

# 'Brain training' overcomes tics in Tourette syndrome, study finds

18 April 2014, by Emma Thorne



(Medical Xpress)—Children with Tourette Syndrome (TS) may unconsciously train their brain to more effectively control their tics, a study led by experts at The University of Nottingham has confirmed.

Teenagers diagnosed with TS were slower than their typically developing peers when asked to perform a task that involved them simply moving their eyes to look at targets. However, they significantly outperformed their peers when the task was more demanding and required them to choose between looking at or away from targets. In this task they were as fast as their peers but made fewer [eye movements](#) in the wrong direction.

The study, published in the British *Journal of Neuropsychology*, showed that the children with TS who performed the best on the most demanding task were also those who had fewer [tics](#).

## Breaking the pattern

Professor Georgina Jackson, in the Institute of Mental Health, said: "A healthy child is not continuously worrying about unpredictably doing something embarrassing but a child with TS is often anxious that the unintentional movements or noises they make will draw attention to themselves."

"They can devote considerable time and effort every day trying to delay or conceal these movements in class, and it can be exhausting. Yet, when we ask them to complete a difficult control task like ours which requires them to be really careful if they are not to make mistakes we find that they are very good."

Professor Jackson added: "When presented with a stimulus which we find interesting, it is a natural human response to want to look at it. Often when asked to purposefully not look our eyes will momentarily glance towards it for a fraction of a second before our brain corrects the behaviour."

Tourette syndrome is a neurodevelopmental disorder that causes involuntary noises and movements called tics. These can range from eye blinking, mouth opening and throat clearing, to more complex sequences of movements such as head-shaking, scratching and gestures and repeated phrases.

Tics start in early childhood—typically between five and seven years of age—and peak between the ages of eight and 12 years old before becoming less frequent and severe for many sufferers.

TS can often also be associated with other conditions such as [obsessive compulsive disorder](#) (OCD) or attention deficit hyperactivity disorder (ADHD). The children in the current study did not have a diagnosis of ADHD. ADHD is associated with impairments on demanding control tasks such as the one used in this study.

## Motor control

Experts still don't know exactly what causes the disorder, but it is thought to be linked to abnormalities with some parts of the brain, including the basal ganglia, which helps regulate the body's movements including eye movements.

It has been suggested that since TS results in tics there should also be a general impairment in controlling voluntary movements. This is not what this study finds. Although reflexive eye movements are slower, controlled movements are improved and this improvement is related to less severe tics. Previous studies by our group have suggested that this improvement in controlled movements is related to changes in the [motor control](#) regions of the brain.

"Our tasks tested which group of participants experienced the most number of these tiny errors and we found that the children with TS performed particularly well in this respect," added Professor Jackson.

### **New clues to improve treatment**

Participants in the study performed two tasks: one required them to repeatedly look at a target (known as pro-saccade) while the other involved shifting unpredictably between looking at an object and looking away (anti-saccade).

The study found that the TS group were around 20 milliseconds slower to initiate and complete the task when they were asked to repeatedly look at a target, compared to the control group.

However, when presented with the more complex task of switching between looking at a target and looking away from a target the study found that the children with TS made significantly less—20 per cent less—than the control group.

There was also a strong positive correlation between the performance of these TS children and their score on the Tale Global Tic Severity Scale. The data suggests that those who showed the greatest cognitive control also exhibit lower levels of tics.

The researchers add that further studies over the longer term are needed to find out whether cognitive control measures like those used in this research could be used to predict the likely remission of tics during adolescence.

APA citation: 'Brain training' overcomes tics in Tourette syndrome, study finds (2014, April 18) retrieved 5 May 2021 from <https://medicalxpress.com/news/2014-04-brain-tics-tourette-syndrome.html>

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