



Parts Based Processing in Autism

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INTRODUCTION

The ability of individuals to attach meaning to their surroundings requires them to not only look at the parts of an object (local processing) but also integrate those parts into a coherent whole (global processing).

Individuals with autism spectrum disorder (ASD) often have difficulty “seeing the big picture” because they tend to rely on local, rather than global, processing strategies. This local bias may be driven by difficulties in grouping stimuli based on Gestalt principles, an early preattentive perceptual system required for perception of global structures.

PURPOSE

To examine coherence in individuals with ASD at a preattentive level of visual processing using the Ponzo illusion and a perceptual grouping task.

METHODS

Participants: Fifteen (10 male) adults ($M = 35$ years) with high functioning ASD and fifteen age/gender/handedness matched typically developing (TD) controls. All participants had normal or corrected to normal vision.

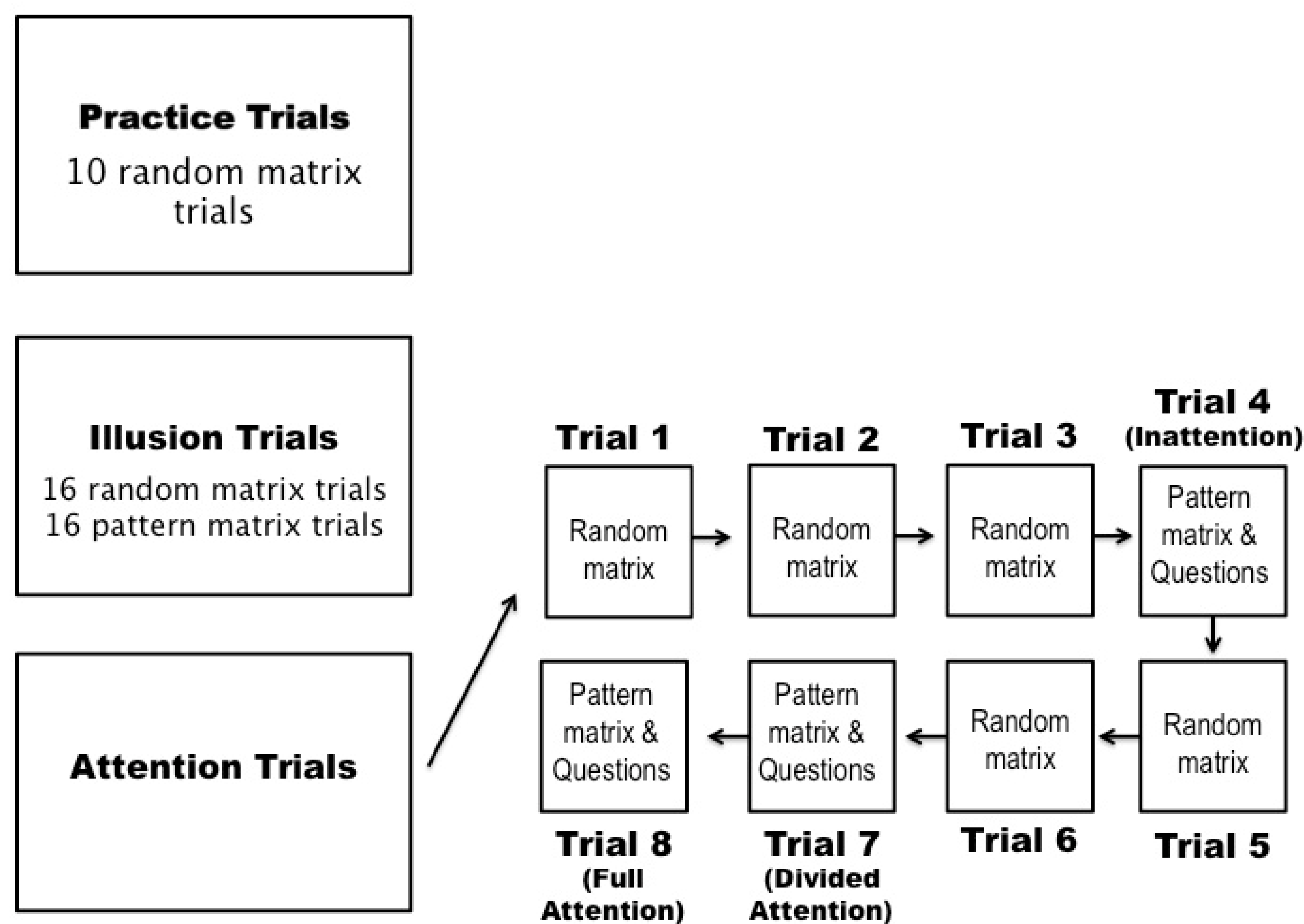


Figure 1. Experimental Structure.

