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Evidence for global perceptual averaging in individuals with Autism Spectrum Disorder

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Abstract

Studies of visual perception in individuals with Autism Spectrum Disorder (ASD) report enhanced local processing, and either impaired or suppressed global processing. In contrast, we report evidence of global size averaging despite poor accuracy at recalling sizes of individual objects, as well as a persistent contextual influence of adaptation to mean size on the perceived size of single objects across groups of ASD and control observers. In Experiment 1, participants viewed a set of heterogeneously sized circles followed by two test circles and judged which test circle represented the mean size (mean task), or was a member (member task) of the set. Despite their noted hypersensitivity to local detail, the ASD group showed the same patterns of high accuracy in the mean task and chance accuracy in the member task as the control group, in-line with Ariely's (2001) proposal that observers can extract average properties of sets without retaining information about individual items. In Experiment 2, participants adapted to two patches of heterogeneously sized dots with large and small mean sizes, then judged which of two subsequently presented test dots was larger. Contrary to the notion that individuals with ASD are better at suppressing global context, both groups perceived the sizes of the physically identical test dots as an inverse function of the preceding adapting patches.

This negative aftereffect of mean size adaptation across observers supports the proposal that mean size is encoded as a fundamental visual attribute (Corbett, et al., 2012). Taken together, results suggest that individuals with ASD show normal sensitivity to such contextual regularities in the surrounding environment. Our findings not only provide further evidence for the fundamental nature of perceptual averaging in vision, but also raise questions for theories that predict superior local visual processing and impaired or suppressed global visual processing in individuals with ASD.