Theory of Mind and Its Significance in Children with Autism

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**Abstract**

**Objectives**: Theory of mind may be one of the most studied topics in autism research today. Children with autism display behaviors that may appear odd due to their impairments in communication and language, in social situations, and may exhibit stereotyped or repetitive behaviors and/or interests. These children typically also have a deficit in theory of mind or the ability to understand the mental states of others. **Results**: Research currently focuses on potential relationships between theory of mind and social experiences, language development, and other cognitive processes. Most studies have confirmed a relationship between theory of mind deficits and impairment in one of the above areas, and have implied the importance of early language and communication skills development, mental state discourse, and training programs in theory of mind development. **Conclusions**: The implications of these studies may provide a valuable stepping stone for the development of early intervention programs specializing in these areas.

## Introduction

Autistic Disorder may be one of the fastest growing diagnoses in young children today. Recent statistics from the Center for Disease Control and Prevention suggests a prevalence rate of nearly 1 in 150 (previously 1 in 250) children diagnosed with an Autism Spectrum Disorder (Center for Disease Control and Prevention; Kabot, Masi, & Segal, 2003). Despite this startling statistic, researchers have yet to agree on the causal factors of autism. According to Kabot et al. (2003), autism appears to be due to a dysfunction in the central nervous system. Although there is little agreement regarding a single cause, researchers agree that autism can be considered any one of three types of disorders: a neurological disorder, a psychological disorder affecting cognitive, emotional, and behavioral development, or a disorder of social relationships (Kabot et al., 2003).

Children with Autistic Disorder have several defining characteristics, including impairment in social interactions, impairment in communication, and stereotyped or repetitive patterns of behaviors and interests (American Psychiatric Association, 2000). Such deficits and behaviors cause these children to appear especially odd when they encounter social situations. One such peculiarity found among children with autism is an apparent lack of theory of mind, which is one of the most popular topics in current autism research (Begeer, Rieffe, Terwogt, & Stockmann, 2003; Carpenter, Pennington, & Rogers, 2001; Fisher & Happe, 2005; Jarrold, Butler, Cottington, & Jimenez, 2000; Kerr & Durkin, 2004; Kinderman, Dunbar, & Bentall, 1998; Kleinman, Marciano, & Ault, 2001; Muris et al., 1999; Pellicano, 2007; Sicotte & Stemburger, 1999; Steele, Joseph, & Tager-Flusberg, 2003; Symons, 2004). Most of the current research concerning theory of mind is devoted to the cognitive differences between children with autism and typically developing children.

## Theory of Mind and Its Significance in Autistic Disorder

Theory of mind is described as the ability to understand or speculate about the way others

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think and believe, including the ability to anticipate others' behavior (Carpenter et al., 2001; Crain, 2005; Fisher & Happe, 2005; Muris et al., 1999). Therefore, children with autism have difficulty understanding that others have thoughts and emotions different from their own. Some researchers suggest that theory of mind is necessary both for understanding one's social environment and for the ability to engage in socially appropriate behavior (Kinderman et al., 1998; Muris et al., 1999). Theory of mind deficits in children with autism may be a causal factor in these individuals' social impairments (Kinderman et al., 1998; Kleinman et al., 2001; Muris et al., 1999; Surian, 1997; Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998).

In most research, a child who is believed to have a theory of mind deficit is asked to complete a false belief task. The false belief task is the most frequently used instrument in current theory of mind research and tests an individual's comprehension of another's false belief (Muris et al., 1999). A false belief is simply an individual's wrong belief about others' thoughts (Muris et al., 1999). In a false belief task, the child is asked a series of questions designed to predict whether the child can distinguish between newfound knowledge of a stimulus and previous thoughts about the stimulus of interest (Muris et al., 1999; Symons, 2004).

One popular false belief task called the Smarties test involves a child being presented a box with a picture of candy displayed on its lid (Crain, 2005; Muris et al., 1999). When the child opens the box, he or she discovers that the box instead holds crayons or pencils (Crain, 2005; Muris et al., 1999). Flavell et al. found that if this child is asked whether another child who has not seen the contents of the box will know that the box contains crayons rather than candy, the child with impaired theory of mind will assume that the other child shares his knowledge of the unexpected contents of the box (Crain, 2005; Muris et al., 1999; Symons, 2004). Thus, the child will expect another child to predict that the box holds crayons. The failure of this task illustrates an inability to understand the separation of self and others.