PERCEPTUAL GROUPING TASK

Participants were asked to judge which of two black parallel lines, presented on a computer screen, was longer. Lines were presented on either a background of randomly generated black and white dots or on a background where the dots were arranged so that they form a V or inverted V pattern that induces the Ponzo illusion in healthy controls.

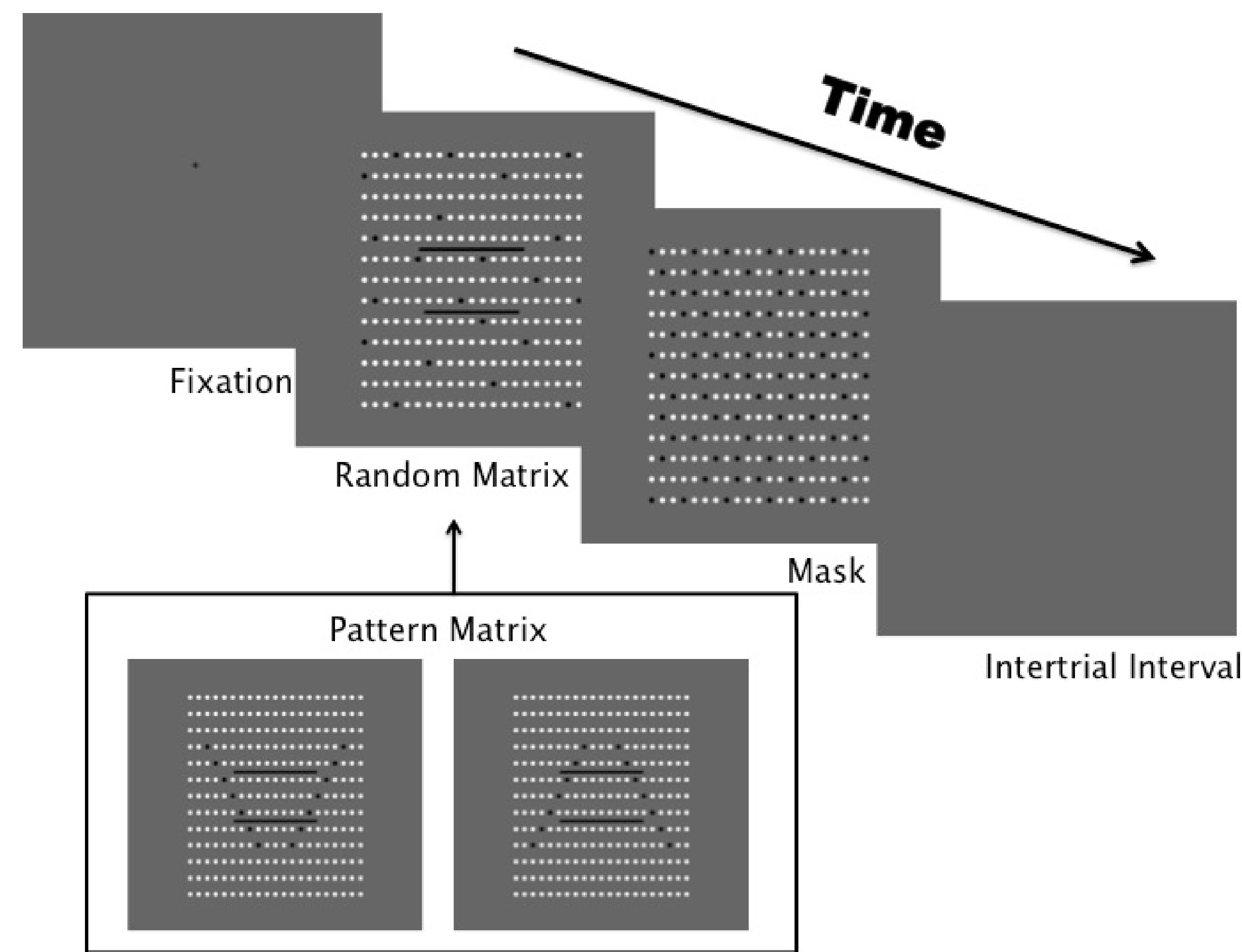


Figure 2. Trial events.

