Centroid Judgements Are Substance Indifferent And Therefore Based On A Saliency Map

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**Background & Rationale:**

- A saliency map (Koch & Ulman, 1985) is a topographical map where only salience is recorded at each spatial location, uninformative about the features that produced the salience.
- Centroid task: Estimate the centroid (center of gravity) of all stimulus items. **Hypothesis:** Only spatial information matters, features are irrelevant except to indicate the locations of items.
- **Implication:** If the accuracy of centroid judgements is independent of substance composition— the features—of items, then centroid judgments are computed on a saliency map.

**Experimental Methods:**

**Purpose:** To demonstrate that centroid judgements are computed independently of the feature-composition of the stimulus items.

**Stimulus:** 8 different compositions of stimulus items were tested in a mixed list. Items could be homogeneous or could vary in color, shape, and luminance (which could be less than, equal to, or greater than the background level). (In Fig. 1, the first 14 backgrounds are shown darker than actual background in the experiment in order to more clearly show the stimuli.)

**Task:** On each trial, 16 stimulus items, which had either the same or 2, 4, or 8 different features, were presented for 300 msec, immediately followed by a 100 msec mask. Subjects estimated the centroid of all stimulus items and were shown the correct centroid after each response.

**Results & Conclusions:**

The colored area around the data represents a 95% confidence interval. There is no statistical difference in mean error magnitude among the eight compositions of stimulus, i.e., accuracy was substance indifferent.

**Conclusion:**

Centroids are computed directly on a saliency map that represents the “salience”, a real number, at locations at which an item is present, and zero otherwise. Item features are represented elsewhere in the system.