

What kinds of contours bound the reach of filled-in color?

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Introduction: Filling-in occurs when a visual feature located in one region of visual space is perceived in a nearby region where it is not actually present. In the case of color, a classical example of filling-in is the Boynton Illusion, in which an achromatic area between a black squiggly contour and a yellow region is filled-in by the yellow. In this case, the squiggly line serves as a luminance contour that bounds the area filled-in by color.

Purpose: The present study investigated whether color filling-in is bounded also by illusory contours.

Methods: This study evaluated different kinds of contours: real (different forms of a luminance-contrast edge) and illusory (Kanizsa square from solid pacmen, Kanizsa square from "bull's eye" pacmen, horizontally phase-shifted vertical lines). For all stimuli, a yellow square (defined solely by an S-cone from its achromatic background) was presented within one type of contour. In one condition (a control), the yellow square physically abutted the contour. In two other conditions, the yellow square was not touching the contour: in one condition it was approximately 4 min from the contour and in another condition about 6 min. Stimuli were presented for 8 seconds. The subject indicated via a button press whether the yellow appeared to be touching the contour (thus a filled-in color). The proportion of times that filling-in occurred and the response time of filling-in were measured.

Results & Conclusion: Filling-in occurred for both real and illusory contours. Thus illusory contours without luminance contrast, as well as contours defined by local luminance contrast, are capable of constraining filled-in color.

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