

Changes in relative area produce equal and opposite effects on lightness and perceived illumination

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Changes in relative area produce equal and opposite effects on lightness and perceived illumination.

In prior work (Gilchrist & Soranzo, ECVF 2012) in which subjects looked into two windows in the far wall of a vision tunnel and adjusted the level of illumination in one window to match that of the other, they matched the windows for highest luminance (not average). The fact that both lightness and perceived illumination are anchored by highest luminance directly implies Koffka's invariance theorem. For a given luminance within a framework, changing highest luminance changes lightness and perceived illumination in equal but opposite ways. In this new study, we consider area effects. We found that when a darker region is less than half of the total area within a window, Koffka's theorem applies directly. However, when the darker region covers more than half of total area, Koffka's principle applies to the darker region, but not the lighter one, which is anchored at white. Perceived illumination level can now be incorporated systematically into anchoring theory.