



# Sensory-action binding: a new facet of Gilles de la Tourette Syndrome?

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Gilles de la Tourette syndrome (GTS) is a neuropsychiatric disorder characterised by a persistent motor or vocal tic present for >1 year. Although traditionally considered a movement disorder, some have suggested that GTS may be considered a condition of purposeful actions mediated by the relationship between sensory processes and motor responses, i.e. altered sensory-action integration (“binding”).<sup>1</sup> Now, researchers in Germany have investigated this concept in the context of inhibitory control. Here, 35 adolescents with GTS and 39 healthy controls completed a visual-auditory Go/NoGo-task<sup>2</sup>: the participants had to press a key when the word “Press” was presented on a computer screen (Go trial) or refrain from key pressing when the word “Stop” was presented (NoGo trial). Some NoGo trials also incorporated a compatible (spoken word “Stop”) or conflicting (spoken word “Go”) auditory stimulus.

During the task, the participants were monitored by EEG and event-related potentials (ERPs) were recorded and analysed. At the behavioural level, patients with GTS showed a worse performance than controls, and larger performance differences when inhibitory control had to be exerted in tasks employing uni-modal (visual only) rather than bi-modal (visual and auditory) stimuli. The researchers suggest that this behaviour is indicative of increased binding between bimodal stimuli and responses. At the neurophysiological level, this perturbed behavioural response seemed to be due to altered stimulus-response translation processes (or sensory-action binding) in the right inferior parietal cortex (BA40). The researchers propose that response-inhibition processes are affected in patients with GTS by the nature of the sensory stimuli that are needed to trigger behavioural control, supporting the theory of altered sensory-action binding in GTS.

## Referring to:

Vanessa, P., Bodner, B., Brandt, V.C., Baumung, L., Roessner, V., Münchau, A. & Beste, C. (2018,) Altered perception-action binding modulates inhibitory control in Gilles de la Tourette syndrome. *J Clin Psychol Psychiatr.* doi: 10.1111/jcpp.12938.

## Further reading:

<sup>1</sup> Beste, C. et al. (2018). Tics and Tourette syndrome — surplus of actions rather than disorder? *Mov. Disord.* 33: 238-242. doi: 10.1002/mds.27244.

<sup>2</sup> Chmielewski, W.X. et al. (2016). Concurrent information affects response inhibition processes via the modulation of theta oscillations in cognitive control networks. *Brain Struct. Funct.* 221: 3949–3961. doi: 10.1007/s00429-015-1137-1.

## Glossary:

**Inhibitory control:** the voluntary capacity to inhibit or regulate strong attentional or behavioural responses. Inhibitory control requires the ability to focus on relevant stimuli in the presence of irrelevant stimuli, and to override strong but inappropriate behavioural tendencies.

**Event-related potentials (ERPs):** the measured electrophysiological response to a stimulus; the ERP waveform is measured by electro-encephalography and consists of a series of positive and negative voltage deflections.