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The girl who liked to shout in church

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I first met Jane when she was six years old. She was a pupil in a small school for children with autism, and I was a teacher there. She had perfectly upright posture, like a dancer, and walked everywhere on tip-toes, as if gliding through life and wishing to have minimum contact with the earth. She was standing by the window by herself, and her eyes seemed transfixed on the shadows cast by the swaying branches of a tree outside. She was talking in an eloquent voice, to herself. 'I mustn't shout in church, must I? Dodecahedrons have 12 sides, decagons have ten sides, octagons have eight sides, and hexagons have six sides. It's rude to say frontbottom in church, isn't it?'

Upon entering the room, Jane glanced briefly across to me, and asked me my name. I told her. She touched my sweater, and said 'Soft wool, beige and brown'. I asked her if she liked my sweater. She said 'Smooth, my blanket is smooth and soft.' Then, without looking at me, she took my hand and lifted it towards a shelf. I guessed she was trying to get me to pass her one of the toys out of her reach. I handed one to her and still without looking at me, she took it and sat down in the middle of the floor, playing with it by herself.

Suddenly, she asked, 'Simon, I mustn't shout in church, must I?' Staring at her toy, she waited for me to reply. 'Well, no', I said, rather taken aback at the oddness of the question. It struck me that for children with autism many social conventions might be rather hard to see the point of.

'It's rude to say frontbottom in church, isn't it Simon?' 'Yes', I said. 'I mustn't whisper frontbottom noisily in church, must I Simon?' 'No', I said, feeling that this conversation was getting rather predictable.

I wondered if these questions reflected Jane's inability to understand the meaning of the term 'rude'. She could certainly say the word, but did she really understand it? She glanced at me, but then turned her eyes back to a shiny red-and-silver milk bottle-top which she rotated at high speed near one eye.

She started again 'It's rude to shout in church, isn't it Simon?' I felt her set of repeating questions was leading nowhere, so I decided to take control of the conversation. 'Come on, Jane, let's do some reading', I said, leading her gently over to the table and picking out a story book. She sat down next to me, and before I could begin she asked 'Dodecahedrons are 12 pentagons, aren't they Simon?' I confessed that I wasn't sure, but she immediately followed this up with 'I mustn't shout in church, must I, Simon?'

I abandoned the book and decided to explore Jane's interest in geometry. After all, how many normal six-year-olds knew that 12 pentagons made up a dodecahedron? (She was right, by the way. I checked later.) We started our lesson by drawing as many geometric shapes as she knew. She was remarkably skilled at producing a large range of such shapes, and knew all of their names. It soon became clear that my efforts at using this educationally was simply providing her with an opportunity to indulge in a favourite ritual, namely reciting geometric terms. Once she was onto this, there was no shifting her. For example, I asked her to describe her house, and she brought this back to geometry. 'My bedroom window is a rectangle, an oblong, and it has little triangle window-catches. What shape are your bedroom windows, Simon? Are they rectangular or round?'

I soon learnt that whatever educational progress Jane was going to make, it was going to be in tandem with her own interests in geometry, churches, and other favourite topics. Any attempts to repress these repetitive themes proved unsuccessful. As she learnt to read and write, she chattered away to herself about such obscure things as quindecagons and tetrahedrons, or shouting in church, and as the months passed, her reading, writing and arithmetic all developed.

