

**READING PASSAGE 1**

You should spend about 20 minutes on **Questions 1-13**, which are based on Reading Passage 1 below.

**Tickling and laughter**

*Why does tickling, or even the thought of it, produce laughter?*

- A** Tickling is the act of touching so as to cause laughter or twitching movements. Tickling may have been one of the first ways early humans communicated with each other and is a useful form of non-verbal communication, particular with babies and children. The word itself comes from the English of the Middle Ages when *tickelen* meant 'to touch lightly'.
- B** If you don't know whether you are ticklish, you'll have to ask someone else. Tickling is not included in the spectrum of pains and pleasures that we can inflict on ourselves and while we can stroke and scratch and hurt ourselves, the one thing we can't do effectively is tickle ourselves. And no-one knows why. It is a subject that has intrigued philosophers and scientists since antiquity. The ancient Greek philosophers Plato and Aristotle speculated about tickling and its purpose. The 19th-century British scientist Charles Darwin was the first to attempt to analyse this peculiar phenomenon, observing the involuntary spasm it seems to trigger in babies and primates, and he came to the conclusion that tickling was an ingredient in forming social bonds. In 1872 he noted that the key to the success of tickling is that 'the precise point to be tickled must not be known'. So it is surprise, rather than tactile pressure, that is a key ingredient in successful tickling. Indeed, in people who are extremely suggestible, the threat of being tickled without even being touched is enough to induce hysterical laughter. This is as effective with adults as with children and provides a clue to the fact that tickling is not merely a physical sensation. Ticklishness is not something that diminishes with age, nor does anyone know why some people are more ticklish than others, and there are no distinctions to be made along gender lines. The whole thing is mysterious.
- C** Research has been done on animals on the relationship between tickling and laughter. Neuroscientists at Bowling Green University in Ohio in the USA have recently discovered that rats respond to being tickled with squealing, chirping sounds, increased excitement and little kicks – especially when tickled on the nape of the neck. Dogs may not respond quite as effusively, but it is common for tummy-tickling to trigger frantic hind leg action which appears to be a sign of pleasure. More controversial is the claim that Washoe, a female gorilla living in the primate facility at Washington Central University and trained in American sign language, frequently makes the sign for 'tickle me', suggesting that it is pleasant sensation.
- D** For eminent neuroscientist Professor V S Ramachandran, head of the Department of Brain and Cognition at the University of California, laughter is the essential key to

unlocking the mystery of tickling. 'Laughter' is a signal that the tickling is a false alarm, that there is nothing to really worry about, the subject is not really under attack,' Ramachandran says. 'When someone tells you a joke, they take you along a path of expectation to a punchline which is a twist in the path. When the subject laughs at the punchline, it is a recognition that danger has been averted. The same applies to tickling.'

- E** Ramachandran has studied the response by children to tickling. He says: 'Most babies are ticklish. In evolutionary terms it may be that in humans, ticklishness is a leftover of childhood behaviour with some social benefits. But because there are so many layers to the human mind, people who do not consider themselves ticklish may be inhibited about laughing and exposing their vulnerability.' Another researcher, Christine Harris believes that there are two types of tickling. The lighter pressure results in the urge to scratch or rub, while the heavier provokes laughter. As to why some areas of the body appear to be more sensitive to tickling than others – the soles of the feet, the underarm area, the stomach and the neck are most commonly mentioned – Ramachandran suggests that 'these are areas that are not normally touched by other people so it is an indication that they are considered private space'. Other especially ticklish areas include the waist and ribs.
- F** The laughter response to the stimulus of tickling comes from the brain. Sarah Jayne Blakemore, a cognitive neuroscientist at London's University College, says the cerebellum, a more primitive part of the brain, dampens the tickle sensation if you try to tickle yourself, telling the cortex to ignore the feeling. To demonstrate theory, she constructed a robotic tickle machine with a foam-tipped arm and operated by an unseen person. Blakemore used MRI scans which measure blood flow in the brain to compare cerebral activity when six volunteers tried to tickle themselves and when they were tickled by the machine. The part of the brain that registers touch reacted more strongly when the machine tickled them than when they tickled themselves. Recent studies suggest that reaction to tickling, like laughter, is innate. Children born deaf and blind react normally to being tickled. No specific studies have been conducted, however, on tickling in people suffering from autism.