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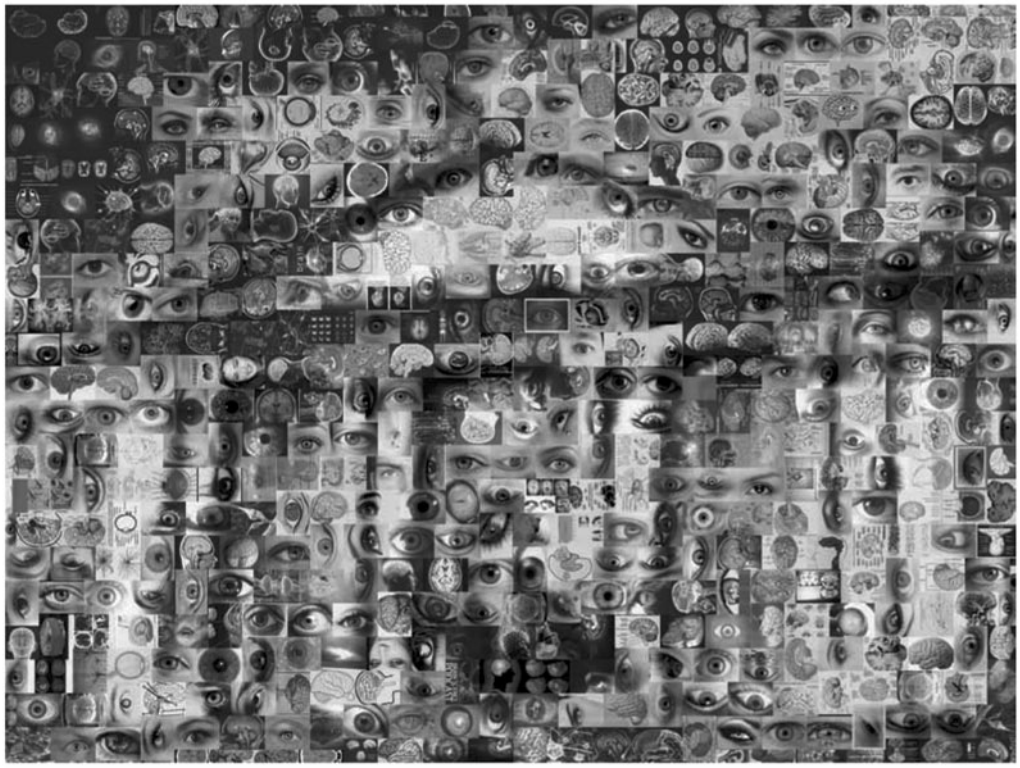

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Abstracts

◆ **Spatiotemporal object formation: Contour vs surface interpolation**
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Visual object formation from fragmentary information depends on two complementary processes: a contour interpolation process that interpolates between visible edge fragments and a surface interpolation process that connects similar regions across gaps. It has been suggested that each process can operate in the absence of the other, but this hypothesis has received little experimental study. Here we investigate spatiotemporal object formation (completion across gaps in both space and time) when contour- and surface-based processes are congruent or incongruent. We used the shape discrimination task of Palmer et al (2006 *Journal of Experimental Psychology:General* **135** 513–541) to investigate the degree of unit formation. In this paradigm, shape discrimination is enhanced when visible object fragments fulfill the geometric conditions for contour interpolation ("spatiotemporal relatability") relative to control ("non-relatable") displays. In the present study we investigated incongruent conditions: (i) non-relatable displays with coherent surface properties (same color, texture or shading pattern), and (ii) relatable displays with bits with different surface properties (eg three different colors, http://www.sowi.uni-kl.de/wcms/fileadmin/wpsy/public/STI/STI_Surface/STI_Surface.htm), along with congruent displays. Results showed that shape discrimination performance was completely predicted by unit formation due to relatability of contours and not by surface properties. These results indicate the primacy of contour interpolation in determining object shape.

◆ **Influence of object pose on contour grouping**
J Elder (Centre for Vision Research, York University; e-mail: jelder@yorku.ca)
Models of contour grouping are typically based upon local Gestalt cues such as proximity and good continuation. Recently, Elder et al (VSS 2010) reported evidence for the involvement of higher-order properties of natural contours. In the present study, we consider specifically tuning to the canonical pose of natural shapes. Observers were asked to detect briefly presented target contours represented as sequences of short line segments, embedded in randomly positioned and oriented noise segments of the same length. We used QUEST to estimate the threshold number of noise elements at 75% correct performance in a yes/no task. Targets were the closed bounding contours of animal shapes drawn from the Hemera database, presented at 4 orientations in interleaved blocks: 0, 90, 180, 270 deg. We note that the statistics of line segment orientation are the same for the 0 deg and 180 deg conditions, and the statistics of first-order and in fact all higher-order shape cues are identical for all conditions. Nevertheless, we found that thresholds were significantly higher for the 0 deg (original pose) condition than for the rotated conditions. This result suggests that contour grouping depends not only upon the natural statistics of object shape but also of object pose.

◆ **3D Object recognition: Where do we look in depth?**
F Cristino, C Patterson, C Leek (Bangor University; e-mail: f.cristino@bangor.ac.uk)
Although object recognition has been studied for decades, very little is known about how eye movements interact with the encoding and recognition of objects in 3D. We recorded eye movements in an object recognition task; firstly while subjects learned a subset of anaglyph stimuli, and then while they were asked to recognise these stimuli during a test phase. Participants either performed the task monocularly or stereoscopically. We compared eye movement patterns against three theoretical models of shape analysis (saliency, curvature maxima/convexity, curvature minima/concavity). The curvature models were computed directly from the 3D mesh objects. A novel technique was created to extract depth from the eye movement data, allowing us to analyse their spatial distributions in three dimensions (3D heatmaps). Behaviourally, subjects were more accurate and faster during the recognition task when viewing objects stereoscopically, making fewer saccades and longer fixations. The results showed that the distribution of eye movements in object recognition is: (i) structured and consistent across observers, (ii) similar between the learning and test phases, (iii) unchanged if viewed stereoscopically, and (iv) best accounted for by the surface concavity model. Indeed, the saliency model performed no better than chance in predicting the spatial distribution of eye movement patterns.

◆ **Misbinding object location information in visual working memory**
Y Pertzov, N Gorgoraptis, M-C Peich, M Husain (University College London; e-mail: pertzov@gmail.com)
Misbinding visual features that belong to different objects—illusory conjunctions—is known to occur under specific experimental conditions, eg brief presentations (Treisman and Schmidt, 1982). A recent