Her parents interpreted this progress as a sign that she was emerging from her autism, but socially she was really as one-sided as ever, talking with others only about her own restricted topics, and often simply talking to herself. She was also still quite oblivious of other people *as* people. For example, one day we were having lunch with the other teachers and children. I was seated next to her. Before I could stop her, Jane suddenly climbed up on the table, putting one hand on my head to

steady herself, then, quick as anything, crawled over (with no regard for where her knees and feet were going) to grab a piece of cake on the far side of the table. Miraculously, only one person's meal got a foot in it, although a cup of orange juice got knocked over in her single-minded pursuit of the cake. The idea that she could have used words, or gestures, or even eye-contact, to request a piece of cake did not seem to have even entered her mind. And the idea that I might be more than just a useful object to hold on to, and that both I and the others might have thoughts and feelings about her walking in our food, did not seem to concern her at all. I was reminded of a description of another child with autism, by Leo Kanner, the psychiatrist who first described the condition:

> on a crowded beach he would walk straight toward his goal irrespective of whether this involved walking over newpapers, hands, feet, or torsos, much to the discomfiture of their owners. His mother was careful to point out that he did not intentionally deviate from his course in order to walk on others, but neither did he make the slightest attempt to avoid them. It was as if he did not distinguish people from things, or at least did not concern himself about the distinction. *(Kanner, 1973, p. 95)*

Jane interacted, in her bizarre way, with adults only, making fleeting eye-contact with them. Occasionally, she stared long and deep into my eyes, but it never felt like any connection was being made between her and me. With children she acted as if no one was there, instead taking one of her bottle-tops out of a pocket, and twidding it close to the corner of her eye, rotating it at tremendous speed and giggling quietly to herself.

During the next year, I got to know Jane well. Each morning she arrived in school with the same of kind of greeting. 'Hello, Simon. It's rude to hiss loudly in church, isn't? Diamonds aren't decagons, are they Simon?' She was almost always in a good mood, usually smiling (but mostly to herself), and always trying to extend her interest in geometry to new objects, such as the design of buildings. Her play rarely included any make-believe. On one occasion I attempted to introduce this, taking her into the playhouse and setting up a 'tea-party' with the teddies. This just led to a series of confused questions from her: 'Are we pretending now? This isn't a real house, is it? Why are we pretending, Simon?' I was struck by how odd it was to have to explain what pretence was, or what it was for, given how naturally this seemed to be a part of other children's play. Without my direction in this, her play soon reverted to endless drawing and cutting out of geometric shapes.

At the end of the year, Jane moved to a new school, and I also left to return to university. I wondered what would become of her. Imagine my surprise when, ten years later while working as a research psychologist in

another school for children with autism, I encountered a rather graceless adolescent, but with a shrill, eloquent voice, standing beside a window, reciting to herself 'I mustn't shout in church, must I? Dodecahedrons have 12 sides, decagons have ten sides, octagons have eight sides, and hexagons have six sides.'

'Jane?' I said gently. She turned round, glancing at me briefly, and then turned back to her earlier position of staring down into the garden from the classroom window. 'Do you remember me, Jane?' I asked. Without looking at me she said, 'Yes, your name is Simon, and your birthday is on August the 15th.' She was right, and I suddenly had a flash-back to a day ten years earlier when I had told her the date of my birthday, when she was asking everyone this question. Her memory was impressive. I said to her 'Do you remember when I used to teach you, when you were just a child?' She replied with characteristic accuracy. 'Yes. You had a beard then, and different shoes.' As usual, she was right about these details. But what obscure details to remember! I smiled, and asked her how she was. She replied with a question. 'It's rude to shout frontbottom in church, isn't it, Simon?'

What might be causing Jane's social and communication abnormalities?

Since the pioneering studies by Hermelin and O'Connor, working in the Medical Research Council's Developmental Psychology Unit in London in the 1960s and 1970s, evidence has been accumulating that there are cognitive deficits in people with autism. Perhaps the clearest evidence comes from standard intelligence tests which shows that some two-thirds of people with autism have IQs below the average range, and even among those whose IQ is in the normal range, verbal IQ is usually significantly lower than visuospatial IQ.

Could Jane's unusual social behaviour and odd style of communication also be the result of a specific cognitive deficit? It seemed plausible that some aspect of her understanding of people might be impaired, and that this might underlie her social difficulties. When she was 16 years old I examined her using a variety of psychological tests, in order to clarify this question. Behind each test lay a specific hypothesis.

