The Impact of Mental Images on Reasoning: A Study on Aphantasia

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Abstract

There is a long-standing debate about the role of visual mental images in reasoning. Knauff and Johnson-Laird’s (2002) Visual Imagery Impedance Hypothesis (VIIH) suggests visual imagery can hinder abstract reasoning, as evidenced by slower responses to visual compared to spatial and control problems. Aphantasia — reduced or absent visual imagery— offers a unique opportunity to test this hypothesis. In an online version of the reasoning paradigm used in VIIH studies, aphantasic and control participants completed three problem types (visual, spatial, control), while reaction time and accuracy scores were measured. In addition, a second classification, based on the Object-Spatial Imagery and Verbal Questionnaire (OSIVQ), was employed to differentiate participants according to their cognitive style and explore possible performance differences between the visualiser, spatialiser and verbaliser clusters. Our study replicated the findings of Knauff and Johnson-Laird (2002), as a slowdown for visual problems in comparison to spatial and control ones was demonstrated in typical imagers. In aphantasics, this effect was less marked, but the difference between the groups is not substantial enough to be conclusively established. More in-depth analyses distinguishing “complete aphantasia” and hypophantasia revealed a more significant slowdown within the latter group, suggesting that visual imagery, even in its weakest form, influences performance on such tasks. Finally, our OSIVQ classification-based analyses showed that participants in the visualiser cluster are the most impaired in this task. Overall, our results demonstrated the importance of considering the influence of mental images and cognitive styles in theories of reasoning.

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**Keywords**: aphantasia, mental imagery, reasoning, cognitive style, strategy