The human visual system encodes multiple mutually exclusive categories of cause and effect interaction

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Abstract

'Causal perception' describes the phenomenon wherein certain interactions between objects are automatically and irresistibly experienced as involving cause and effect. Previous work using retinotopically-specific visual adaptation paradigms has provided evidence that there is at least one specific causal event, 'launching', which is identified sufficiently early in visual processing that the visual system still operates using the surface of the retina as its frame of reference. Here, we demonstrate that there are in fact multiple 'causal perceptions', such that the visual system also detects a category of event described as 'entraining'. Using a novel ambiguous 'launch/push' display, we find that adapting to launching events leads to more 'pushing' reports, while adapting to entraining events leads to more 'launching' reports, and that these adaptation effects only occur for test events presented to the same location on the retina as the adaptation stream (i.e., are retinotopically specific). We discuss the implications of this finding for future work on causal perception and cognition.

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