Did Jane recognize faces?

Faces are an important part of people. They contain information relevant to recognizing a person's age, gender, emotional state and, of course,

their identity. Imagine how confusing the social world would appear if faces were unrecognizable. To check if this was any part of Jane's problem, I tested her understanding of each aspect of face recognition in turn.

To test age recognition, I gave her a set of photographs of young and old people, and asked her to put them into two piles accordingly. She did this with no difficulty at all. She did the same with gender recognition, sorting the pictures into piles of male and female faces without any hesitation. What of emotion recognition? Here, I gave her pictures of four kinds of facial emotional expression: happy, sad, angry and afraid. Again, she performed without error on this task. Finally, I presented her with a set of photographs of faces of other children in her class, and asked her to name them. She had no difficulty at all in recognizing their identities from their faces alone. Her understanding of faces and at least these aspects of the information they contain seemed to be unimpaired, and thus could not be causing her social and communication problems.

Did Jane recognize different people's perspectives?

Since much of Jane's behaviour appeared to be profoundly 'egocentric', it seemed reasonable to consider whether this might be due to an inability to appreciate that people have different perspectives on the world. Jean Piaget, the Swiss child psychologist, suggested that in normal development there was a stage of extreme egocentrism, and that this could be measured using tests of 'visual perspective-taking'. This idea has been disproved by newer tests, in that normal children who fail Piaget's tests turn out to be quite competent at passing other, purer tests of visual perspective taking, and in this sense do not shown any egocentrism. But perhaps Jane would fail such tests.

The visual perspective-taking task I used to check this possibility was modelled on one developed by the American child psychologist, John Flavell. He had shown that even normal two to three-year-old children could pass such tests. I positioned six toys around the room, and then sat opposite Jane, and said to her 'Now, I am going to look at each of these toys, and I want you to tell me which toy I am looking at.'

I then closed my eyes, keeping my head facing straight ahead, and then opened my eyes so that I was looking at one of the toys to the left. I said to her 'What am I looking at now, Jane?' She identified the toy in my visual field immediately. Then I closed my eyes again, and without moving my head, opened my eyes again so that I was now looking at a different toy, this time on the right. Jane again named the correct toy without any hesitation.

By the time I had looked at all six toys, in random order, and had heard her name them correctly as I looked at each of them in turn, I was in no doubt that she understood my visual perspective, and appreciated that it was different from hers. Indeed, given that three of the toys were positioned behind her, so that she could not see them but I could, there was no doubt that she was distinguishing her own perception from mine. In this sense, she did not demonstrate any egocentrism. A sketch of the experimental set-up is shown in figure 1.1.

Did Jane recognize that someone else could have different thoughts?

Although she was clearly not egocentric when it came to understanding *visual* perspectives of different people, it remained possible that she might be egocentric on a different level, that of appreciating people's thoughts. When I was with her, it certainly felt as if Jane was oblivious to what I and others might be thinking. I set out to check this possibility.

I decided to examine her using a test of 'conceptual perspective-taking', and chose a test that had been developed for use with normal four-year-old children by Josef Perner at the University of Sussex, and Heinz Wimmer at the University of Salzburg, Austria. This test was designed to check if a child can appreciate that people have different beliefs about the same situation, depending on the information to which they have access. Normal children of less than three and a half years tend to fail this test, revealing their egocentrism after all. Would Jane, despite being 16 years old, also fail such a test?

The test went like this. I showed her two dolls, Sally and Anne. I then checked that she could distinguish the two characters (which she could), and then told her a short story about the two dolls. 'Sally has a marble, and she puts it into her basket.' I placed a marble into Sally's basket. Then I continued. 'Now Sally goes for a walk. (Exit Sally.) Now look. Naughty Anne takes Sally's marble, and puts it into her own box.' Jane watched all of this being enacted by the two dolls. Then I said to Jane 'Oh look! Here comes Sally, back from her walk.' I brought Sally back into full view. Then I asked Jane 'Where will Sally look for her marble?'

