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Q40 What Is Theory of Mind, and Is It Impaired in ASC?

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A theory of mind (ToM) is the ability to infer mental states (i.e., beliefs, desires, intentions, imagination, emotions, etc.). This is a crucial way to help us make sense of behavior, and predict what that person might do next. Deficits in understanding other minds seem to be a core and, possibly, universal deficit among such individuals. Some people with ASC lack almost all signs of a ToM – a form of "mindblindness." More commonly, people with autism have some of the basics of a ToM but have some difficulties in using it at a level that one would expect, having degrees of mindblindness. Note that the terms "ToM, " and "mindreading, " can to some extent be used synonymously. The following is a summary of experimental evidence reviewed by Baron-Cohen (1995), Happé (1996), and Frith (1989).

The *mental-physical distinction* is a fundamental cornerstone of our ToM. 3- to 4-year-old typically developing children can easily make these judgments, whereas children with severe ASC have difficulty making such judgments. Typically developing 3- to 4-year-olds also already know that the brain has a set of mental, as well as physical, functions. In contrast, children with ASC who have a mental age above a 4-year-old level appear to know about the physical functions, but most fail to mention any mental function of the brain. Children from about the age of 4 years are, typically, able to distinguish between *appearance* and *reality* and talk about objects that might have misleading identities. Children with ASC, presented with the same sorts of tests, may not talk about objects in the same way, not capturing the object's dual identity in their spontaneous descriptions. *First-order false belief tests* assess the understanding that different people can have different thoughts about the same situation. Typically developing 4-year-olds can keep track of how different people might think different things about the world. Children with ASC have difficulties in shifting their perspective to judge what someone else might think, instead, simply reporting what they themselves know. Another corner stone of the typically developing child's ToM is understanding where knowledge comes from, so that they can work out who knows what. This underpins appropriate communication and understanding of deception. Typically developing 3-year-olds can understand

the *seeing-leads-to-knowing* principle, but children with ASC are virtually at chance on this test.

By the age of 4, typically developing children can also pick out words from a word list that refer to what goes on in the mind or what the mind can do. Children with ASC have much more difficulty in making this judgment. Many studies have also reported a lower frequency of *pretend play* in the spontaneous play of children with ASC. This might express a failure to reflect on one's own imagination – a mindreading difficulty – or a failure to switch attention flexibly from reality mode to pretend mode as a result of some aspect of what is called "executive function," or both. Emotions can be caused by physical events and/or by mental states. such as desires and beliefs. Typically developing 4- to 6-year-olds understand all 3 types of emotional causes. In contrast, children with ASC with this mental age have difficulty with the more complex *causes of emotion* (i.e., mental states). From *gaze-direction,* typically developing children (age 4 years) can work out when someone is thinking about something. Gaze-direction also allows young typically developing children of the same age to work out which of several objects a person wants. Children with ASC, in contrast, are relatively blind to such information from gaze-direction. *Figurative speech*, of course, also requires an understanding of the speaker's intentions, in order to move beyond the literal level of simply mapping words onto their referents. This more advanced mindreading test (pitched at the level of a typically developing 8-year-old) reveals more subtle mindreading difficulties in higher-functioning individuals with ASC. *Pragmatics* is the use of language appropriate to the social context. Almost every aspect of pragmatics involves sensitivity to speaker and listener mental states and, hence, mindreading. Studies of pragmatics in children with ASC have included whether the principles of conversational relevance can be recognized and recognizing when someone said the wrong thing (i.e., faux pas). Both studies suggest that children with ASC have difficulties in this area.

There are no reported cases of individuals with ASC who pass first order ToM tests (i.e., considering one person's thoughts) at the right mental age. A child should be able to pass such tests at 3–4 years of mental age. However, in ASC, on average, a mental age of 9 is needed before the passing of such tests is seen, and the youngest mental age of an individual with ASC passing such tests is 5 ½ years. As a result of a delay in acquiring first order ToM, these individuals often fail *second-order false belief tests*. These involve considering one person's thoughts about another person's thoughts. This corresponds to a 6-year-old mental age level. Some individuals with ASC, who are high functioning and who are usually adults, may pass even second-order false belief tests but have difficulties in more advanced ToM tests, such as inferring complex mental states (e.g., bluff and double bluff), or in decoding complex mental states from the expression in the eye region of the face.

Difficulties in mindreading in ASC appear to be early occurring; from at least the end of the first year of life, if one includes joint attention deficits, such as not following what other's are interested in. They also appear to be universal, if one tests for these either at the right point in development or by using sensitive, age-appropriate tests. Clues relating to the brain basis of the ToM difficulties in ASC are being gathered from functional neuroimaging studies.

References

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Further Reading

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