CAN YOU Believe it?

WITH DR ANNA MA-WYATT

Automatic acts

Our brains are constantly sifting, sorting and interpreting.

WE swat at a fly. Sometimes we even hit it. We brush our teeth while thinking about the upcoming day. We recognise someone's new haircut in the crowded office. How can we do this when there is more information in our environments than we can possibly process?

The human brain acts as a filter, rapidly identifying the relevant information about a scene to perform what appears to be a simple task (like brushing teeth). To reach to the toothbrush, you need to know where it is on the basin and then you need to co-ordinate your hand and fingers to pick it up. Yet we are hardly even aware of doing so.

As we move around in our environment, we often make these rapid, goal-directed movements. These movements seem pretty effortless, but in fact our brains perform many complex computations to achieve them.

Much of it - like playing tennis or swatting a fly - depends on how familiar we are with the activity. In essence, our brain "memorises" actions and reactions to guide our expectations.

Research at the University of Adelaide indicates this memory is the key to much co-ordination. How we remember where things are around us before we even start to move is critical in determining the outcome (whether we hit or miss the fly, for example).

The research revealed that not only do we continue to gather information about position as we reach (the fly moved), but we automatically update our actions according to our experience of what happened in the past.

It's strategies like these that help us hit rapidly moving objects such as flies and tennis balls.

The human brain has learned a series of tricks to help us perform in a complex and often chaotic environment. And it's not just about vision. It's about expectations.

When the "shuffle" feature became popular on the iPod, Apple was flooded with complaints that there was something wrong with the machine, since it kept repeating the same artists over and over again.

Apple strongly defended the iPod. As it turns out, it's our beliefs about randomness that tend to be wrong. People are strongly biased to try to find patterns and order in the world, so we have trouble actually recognising true randomness when we see it.

So, for example, if you ask people to pick a random number from one to 10, far more people will tend to pick seven than any other number. There's a reason for this: seven has less structure to it than any other possibility. It's not at either end, but it's not in the middle. And it's a prime number - it's not a multiple of anything except itself and one. The only other number that's like this is three - and that's the next most popular choice.

While this kind of thing makes a fun trick, it also tells us a lot about the way that our brains find order in the world. It turns out that people impose complex structures on more abstract things such as mathematics, art and language.

This search for structure reveals a great deal about how the human brain works.

By studying how people learn what new words mean without even looking in a dictionary and how we look for and recognise new information in a disorganised and information-crowded world, we can calculate the mathematical laws that describe how we do these things.

Knowing these processes can help create more user-friendly technology and effective learning and training techniques. It can also help understand how damage to the brain circuitry responsible for processing this information can severely impact on quality of life.

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Smart short cuts

- There is more happening around us than our brain can process.
- The human brain acts as a filter, sifting relevant information from background noise.
- Memories of previous experiences produce expectations of what will happen.
- These expectations speed up our responses as less thought is needed.