ILLUSION TRIALS

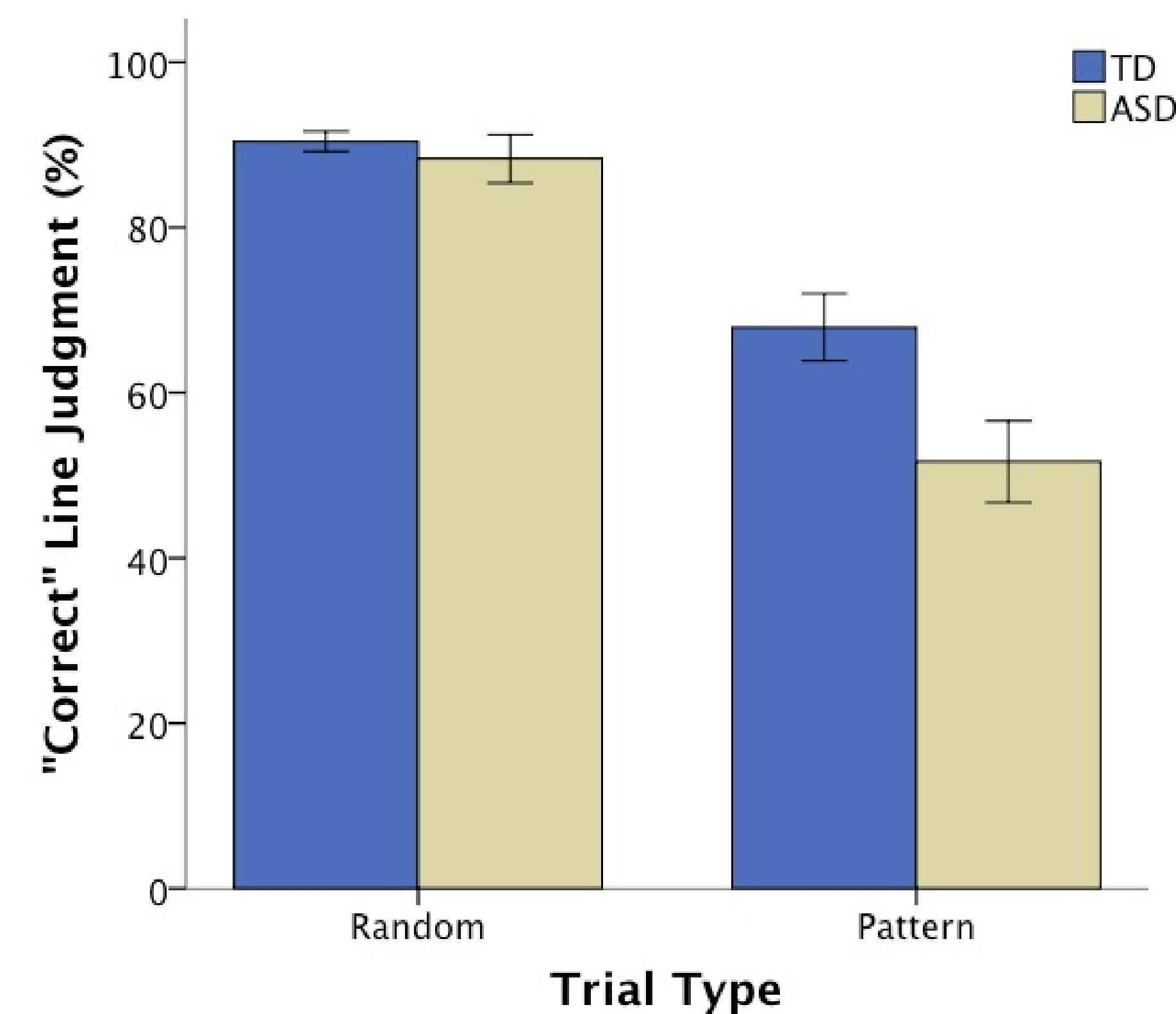


Figure 3. Results from the illusion trials. Error bars represent SEM.

