THE CHILD WITH AUTISM: First Lessons in Mind Reading

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Autism was the term that Leo Kanner used to describe the 11 children he saw in his clinic in Baltimore in 1943[1]. The term came from the Greek word autos, meaning 'self', and seemed an appropriate description of their behaviour. The children appeared cut off from the social world, instead living in their own private world. The tragic implication was that such children were unable, for whatever reason, to connect with humankind. The question was: Why?

The search for the cause of autism has led to a number of false starts. In the 1950's and 1960's, Bruno Bettelheim, working in Chicago, thought it was induced by 'refrigerator parents[2]'; he thought the parents were insufficiently emotional to form a natural bond with their child. The theory was that as a result of failing to form the primary bond with the parent, the child never went on to form any other bond with anyone else. For Bettelheim, the implication for treatment was clear: 'parentectomy' (removal of the child from the parents).

This turned out to be a blind alley, since studies showed that parents of children with autism were just as caring as any other parents, and were not neglecting their child. More important, children who are in fact seriously neglected do not typically show the symptoms of autism. Bettelheim's thesis was just one instance of the psychoanalytic dogma of parent-blaming (and usually mother-blaming) in post-war child psychiatry.

In the 1970's, Michael Rutter, working in London, characterised autism as a form of language disorder. This was on the basis that autism is always accompanied by language delay[3] (indeed this is one of the diagnostic criteria). This new theory at least drew attention to the possibility that the problem was due to inborn abnormalities in the child, and not in the way the parents had treated their child; but it was a

