Theory of Mind in Autism: Development, Implications, and Intervention

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Mind reading is often thought to be the activity of psychics, but in a sense most of us are mind readers, or at least we have a theory of mind. The concept of theory of mind can be difficult to grasp, as is typical with any exploration into the mental world of humans. This construct does not represent a single cognition, behavior, or emotion. The mind is comprised of beliefs, desires, emotions, perceptions, and intentions. Theory of mind is the ability to attribute these mental states to self and others in order to understand and predict behavior. It involves making the distinction between the real world and mental representations of the world. Individuals with autism spectrum disorder tend to be less proficient "mind readers" compared to people who are typical. Theory of mind deficits can be used to explain the social and communication impairments that define autism spectrum disorder. This article will compare the typical development of theory of mind with the development of mental state understanding in individuals with autism spectrum disorder. Implications of theory of mind challenges will be discussed and intervention approaches will be suggested.

Typical and Atypical Theory of Mind Development

Theory of mind development begins early in life, as does the shift from the typical course of development that is seen in children across the autism spectrum. Antecedents to theory of mind development are evident in infancy. At 5 months of age, typical children can recognize different facial expressions, but understanding the meaning occurs a few months later. Once young children are able to reliably interpret the facial expressions of others, they begin to use this nonverbal information to guide their behavior. For example, a toddler may look at his mother's face for cues about whether it is safe to approach an unfamiliar person. Dawson and Osterling (1994) studied videotapes of first birthday parties of typical children and children who later received a diagnosis of Autistic Disorder and found that the best predictor of future diagnosis was lack of attention to the face of others. Considering this evidence, it is not surprising that young children with autism spectrum disorder usually do not se the gaze of another to guide their behavior.

Intention, or acting in a particular way either consciously or unconsciously to bring about a desired outcome, is also an early marker of theory of mind development. Within the first year of life infants come to understand that the behavior of others is goal-directed. Children with autism spectrum tend to use people as objects. For example, they may grab an adult's hand and use it to reach a desired item. Intentional communication begins in infancy in the form of gestures and moves to simple language. Joint attention is a form of intentional communication and refers to behaviors such as pointing to or bringing an object of interest to another person to share enjoyment, or changing eye gaze to share attention with another. Children with autism are less likely to use joint attention, but may point to request an object. In addition, the use of gestures to communicate is often strikingly absent in people with autism spectrum disorders across ages. To summarize, children with autism spectrum disorders often fail to develop the prerequisites of theory of mind.

Typically developing two year olds engage in pretend play and demonstrate some understanding of pretense. Two year olds with autism usually do not engage in pretend or imaginative play; rather, their play tends to be limited to the exploration of the physical aspects of toys. Children with autism rarely imagine an object to be something that

it is not (e.g., pretending a block is a car). At approximately two years of age, typical children can predict the desires of others. In other words, they can understand what other people may want, and that this may be different from their own desires. Children with autism have less difficulty understanding simple desires compared to other mental states such as beliefs, but they still lag behind their typical peers in this area of development (Baron-Cohen, 1993).

Most investigation of theory of mind development has focused on 3 to 4 year old children. It is evident that between the ages of 3 to 4 there is rapid development in this area. Three year olds typically fail to recognize their own and other's false-beliefs (holding beliefs that conflict with reality). Wimmer and Perner (1983) developed a means of measuring false-belief understanding, and although many subsequent studies have modified the task, the classic false belief task is as follows:

A character named Maxi places a chocolate candy in a kitchen cabinet and leaves the room to play. While he is playing, his mother enters the room and moves his candy into a drawer, without Maxi witnessing this switch. Then, Maxi returns and the child participant is asked where Maxi will search for his candy, in the cabinet or the drawer. Often the child is asked where they believe the candy is located as well.

Correct responses to false-belief tasks increase with age: children at 30 months answer false-belief questions correctly only about 20% of the time, children at 44 months are correct about 50% of the time, and at 4 years of age children perform better than chance, answering most correctly (Wellman et al., 2001). Various studies have shown that the majority (around 80%) of children with autism, even those with average intelligence, fail measures of false-belief (Baron-Cohen, 1993). In other words, children with autism across the age span will often answer that Maxi will immediately search for the candy in the drawer. As typical children mature, they increasingly would understand Maxi's perspective and would suggest that Maxi would search for candy in the cabinet.