The correct answer, of course, is that Sally will look in her basket, where she still *believes* it is, since that was where she left it. However, Jane failed this test, saying that Sally would look for the marble in Anne's box. I asked her why she would look there, and Jane said 'Because that's where the marble is.' I was astonished, since most people with a *mental age* above three to four years old never make this mistake, and there was

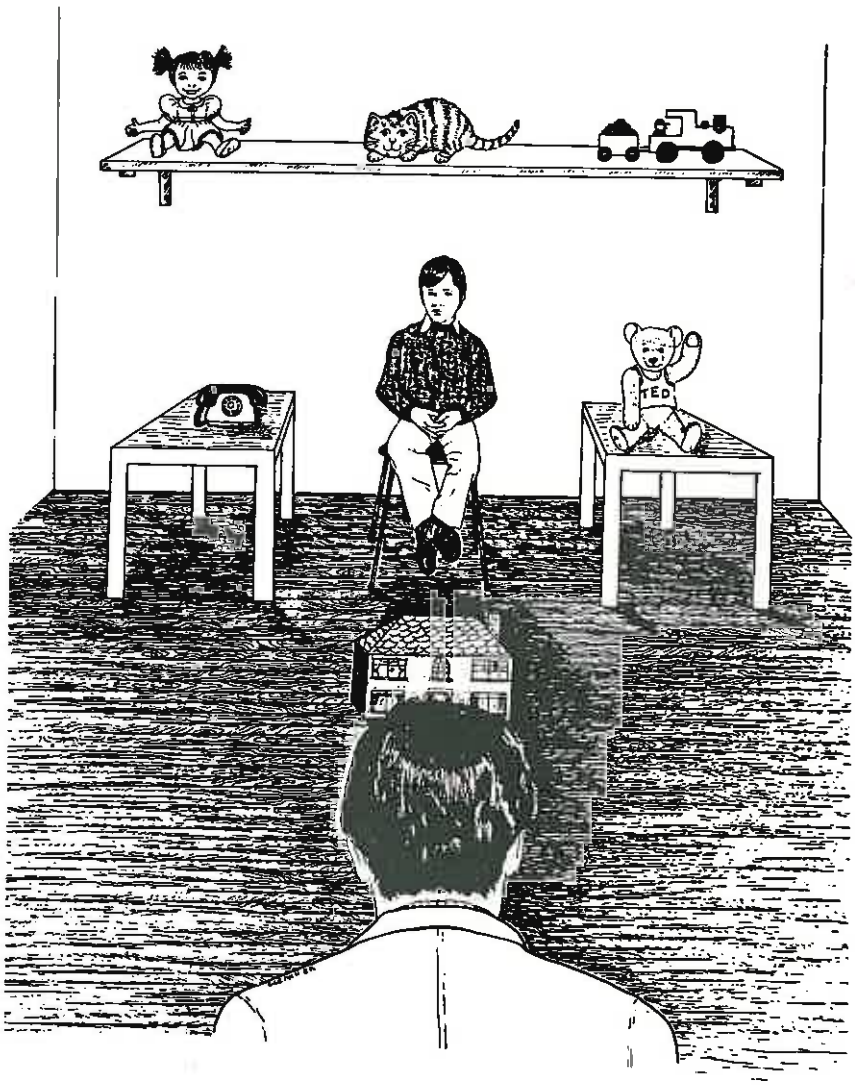

Figure 1.1 Visual perspective-taking test.
(Reproduced with permission from S. Baron-Cohen, *British Journal of Developmental Psychology*, 1989, vol. 7, pp. 113–27.)

no doubt that on all other measures of intelligence, Jane had a mental age much higher than a four-year-old. The test is sketched out in figure 1.2.

