Intra-individual cognitive imbalance in ASD between perceptual reasoning and ambiguity-solving related to tool use: Comparison among children exhibiting ASD, AD/HD, and typical development.


Abstract

OBJECTIVE: Several studies have suggested that objective deficits in the processing of abstract information in conjunction with an enhanced ability to process concrete information is a definitive characteristic of autism spectrum disorder (ASD). However, this cognitive imbalance is not necessarily clear in high-functioning autistic individuals who do not display absolute differences relative to typically developing (TD) populations. Thus, the purpose of this study was to identify this cognitive tendency in high-functioning autistic individuals using intra-individual cognitive comparisons.

METHODS: The reaction times (RTs) of TD children, children with ASD, and children with attention deficit hyperactivity disorder (AD/HD) (n=17 in each group, mean age=11.9 years, age range=9.8-15.8 years) were compared using the Which/How-to-Apply Tools (W/HAT) test, which consists of tasks requiring the adaptive use of novel tools and familiar tools in atypical and typical situations. Differences in RTs between the atypical and typical trials ([A-T]) were used to assess intra-individual cognitive imbalances.

RESULTS: As predicted, the [A-T] scores of the ASD group were significantly higher than those of the TD group even though the RTs in the atypical and typical trials did not differ. Additionally, the [A-T] values were significantly higher in the ASD group than in the AD/HD group, which indicates that the cognitive imbalance was specific to ASD individuals. No significant interaction was detected between the trial and subject group.

CONCLUSIONS: The findings of this study demonstrate that a cognitive imbalance in ASD individuals may enhance the current understanding of the pathophysiology of this disorder, which is found in a range of individuals, including those with obvious cortical dysfunction to those with only intra-individual imbalances.