Targeting the neural task-control circuitry to enhance self-regulatory control in bulimia nervosa

By Dr Jessica K. Edwards

Previous research has found that bulimia nervosa is associated with dysregulated self-regulatory control, as a result of anatomical and functional disturbances to the neural task-control circuitry in the brain[1]. A longitudinal study has now assessed how activation of these task-control circuits varies with changes in bulimia nervosa symptoms that occur during adolescence. Participants (32 females with bulimia nervosa and 28 healthy controls) were invited to complete a Simon task that involved presentation of a leftward or rightward pointing arrow that was either congruent or incongruent with its position on a screen. The participants were asked to report the direction of the arrow as quickly as possible, whilst the neural task-control circuits were monitored by functional magnetic resonance imaging. The procedure was repeated at three time points over adolescence. Healthy controls showed decreased conflict-related neural activation over time, whereas those with bulimia nervosa showed increased activation of the task-control circuits. Interestingly, bulimia symptoms inversely predicted conflict-related neural activation over time, meaning that as symptoms decreased, activation of the task-control circuitry increased. The researchers propose that this phenomenon may be a compensatory mechanism that permits regulation of eating behaviours over childhood development. They conclude that the neural task-control circuitry may be an anatomical target for early intervention in bulimia nervosa to enhance self-regulatory control.

Cyr, M., Fontaine, M., Stefan, M., Terranova, K., Kopala-Sibley, D.C., Attia, E. & Marsh, R. (2017), A longitudinal functional magnetic resonance imaging study of task control circuits and bulimic symptoms over adolescence. J Child Psychol Psychiatr. doi:10.1111/jcpp.12840

Further reading:

Lock, Garrett, Beenhakker, & Reiss, 2011; Marsh et al., 2011) and adults (Marsh et al., 2009; Skunde et al., 2016

[1]Lock, J., Garrett, A., Beenhakker, J & Reiss, A.L. (2011), Aberrant brain activation during a response inhibition task in adolescent eating disorder subtypes. Am J Psychiatry. 168:55-64. doi: 10.1176/appi.ajp.2010.10010056

Glossary:

Bulimia nervosa: *an eating disorder characterized by recurrent episodes of binge eating followed by compensatory behaviours to prevent weight gain*

Self-regulatory control: *conscious management of guiding ones thoughts, behaviours and desires to reach goals; it encompasses executive control, emotional regulation and the ability to delay gratification*

Simon task: *a paradigm described by J.R. Simon in 1963 whereby people respond faster and more accurately if there is a match between a stimulus and its response feature (the "stimulus-response compatibility effect")*

Functional magnetic resonance imaging: *a non-invasive technique that uses a strong, static magnetic field and radio waves to measure brain activity based on detecting changes in cerebral blood flow*