The Effect of Backward Structure Masking on Efficiency of the Centroid Task.

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The centroid task is an important tool used to study feature-based attention. In the centroid task, a participant uses a mouse to indicate the perceived centroid of a "cloud" of briefly-displayed stimulus items. Backward structure masks are routinely used in this task to limit the availability of information about the items in the stimulus cloud, thus eliminating the possibility of attention shifts. These masks consist of an array of elements that fill the display and are similar to the items in the stimulus cloud. Participants in centroid tasks often report that stimulus items seem to be "drawn to" or otherwise confused with subsequent mask elements. This experiment was designed to test whether the spatial relation between stimulus items and mask elements changed the perceived position of the stimulus items in any way that interfered with centroid judgments. To do this, stimulus clouds were presented consisting of eight items. In one condition, four of these items were presented at the location of a subsequent mask element and the other four were displaced from the location of the nearest subsequent mask element. In a second condition, all eight items were aligned with subsequent mask elements. A variety of analyses found no effect on the centroid responses that depended on whether stimulus items were aligned or displaced. This result is surprising since it contradicts participant introspections; at the same time, however, the lack of an effect simplifies interpretation of centroid data collected using backward masks.