpreted concerning the landscape of action and landscape of consciousness discussed by Bruner (1986). Interestingly, even though all the children could refer to mental states in their narratives, approximately 50% of the children from low SES backgrounds failed in the false-belief task, indicating a lack of understanding of theory of mind. The narration by the mothers from high SES families was more elaborate with significant reference to the mental state of the protagonist as compared to the narration of the mothers from low SES families. A significant relationship between mothers' narration/theory of mind understanding and children's narration/theory of mind understanding was also observed.

**Authors' Note:** Correspondence concerning this article should be addressed to Nandita Babu, E-mail: Nandita.babu@gmail.com

Over the past three decades there has been extensive research across the globe on children's development of a theory of mind (ToM). It refers to the ability to attribute mental states such as beliefs, desires, intention to self and others. During the preschool years, children begin to understand, predict, and explain their own and others' talk and action by attributing mental states to them, such as know, think, remember, forget, dream, pretend, etc. They come to see themselves and others as mental beings, that is, as people who hold mental states. Researchers have arrived at a consensus that children generally develop a theory of mind when they are three to five years of age. However, an individual difference in the rate of development of ToM has also been observed as an outcome of different contextual factors, like child's belongingness to a family with a low or high socioeconomic status, the birth position, the number of siblings, the amount of social and linguistic interactions that the child is exposed to, and many other socio-cultural factors. Some of this research evidence will be referred to later in this paper. The present paper reports a study on the development of theory of mind in children from Indian families with different socioeconomic statuses. The research was an attempt to provide evidence to the long awaiting question of the universality versus culture specificity of theory of mind development in children. Before moving on to the research in question, it is relevant to discuss and review the emergence and current status of research in the area of theory of mind development in children.

### **Development of a Theory of Mind**

Acquisition of theory of mind permits children to reflect on their own and others' mental states, and thus interprets human behavior in sensible ways. A theory of mind is a powerful social tool that makes an enormous difference to the child's development. It transforms the way children are able to see other people, and make sense of what they are doing. It allows the explanation, prediction, and manipulation of the behavior of others. Acquiring a theory of mind may well be instrumental in the development of particular forms of reasoning and, as such, may represent a significant step in cognitive development. Effects of the child's theory of mind, thus, spread across cognitive, language, and social development. By the time children are five years old, they understand that people's beliefs represent and may sometimes misrepresent the world, and that it is people's representation of the world that determines what they say or do. Using the false-belief paradigm of Wimmer and Perner (1983), researchers have clearly shown that, after about four years of age, children recognize that other people may hold beliefs that are different from their own; they understand that a person may believe something that they know to be false, and they can anticipate that the person will act based on their false belief. At the same age, children first understand the distinction between reality and appearance, that is, the distinction between what something is and what someone might believe it to be (Flavell, Flavell, & Green, 1983). Further, children's understanding of false belief and of the appearance-reality distinction is related to one another as well as to children's understanding of change in their own beliefs (Gopnik & Astington, 1988). Four-year-olds but not year-olds recognize that their own beliefs may change over time, and they can remember and report their earlier beliefs. Four-year-olds also understand the role of perception (Wimmer, Hogrefe, & Sodian, 1988) and point of view (Flavell, Everett, Croft, & Flavell, 1981) in belief formation. Furthermore, they can identify and remember the sources of their beliefs (Gopnik & Graf, 1988).

However, there is marked variation in the particular age at which children achieve success on false-belief tasks. Some children master false-belief understanding at three years of age and others not until five years of age (Jenkins & Astington, 1996). Wellman et al. (2001) conducted a meta-analysis based on the performance of preschool children on false-belief understanding. They found that a majority of three-year-olds performed at chance, or below, on false-belief tasks, whereas, by age five, success was widespread across all tasks variations. Based on their meta-analysis, Wellman et al. (2001) concluded that theory of mind understanding reveals genuine conceptual changes during the preschool years. So, what might account for these differences in ToM development? Some of the researchers have begun to address factors producing individual differences in ToM development. The next section addresses some of these issues in theory of mind development.

## Why and How Children Develop a Theory of Mind?

The issue of major concern among researchers in this area is why and how children develop a theory of mind? Keeping in line with the age-old controversy of biology and environment, theorists in this area also disagree regarding the biological or socio-cultural perspective to a theory of mind development. The ubiquitous use of mental state language and the fact that ToM exhibits a stable pattern of development among children have convinced many that our "theory of mind" is a biological inheritance. There is more or less an agreement on this issue among theory-theorists (Bartsch & Wellman, 1995; Gopnik & Slaughter, 1991), Modularity theorists (Baron-Cohen, 1995; Fodor, 1992; Leslie, 1994; Leslie, Friedman, & German, 2004; Mitchell, 1994), and simulation theorists (Harris, 1991; Johnson, 1988). **Theory theorists** argue that older children's and adult's knowledge of the mind consists of a theory, and that development in theory of mind is essentially one of the hypothesis testing. These arguments are part of a more general tendency to think of cognitive development in terms of theory formation (Carey, 1985, 1988; Gopnik, 1988; Karmiloff-Smith, 1988). **Modularity theorists** (Baron-Cohen, 1995; Fodor, 1992; Leslie, 1994; Leslie, Friedman, & German, 2004; Mitchell, 1994) have different views about what is acquired in ToM development and how. Almost everybody agrees that theory of mind development is dependent upon the biological maturation of genetically based neurocognitive structures, or modules, of the brain. Leslie (1994) and Leslie et al. (2004), for example, postulate the acquisition of ToM through neurological maturation of a succession of domain-specific and modular mechanisms for dealing with agent versus non-agent objects. **Simulation theorists** argue that children develop a concept of mind through experience and not through maturation or theory building. Some in this group say that children's early understanding is intuitive, rather than theoretical (e.g., Johnson, 1988). What the child understands is their own phenomenal experience. Through introspection, they become aware of their own desires, beliefs, and feelings, and then use this awareness in understanding others. Harris (1991) develops this idea in some detail. He argues that the child, who in the false-belief task, for example, tells you where the other person would search for the chocolate, is not making any theoretical prediction, but is engaging in mental simulation.

The problem with the above mentioned theories is that their approach to the issue of development of social understanding or understanding of a theory of mind is individualistic. The issue to be addressed here is whether theories start with the individual or focus on the influence of social context on development. According to Raver and Leadbeater (1993), the developmental question is "whether the true starting point is to be located in the single, isolated, free mind of the individual or in a social communal world of shared experience or language" (p. 355). The discomfort in reconciling between theory construction and social construction is also evident in the writing of Astington and Olson (1995), where they suggest an alternative to theory construction. According to them, children construct a theory about human talk and action through a process of enculturation in which children internalize the folk psychology of their particular culture. In this view, social construction is equivalent to enculturation and the ability to "participate in a kind of interpretive discourse. [...] In the one case, the child is seen as constructing concepts, in the other as internalizing social understanding." (p. 185). **The enculturation hypothesis**, a radically different view, suggests that theory of mind develops to help us regulating our interaction with others, and is primarily the result of socialization or enculturation. Internalization, in this socialization approach, involves making external social norms internal. Astington and Gopnik (1991, p. 19-20) wrote: "on this view folk psychology is ... what Wittgenstein would call a 'form of life', a set of social and cultural practices and conventions. The mechanism for development in this view would be socialization and enculturation – children would learn how to psychologize appropriately in the way that they learn to dress properly or eat politely." However, there has been an attempt by the **simulation approach** and the **enculturation hypothesis** to consider the role of social landscape, as it minimizes the active social interaction in developing mental state reasoning. Concepts about mind are not just passed on from one to the other social group, nor are they completely formed by individual child-theorists. Instead, children gradually construct social understanding through the regularities they experience in interacting with others (Carpendale & Lewis, 2004). In the

course of development while constructing knowledge of the physical world, children are also constructing knowledge of other people. Triadic interaction between the child, another person (or several), and the world is essential for development of social understanding, specifically the development of a theory of mind. Around the age of two years with the acquisition of language, children's interaction in a social context becomes more sophisticated. Children now start to talk about mind, which is indicated in their acquisition and extensive use of mental state words (Babu, 2009). Language starts to function as a tool facilitating social interaction as well as a tool that is facilitated by social interaction. Mental state language here is viewed as an activity and not simple sharing of information. Learning to use mental state words is rooted in children's everyday experience with coordinating attention with others. Children learn about the meaning of mental state words through learning the adult use of such words, which became the criteria for such use. Once children start to talk about the social, emotional, and psychological world, they can begin to reflect upon and think people's action in psychological terms. In this context, it is important to note the relevance of **narrative practices as a language activity** in a social context. By engaging themselves in narratives, children learn to practice mental state reasoning and evaluate the criteria for validating such reasoning. Thus, narrative practices at home and at preschool provide a rich avenue for development of theory of mind. The narrative practice hypothesis of Hutto (2007a) will be discussed in the next section as an alternative explanation for theory of mind development. At this point, however, it is important to focus the discussion on Bruner's theorization of the dual landscapes of narratives. This has significant implication for delineating the role of narrative practice as an important tool for development of theory of mind.

