

## Language may be the key to theory of mind

HOW blind and deaf people approach a cognitive test regarded as a milestone in human development has provided clues to how most of us deduce what others are thinking.

Understanding the mental states of others, and realising they can differ from our own, is known as theory of mind. It underpins empathy, communication and the ability to lie. But we don't acquire ToM until around the age of 4, and how it develops is a mystery.

You can test for ToM via the false-belief test, in which two children are shown playing. One puts a toy under the bed and leaves the room. The second then removes it and puts it in the toy box. On returning, where will the first child look for the toy? Those under the age of four choose the box, while older children correctly say under the bed.

Where does this leap in understanding come from? According to one hypothesis, children deduce that other people have internal experiences that are different from their own by observing the facial expressions and gestures of others over time.

To test this idea, neuroscientist Rebecca Saxe at the Massachusetts Institute of Technology and colleagues scanned the brains of 10 adults who had been blind from birth as they answered questions about the beliefs of people described to them. While most blind adults have a mature ToM, it wasn't clear whether they used the same parts of their brain as sighted people do to reason about the mental states of others.

Saxe's team showed that the same brain regions were indeed activated in the blind adults as in 22 sighted volunteers (*Proceedings of the National Academy of Sciences*, DOI: 10.1073/pnas.0900010106). They conclude that the way the

brain reasons about the beliefs of others does not depend on visual observation.

Another suggestion is that ToM comes from language, which allows children to listen to people talking about their beliefs and emotions. This is backed up by the fact that language fluency and the ability to pass the false-belief test emerge at around the same age. However, previous studies have not teased apart whether language makes understanding false beliefs easier, or is a "necessary prerequisite", says Jennie Pyers, a psychologist at Wellesley College in Massachusetts.

Enter a community of deaf people in Nicaragua, who only developed a sign language in the

### **"Adults who later learned the more complex language got better at the false-belief test"**

1970s and hence provided Pyers's team with a unique opportunity to compare two sets of people with very different levels of language ability: the first generation of signers, who created the rudimentary sign language, and adolescent signers who had worked out a more complex system of signs.

Pyers's team showed both groups videos of false-belief tests and asked them to answer by pointing at one of two images. The adolescent signers were more likely to show an understanding of false belief than the older generation (*Psychological Science*, DOI: 10.1111/j.1467-9280.2009.02377.x). What's more, adults who later learned the more complex language from the youngsters got better at the false-belief tests. The researchers say this suggests that language contributes to a mature theory of mind. Anil Ananthaswamy ■