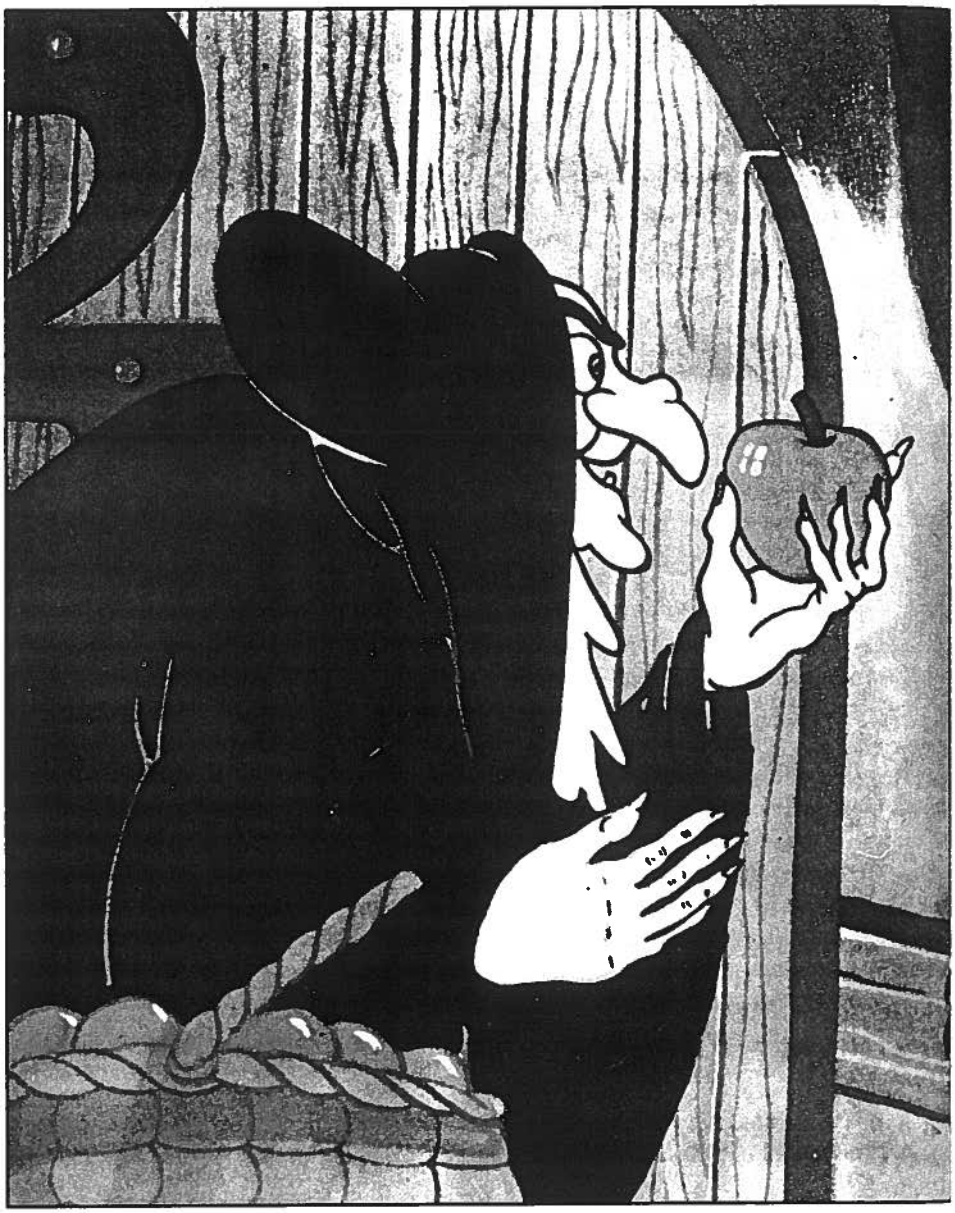

Figure 1. The deception of Snow White. This single frame captures the essential plot that a normal four-year-old child can understand. Snow White does not know that the old lady is really her wicked stepmother in disguise, and that the lovely looking apple is really a poisonous one. The normal four-year-old's mindreading skills allow them to keep track of who knows what, and what each person's real intentions might be. Most children with autism fail to understand what each person might know or think, or how their intentions might be deceptive. They suffer from 'mindblindness'.

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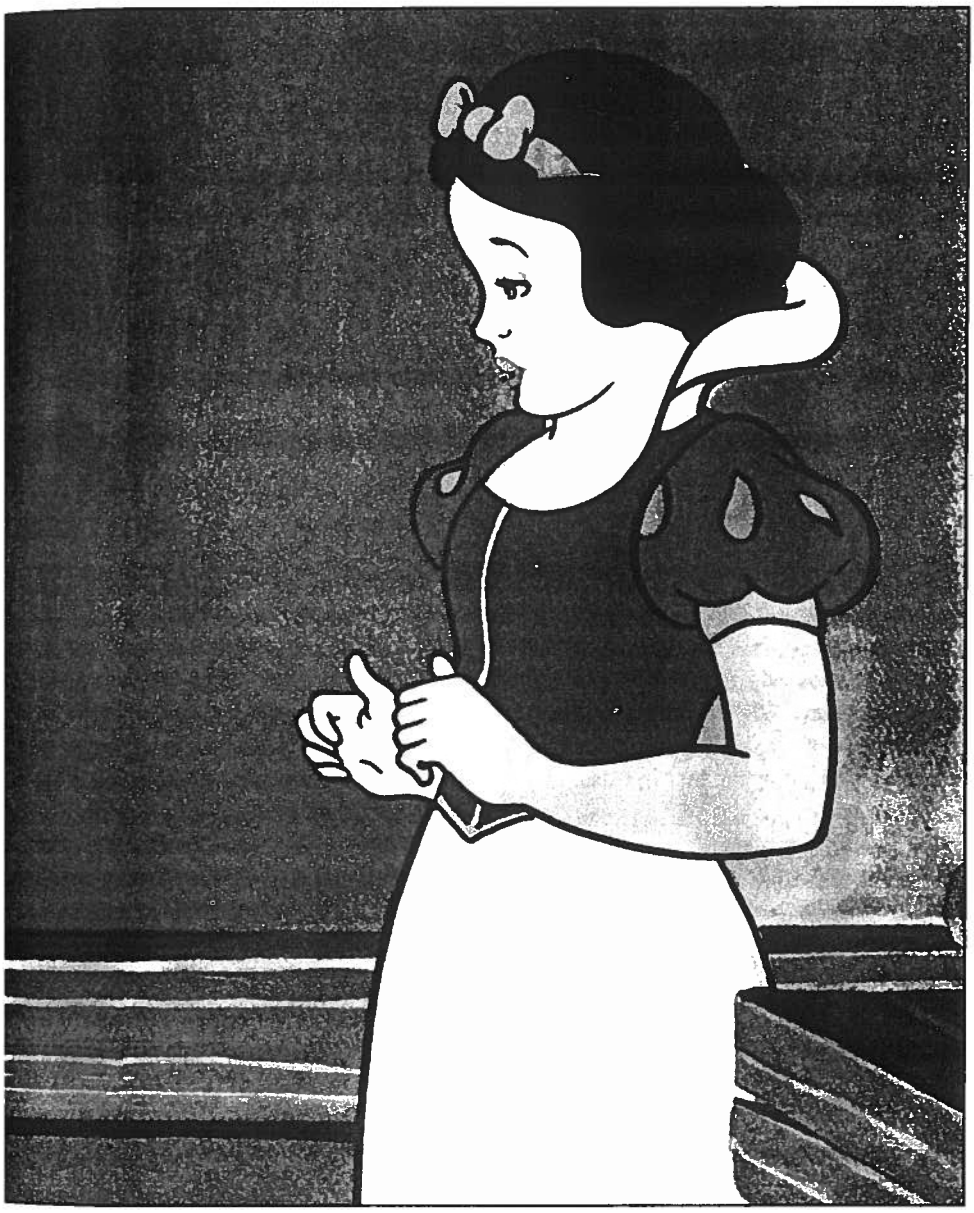
theory that Rutter himself later disproved. His studies showed that when children with autism and children with specific language impairment were compared, the latter group made a better social adaptation. Their problem with language was a clear handicap to developing relationships, but was not insurmountable.