### Theory of Mind and Narratives

Theory of mind is intrinsic to narration. According to Bruner, an important and noticeable feature of a story that appeals to everybody is that it simultaneously deals with reality, i.e., events and actions in the real world, and a character's perception of reality, i.e., their beliefs, desires, and intentions. Bruner says: *"Story must construct two landscapes simultaneously. One is the landscape of action where the constituents are arguments of action, agent, intention or good situation, instrument something corresponding to story grammar. The other landscape is landscape of consciousness: what those involved in the action know, think or feel or do not know, think or feel"* (p.14). Bruner (1990) argued that an individual must comprehend both landscapes simultaneously to understand a story. Indeed, evidence suggests the importance of the landscape of consciousness in order to organize and comprehend the stories. Thus, understanding stories, as well as narrating them, requires an awareness of story characters' mental representations, i.e., a character's thoughts, beliefs, and feelings. Research shows that while there is reference to dual landscape in the story narrated by a five-year-old, there is only reference to the landscape of action in the stories narrated by a three-year-old. Feldman, Bruner, Renderer, and Spitzer (1990) found that participants who heard a story containing the landscape of consciousness, as opposed to one containing only the landscape of action, were able to provide information beyond what was directly given in the stories. They not only made references to the characters' thoughts and feelings, but also gave more concluding interpretations of the story and were able to organize the events of the story in a better way. Astington (1990) suggested that young children fail false-belief tests because they understand the landscape of action but not the landscape of consciousness. In commenting on this conceptualization, Astington (1990) claimed that the meta-representational ability that is involved in ascribing propositional attitudes to others is just what is required for understanding the dual landscape of narratives. Babu (1989, 2004) has shown that at six years of age, children could report narratives by constructing these dual landscapes. At this stage, meta-representational abilities are reflected in the stories retold by them. Researchers (Yussen & Ozcan, 1996) interested in children's development of storytelling attributed the developmental differences in storytelling performance to younger children's difficulty in representing other people's mental states. Narratives of three-year-olds are described as unrelated descriptions of objects, actions, characters, and states (Trabasso et al., 1992). Four-years-olds are at a transition. Although they told goal-based stories, they still had some difficulty when the goal object was not

shown in picture. Then, the children were more prone to report action description. In a study by McKeough (1992), stories by four-year-olds resembled scripts, that is, they talk about routine events and actions that do not require any meta-representational ability. In short, the functional use of their newly acquired meta-representational ability is not evident in their stories. After five years of age, children produce goal-based stories (McKeough, 1992). Studies have also examined the role of family discourse during joint reading interaction and self-other understanding. Joint book-reading behavior is a common form of interaction for young children and their parents (Bus & van IJzendoorn, 1995, 1997; Scarborough & Dobrich, 1994; Senechal & LeFevre, 2002). Mandler (1983) described how a story may contribute to the development of representational thought through its structure and processes, more so than through the story's content. Garner, Jones, Gaddy, and Rennie (1997) asked mothers to read a wordless storybook with their children, and examined mental state references about the emotions of the characters. Mothers who explained the causes and consequences of emotions had children who did better on emotional understanding tasks than children of mothers who did not refer to emotions or did not explain them. Turnbull and Carpendale (1999) used a similar storytelling procedure and gave examples of how those children who have poorly developed interchanges about the mental states of story characters tend to show poor false-belief understanding.

### **The Narrative Practice Hypothesis**

The Narrative Practice Hypothesis (NPH) by Hutto (2007a) proposes that children only come to acquire a theory of mind by being exposed to and engaging in narrative practices. As stated, the NPH is a developmental hypothesis about how we come to acquire a theory of mind. **In his writing on Folk Psychological Narratives**, Hutto provides an extended argument for the view that our folk psychological capacities have a socio-cultural basis rather than a biological one. Narratives present what happened and what a person did in a way that allows an audience to make sense of the thoughts, feelings, and actions of the characters. Hutto states: "children normally achieve [folk psychological] understanding by engaging in story-telling practices with the support of others. Stories about others who act for reasons – i.e., folk psychological narratives – are the foci of this practice. Stories of this special kind provide the crucial training set needed for understanding reasons" (Hutto, 2007b, p. 53). During early childhood, narrative practices involve a lot of questioning by the parents and caretakers, allowing children to think of reasons for behavior. In storytelling, for example, parents ask children questions about the characters' behavior (e.g., Why do you think he did that?). This helps children to realize the importance of giving explanations. To appreciate stories, children must be imaginative and respond with reflection on their own representations of the characters representations. Such preparedness in children is also the result of an early and continuous exposure to narratives. Narratives are both exemplars and tools used to teach children how to become good folk psychologists. In the case of folk-psychological narratives, this will normally involve jointly attending to words with mental state reference (think, know, want, desire) and discussing what the story characters know, feel, and want. By attending to enough of these exemplars, it is possible for children to develop an implicit practical understanding of how to make sense of persons who act for reasons. In this respect, "conversations about written and oral stories are natural extensions of children's earlier experiences with the sharing of event structure" (Guajardo & Watson, 2002, p. 307).

The Narrative Practice Hypothesis is consistent with empirical findings stating an important link between narrative abilities and our understanding of other's mental states (Astington, 1990; Babu, 2004; Dunn et al., 1991; Feldman et al., 1990; Lewis, 1994, Lewis et al. 1994; Nelson, 2007; Peterson & McCabe, 1994). Training studies (Guajardo & Watson, 2002) involving narratives have shown that narrative training is responsible for improved performance in false-belief tasks indicating the fact that exposure to narratives is a critical determiner of folk psychological abilities. It further suggests that the relationship is stronger than mere correlation. Thus, it has been concluded that narrative is an effective tool for "at least modest improvements in children's theory of mind development" (Guajardo & Watson, 2002; p.

320). Similarly, it has been observed that “frequent conversations about the mind can accelerate growth of a ToM” (Garfield et al., 2001, p. 513).

### **Tom and Narrative Practices in Different Socioeconomic Backgrounds**

Hutto's (2007a, b) theory allows for the fact that there will be differences both in the acquisition of a theory of mind and in narrative practices across cultures. In cultures where there is less storytelling or storytelling of a different sort, the theory of mind will differ or be less robust. The vast majority of research on ToM-studies has consisted of Caucasian children from middle to upper income, well educated backgrounds, with only few studies examining the performance of children from a low socioeconomic background (for review of studies in India see Babu and Mohanty, 2001). Moreover, the study of Murray et al. (1999) on 125 same-sex twins failed to find a significant relationship between false belief and social class. Cole and Mitchell (1998) found that a low socioeconomic status is negatively correlated with false-belief performance. It was also evident that children from middle-class backgrounds had higher scores on false-belief tasks than working-class children (Cutting & Dunn, 1999), and African American low-income preschoolers performed poorly than European Americans (Curenton, 2003). Hughes et al. (1999) found an association between socioeconomic status (SES) and ToM, although this association was no longer significant when language ability were taken into account. Pears and Moses (2003) and Farhadian, Abdullah, Mansor, Redzuan and Kumar (2010) evidenced that a mother's occupational status had a significant contribution to ToM development. Children of employed mothers had a better performance on ToM-development compared to housewife-mothers. The authors concluded that it might be due to the quality of relationship between mothers and their children and the amount of time that mothers may spend with their children. In addition, employed mothers may talk more about the mental states and feelings with their children. The findings of studies on parental demographic backgrounds and ToM development are few and somewhat inconclusive. However, it is not yet clear why low-income preschoolers performed poorly in false-belief tasks. One plausible explanation would be the discrepancy in language proficiency between the low-income children and the middle- and upper-income children. Another explanation following Lilliard (1998): speculation would be that using mental states behavior is an affluent Western European view of human behavior. Curenton (2003) speculates that low-income children may be at a disadvantage because the task was originally developed using white middle-class samples (Wimmer & Perner, 1983).

