

The Contribution of Human Cortical Area V3A to the Perception of Chromatic Motion: an rTMS study.

McKeefry DJ¹, Burton MP¹ and Morland AB²

¹ Bradford School of Optometry & Vision Science, University of Bradford, U.K.

² York Neuroimaging Centre, Dept. Psychology, University of York, U.K.

Area V3A is an important visual region in the human brain for the perception of motion (*Tootell et al., 1997, Journal of Neuroscience 17, 7060-7078*). However, little is known about its contribution to the perception of motion when it is defined by colour. In this study V3A was first identified in 5 human participants on both a functional and retinotopic basis using fMRI techniques. V3A, along with other motion responsive areas (V5/MT+, dorsal V3 and V1), was then targeted for disruption by the repetitive transcranial magnetic stimulation (rTMS) whilst the participants performed a delayed speed matching task. The stimuli used for this task included chromatic, isoluminant motion stimuli which activated either the L-M or S-(L+M) cone opponent mechanisms, in addition to stimuli that contained only luminance contrast (L+M). The speed matching tasks were performed for chromatic and luminance stimuli that moved at a speed of either 2 deg/s or 8 deg/s. rTMS to area V3A produced a perceived slowing of all chromatic and luminance stimuli at the slow and fast speeds. Similar deficits were found when rTMS was applied to V5/MT+. In contrast no deficits in performance were found when areas V1 and V3d were targeted by rTMS. These results provide evidence of a causal link between neural activity in human area V3A and the perception of chromatic isoluminant motion. Furthermore, they establish area V3A, alongside V5/MT+, as a key visual area in a cortical network that underpins the analysis of both chromatically- and luminance-defined motion.

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