Was Jane just answering on the basis of her own knowledge of where the marble was, or did she actually have a concept of Sally's thoughts? Perhaps I should have asked her directly about Sally's thoughts. In a quick retest, I explored this possibility. Using a different character, Peter, and a different object (a chocolate) being moved, but using the same basic story structure, I asked Jane 'Where does Peter *think* it is?' rather than 'Where will Peter look for it?' She still failed the test, pointing to where she knew the chocolate was, rather than to where Peter falsely believed it was. And she clearly remembered where Peter had originally put the chocolate, since she was able to answer correctly the question 'Where did Peter put the chocolate in the beginning?'

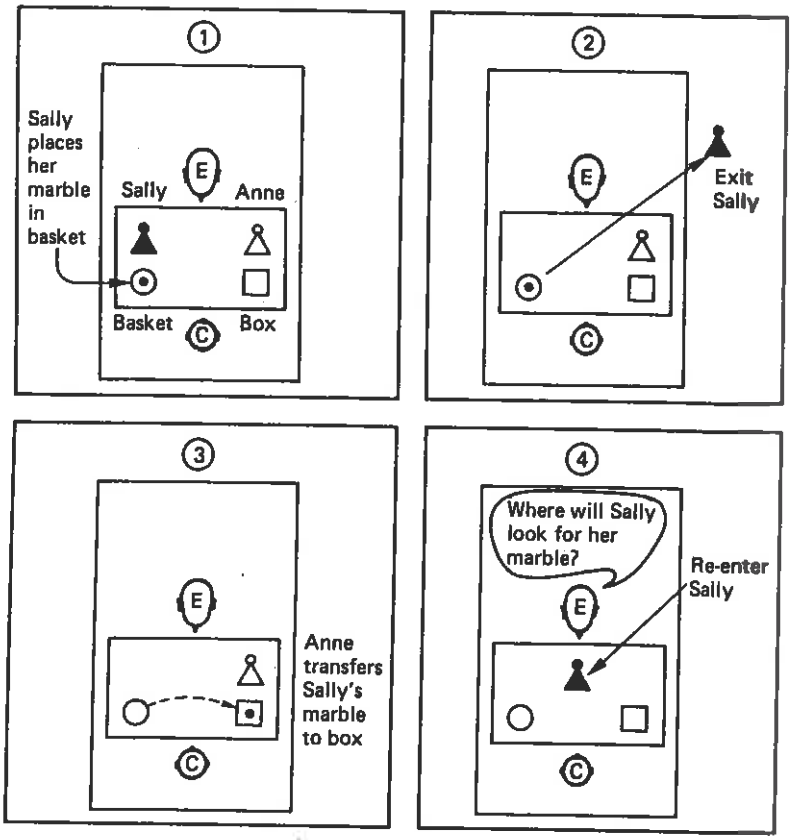

Figure 1.2 Conceptual perspective-taking test.
(Reproduced with permission from S. Baron-Cohen, A. M. Leslie and U. Frith, *Cognition*, 1985, vol. 21, pp. 37–46.)

Here, then, was clear evidence that Jane was actually functioning at below a three-year-old level in her understanding of other people's thoughts, despite her high ability in many other areas. She seemed very egocentric in this key area.

Testing this deficit further

Although the puppet story method suggested a specific deficit in Jane's understanding of other people's thoughts, there remained a niggling suspicion on my part that this could still simply be a by-product of some feature of this particular test. I therefore retested her, but this time using a different technique altogether, a picture sequencing task. In this task, I showed Jane a set of four pictures, told her which one to start with, and then asked her to put the other three pictures together to make a story with them. One set of stories involved a character who, like Sally in the first puppet experiment, was tricked, and therefore held a false belief.

For example, in the first picture a girl was depicted putting her teddy down on the ground. In the second and third pictures she was depicted picking a flower, whilst behind her back a naughty boy sneaked in and took her teddy. In the final picture, the girl turned back again, only to discover her teddy was gone. The girl looked astonished. This story is shown in figure 1.3.