Therefore, the present research attempted to investigate the theory of mind understanding of children from families of two different socioeconomic statuses by administering false-belief tasks as well as a story-narration task. In addition to investigating ToM understanding, performance in story-narration would also help in looking at the difference in language proficiency among children of low and upper middle SES. The present research tries to address the following objectives:

1. To compare the narrative skills and theory of mind understanding of six-to-seven-year-old children and their mothers from low- and upper middle-class backgrounds.
2. To investigate the relationship between theory of mind understanding and the narrative skills of children and their mothers from the two socioeconomic backgrounds.
3. To investigate the theory of mind understanding as reflected in story narration (as indicated by the landscape of action and landscape of consciousness) of children from the two socioeconomic backgrounds.

## **Method**

### **Participants**

A group of 30 six- and seven-year-old children (mean age of upper middle-class = 6.793 and of low SES = 6.844), with 15 children from each SES background, participated in the study. Their mother tongue was Hindi and medium of instruction in school was also Hindi. All participants from low SES were taken from a slum area in Delhi, India. The parents' average

monthly income is Rs 5,000 (approximately 80 Euros). The family in average consists of six people living in a single room. All the families have their bed, sofa, television, and refrigerator in that room. The mothers were primarily occupied with household chores and nurturing their babies. They were either illiterate or had two to three years of schooling. During the day children spend their time in school; in the afternoon they attend tuition classes (either for extra help in regular studies or for completion of home assignments), and in the evening they play in the neighborhood. Interaction between parents and children was very little. Participants from upper middle-class families live in big housing complexes. The average monthly income of the parents is Rs 25,000 (approximately 400 Euros). Mothers were educated and children attend public schools. All the mothers are non-working and spend their time at home. After school, in the afternoon, mothers help the children in completing the home assignments. In the evening, the children spend their time either on the playground or engage themselves in pursuing their hobbies like learning to sing, playing an instrument or drawing and painting.

## Measures

1. Story-narration task: The only tool that had been included in the study to elicit stories from the children and mothers were standard verbal leads for six stories, and two pictures based on each story.

2 Theory of Mind task:

(a) Maternal Mental State Input Inventory: In order to assess mothers' sensitivity to ToM, Maternal Mental State Input Inventory (MMSII) was prepared based on the original inventory by Peterson and Slaughter (2003). In this inventory (given in appendix A) the mothers were given seven vignettes that depicted episodes from daily-life family interactions, like a mother's forgetfulness to bring toffee, wrapping a birthday gift for the child, etc. In each vignette, a four-year-old child questions his/her mother. Each vignette ends with a dilemma leading to open answers from the mothers. All the responses given by the mothers were studied thoroughly and were categorized into four categories. Examples of these responses are discussed in the result section.

1. Non-elaborate non-mental state (NENMS) (rating given was 1): Brief answers with no reference to the mental states of the character in the vignette.

2. Elaborate non-mental state (ENMS) (rating given was 2): Elaborate explanations with no reference to the mental states of the character in the vignette.

3. Non-elaborate mental state (NEMS) (rating given was 3): Brief answers with explicit reference to the mental states of the character in the vignette.

4. Elaborate mental state (EMS) (rating given was 4): Elaborate explanations with explicit reference to the mental states of the character in the vignette.

(b) False-belief Task: Following the paradigm of Wimmer and Perner (1983), the two tasks (a) Unknown location and (b) Unknown content were used in order to assess children's theory of mind understanding. A detailed description is given in the appendix B. The tasks were presented in the form of stories that were enacted in Hindi language with the use of puppets.

## Procedure

The data was collected by two female researchers in the slum (low socioeconomic class) as well as in upper middle-class families. Before starting the interview, a good rapport was formed with the children and their mothers. Mothers were informed about the purpose of the present study. One researcher sat with the child in an isolated corner of the house/room. To avoid interference from the mother, the other researcher conducted the interview with the mother. After building a warm conversation with the child, the interviewer instructed the child and said, "I will show you some pictures, you have to look at them very carefully and then tell me a story using those pictures." The picture sets were shuffled and arranged randomly before they were presented to the child. After presenting each set, the child was given sufficient time to look at the pictures and to understand what was happening in them, and then was asked to tell the

story. Story leads and probing were also given, including “What happens next?” or “Do you want to tell us more?” When the child said that the story was finished and s/he has nothing more to say, the next set of pictures was shown to the child. The same procedure was followed with all six stories. The child’s responses were recorded. After the completion of the task, the child was given a small gift as reinforcement. After the story-narration, the false-belief tasks were administered.

The mothers who were interviewed at the same time were also given the story pictures. The researcher said, “Look at the pictures carefully, and construct a story and narrate it as if you were telling it to your child.” Three sets of pictures were selected. Before presenting the sets of pictures to each mother, the pictures were reshuffled to ensure randomized order of presentation. The mothers were given time to look at the pictures carefully and construct the story. After the completion of one story, another set of story pictures was presented, and the same procedure followed. After the completion of the third story, MMSII was conducted and the responses were recorded.

### Coding

**Narrative transcription.** All the narrations by children and mothers were first recorded in a voice recorder, and later transcribed verbatim including all remarks by experimenter and children. Only the children’s/mothers’ comments that were specifically related to the story were of interest and were considered in the analysis. Other utterances were deleted following the deletion procedure given in Table 1. The final transcript consists of only children’s/mothers’ remarks that are relevant to the story.

**Table 1**

*Criteria for transcript deletion*

- 
1. The transcripts were modified to include only statements that are directly relevant to the story. All irrelevant remarks were deleted.
  2. All experimenter statements were deleted.
  3. Participant’s responses to the experimenter’s questions or request for elaboration/clarification were excluded, except for those that were responses to the standard probes.
  4. Filler words (e.g., hmm, uhuh, and huh) were deleted.
  5. Participant’s denial (e.g., I do not know) and refusals were deleted.
- 

**Narrative volume.** The total number of words in the narratives of children and their mothers were calculated to indicate the narrative volume. It indicates the overall richness of story-narration. As discussed earlier, one of the purposes of administering the story-narration task is to compare the language proficiency of the participants from the two socioeconomic backgrounds. The analysis of communication units in the present context is considered as an indicator of language proficiency of the participants.

**Communication unit.** This is a method for assessing the syntax of narratives (Loban, 1976). It is defined as an independent clause and all its modifiers; it is a syntactic unit that is based on a clause structure (i.e., subject-verb-proposition). Because the C-unit is a measure of a syntactically constructed unit, it demonstrates the child’s ability to tell a linguistically coherent story, which provides a measure of syntactic coherence. In addition, C-units can provide a measure of syntactic complexity because they accurately measure the complexity of longer sentences. In the present study, the syntactic features of children’s and mothers’ narratives, both coherence and complexity, are examined by C-units.

Two independent transcribers divided the narratives into C-units. Utterances with a strict causal structure involving a subject-verb proposition, “the boy was looking for toys,” would be counted as one C-unit. “A boy, a toy, the store,” however, would not because they do not contain a verb. The C-units are parsed at coordinating conjunctions (e.g., but, and, so) if they were preceded and followed by subject-verb propositions. For example, “The boy ate one chocolate



and gave one to the sister.” Hence, it was possible for one utterance to be parsed into multiple C-units if that statement contained two independent clauses. However, subordinate clauses were not considered as two C-units because the subordinate clauses modify independent clauses. Subordinate clauses are preceded by subordinating conjunctions (e.g., because, if, when). “The boy is crying because he didn’t get the toy” was counted as one C-unit.

