OPINION

Motor memories

BY **VIRGINIA HUGHES**

8 MAY 2009

bike.jpeg

Here's a quick mental exercise: look away from the keyboard and ask yourself, where are the keys you press to type your first name?

Most of you will move your fingers in the air, mimicking the movements you make on a keyboard. That's because you've learned the locations implicitly, following a kind of unconscious motor script.

Several presentations today at the **International Meeting for Autism Research** suggest that this kind of procedural memory — which we use for everything from riding a bike to conjugating regular verbs — is impaired in people with autism, although they seem to be able to learn using different systems.

Graduate student Brittany Travers described one experiment where she showed people with autism and healthy controls four squares on a computer screen, each labeled with a letter. In every trial, an airplane popped up in one of the squares. The kids were asked to type, as fast as possible, the letter shown beneath the airplane square.

The string of letters repeated every 12 trials. Although the participants didn't realize this, their fingers did: the responses of both groups quickened with practice. The autism group always took longer to respond than the controls, but over many trials, the response times of both groups

improved at the same rate.

Travers then repeated the experiment while the participants were inside a magnetic resonance imaging machine. She found that the autism group showed more activity in the middle frontal gyrus, an area involved in explicit learning and forming declarative memories, such as of specific dates or events.

In contrast, the control group showed more brain activity in the caudate, the orbital frontal cortex and the cerebellar vermis —areas that are important to implicit learning and forming procedural memories.

What I find most fascinating is that the autism group learned the letter sequence at the same rate as the control group. What that means is that even if these children's procedural memory is impaired, their brains have somehow learned to compensate — and quite well. Either that, or their brains — for whatever reason — just prefer to rely on declarative memory.