Jane could not sequence any of these stories correctly, although she did attempt to put them into a story. When I asked her to tell me the story she had created, she simply described each picture in terms of the physical objects and actions depicted: 'Here's a girl. Here's a boy picking up the teddy. Now the girl is picking a flower.' There was no mention of the characters' *mental states*, their thoughts, desires, intentions, etc.

This strengthened the conclusion from the Sally–Anne experiment that Jane really was unable to appreciate other people's thoughts. But I still

Figure 1.3 Picture sequencing test of a mental-state story.
(Adapted from S. Baron-Cohen, A. M. Leslie and U. Frith, *British Journal of Developmental Psychology*, 1986, vol. 4, pp. 113–25.)

needed to check some other possibilities. For example, could the problem on the picture-sequencing test simply reflect an inability to *sequence*, and be nothing to do with understanding thoughts?

I checked for this by giving Jane a different set of stories which were simply about physical objects interacting, and which could therefore be sequenced by simply using a concept of physical causality. Understanding mental states was not necessary for this set, although of course sequencing ability was. In one such story, for example, a girl was walking along, and tripped over a brick. Jane had no difficulty with stories of this sort. This story is shown in figure 1.4.

Nor did she have any problems sequencing stories where people were involved, but where the story could be understood simply in terms of their *behaviour*, not their mental states. For example, she had no difficulty putting together a picture story showing a boy eating an ice cream, and a girl grabbing it for herself (figure 1.5). This strongly suggested that what Jane specifically failed to understand was human action in which the person's mental states had to be considered for the action to be understood. It was not just people that confused her. It was their mental states.

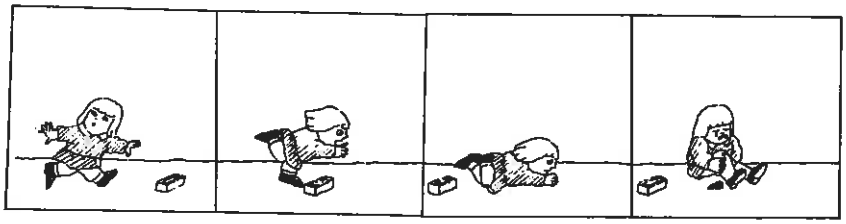

Figure 1.4 Picture sequencing test of a physical-causal story.
(Adapted from S. Baron-Cohen, A. M. Leslie and U. Frith, *British Journal of Developmental Psychology*, 1986, vol. 4, pp. 113–25.)

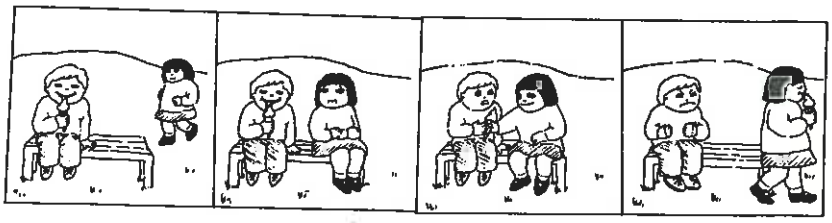

Figure 1.5 Picture sequencing test of a behavioural story.
(Adapted from S. Baron-Cohen, A. M. Leslie and U. Frith, *British Journal of Developmental Psychology*, 1986, vol. 4, pp. 113–25.)

Was Jane's world a purely physical one?

This prompted me to explore what her view of the world must be like. Imagine being in a world in which there was no such thing as a mental state. What would this mean? Would this mean that one was simply restricted to understanding everything in terms of physical events and physical causes?

I decided that a clear test of this would be if I explored Jane's concept of the *brain*. Supposing she knew that the brain existed. What would she understand of its function? Would she, like normal adults and even like normal four-year-old children, and indeed like people with learning difficulties, understand that the brain has a range of *mental* functions, like thinking, dreaming, hoping, pretending, wishing, etc.? Or would she, as we might predict given her performance on the earlier tests of understanding other people's thoughts, simply be oblivious of the mental, and conceive of the brain only in terms of its *physical* functions?