Fragments that are part of the dialogue are considered as C-units, even if they fail to conform to a causal structure. For example, the comment “the boy said, I won’t give the chocolate to her, she is naughty, she never shares anything” was counted as four C-units. As dialogues are an important part of narratives, special consideration was made for their inclusion as C-units. Finalization of the C-units was done based on consensus between two experts who did not participate in the collection of the data.

**Narrative component.** Four aspects of the narratives were analyzed: **coherence, complexity, frequency of the occurrence of mental state words, and narrative quality.**

**Narrative coherence** is indicated by the communication unit (C-unit). Based on the deletion procedure, utterances that are irrelevant and not related to the story as well as incomplete utterances were deleted. Thus, the number of C-units represents the number of utterances that are syntactically constructed and relevant to the story. The number of C-units produced by the child is not synonymous with the narrative volume because coherence is not a measure of overall narrative talk. On the contrary, coherence by definition is a measure of syntactically constructed sentences that indicates the child’s ability to tell a coherent story. Another measure of narrative skill is **complexity**, which is indicated by the mean length of C-unit. The third aspect of narrative analysis is the occurrence of **mental state words (MS words)** such as: think, know, guess, pretend, hope, etc. These words are used to talk about one’s own and others’ cognition, intention and desire, and emotion. Research has indicated that mental terms, such as know, think, and remember start to appear in children’s lexicon in the second and third year of life (Bretherton & Beeghly, 1982; Shatz, Wellman, & Silber, 1983). A complete understanding of the semantic and pragmatic properties of such mental state words in English occur when children are four to five years of age (Moore, Bryant, & Furrow 1989; Moore & Davidge, 1989; Moore, Harris, & Patriquin, 1993). Studies done on early acquisition of mental state verbs in Oriya language (a regional language in India) have revealed that words such as say, know, think, sad/happy are acquired by children between the age of two to five years (Satpathy, 1993, Babu & Mishra, 2000).

It is important to note here that mental states can be experienced without being verbalized using any mental state words, and that those words can be uttered independent of any experience of the mental states. Thus, there could be a discrepancy between use of internal state words and communication about internal states. In any normal conversation in English, for example, when someone says “Anita knows the answer,” the intended meaning has something to do with Anita’s knowledge. On the other hand, when someone says “you know she is a good dancer,” the intention is not to talk about knowledge as such. In the second case, “you know” is used rather as a conversational device. These are highly stereotyped phrases containing internal state words, which have absolutely no reference to mental states. In order to designate the words as ‘mental state word’ certain criteria were followed. Words without explicit reference to mental states and words used as conversational devices such as: ‘let’s see’, ‘do not know’, were eliminated. In addition, only those words that were used by the participants to refer to the mental state of the protagonists in the narratives were considered. The narrative-relevant mental utterances were thus extracted and then categorized into four categories: cognitive, affective, linguistic, intention and desire. This categorization helped us in analyzing the fourth aspect of narratives, **the narrative quality**. It was considered to differentiate Bruner’s dual landscapes: the landscape of action and the landscape of consciousness in the narratives of the participants.

## Results and Discussion

### Narrative Analysis

As discussed earlier, the mothers were asked to narrate three stories and the children were asked to narrate six stories. The narrative volume of the two groups of children, i.e., slum and upper middle-class is 7808 and 7865 words respectively, whereas that of the mothers is 3539 and 4489 respectively.

As per the coding procedure explained earlier, the coherence and complexity of each story was calculated and analyzed. The coherence, i.e., C-units per story, was calculated for each story narrated by the child, and was estimated accordingly for all six stories. The mean C-unit was calculated for each child first, and was then calculated for the respective group (upper middle-class and slum). The same procedure was pursued to calculate the group mean of coherence of mothers from both socioeconomic backgrounds. The children from upper middle-class and slum did not differ in their narrative coherence. The mean scores of narrative coherence of slum children were 12.24 and those of upper-class children were 12.37. On the other hand, the mothers from the slum and upper middle-class background differed in the narrative coherence having a mean score of 8.24 and 9.69 respectively.

The complexity score of each narrative was calculated by dividing the total number of words in each story by its respective coherence. The complexity score of each story was calculated for each child and was then estimated accordingly for all six stories. As in the case of coherence, the group mean complexity-score was calculated for the children as well as for the mothers. The narrative-complexity mean score for slum and upper middle-class children is 7.01 and 7.43 respectively. It indicates that there is no difference between the two groups of children. However, the mean scores of mothers of the slum and upper group differed with a mean score of 7.97 and 9.31 respectively. Overall, the result shows that children of two groups do not differ in their narrative coherence and complexity irrespective of the fact that their mother differed correspondingly.

Mental state words (MS words) were divided into four categories, i.e., cognitive, affective, linguistic, and intention and desire (Table 2). For each category, words were first counted for each story, and later for all six stories. In order to see the relationship of MS words with other variables in the study, the combined score of all four categories was taken. Table 1 shows the frequency of occurrence of the four categories of words. The frequency of occurrence of cognitive words is higher in the narratives of the upper middle-class children, whereas the frequency of occurrence of affective, linguistic, and intention/desire words is higher in the narratives of the slum children. Consideration of mothers' narratives indicated that the frequency of cognitive, linguistic, and intention/desire words is higher in the narratives of upper class mothers, whereas the frequency of occurrence of affective words is higher in the narratives of slum mothers. The chi square analysis (chi square = 8.58, df = 3,  $p < .05$ ) indicates that the upper middle-class and slum children differ significantly in the use of the four different categories of mental state words in their narratives. The chi square analysis (chi square = 26.43, df = 3,  $p < .01$ ) indicates that the upper middle-class and slum mothers differ significantly in the use of the four different categories of MS words in their narratives.

**Table 2***Frequency of mental state words of mothers and children.*

<b>Children</b>	<b>Cognitive</b>	<b>Affective</b>	<b>Linguistic</b>	<b>Int/Desire</b>	<b>Total</b>
Upper	121	117	141	14	393
Slum	99	162	163	15	439
Total	220	279	304	29	832
<b>Mother</b>					
Upper	75	23	75	20	193
Slum	49	48	52	3	152
Total	124	71	127	23	345

When the narratives were analyzed, it was found that the variety of cognitive words was more extensive in the upper-class children and their mothers in comparison to that of slum children and their mothers, while the variety of affective, linguistic, intention/desire words was found to be more in slum children and their mothers in comparison to the other group. The variety of words in Hindi with their translation in English is given in tables 3a and b.

**Table 3a**

*Variety and mean frequency of occurrence of cognitive and affective words in the narratives of children (upper and slum) and mothers (upper and slum).*

	Mean Frequency			
	Children		Mothers	
Cognitive	Up per	Slum	Upper	Slum
<b>Dekhata Hai (See)</b>	2.7 33	3	2	1.2
<b>Samajh (Understand)</b>	0.2	0	0.933	.6
<b>Pata Nahin (Don't Know)</b>	1.9 33	1.4	0.133	0.533
<b>Sun Na (Listen)</b>	0.1 33	0.067	0.2	0.267
<b>Sochna (Think)</b>	1.1 33	1.333	0.867	0
<b>Yaad Aata Hai (Remember)</b>	0.2	0	0	0
<b>Mann (Mind)</b>	0.2	0	0.133	0.133
<b>Lagta Hai (Feel)</b>	1.5 33	0	0	0
<b>Idea/Choice</b>	0	0	0.333	0
<b>Promise</b>	0	0	0.267	0
<b>Dhyan (Concentrate)</b>	0	0	0.133	0.133
<b>Natak Kerna (Deception)</b>	0	0.8	0	0
<b>Bhool Na (Forget)</b>	0	0	0	.2

