ORIGINAL RESEARCH ARTICLE
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When Pinocchio’ no e doe not g o : belief ega ding lie-detectability mod late p od ction of deception

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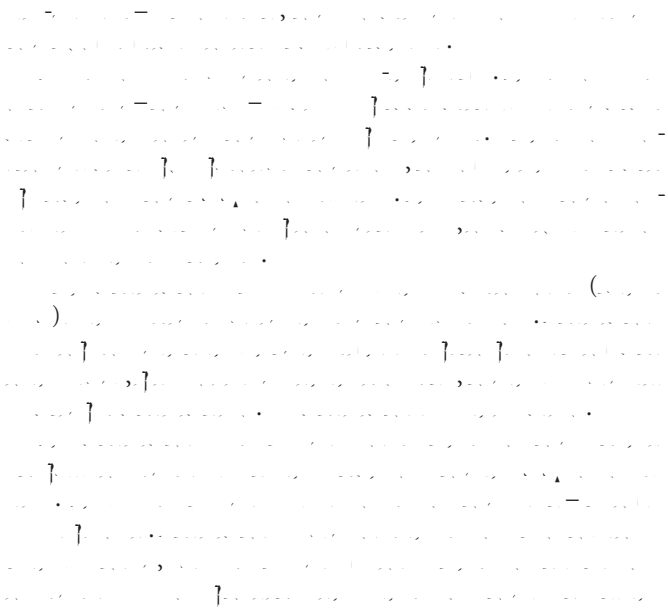
Does the brain activity underlying the production of deception differ depending on whether or not one believes their deception can be detected? To address this question, we had participants commit a mock theft in a laboratory setting, and then interrogated them while they underwent functional MRI (fMRI) scanning. Crucially, during some parts of the interrogation participants believed a lie-detector was activated, whereas in other parts they were told it was switched-off. We were thus able to examine the neural activity associated with the contrast between producing true vs. false claims, as well as the independent contrast between believing that deception could and could not be detected. We found increased activation in the right amygdala and inferior frontal gyrus (IFG), as well as the left posterior cingulate cortex (PCC), during the production of false (compared to true) claims. Importantly, there was a significant interaction between the effects of deception and belief in the left temporal pole and right hippocampus/parahippocampal gyrus, where activity increased during the production of deception when participants believed their false claims could be detected, but not when they believed the lie-detector was switched-off. As these regions are associated with binding socially complex perceptual input and memory retrieval, we conclude that producing deceptive behavior in a context in which one believes this deception can be detected is associated with a cognitively taxing effort to reconcile contradictions between one’s actions and recollections.

INTRODUCTION



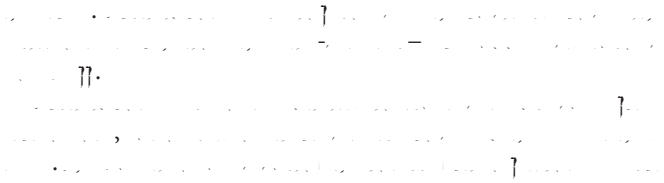


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Table 1.

(**Fig re 3**).

