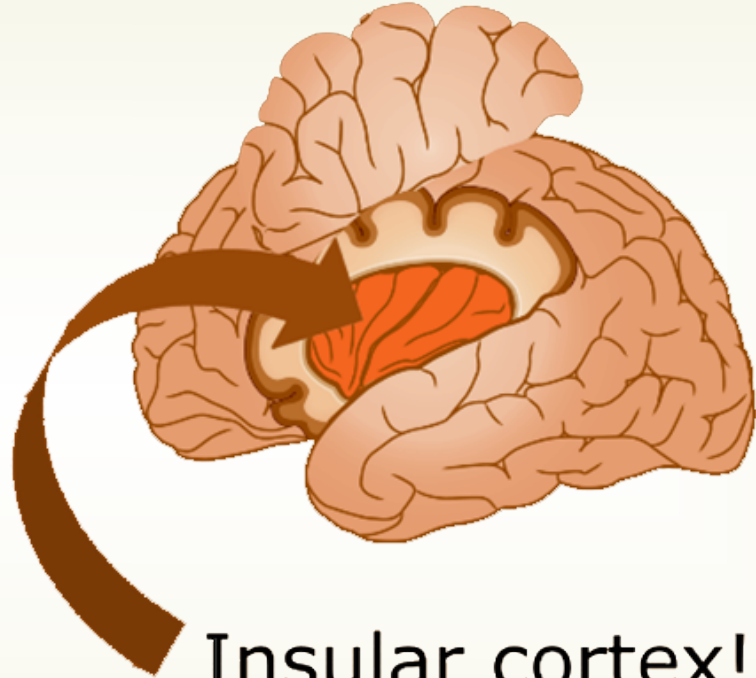


A procrastination preview



Insular cortex!

When Math Hurts: Math Anxiety Predicts Pain Network Activation in Anticipation of Doing Math

Ian M. Lyons^{1,2*}, Sian L. Beilock^{1*}

¹ Department of Psychology, University of Chicago, Chicago, Illinois, United States of America, ² Department of Psychology, Western University, London, Ontario, Canada

Abstract

Math can be difficult, and for those with high levels of mathematics-anxiety (HMAs), math is associated with tension, apprehension, and fear. But what underlies the feelings of dread effected by math anxiety? Are HMAs' feelings about math merely psychological epiphenomena, or is their anxiety grounded in simulation of a concrete, visceral sensation – such as pain – about which they have every right to feel anxious? We show that, when anticipating an upcoming math-task, the higher one's math anxiety, the more one increases activity in regions associated with visceral threat detection, and often the experience of pain itself (bilateral dorso-posterior insula). Interestingly, this relation was not seen during math performance, suggesting that it is not that math itself hurts; rather, the anticipation of math is painful. Our data suggest that pain network activation underlies the intuition that simply anticipating a dreaded event can feel painful. These results may also provide a potential neural mechanism to explain why HMAs tend to avoid math and math-related situations, which in turn can bias HMAs away from taking math classes or even entire math-related career paths.

③

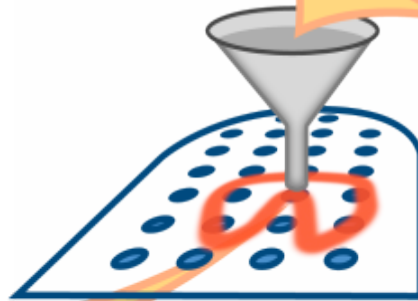
Feel happy
(temporarily)



Zombie Tube

②

You funnel attention
onto a more pleasant task



①

Unhappy
feeling



Pomodoro



- ✓ 25 minutes
- ✓ no interruptions
- ✓ focus
- ✓ reward!

Illustration Credits

- Insular cortex, image © 2014 Kevin Mendez
- Procrastination funneling, image © 2014 Kevin Mendez
- Pomodoro timer, Autore: Francesco Cirillo rilasciata a Erato nelle sottostanti licenze seguirÃ OTRS, http://en.wikipedia.org/wiki/File:Il_pomodoro.jpg
- "Barbara Oakley at age 10 (September 1966) with Earl the lamb." Photo courtesy Barbara Oakley

Recommended reading

- Boice, Robert. *Procrastination and Blocking*. Westport, CT: Praeger, 1996.
- Lyons, I.M., and S.L. Beilock. "When Math Hurts: Math Anxiety Predicts Pain Network Activation in Anticipation of Doing Math." *PLoS ONE* 7, no. 10 (2012): e48076.
- Steel, Piers. *The Procrastination Equation*. NY: Random House, 2010.
- Steel, Piers. "The Nature of Procrastination: A Meta-Analytic and Theoretical Review of Quintessential Self-Regulatory Failure." *Psychological Bulletin* 133, no. 1 (Jan 2007): 65-94.
- Tuckman, Bruce W., and Henri C. Schouwenburg. "Behavioral Interventions for Reducing Procrastination among University Students." In *Counseling the Procrastinator in Academic Settings*, edited by H.C. Schouwenburg, CH Lay, TA Pychyl and JR Ferrari Washington, DC: American Psychological Association, 2004.