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Real-time Influence of Interocular Transfer During Binocular Rivalry

Suppression

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Binocular rivalry occurs when different images are presented to each eye causing one image to achieve dominance and suppress the other from conscious awareness. Typically conscious awareness alternates between the two images within seconds. Continuous Flash Suppression (CFS) (Tsuchiya & Koch, 2005) is a new technique that reliably and completely suppresses an image over tens of seconds; allowing the study of unconscious visual processing's influence on conscious perception and behaviour. Previous studies have shown that interocular transfer of the motion aftereffect occurs even when the moving stimuli is binocularly suppressed. However, these studies either did not achieve full suppression or the motion aftereffect was measured after binocular suppression ceased (Blake & Fox, 1974; Lehmkuhle & Fox, 1975; Watanabe, Maruya & Watanabe, 2006). This study mimicked a blindsight paradigm, where subjects were asked to indicate the direction (up vs. down or left vs. right) of a slow moving grating presented to one eye, although it was entirely suppressed by CFS Mondrians presented in the fellow eye. Three of five subjects chose the direction OPPOSITE the actual drift direction at better than chance level ($p < 0.03$); the remaining subjects performed at chance level. Two subjects, one who performed better than chance ($p < 0.007$), reported a conscious perception of the Mondrians subtly moving in a coherent direction during long fixation times, even though the Mondrians were uniformly randomized. The perception was reported as not similar to fusion. The remaining subjects reported no awareness of coherent Mondrian movement. These results imply real-time interocular transfer of motion of a suppressed stimulus exists and influences conscious perception and behaviour.