Flavell et al. suggested that the knowledge of the differentiation between self and others typically does not develop until a child is around the age of four or five years (Crain, 2005). For a child to exhibit theory of mind, he or she must be able to correctly complete the above false belief task by assuming that the other child will not share knowledge of the box's true contents and predicting that the child will state the box contains candy (Crain, 2005). After the successful completion of the false belief task, a child should be able to understand that the self is a mental agent whose thoughts and beliefs can change over time and are distinct from the self of another individual (Symons, 2004).

The development of theory of mind may have first been suggested through Vygotsky's theory of internalization (Symons, 2004). Internalization is the process by which a child's reasoning about mental states becomes internalized through participation in interpersonal dialogue about self and others' thoughts and emotions (Symons, 2004). This interpersonal dialogue can be witnessed through social and pretend play (Symons, 2004). Vygotsky expected the child to first speak aloud, expressing her and others' thoughts and emotions in an egocentric fashion before she is able to speak internally and thus differentiate between self and other's thoughts and emotions (Crain, 2005). Similarly, Baldwin believed that a child's social self emerges when he or she discovers that others also think of themselves as "me" and that they have different experiences than the child's own (Symons, 2004).

**Theory of Mind: Social Implications**

The development of theory of mind can be influenced by social means in addition to maturational processes. Examination of Bowlby's attachment theory and theory of the working model suggests that the early caregiver relationship with the child can shape the child's expectations of others' behavior, as the construction of mental representations of the surrounding social world is a natural consequence of the early caregiver relationship (Symons, 2004). Therefore, even from the very beginning, a child's later theory of mind development can be influenced externally. Vygotsky's theories may imply that children learn about their social world by directly or indirectly listening to adults or older children discussing events around them, all while internalizing rules about the functioning world (Symons, 2004). Meins and others similarly believe that children learn to internalize representations of self and others through conversations with their caregivers about emotions, yet others believe caregiver attachment is unrelated to internalization (Symons, 2004).

According to Bruner, speech and language may also greatly influence a child's internal speech as a potential source of information about the social world, which the child can then internalize into his or her own thoughts and feelings about the world (Symons, 2004). Even Piaget, who rarely discussed development from a social context, suggested that the understanding of self in relation to others may be affected by social and cultural contexts, with social contact contributing to the development of consciousness of self (Symons, 2004). Hence, early communication with other more mature individuals about thoughts and feelings can be highly influential in the development of theory of mind.

Due to the nature of Autistic Disorder, one might conclude that as children with autism have severe social and communication impairments, they may not be able to as easily internalize such discourse about the mental states of others or even themselves. Children with autism frequently have difficulty engaging in appropriate interactions with others and in more severe cases remain unable to communicate their basic needs to caregivers. Thus, they most likely will not be observed engaging in any kind of conversation with another individual about their thoughts and feelings. Without engaging in this discourse, they may have a decreased ability to complete the process of internalization and may consequently be unable to develop theory of mind at the same rate as their typically developing peers.

Most of the current research focuses on the relationship between theory of mind deficits and the social experiences and cognitive processes of children with Pervasive Developmental Disorders such as Autistic Disorder and Pervasive Developmental Disorder - Not Otherwise Specified (PDD-NOS). Researchers have designed many different tasks testing theory of mind (i.e., false belief tasks, brain function tasks) and have completed longitudinal studies in order to better understand the relationship between theory of mind and autism. Thus far, the research has found significant evidence of a strong relationship between Autistic Disorder and theory of mind deficits (Begeer et al., 2003, Fisher & Happe, 2005; Kerr & Durkin, 2004; Kinderman et al., 1998; Kleinman et al, 2001; Morgan, Maybery, & Durkin, 2003; Muris et al., 1999; Oberman & Ramachandran, 2007; Pellicano, 2007; Sicotte & Stemburger, 2007; Steele et al., 2003; Yirmiya et al., 1998).

As Symons (2004) discussed, theory of mind deficits may be inversely related to language development and mental state discourse with caregivers. Symons argued that a child's early communication about the cognitions and emotions of others is critical to the development of theory of mind in addition to the development of social understanding (2004). Similarly, Symons suggested that the more a child participates in and exposure to conversations about the mental states of self and others, the more the child learns about these states (2004). This in turn leads to the acquisition of theory of mind as well as improved false belief task performance (Symons, 2004).