	Mean Frequency			
	Children		Mothers	
	Upper	Slum	Upper	Slum
<b>Affective</b>				
<b>Rona (Cry)</b>	0.667	1.533	0.333	0.733
<b>Accha Lagega (Feeling Good)</b>	2.067	3.467	0.133	0.933
<b>Bura Lagega (Feeling Bad)</b>	2.8	4.133	0.267	1.067
<b>Khush (Happy)</b>	0.867	0.667	0.8	0.333
<b>Dukh (Sad)</b>	0.333	0.6	0	0.133
<b>Udas (Gloomy)</b>	0.667	0	0	0
<b>Ganda Lagega (Feeling Miserable)</b>	0.4	0	0	0
<b>Ajeeb Sa Laga (Feeling Differently)</b>	0	0.267	0	0
<b>Gussa (Anger)</b>	0	0.133	0	0

**Table 3b**

*Variety and mean frequency of occurrence of linguistic and intention/desire words in the narratives of children (upper and slum) and mothers (upper and slum)*

	Mean Frequency				Intention/ Desire	Mean Frequency			
	Children		Mother			Children		Mother	
	Upper	Slum	Upper	Slum		Upper	Slum	Upper	Slum
<b>Linguistic</b>									
<b>Bolti Hai (Tell)</b>	3.467	6.533	0.2	1.733	<b>Chaiye (Want)</b>	0.933	0.8	1.333	0.2
<b>Batana (Say)</b>	0.6	0.4	0.6	0.267	<b>Man Kar Raha Hai (Wish)</b>	0	0.2	0	0
<b>Kehta Hai (Say)</b>	4.6	3.067	3.533	1.2					
<b>Poochega (Ask)</b>	0.733	0.867	0.667	0.267					

### Narrative Quality

As introduced earlier, according to Bruner (1986), a story must construct two landscapes simultaneously. One is the landscape of action where the constituents are arguments of action, agent, situation, and instruments, corresponding to story grammar. The other landscape is the landscape of consciousness: what those who are involved in the action know, think or feel, or do not know, think or feel. Considering Bruner's viewpoint, an attempt was made in the present study to find out level of action and level of consciousness in the narratives of children and their mothers. For this purpose, action-based statements (AB), consciousness-based statements (CB), and combined action- and consciousness-based statements (ABCB) were extracted from the narrative. The action-based statements (AB) are those that involve simple action-description

without any reference to mental states. The consciousness-based statements (CB) are non-elaborate and involve simple reference to mental states with no explicit causal reference. The combined action- and consciousness-based statements (ABCB) are elaborate and have an explicit causal explanation of psychological state. There is an attempt to link the protagonist's action in the real world with that of his mental state. The action-based (AB) and the consciousness-based (CB) statements are found more frequently in slum children, whereas the combined action- and consciousness-based (ABCB) statements are found more often in the narratives of upper-class children. The same trend was observed in the narratives of mothers (Table 4). Some of the verbatim responses (in Hindi language) from each of these categories are given below along with the English translations.

**a) Action-based (AB):** *“Mamma aur baby market jaate hai aur fruits lete hai aur phir mamma baby ko balloon dilate hai aur who ghar chale jaate hain.”* (Mother and baby go to the market, and they bought fruits and the mother gave a balloon to the baby and they go home.) As can be seen in the example, there is no reference to mental state.

**b) Non-Elaborate consciousness-based (CB):**

1. *Sochenge ki “hum aadha aadha baant lete hain.”* (They think, “we will divide it equally.”) There is a reference to thinking.

2. *“Ladke ne toffee ladki ko dikhaayi.”* (The boy has shown a toffee to the girl.) This is a simple reference to a process of perception, i.e., sight.

**c) Elaborate consciousness-based (ABCB):**

1. *“Phir who sochta hai ki shayad who school gaye honge toh woh school chale jaate hain.”* (He probably thought the ice cream seller had gone to school, they went to school.) There is a causal explanation of psychological states.

2. *“Chaadar hataa kar phir Dekhti ha, nana naatak karte hain.”* (She removed the blanket and saw that grandfather was pretending.) There are references to cognition as well as affect.

**Table 4**

*Frequency of action-based (AB), non-elaborate consciousness-based (CB), and elaborate consciousness-based (ABCB) statements in the narrations of children and their mothers*

Children	AB	CB	ABCB	Total
Upper	536	126	204	866
Slum	591	320	73	984
Total	1127	446	277	1850
Mothers				
Upper	156	91	69	316
Slum	162	88	58	308
Total	318	179	127	624

### Theory of Mind Understanding

Theory of mind understanding is assessed by means of the false-belief tasks in case of children and by means of the Maternal Mental State Input Inventory (MMSII) in case of the mothers. All the children from the upper class could answer the questions correctly in the false-belief task, whereas six children from the slum failed to answer the questions in the false-belief task. The mean score in the unknown location-task was 2.2 and 1, and in the unknown content-task was 2 and 1.33 for the upper middle-class and slum children respectively. There was a

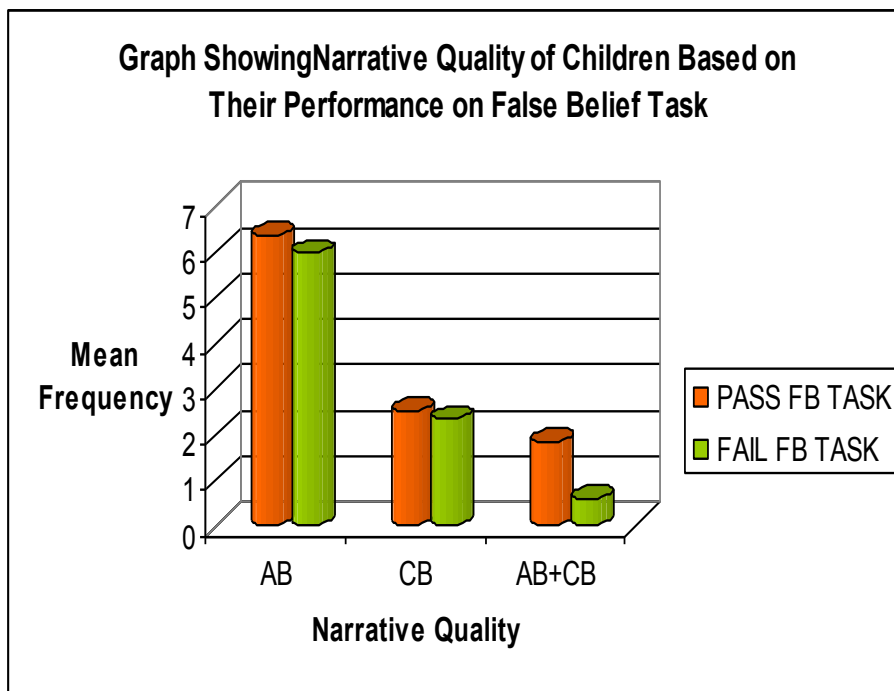
significant difference ( $t = 2.38$ ,  $df = 28$   $p < .02$ ) between the children from the upper middle-class (mean = 3.93) and the slum (2.3) in their false-belief task performance.

There was no significant difference between the mothers from the upper middle class (mean = 2.59) and the slum (2.29) in their theory of mind understanding as assessed by MMSII ( $t = 1.68$ ,  $df = 28$   $p > .05$ ).

