Visual Realism and Global Processing in Aspergers Disorder

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Abstract

Different theoretical perspectives have been proposed to explain the visuospatial performance often seen in Aspergers disorder. According to the weak central coherence account, the individuals with autism show a processing bias for local information. Another perspective, the enhanced perceptual functioning account surmise that the individuals with autism have both intact local processing as well as global processing. A case study of S.M, a 10-year-old child diagnosed with Aspergers is reported here. His performance on representational drawing tasks revealed that S.M had superior local but impaired global processing. His performance is discussed in terms of weak central coherence and enhanced perceptual functioning.

Keywords: Aspergers disorder, Visual Realism, Global Processing, Enhanced Perceptual Functioning

INTRODUCTION

Asperger's disorder is an autistic spectrum disorder characterized by qualitative impairment in social relationships, restricted range of interests and impairment in verbal and nonverbal communication, especially in the pragmatics of social communication. This disorder is said to have a prevalence of 1 in 10,000 (Volkmar & Klin, 2000). Individuals with Aspergers share the characteristics like extraordinary interests, frequent high IQ, expertise in areas like complex calculations and computer programming. Many individuals with Aspergers demonstrate outstanding savant skills which facilitate their high level of cognitive and creative functioning.

Various researches have been done to study the representational drawing and the transition from intellectual to visual realism in children with autism (Ford & Rees, 2008; Charman & Baron Cohen, 1993). Representational drawing emerges in children when they start depicting scribbling in their drawings. It occurs through the stages of intellectual realism and visual realism. In intellectual realism children draw what they know about an object whereas in visual realism the children draw what is actually seen. Some savants use a strategy “construction by local progression” exhibited by savant E.C. for realistic drawings in which details are drawn first, and then moving on to an adjacent part before completing a part already begun. However, the local processing strength exists alongside intact global processing in autism that is they have enhanced perceptual functioning (Mottron & Burack, 2001).

A case study of an Aspergers child, S.M, with exceptional realistic drawing talent much like that displayed by E.C is reported here.

CASE REPORT

S.M is a right-handed male, age 10 years, 8 months. S.M was born full-term by an emergency cesarean section after 36 hours of labor. He weighed 8 pounds at birth and was healthy. From 3 weeks to about 3 to 4 months, S.M cried constantly. He could not be consoled by his parents, a behavior his parents attributed to colic. At that time, his parents noticed that he did not smile as compared to other children
of his age. As an infant, he resisted being hugged by his parents. S.M showed normal development of receptive language but was delayed in expressive language skills. At 18 months, he could only produce a few monosyllabic utterances. As has sometimes been reported in autistic children, S.M developed his own language that involved clucking sounds. Though having a good vocabulary and grammar, he would repeat phrases and questions in a stereotypical fashion often to the limit of irritating others. His gait was awkward as he swayed from side to side while walking. Around 20 months, he also exhibited toe-walking, hand-flapping, and head banging behaviors and habitually hit his knee and fists. At age 4, S.M was administered the Childhood Autism Spectrum Test and was diagnosed with Aspergers Syndrome. At the age of 5 years he had difficulty playing with other children “on their terms” and often played his “own games” without regard for what other children wanted to do.

**Representational Drawing tasks**

Drawings of S.M showed high accomplishments in depicting perspective, proportion, certainty, sensitivity of line and shading, together with detailed accuracy, imposing highly individual and personalized style. To assess level of drawing talent, a pre-test was administered initially to ascertain S.M’s concept of view specificity in pictures. Successful performance on the pre-test was necessary for the presentation of representational drawing tasks. For the pre-test, he was shown a horse and a teddy and was asked to select the photograph showing their present position. S.M showed successful performance on these tasks and thus the representational drawing tasks involving a striped mug and teapot were presented with their occluded handles and S.M was asked to draw them exactly showing their present position. His drawing was scored for level of realism using a detailed, reliable, and valid scoring system that was used in other research (Ford & Rees, 2008). Scores on this task can range from 0.0 to 1.0. The task presentation and scoring of representational drawings were done as per Ford and Rees. S.M was able to produce realistic drawings for these tasks as shown in figure 1 and 2. While drawing, S.M used the ‘construction by local progression’ strategy used by the savant, E.C. S.M drew them hyper-realistic and included many of the characteristics of drawings by precocious realists—line as edge, detail and occlusion. His drawing received a perfect score of 1.0 for visual realism.

To determine whether S.M used the kind of local proximity strategy described in autism spectrum individuals by Mottron and Belleville (1993) and Mottron et al. (1999), S.M’s drawings were observed. It was assessed whether S.M first drew the global shape and then altered the global shape by modifying it and adding details, or whether he drew the still life part by part. S.M used the same kind of extreme local strategy used by the savant, E.C., which Mottron and Belleville (1993) refer to as the strategy of construction by local progression. He did not sketch in the overall shape but rather drew part-by-part. Thus, for the mug, S.M began at the top and worked his way down to the base (figure 1).

**Fig-1. Drawing of the mug.**

![Fig-1. Drawing of the mug.](image1)

**Fig-2. Drawing of the teapot.**

![Fig-2. Drawing of the teapot.](image2)

**Figs. Representational Drawings of S.M**
S.M’s drawings were assessed for global meaning. For instance, S.M showed omission errors for the teapot’s pattern than mug’s stripes as the teapot’s representation was complex consisting of the handle, spout and lid as compared the mug’s representation which was simple consisting of the handle of the mug. Thus, his performance was impaired in integrating the local elements into a global whole and demonstrated inferior global processing.

**DISCUSSION**

The current case study sought to examine whether S.M, an Aspergers child with exceptional strengths in drawing and visual imagery, had visuo-spatial skills in line with weak central coherence or enhanced perceptual functioning. Representational drawing tasks were administered to assess S.M’s drawing ability. S.M demonstrated superior performance on local processing tasks, along with impaired performance on the global processing task similar to that of E.C. (Mottron & Belleville, 1993).

The performance at striped mug task test might also be considered a measure of local processing since to determine whether one has seen stripes before one must notice whether small details have been altered. On the observational drawing task, S.M exhibited the same drawing strategy as E.C. (Mottron & Belleville, 1993). S.M used E.C.’s strategy of “construction by local progression.” He moved onto an adjacent part before completing the part already begun. While S.M demonstrated superior local processing, he also demonstrated inferior global processing. S.M’s drawings were prone to an influence of meaning and were guided by genuine conceptualizations. He might have failed to integrate the local elements into a global whole as conveyed by his performance on the teapot task. This is consistent with finding that adults with Asperger’s syndrome made more errors in identifying impossible figures than did a control group of undiagnosed adults (Rodgers, 2000).

Taken together, the findings suggest that S.M has weak central coherence in the visual domain. He demonstrated superior performance on local processing tasks, along with impaired performance on the global processing task. The combination of superior local processing and exceptional realistic drawing ability that was found in S.M suggests that local processing and realistic drawing skill are related. Drake et al. (2010) demonstrated a correlation between these two skills in a typical population of children.

In summary, S.M demonstrated exceptional realistic drawing talent much like that displayed by E.C. as an adult. His drawings’ revealed the existence of visual realism in children with Aspergers. The findings have implications for improving our understanding of the capacity of Aspergers children for conceptualization as well as providing some important insights into their cognitive abilities through their drawings. Future research can also investigate whether there is a relation between imaging capacity and the local processing bias.

**REFERENCES**


