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# Spatiotemporal dynamics of the perception of dot displays

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## Abstract

Liss and Reeves (Perception, 1983) found that observers could often see only a subset of a group of discs which were masked after brief exposures. Subject numerosity judgments in this experiment provided evidence that this was due to the masks effectively interrupting the visual processing of the displays. An implication of their results is that the discs in their displays did not become available for conscious processing simultaneously. We sought to characterize the dynamics of this process. In our experiments, we asked subjects to give location responses for all dots that were observed in displays masked at variable SOAs. The numerosity of responses confirmed the results of Liss and Reeves (1983). To go beyond those results, we assume that the pattern of location responses reveals the spatial distribution of the visual information that was made available to the observer during the brief exposure. Subjects' location responses in our multi-dot displays indicate that the dots do not become available for conscious processing simultaneously. Dots near fixation are detected (and localized) first, followed by increasingly more peripheral dots. Additionally, at longer SOAs, dots closer the centroid of the dot distribution are more likely to be detected. However, dots presented alone seem to be detected nearly equally well centrally and peripherally. These three phenomena are encompassed in a quantitative model that describes the apparent rapid expansion of visual consciousness. The model provides a reasonable account of how the spatially distributed information is optimally processed within the limitations imposed by perceptual mechanisms.

Rubin, T. N. Chubb, C. F. Wright, C. E. Wong, S. A. Sperling, G. (2008). Spatiotemporal dynamics of the perception of dot displays [Abstract]. Journal of Vision, 8(6):282, 282a, <http://journalofvision.org/8/6/282/>, doi:10.1167/8.6.282. [[CrossRef](#)]