To find out, I asked her, first, to tell me where her brain was. She pointed to her head. Clearly, she was aware of the existence of this organ. I then asked her 'What is your brain for?' She replied 'It makes me move. It makes me do things. It makes me walk and run.' I asked her if it was for anything else. She said no.

Matching her failure on the tests of understanding beliefs, she seemed to view the world purely in terms of physical events and objects with physical functions alone. She seemed blind to the existence of mind. Indeed, I was drawn to the conclusion that autism was a cognitive disorder which could be thought of as a case of *mind-blindness*.

How might mind-blindness relate to Jane's behaviour?

Relating cognition to behaviour requires a degree of speculation. Nevertheless, it seems plausible to regard Jane's odd social approaches and her strange use of language as directly related to her mind-blindness. For example, Jane did not avoid people. She tried to interact with them, yet seemed to relate only to their physical aspects. She noted their clothes, their hair-style, their date of birth, etc., but seemed unaware of what they might be thinking, either of her, or of things that could be shared.

She was clearly confused by social conventions, conventions like sitting quietly in church, which depend upon appreciating other people's thoughts, beliefs, desires and intentions. She treated people, in one sense, like any other physical object in the room. Thus, she pushed my hand up towards an object out of reach, treating me like a physical object that

could get things for her, or that could be used to climb on in order to reach things.

In another sense, she was very aware of people being animate, complicated objects. Most of the things they did or said she did not understand, and so she tended to withdraw from them. It is plausible that this was because she could not understand them in terms of their mental states. Instead, she seemed to attempt to control them in much the same way as one might try to control a complex machine that one does not understand. Thus, she asked highly repetitive questions which elicited highly predictable replies. She would ask 'I mustn't shout in church, must I?', and listeners tended to reply 'No'. Thus her language, although technically normal, seemed inflexible and insensitive to the thoughts or intentions of her listener. She would stick to factual questions with predictable answers: 'Hexagons have six sides, don't they?' Her repetitive questions allowed her to participate in a sort of conversation, and to avoid the confusion of a more normal, flexible conversation which would require an understanding of communicating intentions and beliefs.

Her play, focused as it was on the visual aspects of objects, their geometry, colour, size, etc., also allowed her to exercise her clear intelligence, without entering into the activity of sharing the mental state of *pretending*. And the final clue to her mind-blindness could be seen in her odd use of eye-contact: she seemed unaware of how this is normally used to communicate thoughts to other people.

Was Jane's mind-blindness total?

Although Jane was particularly poor at understanding other people's beliefs, it was not the case that she was completely unaware of all mental states. For example, she was certainly aware of people's *desires*, in that she could identify what people liked or disliked. She was also aware of simple emotions (like happiness and sadness) that occur when desires are fulfulled or unfulfilled. Another mental state she certainly understood was *perception*, this was evident in the case with which she passed the visual perspective-taking test, described earlier.

Since both desire and perception are mental states that are understood very early in normal development, this suggested that Jane had developed a little way in her appreciation of mental states, but obviously not as far as understanding pretence or beliefs. This raised the possibility that what was wrong in her case was not a complete absence of an understanding of mind, but a *delay* in the full development of it. It also suggested that, with time, or with the right intervention, this ability might develop further. Certainly, there were some other teenagers with autism who had

eventually reached the stage of being able to pass the Sally–Anne test, and who even showed some pretending. But in these few cases, such developments were *years* after their normal appearance in other children.

Jane seemed suspended in a twilight of awareness: her world was not totally devoid of the notion of people's mental states, but almost so. Would she emerge from this state with time? Or could some form of treatment free her from the confines of her largely physical worldview? And if she could be liberated in this way, would her social and communication problems diminish? Frustatingly, there were as yet no answers to these questions.

Acknowledgements

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Further Reading

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