In contrast, children with autism did not seem to find ways to circumvent their language difficulties, so as to form relatively normal social relationships. Rutter concluded that there must be other cognitive deficits that prevent the child with autism from entering into the social world.



In parallel with this line of research, Beate Hermelin and Neil O'Connor[4] found the first clear evidence of cognitive deficits in these children. They seemed to process information differently from normal children, and seemed specifically impaired in extracting 'meaningful structure' from stimuli.

For example, whereas the normal child can recall more information in a word list if the words are meaningful, children with autism seemed equally good at memory tasks whether the items to be recalled were meaningful or meaningless. This gave an important clue that when children with autism perceive the world, they might see it very differently from the rest of us. But how was this going to explain their uniquely social difficulties?

A big impetus for autism research came from an unexpected direction: Researchers in developmental psychology were tackling the question 'How does a child become social?' The answer seemed to be: By becoming a proficient mindreader. That is, when the normal child (and adult) sees a social situation, he or she interprets the situation in terms of people's mental states – their thoughts, desires, intentions, beliefs and so on. What came as quite a shock was that the normally developing child, by two years old, understands that people might be pretending; by three years old they understand that people might know something or be ignorant about something; and by four years old they understand that different people can have different (and even false) beliefs about the same situation.

For example, the normal four-year-old child can understand that if John (correctly) thinks the money is in the drawer, and Andy (mistakenly) thinks the money is in the biscuit tin, when asked where Andy will look for the money, the four-year-old child will answer 'in the biscuit tin'. That is, when considering Andy's behaviour, they disregard the real world (where the money really is), and instead attend to where the money is in Andy's mind.

Heinz Wimmer and Josef Perner published these findings in the journal *Cognition* in 1983[5]. This effectively turned the field of child development upside down. Four-year-old children, whom Piaget had characterised as being 'egocentric', were in fact constantly monitoring two realities; the real world and the world as it has been represented in the mind of the person with whom they are interacting.

