Differential color congruency effects across metacontrast and object substitution masking under equiluminant viewing conditions.

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When a second visual stimulus (the mask) is presented shortly after an initial stimulus (the target) and in close proximity to it, visibility of the initial target can be severely reduced, a phenomenon called visual masking. Prior studies have identified a color congruency effect in visual masking, whereby larger masking effects are typically observed when the target and mask match in color than when they do not. However, prior studies have often failed to equate the luminance of masks and targets of different colors, allowing for the possibility that the color-congruency effect may have in fact arisen from congruency along the luminance channel rather than along hue channels. Here, we study color-congruency effects under conditions of perceived equiluminance using two types of visual masking procedures: Metacontrast Masking (when the mask stimulus has contours that closely follow, but do not overlap those of the target stimulus) and Object Substitution Masking (when the mask stimulus consists of four small dots surrounding the target that onset with the target but remain visible after it offsets).
Further, we examine whether the observer's task (shape identification versus color identification) interacts with the color-congruency effect and whether this interaction is different across these two forms of masking.
Our results show that (a) color-congruency effects are most prevalent in forms of masking that are sensitive to the surface properties of the stimulus (such as MM), and (b) they suggest that OSM might not depend on the interaction between contours. Finally, the results are also consistent with the proposal that at least part of OSM is mediated by motion-processing mechanisms (that update the position and identity of objects as they change over time) because low-level motion detectors are blind to hue, so one would expect a lower-degree of color-driven congruency effects in OSM.