Uncovering spatial and verbal cognitive profiles in aphantasia through unsupervised clustering

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Abstract

Mental images are a ubiquitous phenomenon for many people. In recent years, attention has focused on a condition defined by the absence of mental images - aphantasia. Individuals with aphantasia are found to perform as well as typical imagers in most areas. Interestingly, several studies have proposed that individuals with aphantasia might have a more ‘semantic and abstract’ mode of functioning. The present study aims to better understand the cognitive profile of individuals with aphantasia, by examining their performance regarding semantic and/or abstract processing. To that end, 45 participants with aphantasia and 51 controls completed questionnaires and behavioural tasks assessing sensory and spatial imagery, verbal strategies, verbal and non-verbal reasoning, and verbal and spatial working memory. Initial comparisons suggested very few differences between individuals with aphantasia and controls. However, an unsupervised clustering algorithm revealed three clusters focusing respectively on visual imagery, spatial imagery and verbal strategies, and two very distinct profiles of individuals with aphantasia among these clusters. The first profile had low visual imagery but maintained multisensory imagery, and had higher spatial imagery; the other had low imagery across all sensory modalities, and focused on verbal processing. This study shows that individuals with aphantasia should not be systematically classified based on visual imagery only, but characterised according to various aspects of their cognitive profile. This multifaceted approach could provide a balanced view of the benefits and drawbacks of mental images and help us to understand the mechanisms underlying the spectrum of individual differences in representational formats.

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