
Socially and morally responsible cognitive neuroimaging: Mental rotation case study

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Abstract

The neuroimaging of sex/gender differences is problematic because it appears to present a biological explanation for differences between men and women that can be used to justify stereotypes, prescribe certain social structures, and limit resources for individuals interested in pursuing non-gender-normative pursuits. Focusing on the specific question of sex/gender differences in mental rotation I attend to the details of the studies to identify problematic practices and suggest modifications to avoid socially and morally harmful science. I find that most fMRI studies of sex/gender differences fail to elicit the supposed male performance advantage and there is little overlap (and no consensus) on different sex/gender-linked areas or networks underlying mental rotation processing. I identify a number of problems with these studies and conclude that current practice in the neuroimaging of sex differences is sexist, ignores relevant evidence from other scientific fields, and inaccurately presents its results as stemming from "natural" sex differences rather than investigating the possibility that sex differences arise from different gendered rearing environments. Using feminist standpoint theory, I suggest modifications to current practice to begin to address these problems. As a start, these modifications involve: 1) analyzing data blind to gender; 2) assessing the influence of spatial activities, science classes, and the effect of practice on activation; 3) dividing groups based on performance rather than sex/gender; 4) broadening diversity of participants; 5) investigating the effect of strategy use on activation; 6) separating questions of proximate and ultimate causation; and 7) being reflexive in reporting results.

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