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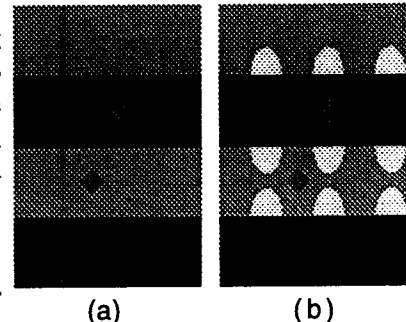
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JUNCTIONS, TRANSPARENCY, AND BRIGHTNESS ((D.C. Somers and E.H. Adelson)) Dept of Brain and Cognitive Sciences, M.I.T., Cambridge, MA.

Purpose. A gray patch on a dark surround appears brighter than the same patch on a bright surround (see a). Stronger effects occur in stimuli like (b), where "snakes" of half-ellipses provide X-junctions consistent with transparency. We modified the snakes to study how boundary information influences brightness percepts.

Methods. Stimuli were flashed for 500 msec. Subjects adjusted the luminances of two test patches to match the brightnesses of the two diamonds. Contrast of the snake inducers relative to surround strips was varied. **Results.** With zero inducing contrast (i.e., fig a), the judged illusion contrast was under 20%. High contrast snake inducers more than doubled the illusion. The enhancement occurred even with barely visible snakes, being significant with 5% inducer contrasts and saturating at 20% inducer contrasts.



Some observers reported that the "brighter" patch appeared self-luminous. The effects cannot be attributed to a change in the apparent brightness of the surrounds, since they were much stronger than could be obtained by increasing the surround contrast in (a). The strongest brightness illusions were associated with a sense of transparent scission. The best effects occurred when X-junction gray-levels were consistent with multiplicative, rather than additive, transparency. Surprisingly, brightness effects did not always require transparent surface percepts and persisted under bistable transparent surface orderings. **Conclusions.** Gray-level junctions along a boundary can greatly affect the perception of brightness within the bounded region. Both the qualitative and quantitative aspects of X-junctions are important.

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