

Changes in Bistable Perception Induced by Fear Conditioning

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Abstract

Background: When observers view ambiguous figures for prolonged period of time, they experience perceptual alternations between two possible visual interpretations (Leopold & Logothetis, 2003). Dubbed bistable perception, this phenomenon has been considered as a useful means to study visual awareness since it induces spontaneous fluctuation in awareness despite constant physical stimulation (Kim & Blake, 2005). To investigate whether visual awareness during bistable perception is affected by emotional valence associated with one of two interpretations, we exploited Pavlovian fear conditioning (Pavlov, 1927). Methods: Among a variety of ambiguous figures, we selected man-rat and duck-rabbit which induced balanced perceptual alternations in a pilot test. Prior to and following conditioning, observers tracked their perceptual experiences during 12 100-sec trials (6 for each ambiguous figure) by depressing one of two keyboard buttons. During conditioning, a pair of unambiguous variants of the man-rat figure was used as conditioned stimuli (CS). For a half of the observers tested, the man image (CS+) was paired partially with electrical finger shock (US) while the rat image (CS-) was unpaired with the electrical shock. For the other half, the rat image was CS+ while the man image was CS-. Reaction time was measured following observers' 2-AFC discrimination task (man or rat) to assess conditioning effect independently. Anxiety test was also given to all observers. Results: For observers who showed faster response to CS+ paired with the shock than to CS- during conditioning, perceptual awareness of CS+ during bistable perception increased following conditioning. Besides, observers who marked high anxiety scores tend to perceive CS- longer following conditioning. Conclusion: Perceptual awareness during bistable perception is affected by fear conditioning. Individual differences in susceptibility of conditioning and the level of anxiety are influential factors.

Footnotes

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