The color of multi-lit objects

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Visual scenes contain multiple illumination levels and objects in those scenes usually extend through more than one illumination level. When judging the color of these objects we usually provide a single match for the color of a whole object. Zdravković et al [1] showed that this object match is determined by two rules: object color is a compromise between the match for the part in the field of highest illumination (according to the first rule), and the match for the part in the largest area of illumination (according to the second rule). Zdravković [2] further tested this in temporal domain and confirmed the first rule: the color of a mobile target moving through illumination levels is equal to its match in the higher illumination. The second rule was not tested, but it was proposed that the color would vary with the amount of time the target spent in each illumination.

Aim of this study was to test the two temporal domain rules in a single experiment by varying the time spent in each illumination. The same participants took part in 5 experimental conditions providing lightness matches for targets of 5 different reflectance values, in some condition perceptual matches and in some conditions matches for the target that just disappeared behind the occluder.

The first rule was confirmed in the situation when the target spent a larger amount of time in higher illumination ($F_{2,22} = 4.629$, $p = 0.021$); object matches were determined by the appearance in the higher illumination. However, the same result was obtained even when the target spent more time in the lower illumination ($F_{2,22} = 5.768$, $p = 0.010$). Finally, when the target spent equal time in both illumination levels, its color did not correspond to the matches from the higher illumination. In comparison to previous findings [2] we obtained the same results for the reflectance range previously used, but not for the full reflectance range used in present study.

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