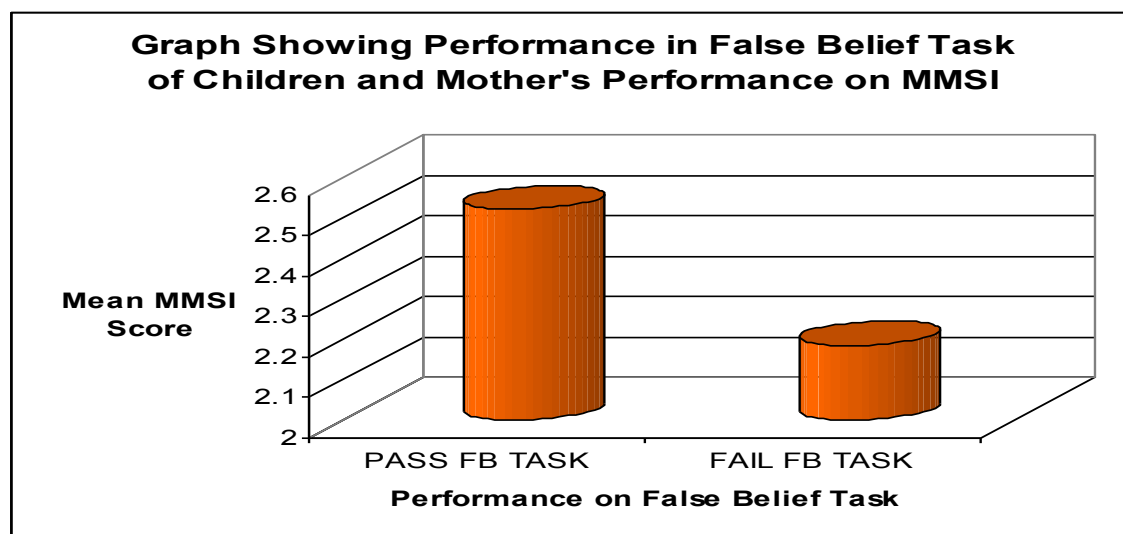
There was an attempt to see the relationships between the different variables used for studying the theory of mind performance of children and their mothers, as well as their performance in storytelling. There is a significant correlation between mothers' performance in MMSII and children's performance in the false-belief task ( $r = .361$ ,  $p < .05$  in the unknown location-task and  $r = .428$ ,  $p < .05$  in the unknown content-task), which indicates a strong relationship between mothers' understanding of theory of mind (ToM) and children's development of a theory of mind reflected in their performance on both tasks of false belief. Results also indicated a significant relationship between mothers' use of mental state words in their narratives and children's use of elaborate consciousness-based statements ( $r = .630$ ,  $p < .01$ ) in their narratives. A significant relationship was also indicated between mothers' use of non-elaborate consciousness-based (CB) and elaborate consciousness-based (ABCB) statements in the narratives, and children's use of elaborate consciousness-based statements in their narratives ( $r = .495$ ,  $p < .01$ ;  $r = .435$ ,  $p < .01$ , respectively). Mothers' use of mental state words was found to be significantly related to children's false-belief task performance in both the unknown location- and the unknown content-tasks ( $r = .361$ ,  $p < .05$ ,  $r = .428$ ,  $p < .05$ , respectively). Results also indicated a significant relationship between mothers' use of mental state words in their narratives and children's use of elaborate consciousness-based statements ( $r = .630$ ,  $p < .01$ ).

There is also a significant relationship between the use of mental state words (MSW) and the narrative quality indicated by elaborate consciousness-based statements in the narratives in case of the mothers ( $r = .612$ ,  $p < .01$ ), as well as the children ( $r = .440$ ,  $p < .05$ ). Additionally, children's narrative quality (use of elaborate consciousness-based statements in narratives) is also related significantly to their performance on the false-belief task evidencing the link between development of ToM and improved narrative quality ( $r = .486$ ,  $p < .01$ ).

Based on their performance in the false-belief task, the slum children were divided into two groups: those who passed the false-belief task and those who failed it. Six children from the slum failed the false-belief task and thus showed failure in understanding theory of mind. It is interesting to note here that, despite their failure in performing the false-belief tasks, these children's use of consciousness-based (CB) statements in their narrative are at par with those who passed the false belief-task. However, their use of elaborate consciousness-based statements was very little (fig. 1). It has also been observed that mothers of children who failed the false-belief task scored less in MMSII in comparison to the mothers of children who passed the false-belief task (fig. 2).



**Figure 1.** Graph showing narrative quality of children based on their performance in false-belief task



**Figure 2.** Graph showing the MMSII performance of mothers of children who passed and mothers of children who failed the false-belief task (low SES background).

### Discussion and Conclusion

The primary purpose of the present study was to investigate the theory of mind understanding of children and their mothers from families of low as well as the upper middle-class by administering false-belief task as well as an informal story-narration task. It was also intended to investigate the role of mothers' sensitivity to mental understanding of theory of mind and their language proficiency on their children's development of theory of mind. As already discussed in the beginning, it is not clear why socioeconomic backgrounds mediate the individual difference in ToM understanding. Some of the reasons cited are: 1. the discrepancy in language-proficiency between low-income children and middle- and upper-income children; 2.



the original false-belief task was meant for white children of the middle class; 3. mental states-behavior is an affluent Western European view of human behavior. The purpose of using the story-narration task was to deviate from the formal assessment of theory of mind using false-belief tasks, and to create an informal assessment-context for the children and their mothers. In storytelling, attempt was made to have an informal dialogue between the mother, the child, and the researcher. It was also intended to investigate the role of mothers' understanding of theory of mind on their children's development of theory of mind.

In consistency with the previous research by Cole and Mitchell (1998), Hughes et al. (1999), and Pears and Moses (2003), the present study indicated the significant impact of children's belonging to low SES and their ToM development. The performance of children from low SES families was significantly poorer than that of children from upper middle-class families. Out of fifteen children from low SES backgrounds, six failed the false-belief task. Analysis of the stories of the children who failed the false-belief task showed interesting results. These children appropriately used non-elaborate consciousness-based statements in their narratives. However, they failed at linking the protagonist's action with his/her mental state. The fact that these children could successfully refer to the protagonist's mental state in their narratives suggests that they have started to talk about mental states successfully, which is difficult for a researcher to assess in the traditional false-belief task. Under such circumstances, there is a need to have alternative assessment procedures than the use of the traditional false-belief tasks. Further, children's narrative quality is also significantly related to their ToM performance. Largely, the findings suggest that narratives provide an opportunity to talk about mental states, and can be used as a resource for the parents to facilitate children's ToM understanding. Narration is a natural day-to-day activity for these children, and it provides the arena for practice of explaining behavior by providing mental state reasons. This supports the narrative-practice hypothesis (NPH) by Hutto (2007a, b). It is interesting to note here that the mothers from the two socioeconomic backgrounds do not differ in their sensitivity to the mental state of others. However, so far as the usage of mental state words in their narratives is concerned, there was a difference between the two groups of mothers. In addition, as it is discussed in the next paragraph, the narrative quality and complexity of the mothers from an upper middle-class background was better than that of those mothers from a slum background. A significant relationship between children's theory of mind understanding and mothers' MMSII score further strengthen the argument that mother-child interaction significantly influences children's ToM understanding.

The stories narrated by children and their mothers evidenced the role of SES on development of narrative skills, which was reflected in narrative coherence, complexity, and narrative quality. The result shows that children from the two SES groups do not differ in their narrative coherence and complexity irrespective of the fact that their mothers differed correspondingly. This suggests that the language proficiency of the children from both groups do not differ, whereas the language proficiency of the mothers from the two groups differs. Considering the data on narrative quality as indicated by the reference to dual landscapes of narratives, a significant difference in performance of slum- and upper middle-class children and their mothers was observed in the occurrence of elaborate consciousness-based (ABCB) statements. Mothers' use of mental state language was also significantly related to children's use of elaborate consciousness-based (ABCB) statements in their narratives. As a whole, this finding supports the earlier research (Meins et al., 2003; Ruffman et al., 2002) on the role of maternal input in theory of mind development in children. It indicates that mother-child interaction mediated by storytelling activities at home provides an opportunity for the child to develop an understanding of the concept of mental states and to use such states to explain behavior. The narrative skill (measured by coherence and complexity) as well as the narrative quality (measured by occurrence of action-based and consciousness-based statements in the narratives) of mothers from slum areas is poor compared to that of mothers from upper middle-class backgrounds. This has probably significantly delayed the development of theory of mind in children from this background, as a result of which approximately 40% of the children failed the

false-belief task. These children also reported less non-elaborated and elaborated consciousness-based narrations.

