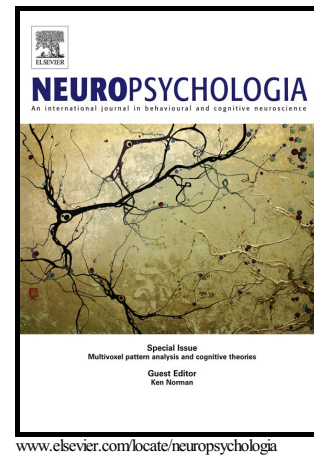


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Iveta Eimontaite, Vinod Goel, Vanessa Raymont, Frank Krueger, Igor Schindler, Jordan Grafman



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Differential roles of polar orbital prefrontal cortex and parietal lobes in logical reasoning with neutral and negative emotional content

Iveta Eimontaite¹, Vinod Goel^{2*}, Vanessa Raymont^{3,4}, Frank Krueger^{5,6}, Igor Schindler¹, Jordan Grafman⁷

¹Department of Psychology, University of Hull, UK

²Department of Psychology, York University, Canada

³Department of Radiology, Johns Hopkins University, Baltimore, MD, USA

⁴Department of Medicine, Imperial College, London, UK

⁵School of Systems Biology, George Mason University, Fairfax, VA, USA

⁶Department of Psychology, George Mason University, Fairfax, VA, USA

⁷Northwestern University Medical School, Cognitive Neurology and Psychiatry and Behavioral Sciences and Physical Medicine and Rehabilitation, Chicago, Illinois, USA

*Corresponding author. Department of Psychology, York University, 4700 Keele St. Toronto, Ont. Canada M3J 1P3. vgoel@yorku.ca

Abstract

To answer the question of how brain pathology affects reasoning about negative emotional content, we administered a disjunctive logical reasoning task involving arguments with neutral content (e.g. Either there are tigers or women in NYC, but not both; There are no tigers in NYC; There are women in NYC) and emotionally laden content (e.g. Either there are pedophiles or politicians in Texas, but not both; There are politicians in Texas; There are no pedophiles in Texas) to 92 neurological patients with focal lesions to various parts of the brain. A Voxel Lesion Symptom Mapping (VLSM) analysis identified 16 patients, all with lesions to the orbital polar prefrontal cortex (BA 10 & 11), as being selectively impaired in the emotional reasoning condition. Another 17 patients, all with lesions to the parietal cortex, were identified as being impaired in the neutral content condition. The reasoning scores of these two patient groups, along with 23 matched normal controls, underwent additional analysis to explore the effect of belief bias. This analysis revealed that the differences identified above were largely driven by trials where there was an incongruency between the believability of the conclusion and the

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