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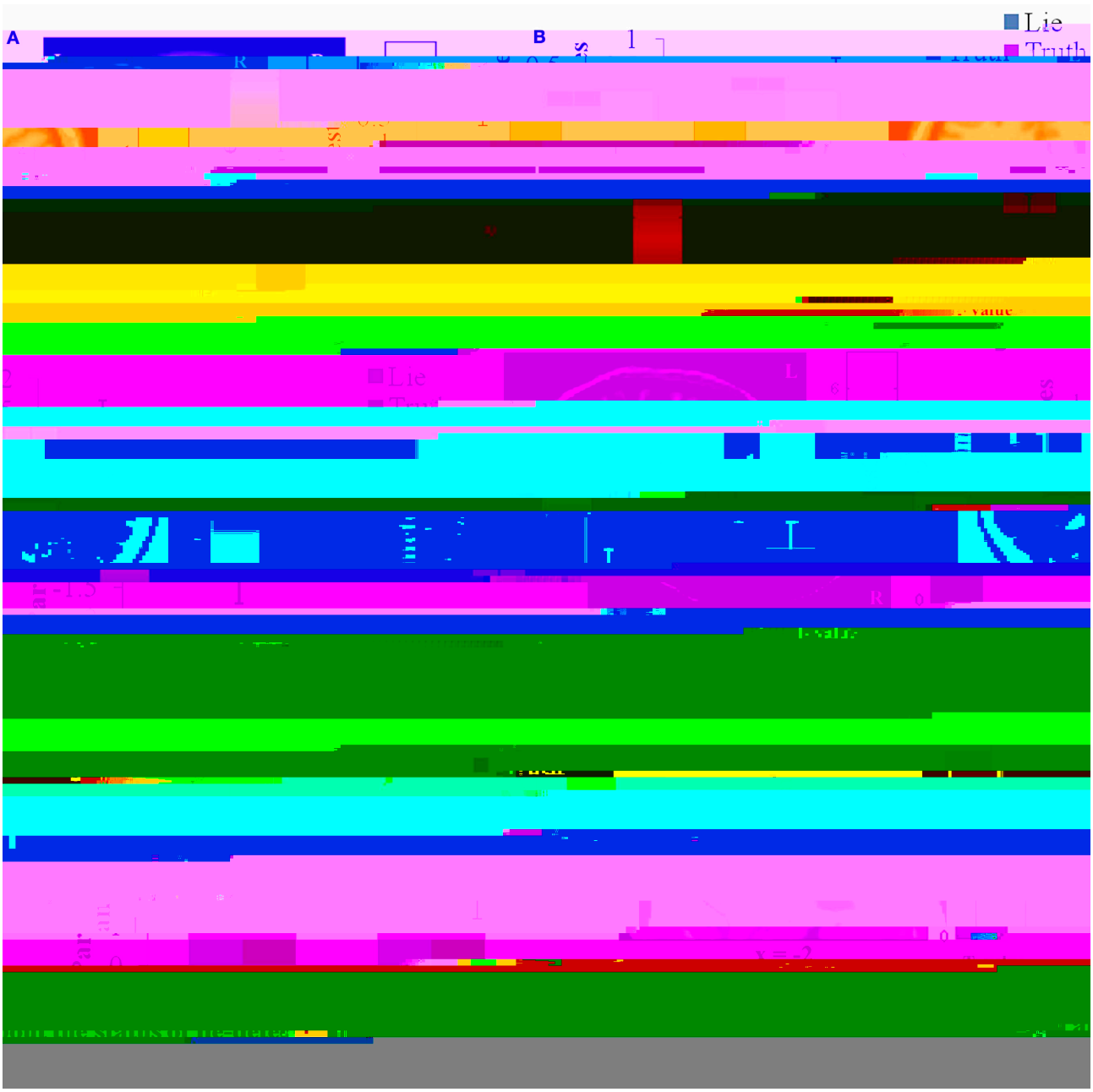
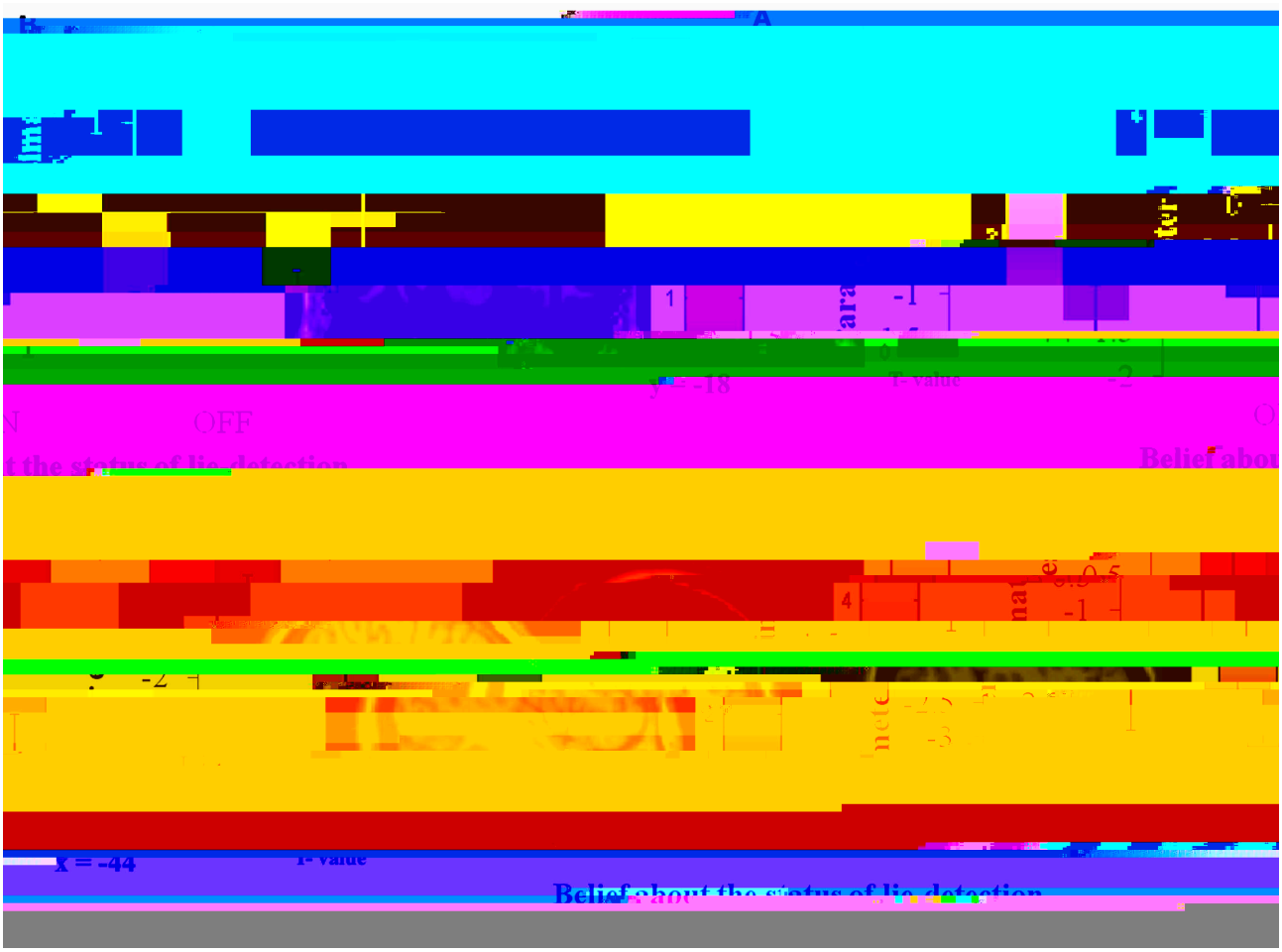

A
B
Lie
Truth



. G ▮ ▸ 4 ( ) - ( ). Panels on the left show the activation cluster and panels on the right show parameter estimates in the activation cluster in the right hippocampus/parahippocampal gyrus (**A** and **B**) and left temporal pole (**C** and **D**). In these loci, the difference between the BOLD activation caused by false vs. true responses was abolished (and for the hippocampus/parahippocampal gyrus, reversed) when participants believed the lie detector was off.

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MAIN EFFECTS: DECEPTIVE vs. TRUTHFUL RESPONSES

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