Our group in London immediately raised the question: Might children with autism be abnormal in their developing mindreading ability? If, as the earlier work implied, children with autism have difficulties in finding meaning, and if the most important meanings to detect in the social world are the mental states of other people, might children with autism be failing to monitor mental states? Our first report[6] suggested that this was indeed the case. In the

above scenario, children with autism mostly responded that Andy would look in the drawer, where the money really was, if he wanted to find it. They appeared to disregard Andy's mental model of the world, and instead only refer to their own model.

The subsequent decade of research has extended this finding in relation to almost every aspect of mindreading. Thus, children with autism perform worse on tests of ascribing almost the full range of mental states (intentions, knowledge, pretence, deception, imagination and so on). It is as if they suffer from a specific form of 'mindblindness'.

It is specific in that this difficulty is not related to their general intelligence or language levels – since control groups of children who have learning difficulties or language problems (but who do not have autism) can mindread at a higher level. And it is specific in that children with autism can perform all sorts of other non-social tasks that involve reasoning and logic at a level that is appropriate for their IQ.

So, if children with autism really are mindblind, what must their world be like? It is very hard to imagine a world devoid of mental things. People move about, interact, say things, but without a notion that they behave as they do as a result of the mental states they hold, their behaviour must presumably appear quite unpredictable, possibly even frightening. Consider a quite ordinary situation: Mary, sitting at the breakfast table, suddenly leaps out of her chair and runs into the other room. The normal person might make sense of this by interpreting her behaviour as follows: maybe Mary forgot something important in the other room, and wanted to get it. Or maybe Mary thought there was something in the next room and wanted to show it to everyone. Referring to her thoughts or her mental states gives us a way of making sense of her otherwise rather odd behaviour.

Now consider a child with autism sitting at the same breakfast table. Why did Mary jump up from the table and run into the next room? It is hard to come up with non-mentalistic interpretations of behaviour. (Behaviourist psychology tried this for a few decades, but it does not come naturally to humans to read behaviour without reference to mental states. Moreover, many social situations are entirely novel, so it is hard to come up with a 'behaviourist' interpretation that will fit). One might expect that the child with autism, suffering from mindblindness, would either run away from the social world – it is simply too confusing without a mindreading ability – or would struggle to interact with the social world in an odd and repetitive manner, attempting to understand (and control) these complex objects (people) that do things unpredictably. The result might either be that the child opts to avoid social situations or that the child displays stilted and stereotyped social responses, such as always asking a person the same question, or always working to engineer social situations to follow a strict script, to make them more predictable. These are in fact two of the classic responses that children with autism show in social situations.

How might their mindblindness have arisen? Currently, this is a hot question, and several options are on the agenda. One is that it has arisen for genetic reasons, since autism itself appears to be strongly heritable. This might mean that in the normal case there are genetic mechanisms that build neural mechanisms for understanding the world in mentalistic ways. This genetic theory implies that our brains might have evolved to mind-read, because of the benefits of being able to do so. Among such benefits are the ability to deceive – the possibility of such deception entails manipulating the beliefs of another person (see figure 1). Having a mindreading capacity also confers other benefits: being able to recognise another organism's intentions, and being able to monitor what the other organism knows or needs to know. In autism, an abnormality might therefore exist at the genetic level and at the neural level. Certainly, there is plenty of evidence for neural abnormalities in autism, though there is no consistent evidence for one part of the brain being abnormal in all cases of autism.

A final option is that the mindblindness is a consequence of some other neurocognitive abnormality, which is critical for mindreading to develop. These are all currently the subject of research.

Finally, can anything be done? Thankfully, some few individuals with autism seem to develop degrees of mindreading, though often later than they normally should; so the problem is probably not 'all-or-none'. It may rather be a case of severe delay. But for the majority who do not overcome it (and even for those who do) there is a need to have a greater understanding of their problems, to tailor education in a specific way to encourage mindreading skills to develop, or to circumvent mindblindness. Parents and teachers have for decades proven to be highly creative in efforts to help these children, and we await with anticipation the outcome of the first trials in helping to overcome mindblindness.

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