Typical 3 year old children understand the simple emotions of others, but have difficulty understanding feelings such as surprise that are the result of mistaken beliefs. By the age of 5, children can recognize feelings that are the result of an unexpected outcome (Hadwin & Perner, 1991). For example, a 5 year old understands that Maxi is surprised because he thought the chocolate was in the cabinet, but it was not there when he looked. For individuals with autism, difficulties with emotional understanding persist throughout life.

Research on theory of mind has traditionally focused on preschool children because this is when there is an apparent rapid development of mental state understanding. Less is known about theory of mind in older children, although there is acknowledgement that further development occurs in this area as children mature. During the school years, children learn to understand that people's actions do not always reflect their true inner feelings, and that people can have a variety of feelings at one time, some of which conflict. School-aged children understand irony, sarcasm, "white lies", the distinction between literal and non-literal speech, and metaphors indicating more advanced ability to understand the beliefs of others. Individuals with autism spectrum disorders often struggle with these aspects of communication, even when they have almost typical language. This is a particularly salient feature of Asperger's syndrome.

Implications of Theory of Mind Difficulties

Theory of mind difficulties can provide a possible explanation for the communication and social challenges that define autism spectrum disorders. Howlin, Baron-Cohen, and Hadwin (1999) further identified deception, empathy, self-consciousness, and the use of persuasion as being dependent on theory of mind understanding. Imagine trying to understand and interact with other people without knowing their thoughts, feelings, or beliefs. Consider the following scenario:

A woman is presenting the status of a project she has been working on at the end of a long staff meeting. Toward the middle of her presentation she notices a colleague looks at her watch and sighs. A man at the meeting starts to nod off while others become fidgety. Her boss asks her to "wrap it up" and even though she is not finished, she decides to end her presentation. As people begin to exit the room, her colleague who was on the verge of falling asleep while she was talking tells her that her project sounds very interesting.

Typical people often take for granted how much we use our understanding of other people's thoughts and feelings to guide our social interactions. In the example above, the speaker was able to read the nonverbal cues of others indicating that they were bored and tired; consequently, she decided to end her presentation. The presenter did not take the phrase "wrap it up" literally, and she knew that the boss intended "it" to mean the presentation, even though this had to be implied from the context. Finally, the speaker probably realized that her sleepy colleague's comment about her project is probably a "white lie", and that his comment did not match his belief or behavior, but instead reflected his desire to please her. Now imagine being a person with an autism spectrum disorder faced with a situation similar to the scenario presented above. An individual within the autism spectrum most likely would have behaved differently as a result of not being privy to the mental states of others.

In individuals with autism spectrum disorders, theory of mind difficulties have a definite impact on their ability to interact in the social world. People with autism may not understand the many unwritten social rules that exist in the "neurotypical" culture, and that these rules often change with the context. For example, a man with an autism spectrum disorder may be told that it is okay to ask close friends or children how old they are, but it is considered impolite to ask strangers or older people their age. Now imagine he accepted a job at a license branch and is told to verify the age of the customer. He would likely become upset because in his mind this is breaking the rules. Another implication of the inability to "mind-read" is that people with autism spectrum disorder may talk endlessly about a topic and may not be able to detect the listener's nonverbal signals that they are not interested. Individuals across the spectrum may be brutally honest and in return, take all words as truth. This also leads to problems understanding deceit, which can put their safety at-risk. People with autism may not understand that an event they experienced was not experienced by all, so they may not be able to provide the background necessary to be understood by others. For example, a man with an autism spectrum disorder gets on the wrong bus and is consequently late for work.

He might not understand that he needs to explain to his employer why he is late, because he assumes his boss knows the reason. From these few examples, it becomes easy to see how confusing life can be when you have trouble understanding the thoughts and feelings of others.

