Name(s)

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Project Number

S0419

Project Title

All that Meets the Eye: The Success Rate of Change Detection Based on Objects and Colors

Abstract

Objectives/Goals

The presence of change blindness in humans is indisputable. However, what has yet to be studied is which factors of an image can improve the success rate of change detection. This experiment investigated whether the removal of an object from a scene is easier to identify than the change of a color of an object in a scene. It was hypothesized that the removal of an object from a scene would be detected more often and in less time than the color change of an object.

Methods/Materials

Informed consent was obtained from 60 people to participate as a subject in the experiment. These observers were asked to detect a change between seven pairs of images, with each pair shown in succession. In three pairs, images were varied by the removal of an object. In the three remaining pairs of images, there was a color change of an object. The seventh pair was a control pair and contained no change between the pre-change and post-change images. The amount of time needed to detect the change and whether the observer was correct in their identification of the change was recorded.

Results

Results showed that the detection of changes in image pairs containing an object removal had a 56% success rate, while a color change of an object had a 48% success rate. Additionally, the average time needed to correctly identify changes revealed that object removals needed about 5 seconds and were distinguished in less time than color changes, which needed about 8 seconds to be correctly identified. However, the standard deviations of these times indicated that the time differences were not statistically significant.

Conclusions/Discussion

This experiment confirmed part of the initial hypothesis. This study revealed that when detecting changes, the removal of an object from a scene is detected more often than the color change of an object. This provides further evidence that objects and their relationship to other objects are more clearly discriminated and encoded by the brain than color. The differences in the amount of time needed to correctly detect changes of an object removal or color change were not significant enough to draw any conclusions. The standard deviations of the times demonstrate that when a change is detected, the time needed to detect the change does not vary widely.

Summary Statement

This study investiaged which change to an image is easier to identify: a removal of an object or a change of a color of an object.

Help Received

Biology teacher reviewed assignments and provided suggestions for revisions.