

Object substitution masking in localization and color discrimination tasks

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Object substitution is a visual masking illusion that occurs when the visibility of a stimulus (target) is impaired by a set of surrounding small dots that remain visible after the target disappears (Enns & Di Lollo, 1997).

Prior studies have shown that the effect of object substitution is larger in discrimination than in detection tasks (Gellatly et al., 2006) suggesting that, to some extent, the target must have been detectable while the identity was not discernable. There is good evidence that identification of a stimulus relies on its localization; so, one hypothesis is that object substitution impairs identification more than localization visibility.

This study aimed to evaluate the effect of object substitution masking along the color dimension in both localization and identification tasks, in order to evaluate whether the object substitution effect occurs prior to or after the stimulus localization.

The luminance of red, green and blue stimuli was equated with the grey background in order to prevent observers from localizing or identifying the target based on solely the evaluation of brightness. We used a' (Kunimoto et al., 2001) as a measure of awareness to consider both an objective evaluation of visibility and a subjective level of confidence.

Results showed that awareness was lower in color identification than in localization, confirming the prediction that identification of a stimulus critically depends on its localization. Furthermore, object substitution equally impaired awareness in the two tasks suggesting that neither the location nor the identity of the target were available to conscious report, even though location was more visible than color when the target was presented alone. Our results seem to contrast with the hypotheses that single feature identification does not depend on localization (e.g. Treisman & Gelade, 1980), and suggest that object substitution occurs before the target has been localized.