ATTENTION TRIALS

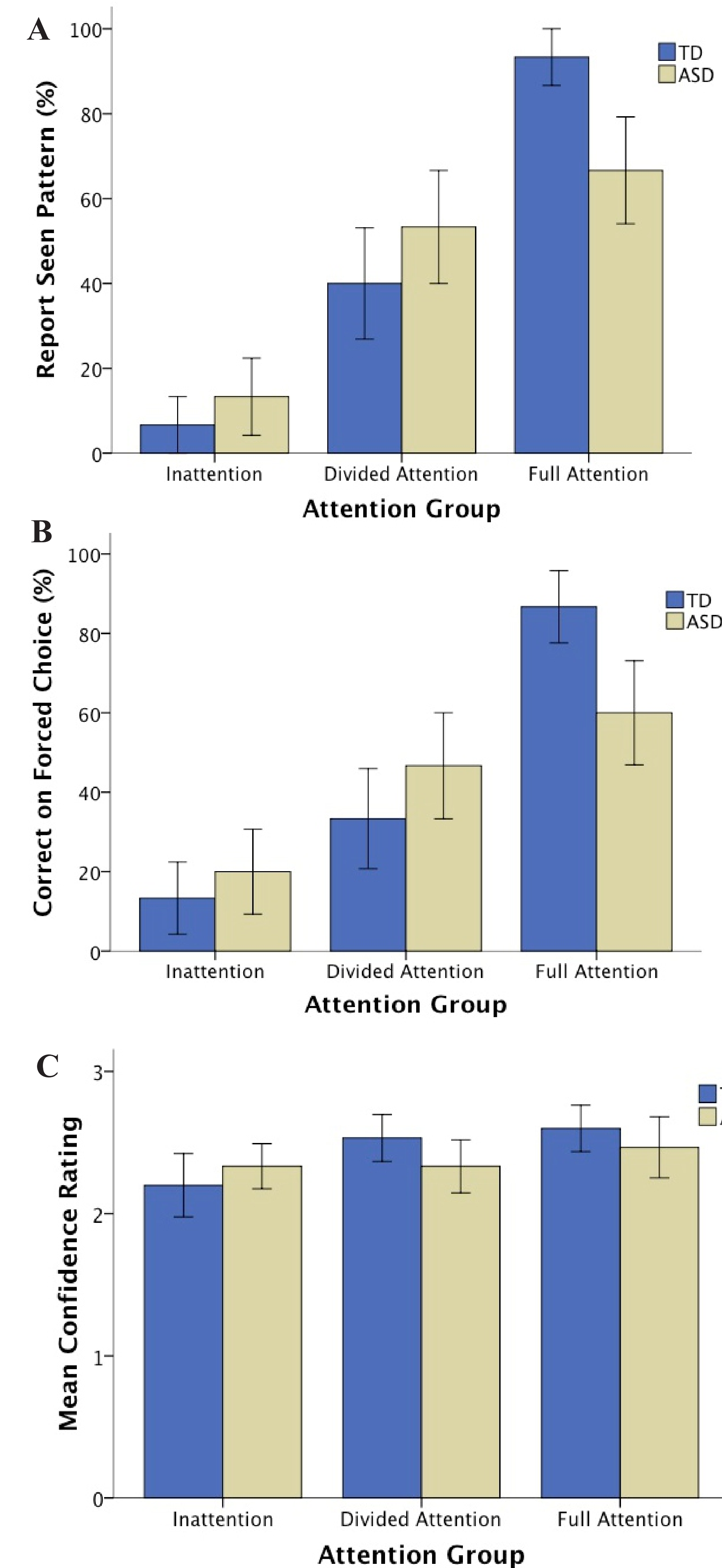


Figure 4. Results from the three questions asked in the attention trials. (A) Percentage of participants who reported having seen a pattern, in response to the direct query. (B) Percentage of participants who got the forced-choice question correct. (C) Mean confidence ratings of the response given to the forced-choice question. Error bars represent SEM.

CONCLUSION

Illusion Trials:

- ASD group showed decreased susceptibility to Ponzo illusion compared to TD group.
- Suggests that individuals with ASD have difficulties grouping stimuli during preattentive visual processing.
- May explain why individuals with ASD rely on local visual processing strategies.

Attention Trials:

- Both groups showed increased illusion susceptibility and increased ability to see and correctly identify the pattern during divided- and full-attention trials.
- Confidence ratings were consistent across all 3 attentional conditions for both groups.
- Suggests that individuals with ASD become more susceptible to the illusion as more attentional processes are recruited.

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