

Abstract

Context modulates the encoding of low-level (e.g. gratings) and high-level (e.g. human face features) visual stimuli. In both cases, the magnitude of contextual influence depends on the strength of the target signal (e.g., contrast, facial feature saliency), and there is variability in susceptibility to contextual effects across individuals. It is currently unclear whether high-level contextual effects are mainly caused by category-specific mechanisms, or are also accounted for by lower levels of the visual processing hierarchy. In order to clarify this, we evaluated whether an individual's susceptibility to contextual modulations correlates across low- and high-level vision. In our low-level task, we measured individuals' contrast detection performance of a horizontally oriented Gabor patch (ie, target signal) embedded within a parallel (same) or orthogonally (different) oriented, bigger Gabor (ie, context; similar to Mannion et al., 2017). The same individuals were tested in a high-level task using a delayed matching paradigm in which they judged whether the eye region (target signal) was strictly identical or different across same or different faces (context). Target signal strength (Gabor patch contrast) in the low-level task was manipulated using an adaptive staircase, whereas in the high-level task, it (eye dissimilarity) was manipulated using fixed morphing steps. Contrast detection performance in low-level task, and the proportion of "different" responses in high-level task followed a sigmoidal function as the target signal strength increased in all conditions. Slope and intercept values of these functions were taken and subtracted across context conditions (same-different) within each task, quantifying an individual's susceptibility to contextual effects. We observed a trend towards a moderate negative relationship between an individual's susceptibility to contextual modulations in low-and high-level tasks. These results suggest that high-level contextual modulations are in part accounted for by contextual mechanisms involved in low-level vision.

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