

Attention and Illusory Motion

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Akiyoshi Kitaoka has produced a number of very compelling “illusory motion” displays, many based on “optimized” Fraser-Wilcox illusions. Modelling, imaging and neurophysiological studies implicate the role of early visual mechanisms in these illusions. We provide supporting behavioural evidence from both visual search and cueing experiments. In Experiment 1, participants searched for an illusory motion target amongst a variable number of distractors (set sizes: 4, 5, 6) displayed in a circular array. Atomic elements were based on Kitaoka’s “Rollers” illusion, organised into concentric rings as in “Rotating Snakes”. Distractor stimuli had the same configuration but individual elements were rotated to eliminate any sense of motion. Average search slopes were completely flat, with the target “popping out” for 11 out of 12 participants. In two control conditions, we preserved the layout but manipulated contrast gradients to disrupt motion. Search was highly inefficient (>100 ms/item) confirming that the illusion, rather than structural differences between target and distractors, attracted attention. In Experiment 2, we used Kitaoka’s Drifting Emboss Illusion with a modified Posner cueing task. On each trial, the illusion plus control (centre rotated 90°) were briefly presented either side of fixation. Following a variable SOA, a large X appeared either to the left or right of fixation and participants made a speeded detection using the appropriate hand. Consistent with the search data, responses were reliably faster following a valid illusion cue. Together, these results suggest that illusory motion can automatically attract attention, further implicating the role of early visual processes.