Title: Individual differences in the influence of mental imagery on conscious perception

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Abstract:

Visual experience can be triggered externally; during perception, or internally; during mental imagery. Imagery and perception rely on similar neural mechanisms, suggesting that there might be an interaction between these two forms of visual experience. One idea is that imagery can bias subsequent perception. Previous research has shown that imagining a stimulus prior to binocular presentation of rivaling stimuli increases the chance of consciously perceiving the imagined stimulus. According to predictive processing theories, such top-down influences should interact with the strength of bottom-up sensory input. To characterize the interaction between top-down imagery and bottom-up sensory input, we compared psychometric response curves for congruent and incongruent imagery. The results were analyzed using a Bayesian hierarchical model that allowed us to simultaneously study group-level effects as well as effects for individual participants. We found strong main effects of imagery as well as of its interaction with sensory evidence within individual participants. However, the direction of these effects was highly variable between individuals, leading to weak effects at the group level. Our results indicate that imagery can bias perception towards and away from the imagined stimulus and can increase as well as decrease sensitivity to congruent sensory input. The way in which our internal world interacts with the external world varies highly between people. This highlights the heterogeneity of conscious perception and emphasizes the need for individualized investigation of such complex cognitive processes.