

Enhanced blue-yellow sensitivity in individuals with depressive symptoms

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It has been shown that individuals with depression subjectively report impaired color perception using self-report measures (Barrick et al., 2002). Given that previous study showed reduced achromatic contrast sensitivity of individuals with depression (Bubl et al., 2009), it is plausible that impaired color perception that those patients reported is related to the decreased achromatic contrast sensitivity. To examine the relationship between depressive symptoms and color sensitivity, we investigated whether the contrast discrimination sensitivity (chromatic and achromatic sensitivity) was modulated by depressive symptoms inferred by Beck Depression Inventory-II (BDI-II) score (Beck et al., 1996). To closely examine the influence of constituents of depression, three primary symptoms for depression (i.e. anhedonia, positive/negative affect, and sleep disturbance) were assessed using Snaith-Hamilton Pleasure Scale (SHPS), Positive and Negative Affect Schedule (PANAS), and Pittsburgh Sleep Quality Index (PSQI). The chromatic (red-green, blue-yellow) and achromatic (black-white) Gabor patches subtending 3-deg visual angle were systematically varied in saturation or contrast (7 levels low to high). In each trial, a standard patch (1st level) was presented with a comparison patch (one of 7 levels) left and right side of the central fixation for 500ms. Following stimulus presentation, Mondrian-like masks consisting of randomly arranged squares were presented for 200ms to prevent afterimage. Participants (N=88) judged the location of stimulus with higher saturation or contrast (left or right) by pressing designated keys on a keyboard. Our results showed that chromatic contrast discrimination sensitivity for blue-yellow gradually increased as depressive symptoms as well as anhedonia, negative affect, and sleep disturbance, were higher. In contrast, chromatic contrast discrimination sensitivity for red-green and achromatic sensitivity did not vary along the severity of depression and three primary symptoms for depression. These results suggest that chromatic sensitivity, for blue-yellow in particular, was enhanced by depressive symptoms, whereas achromatic sensitivity was not modulated by depressive symptoms.

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