

AB070. Feedback improves orientation discrimination in neurotypical adults, but not in adults with autism: a pilot study

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Background: Understanding how individuals with autism spectrum disorder (ASD) learn is important for developing and implementing effective educational and behavioral interventions. Evidence suggests that individuals with ASD are relatively stronger in certain areas of perception (Simmons *et al.*, 2009; Dakin and Frith, 2005); it therefore cannot be assumed that individuals with ASD learn using the same rules and strategies as neurotypicals (NT). Of particular interest, perceptual learning (PL) is a class of learning that is based upon changes induced by the repeated exposure and response to specific types of perceptual information. Such learning often includes feedback, indicating whether or not a response was correct during a trial within a PL task. The objectives of this study were to perform a pilot investigation of; (I) perceptual learning in adults with and without ASD using a low-level orientation discrimination task; and (II) the influence of feedback on accuracy in this task.

Methods: Eleven adults with ASD and fifteen NT adults, matched on Wechsler full-scale IQ and age (18–31 years), performed a low-level PL task. They were asked to indicate whether a grating was tilted to the left (i.e., counter-clockwise) or to the right (i.e., clockwise) relative to an oblique 45-degree reference orientation. Thresholds, defined by the minimal deviation in degrees needed to discriminate tilt orientation, were measured for each participant every 15 minutes, with each block consisting of 420 trials. To assess baseline performance, all participants completed a first block with no feedback. Participants were then randomly assigned to either feedback (NASD =6, NTD =8) or no feedback groups (NASD =5, NTD =7) and completed six subsequent testing blocks.

Results: PL was defined as the percent change in orientation discrimination threshold in each of the six testing blocks relative to baseline performance. No significant increase was found in performance as a function of testing block for any group; PL was therefore not evidenced under the conditions tested. ASD performance remained equal to that of baseline across testing blocks, whether or not trial-by-trial feedback was present. In contrast, NT performance was significantly increased when feedback was present.

Conclusions: NT individuals significantly benefited from feedback, while individuals with ASD did not. These results provide preliminary evidence for a divergent learning style in ASD and NT individuals. These pilot findings raise important questions regarding the impact of feedback during interventions, and at a more basic level, the atypical underlying perceptual and cognitive processes in individuals with ASD.

Keywords: Autism; perception; learning; feedback; reinforcement

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