Broadly, the present study suggests that development of theory of mind understanding is facilitated by talking about such processes during family conversations, and most importantly through narrative practices at home. This is in conformity with earlier research (Babu, 2009). Meins et al. (2003) has shown that mothers' appropriate mind-minded comments to six-months-old children (i.e., comments that accurately reflect the child's mental states) but not inappropriate ones predicted the child's performance on a false-belief task at 45-48 months of age. Ruffman et al. (2002) specifically compared mothers' mental state language with non-mental state language. They found that it was only mental state language, mothers' use of "think" and "know," modulations of assertion, and desire term used with three- to four-year-old children that predicted later success on theory of mind tasks and children's mental state talk. Research has also confirmed that maternal talk significantly relates to desire language and emotion understanding in children (Taumoepeau & Ruffman, 2006).

Several pertinent facts obtained from the present research are as follows. 1. False-belief tasks are not the only method for assessing theory of mind, and such type of understanding can be better assessed through informal dialogue and discourses between adult and child. 2. Story-narration not only provides the scope for practice of mentalist concepts, but also is a better measure of such concepts in children. 3. Mother-child or adult-child interaction plays a significant role in development of theory of mind.

## References

- Astington, J. W. (1990). Narrative and the child's theory of mind. In B. Britton & A. Pellegrini (Eds.), *Narrative thought and narrative language* (pp. 151-171). Hillsdale, NJ: Erlbaum.
- Astington, J. W., & Gopnik, A. (1991). Theoretical explanations of children's understanding of the mind. *British Journal of Developmental Psychology*, 9, 7-31.
- Astington, J. W., & Olson, D. R. (1995). The cognitive revolution in children's understanding of mind. *Human Development*, 38, 179-189.
- Babu, N. (1989). *Children's understanding of the validity and truth of mental representations* (Unpublished doctoral dissertation). University of Toronto, Ontario.
- Babu, N. (2004). *Narratives and child's theory of mind*. Paper presented at the International Conference on Education and Social Science Paradigm, New Delhi, India.
- Babu, N. (2009). *Development of theory of mind and mental state language in children*. New Delhi: Concept.
- Babu, N., & Mishra, S. (2000). Development of mental state verbs among Oriya speaking children: Pragmatics or semantics. *Psychological Studies*, 45, 24-29.
- Babu, N., & Mohanty, A. K. (2001). Language, theory of mind and cultural construction of knowledge: A review. *Indian Psychological Abstract and Reviews*, 8, 1-47.
- Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA: MIT Press.
- Bartsch, K., & Wellman, H. M. (1995). *Children talk about the mind*. New York: Oxford University Press.
- Bretherton, I., & Beeghly, M. (1982). Talking about internal states: The acquisition of an explicit theory of mind. *Developmental Psychology*, 18, 906-921.
- Bruner, J. S. (1986). *Actual minds, possible worlds*. Cambridge, MA: Harvard University Press.
- Bruner, J. S. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.
- Bus, A. G., & van IJzendoorn, M. H. (1995). Mothers reading to their 3-year olds: The role of mother-child attachment security in becoming literate. *Reading Research Quarterly*, 30, 998-1015.
- Bus, A. G., & van IJzendoorn, M. H. (1997). Affective dimension of mother-infant picturebook reading. *Journal of Social Psychology*, 35, 47-60.
- Carey, S. (1985). *Conceptual change in childhood*. Cambridge, MA: Bradford/MIT Press.

- Carey, S. (1988). Conceptual differences between children and adults. *Mind and Language*, 3, 167-183.
- Carpendale, J. L. M., & Lewis, C. (2004). Constructing an understanding of the mind: The development of children's social understanding within social interaction. *Behavioural and Brain Sciences*, 27, 79-151.
- Cole, K., & Mitchell, P. (1998). Family background in relation to deceptive ability and understanding of the mind. *Social Development*, 7, 181-197.
- Curenton, S. M. (2003). Low-income preschoolers' false belief performance. *The Journal of Genetic Psychology*, 164, 411-424.
- Cutting, A. L., & Dunn, J. (1999). Theory of mind, emotion understanding, language, and family background: Individual differences and interrelations. *Child Development*, 70, 853-865.
- Dunn, J., Brown, J., Slomkowski, C., Tesla, C., & Youngblade, L. (1991). Young children's understanding of other people's feelings and beliefs: Individual differences and their antecedents. *Child Development*, 62, 1352-1366.
- Farhadian, M., Abdullah, R., Mansor, M., Redzuan, M., Kumar, V., & Gazanizad, N. (2010). Parental demographics and preschool children's theory of mind. *Journal of Human Ecology*, 29, 121-128.
- Feldman, C. F., Bruner, J., Renderer, B., & Spitzer, S. (1990). Narrative comprehension. In B. K. Britton & A. D. Pellegrini (Eds.), *Narrative thought and narrative language* (pp. 1-78). Mahwah, NJ: Erlbaum.
- Flavell, J. H., Everett, B. A., Croft, K., & Flavell, E. R. (1981). Young children's knowledge about visual perception: Further evidence for the Level 1 - Level 2 distinction. *Developmental Psychology*, 17, 99-103.
- Flavell, J. H., Flavell, E. R., & Green, F. L. (1983). Development of the appearance-reality distinction. *Cognitive Psychology*, 15, 95-120.
- Fodor, J. (1992). A theory of the child's theory of mind. *Cognition*, 44, 283-296.
- Garfield, J. L., Peterson, C. C., & Perry, T. (2001). Social cognition, language acquisition and the development of the theory of mind. *Mind and Language*, 16, 494-541.
- Garner, P., Jones, D., Gaddy, D., & Rennie, K. (1997). Low income mother's conversations about emotion and their children's emotional competence. *Social Development*, 6, 125-142.
- Gopnik, A. (1988). Conceptual and semantic development as theory change: The case of object permanence. *Mind and Language*, 3, 197-216.
- 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., & Graf, P. (1988). Knowing how you know: Children's understanding of the sources of their knowledge. *Child Development*, 59, 1366-1371.
- Gopnik, A., & Slaughter, V. (1991). Young children's understanding of changes in their mental states. *Child Development*, 62, 98-110.
- Guajardo, N. R., & Watson, A. (2002). Narrative discourse and theory of mind development. *The Journal of Genetic Psychology*, 163, 305-25.
- Harris, P.L. (1991). The work of the imagination. In A. Whiten (Ed.), *Natural theories of mind: Evolution, development and simulation of everyday mind reading* (pp. 283-304). Oxford: Blackwell.
- Hughes, C., Deater-Deckard, K., & Cutting, A. L. (1999). Speak roughly to your little boy? Sex differences in the relations between parenting and preschoolers understanding of mind. *Social Development*, 8, 143-160.
- Hutto, D. D. (2007a). Folk psychological narratives: The sociocultural basis of understanding reasons. Cambridge, MA: MIT Press.
- Hutto, D. D. (2007b). The narrative practice hypothesis. In D. D. Hutto (Ed.), *Narrative and understanding persons* (pp. 43-68). Cambridge: Cambridge University Press.
- Jenkins, J. M., & Astington, J. W. (1996). Cognitive factors and family structure associated with theory of mind development in young children. *Developmental Psychology*, 32, 70-78.