Other studies support Symons's view by demonstrating the significance of language development and mental state discourse (Hadwin, Baron-Cohen, Howlin, & Hill, 1997). One such longitudinal study examined the developmental changes in theory of mind over one year's time in children with autism aged 4-14 years (Steel et al., 2003). Children who improved their theory of mind ability were also higher in language development (Steele et al., 2003). The researchers suggested that the participants' improved theory of mind abilities were directly related to their higher levels of language development at the completion of the study (Steele et al., 2003). Although this study did not directly discuss the implications of increased mental state discourse, it may be interesting to discover the relationship between language development and mental state discourse. Perhaps the more a child participates in mental state discourse, the more he or she develops language skills, or vice versa; it may also be worth considering that children with autism already have impaired language and communication. Thus, as children with autism typically also have impaired theory of mind, they probably will improve their theory of mind abilities as their language skills develop.

**Theory of Mind Research: Implications for Children with Autism**

The false belief task has been used widely in theory of mind research, as one might expect given its frequent mention in the literature and textbooks (e.g., Crain, 2005; Muris et al., 1999; Symons 2004). Although researchers have used the false belief task for several different research objectives, most have found that children with autism do in fact perform more poorly than typically developing children (Begeer et al., 2003; Kerr & Durkin, 2004; Sicotte & Stemburger, 1999). Some research has even found differences in false belief task performance between high-functioning children with PDD-NOS and children with autism (Begeer et al., 2003). In fact, the results of this study support other researchers who believe that social and communicative factors play an important role in a child's performance on theory of mind tasks such as the false belief task (Begeer et al. 2003; Hadwin et al., 1997; Steele et al., 2003; Symons, 2004). However, children diagnosed with PDD-NOS may be considered to have a less severe form of Autistic Disorder as their symptoms do not meet all of the criteria for a more specific Pervasive Developmental Disorder (APA, 2000). These children with PDD-NOS may then have further developed language and social communicative skills. According to several researchers, they may be more able to complete the false belief task as higher performance on this task suggests a child's higher language development as well as greater participation in mental state discourse (Begeer et al., 2003; Hadwin et al., 1997; Sicotte & Stemburger, 1999; Steele et al., 2003; Symons, 2004).

In order to further examine the differences in 3-year-old children's understanding of mental states, Kerr and Durkin (2004) developed a study which used both a standard false belief

task and several other tasks designed to gauge a child's understanding of mental states. According to Kerr and Durkin, typically developing 3-year-old children may be able to understand that "thought bubbles" represent thoughts in others and while they do in fact accurately represent an individual's thoughts, these thought bubbles may at times be false or misleading (2004). This finding supports the idea that although most 3-year-old children cannot exhibit theory of mind reasoning, they still may be able to understand some aspects of mental states (Kerr & Durkin, 2004). Interestingly, Kerr and Durkin found that 3-year-old children with autism are able to understand the concept of thought bubbles suggesting that these children may also have some awareness of mental states (2004). Thus, the standard false belief task may not always be extensive enough to effectively test for evidence of theory of mind or any understanding of mental states in young children.

Another potential problem with the frequent use of false belief tasks in testing theory of mind in both typically developing children and children with Pervasive Developmental Disorders is the age at which a child is expected to be able to successfully complete the task (Kerr & Durkin, 2004). For typically developing children, the task is generally successfully completed around the age of 4 or 5 years (Kerr & Durkin, 2004; Symons, 2004). However, since children typically present symptoms of a Pervasive Developmental Disorder by age 3, the differences between these children and typically developing children's understanding of mental states may be unclear at this point (APA, 2000).

Another issue needing further study is how to assess theory of mind deficits in older children. The false belief task frequently used for preschool-aged children may not be appropriate for older children. Several researchers have developed additional tasks more appropriate for older children, used to study theory of mind in both typically developing children and children with autism. Muris et al. attempted to test the validity of one such test, called the Theory-of-Mind test (TOM test), developed by Steememan in 1994 (1999). This test interviews children between the ages of 5 and 12 years, and asks questions about a series of vignettes, stories, and drawings (Muris et al., 1999). The TOM test measures three subscales of thinking including precursors to theory of mind, the first manifestations of theory of mind, and more advanced aspects of theory of mind such as understanding humor (Muris et al., 1999). Muris et al.'s research suggests that the TOM test is indeed an accurate measure of theory of mind and thus is appropriate for older children when the standard false belief task may not be (1999).

