AB102. Image blur perception in amblyopia: beyond edges

Charlene Yang, Reza Farivar, Robert F. Hess

Department of Ophtalmology, McGill University, Montreal, QC, Canada

Background: Understanding the neurophysiological mechanisms of Amblyopia, a neurodevelopmental disorder of the visual cortex, will bring us closer to full recovery. Past findings have been contradictory. Results have shown that despite having severe acuity impairment, amblyopes can nonetheless perceive sharp edges. In this study, we explore the representation of blur through a series of image blur-discrimination and matching tasks, to understand more about the amblyopes' visual system.
Methods: Monocular image blur-discrimination thresholds were measured in a spatial two-alternative forced-choice procedure whereby subjects had to decide which image was the blurriest. Subjects also had to interocularly match pictures that were identical to those used for the image blur discrimination task. Ten amblyopes, as well as a group of ten controls were under study.
Results: Data on amblyopes and controls will be presented for both experiments. According to previous research that was done on blur-edge discrimination and matching, we predict that subjects' performance will follow a dipper function, that is, all observers will be better at discriminating between both images when a small amount of blur is applied rather than when the image is either sharp or very blurry. We also predict that amblyopes' blur discrimination will be noisier, but that they will paradoxically be able to match the sharpness of the images presented in the matching task.
Conclusions: This would confirm our hypothesis about amblyopes' visual system, that they can represent blur levels defined by spatial frequencies that are beyond their resolution limit, and would also raise interesting questions about the visual system in general regarding the different perceptions driven by images versus edges.
Keywords: Amblyopia; image blur-discrimination; image blur matching; edges; dipper function

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