Developing "Mind-Reading" Skills

To address the theory of mind challenges faced by individuals across the autism spectrum, Howlin, Baron-Cohen and Hadwin (1999) developed an intervention guide entitled, Teaching Children with Autism to Mind-Read: A Practical Guide. The Guide provides information on how to teach theory of mind skills to individuals across the autism spectrum while taking into consideration the developmental stages of theory of mind acquisition. The program was developed for children ages 4-13 whose language ability is at about the 5 year old level, but the authors encourage teachers to make adaptations to suit individuals of any age or ability level. The Guide is divided into three instructional areas as follows:

1. **Emotion.** Activities designed to help children understand the emotions of others include instruction in recognizing facial expressions from photos and schematic drawings, and identifying situation-, desire-, and belief-based emotions.

2. **Informational States.** The second part of the Guide offers instruction in simple and complex visual perspective taking; understanding that "seeing leads to knowing"; predicting actions on the basis of a person's knowledge; and understanding false-beliefs.

3. **Pretend Play.** The last section of the Guide suggests activities to promote the development of play skills from the child's current level of functioning (e.g., sensorimotor play) to pretend play.

The Guide includes information on how to assess and establish a baseline of the child's current level of functioning and provides record forms to track progress after each session. Teaching procedures and suggested materials are also identified. The authors encourage the use of reinforcement of correct responses and "error-free" teaching, where the child is prompted to make correct responses. In addition, they suggest always starting a session with mastered skills before proceeding to more difficult tasks. The Guide provides a practical approach to instruction in theory of mind that can be used in both clinical and educational settings.

Carol Gray's book, *Comic Strip Conversations*, is another resource available to help individuals with autism spectrum disorders develop theory of mind understanding. This activity involves using simple drawings to illustrate conversations between people.

With the help of a parent or professional, participants use drawings to comprehend problem situations and to communicate ideas in conversational form. They are asked to identify what people do, say, and most importantly, think in social situations. Color is added to the comic strips to represent emotion.

This activity is versatile, is easy to implement in any setting, and capitalizes on the visual processing strengths of individuals with autism spectrum disorders. Catherine Faherty developed a workbook for children or adolescents with autism spectrum disorders entitled, *What Does It Mean To Me?*. The purpose of this workbook is to help children with autism learn about autism and to develop self-awareness. There are two parts of each chapter. The first section contains worksheets for the child and parent or professional to complete together. The second section provides additional suggestions for the home and school environment. Although the entire workbook is not specifically designed to increase theory of mind understanding, several worksheets within the text are appropriate for this purpose.

An additional resource that contains suggestions and activities that target theory of mind challenges is Jeanette McAfee's book entitled, Navigating the Social World. McAfee's text is designed for use by parents, professionals, and paraprofessionals who live or work with individuals with Asperger's Syndrome or high-functioning autism. The book contains programs meant to help individuals gain social and emotional skills, including activities that target theory of mind understanding. Tasks are designed to complement the learning style of people with autism spectrum disorder. For example, activities are broken down into steps and are repeated until mastered. The use of reinforcement is encouraged to maintain motivation. McAfee's book offers numerous strategies that are practical and easy to implement.

The resources cited above can be borrowed by Indiana residents from the Center for Disability and Information and Referral (CEDIR) at the Indiana Institute on Disability and Community, 2853 East Tenth Street, Bloomington, IN 47408-2696, (800) 437-7924 (toll free in Indiana: voice/TT); (812) 855-9396 (Bloomington; voice/TT).

Summary

Theory of mind, the ability to attribute mental states to self and others in order to understand and predict behavior, is an area of weakness for individuals across the autism spectrum. The development of theory of mind begins in infancy, as does the shift from the typical course that is seen in children with autism spectrum disorders. While the peak in theory of mind development occurs in typical children from the age of 3 to 4, mental state understanding in individuals within the spectrum often continues to be conspicuously absent throughout the

lifespan and leads to significant social and communicative challenges. Many practical resources are available to help parents, teachers, professionals, and paraprofessionals teach and support people with autism spectrum disorder become better "mind-readers."

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