

Limitations of a low-level model of discrimination of change between images

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A simple (low-level) model of local-contrast discrimination predicts object discrimination results, such as detecting subtle differences in the shape of a car, bull, or human face; this suggests that we are optimised to the second-order statistics of natural scenes (Párraga et al, 2000 *Current Biology* **10** 35 - 38; 1999 *Perception* **28** Supplement, 127). The model predicts discrimination thresholds given only the observer's contrast-sensitivity function. Here, we explore the limits of this model, to ask about the involvement of different (higher) visual processes.

We presented images of different sizes, either to disrupt local visual comparisons, or to alter the number of the receptors involved in the task. The results show that (a) a change in magnification between reference and test stimuli destroys the good fit of the model, except for the case of human-face stimuli which may be invariant against magnification changes, and (b) performance is similar when test/reference stimuli are either small and foveal, or are larger at 6 deg eccentricity; the model thus appears to 'M-scale'. These results support a low-level model where one particular discrimination relies on comparisons within one particular neuron set.[Funded by BBSRC (UK).]