- 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* (pp. 47-63). Cambridge: Cambridge University Press.
- Karmiloff-Smith, A. (1988). The child is a theoretician not an inductivist. *Mind and Language*, 3, 183-197.
- Leslie, A. M. (1994). Pretending and believing: Issues in the theory of ToMM. *Cognition*, 50, 193-200.
- Leslie, A. M., Friedman, O., & German, T. P. (2004). Core mechanisms in 'theory of mind'. *Trends in Cognitive Sciences*, 8, 528-533.
- 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 the mind* (pp. 457-480). Hillsdale, New Jersey: Erlbaum.
- Loban, W. (1976). *Language development kindergarten through age twelve*. Urbana, IL: National Council of Teachers of English.
- Mandler, J.M. (1983). Representation. In J. H. Flavell & E. M. Markman (Series Eds.) & P. H. Mussen (Vol. Ed.), *Handbook of child psychology: Vol. 3. Cognitive development* (4<sup>th</sup> ed., pp. 420-494). New York: Wiley.
- Meins, E., Fernyhough, C., Wainwright, R., Clark-Carter, D., Gupta, M. D., Fradley, E., & Tucker, M. (2003). Pathways to understanding mind: Construct validity and predictive validity of maternal mindedness. *Child Development*, 74, 1194-1211.
- McKeough, A. (1992). Testing for the presence of a central social structure: Use of the transfer paradigm. In R. Case (Ed.), *The mind's staircase* (pp. 207-227). Hillsdale, NJ: Lawrence Erlbaum.
- Mitchell, P. (1994). Realism and early conception of mind: A synthesis of phylogenetic and ontogenetic issues. In C. Lewis & P. Mitchell (Eds.), *Children's early understanding of mind: Origins and development* (pp.19-45). Hillsdale, NJ: Erlbaum.
- Moore, C., & Davidage, J. (1989). The development of mental terms: Pragmatics or semantics? *Journal of Child Language*, 16, 633-641.
- Moore, C., Bryant, D., & Furrow, D. (1989). Mental terms and the development of certainty. *Child Development*, 60, 167-171.
- Moore, C., Harris, L., & Patriquin, M. (1993). Lexical and prosodic cues in the comprehension of relative certainty. *Journal of Child Language*, 20, 153-167.
- Nelson, K. (2007). *Young minds in social worlds*. Cambridge, M.A: Harvard University Press.
- Pears, K. C., & Moses, L. J. (2003). Demographics, parenting, and theory of mind in preschool children. *Social Development*, 12, 1-20.
- Peterson, C., & McCabe, A. (1994). A social interactionist account of developing decontextualised narrative skill. *Developmental Psychology*, 30, 937-48.
- Peterson, C., & Slaughter, V. (2003). Opening windows into the mind: Mothers' preferences for mental state explanations and children's theory of mind. *Cognitive Development*, 18, 399-429.
- Raver, C. C., & Leadbeater, B. J. (1993). The problem of the other in research on theory of mind and social development. *Human Development*, 36, 350-362.
- Ruffman, T., Slade, L., & Crowe, E. (2002). The relation between child and mothers' mental state language and theory of mind understanding. *Child Development*, 73, 734-751.
- Satpathy, S. (1993). *Preschool children's understanding of perception as a source of representation: The role of metarepresentational language* (Unpublished Master's dissertation). Utkal University, Bhubaneswar.
- Scarborough, H. D., & Dobrich, W. (1994). On the efficacy of reading to preschoolers. *Developmental Review*, 14, 245-302.
- Senechal, M., & LeFevre, J. A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development*, 73, 445-460.
- Shatz, M., Wellman, H. M., & Silber, S. (1983). The acquisition of mental verbs: A systematic investigation of the first reference to mental state. *Cognition*, 14, 301-321.
- Taumoepeau, M., & Ruffman, T. (2006). Mother and infant talk about mental states relate to desire language and emotion understanding. *Child Development*, 77, 465-481.

- Trabasso, T., Stein, N. L., Rodkin, P. C., Munger, M. P., & Baughn, C. R. (1992). Knowledge of goals and plans in the on-line narration of events. *Cognitive Development, 7*, 133-170.
- Turnbull, W., & Carpendale, J. (1999). A social pragmatic model of talk: Implications for research on the development of children's social understanding. *Human Development, 42*, 328-355.
- Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory of mind development: The truth about falsebelief. *Child Development, 72*, 655-684.
- Wimmer, H., Hogrefe, J., & Sodian, B. (1988). A second stage in children's conception of mental life: Understanding informational accesses as origins of knowledge and belief. In J. W. Astington, P. L. Harris & D. R. Olson (Eds.), *Developing Theories of Mind*. (pp. 173-192). Cambridge: Cambridge University Press.
- Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and the containing function of wrong beliefs in young children's understanding of deception. *Cognition, 13*, 103-128.
- Yussen, S., & Ozcan, N. M. (1996). The development of knowledge about narratives. *Issues in Education, 2*, 1-68.

## Appendix A

### Maternal Mental State Input Inventory (MMSII) (English translation of the inventory in Hindi)

*Instructions:* Here are seven stories, or vignettes, each describing a parent with a young child. We would like you to try to imagine that you are that parent, and that the child in the story is your son or daughter [Child's First Name] during the year when he or she turned four. Listen to the story carefully and answer the question that the child in the story will be asking. Give the response that you think is the most appropriate one in that context. There is no right or wrong answer to any of these questions. Please be realistic and answer in terms of your best estimate of your own actual behavior, either as you recall it, or as you imagine it would be.

Vignettes:

1. Today when mother went to the market, she promised her four-year-old son that she would bring toffee for him. But mother completely forgot to bring the toffee from the market. When the son asks the mother about the toffee after she returns from the market, what will the mother say?
2. A mother and her four-year-old son went to the market and the mother wanted to buy a gift for her older son. She bought a new dress from the market for him. While the mother was packing the gift and was planning to give it as a surprise, the younger son said that he is going to tell his brother what they have bought for him. What will the mother say?
3. When a dog was barking excitedly in the night, a four-year-old son asks his mother "Mother, why is the dog barking?" What will the mother reply?
4. A mother left her keys on the bed and then rushed out of the room to the kitchen. While she was gone, the keys slid down under the bed and disappeared from view. The four-year-old daughter watched this happening. When the mother came from the kitchen, she did not see the keys on the bed. The mother thought that she had left the keys in the kitchen and as she was leaving for the kitchen to get the keys, her four-year-old daughter asked her "Mother, where are you going?" What will the mother say?
5. A four-year-old son was playing in the rain. The mother thought that her son might catch a cold. How will she persuade him to go inside the house?
6. A mother and her four-year-old daughter were at home together when somebody knocked on the door. The mother went outside to see who it was, while the daughter was inside the house. She heard her mother talking to someone very courteously and the mother was very happy. When she came back to the room, the daughter asked "Mother, who was there?" The mother said, "It was the lady from next-door calling me to show her new clothes. But I don't want to go." The daughter told her "But you were so happy when you were talking to her." What will the mother reply?
7. One day, an old friend of the father sent sweets to him. The father was sad when he saw the sweets. The four-year-old son asked the mother, "Why was father sad when he got his favorite sweets from his friend?" What will the mother say?

## Appendix B

### Theory of Mind Tasks

#### False-belief task:

A false-belief task has unknown location- and unknown content-tasks that involve presenting a child with an object with a different identity or content from what is apparent.

##### (a) Unknown location-task:

There are two boxes. One is blue and another is pink. Mickey puts his chocolate in the blue box and leaves for school. When he is away (and cannot see), his mother moves the chocolate from the blue box to the pink one. Now Mickey returns from school and wants to eat the chocolate. Here, the child is asked some control questions and some test questions.

#### Control Questions:

1. *Where was the chocolate in the beginning? Blue/pink box. (Aarambha main chocolate kahan tha?)*
2. *Where did the mother put the chocolate? Blue/pink box. (Maa chocolate kahan rakhi thi?)*

#### Test questions:

3. *Where does Mickey think the chocolate is? Blue/pink box. (Mickey kya sochta hai chocolate kahan hai?)*
4. *Why does he think that the chocolate is in the blue/pink box?/How did he know that the chocolate is in the blue/pink box? (Woh kyun sochta hai chocolate blue/pink dibbe main hai?)*

##### (b) Unknown content-task:

The researcher takes a match box and keeps some candy in that box. The subject child was not aware of this change. Then she asks the child:

1. *What is this box? (Yeh dibba kya hai?)*
2. *What is in the box? (Dibbe main kya hai?)*

Then the child is allowed to open the box and look inside. The child is then asked to close the box. The researcher at this point says that she will now call Baunty (a puppet) who has not seen the content of the box. She brings the boy doll in front of the child and asks the following questions:

3. *What would Baunty think is inside the box? Candy or matchsticks? (Baunty kya sochega ke dibbe main kya hai? Candies/matchbox?)*
4. *Why would Baunty think that there are matchsticks inside the box?/How would Baunty know that there is candy inside the box?(Baunty kyun sochega ke dibbe main candies/matchbox hai?)*