Other researchers maintain that theory of mind deficits may be related to several poor functioning cognitive processes found in children with Autistic Disorder, including weak central coherence and executive dysfunction (Fisher & Happe, 2005; Jarrold et al., 2000; Morgan, Maybery, & Durkin, 2003; Pellicano, 2007). Central coherence refers to the way an individual tends to focus on an object or person as a whole rather than focusing on smaller parts of stimuli (Jarrold et al., 2000). Executive function refers to attributing various qualities to an individual, such as flexibility and the ability to direct behavior toward the future (Pellicano, 2007). Essentially, executive function refers to planning, set shifting, coordination, and inhibition (Fisher et al., 2000; Pellicano, 2007).

Unlike individuals without autism, an individual with autism is believed to have weak central coherence, suggesting he or she tends to focus primarily on the smaller parts of stimuli

(Jarrold et al., 2000; Morgan et al., 2003). Weak central coherence in children with autism has been found through a variety of tests, including the Embedded Figures Test, a test requiring individuals find a specific object or shape within a larger pattern (Jarrold et al., 2000; Morgan et al., 2003). Although some researchers argue that theory of mind and central coherence are two unrelated phenomena of Pervasive Developmental Disorders because they are responsible for entirely different tendencies, Jarrold et al. attempted to find a relationship between the two (2000). Their experiments showed a weak positive relationship between theory of mind deficits and weak central coherence (Jarrold et. al., 2000). However, the relationship was less apparent between typically developing children and those with autism, and more apparent when comparing the verbal mental ages of their participants (Jarrold et al., 2000). Thus, theory of mind deficits and weak central coherence were found in both sets of participants, suggesting that an individual need not have Autistic Disorder to exhibit both theory of mind deficits and weak central coherence.

Similarly, Pellicano (2007) and Fisher & Happe (2005) have tested for a potential relationship between theory of mind deficits and executive dysfunction. An individual with Autistic Disorder often appears to be rigid and inflexible and may be unable to direct behaviors toward the future, thus showing an executive dysfunction (Pellicano, 2007). The experiments in this area of research consisted of training programs in both theory of mind and executive function tasks for children with Autistic Disorder and typically developing children (Fisher & Happe, 2005; Pellicano, 2007). A relationship was indeed found between theory of mind and executive function in both studies (Fisher & Happe, 2005; Pellicano, 2007). However, the extent of the relationship was inconsistent in each of the studies, as the training did not consistently yield higher scores in executive function performance (Fisher & Happe, 2005; Pellicano, 2007). Although the results of these studies do not suggest a significant relationship between theory of mind and executive function, the findings may imply an important advancement in the study of theory of mind in autism research, as the training programs did improve performance in theory of mind tasks (Fisher & Happe, 2005; Pellicano, 2007).

Finally, some researchers argue that despite successful research on theory of mind, a child's understanding of others' intentions has been often ignored in the research (Carpenter et al., 2001). Carpenter et al. argued that as intentions are less difficult to understand than the thoughts and beliefs of others, autism research would benefit greatly from studying intentions in greater depth (2001). Carpenter et al. also suggested that interpreting others' intentions may in fact lead to higher level understanding of mental states (2001). Consequently, Carpenter et al's research with children with autism and developmental delays did not find significant differences in whether the participants understood intentions (2001). Instead, the results suggest that children with Autistic Disorder show a lower level of complexity in their understanding of intentions with the deficits appearing less severe than other theory of mind tasks have previously suggested (Carpenter et al., 2001).

**Conclusions**

As the research suggests, theory of mind is imperative to the social growth and development of children. Without theory of mind, children are unable to interpret the thoughts and beliefs of others, and consequently are unable to attribute meaning to others' behavior. The research shows the importance of early mental state discourse, language and communication

skills, and the benefits of training children with autism to improve their performance in theory of mind tasks such as the false belief task and the TOM test. Ideally, a greater general understanding of mental states would result.

Although the current research is valuable, it could be extended even further. Future research could be directed at developing training programs designed to be used in teaching environments and facilities such as preschools. Such programs could be used as part of the early intervention programs that are already in place. As these early intervention programs have already shown great success, especially in the promotion of adaptive skills for children with autism, training these children in theory of mind tasks may give researchers an opportunity to test for generalizability of their findings. Additionally, the recommended training programs may give these children the opportunity to make significant steps toward better adapting to the social world in which they live.

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