



# Visual Encoding of Social Cues Contributes to Moral Reasoning in Autism Spectrum Disorder: An Eye-Tracking Study

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Eye-tracking studies suggest that visual encoding is important for social processes such as socio-moral reasoning. Alterations to the visual encoding of faces, for example, have been linked to the social phenotype of autism spectrum disorders (ASDs) and are associated with social and communication impairments. Yet, people with ASD often perform similarly to neurotypical participants on measures of moral reasoning, supporting the hypothesis of differential mechanisms of moral reasoning in ASD. The objective of this study was to document visual encoding and moral reasoning in ASD and neurotypical individuals using a visual, ecological, sociomoral reasoning paradigm paired with eye-tracking. Two groups (ASD, Control) matched for age and IQ completed the SoMoral task, a set of picture situations describing everyday moral dilemmas, while their eye movements and pupil dilation were recorded. Moral understanding, decision-making, and justification were recorded. Participants with ASD presented a longer time to first fixation on faces. They also understood fewer dilemmas and produced fewer socially adaptive responses. Despite a similar average level of moral maturity, the justifications produced by participants with ASD were not distributed in the same way as the neurotypical participants. Visual encoding was a significant predictor of moral decision-making and moral justification for both groups. The results are discussed in the context of alternative mechanisms of moral reasoning in ASD.

**Keywords:** moral reasoning, moral decision-making, visual encoding, eye-tracking, pupillometry, autism spectrum disorder

## INTRODUCTION

Moral reasoning has repercussions on the way individuals make decisions and behave socially and therefore is a key socio-cognitive component of everyday interactions (Krebs et al., 1997; Gold et al., 2015; Villegas de Posada and Vargas-Trujillo, 2015). While it relies on rapid and automatic mechanisms such as attentional processes, moral reasoning can also involve elaborate, deliberative reasoning (Kahneman and Sunstein, 2005; Saunders, 2009; Fiedler and Glöckner, 2015). Theoretical models suggest that, like most socio-cognitive functions, moral reasoning includes a perceptual encoding stage that is required to extract relevant information from a social