

A Review of Autism Spectrum Disorder

Perrin Robinson

PSY 230 Writing for the Social Sciences

March 2012

Dr. Richard Beans

### A Review of Autism Spectrum Disorder

Autism Spectrum Disorder (ASD), sometimes referred to as “autism”, is “a chronic disorder whose symptoms include failure to develop normal social relations with other people, impaired development of communicative ability, lack of imaginative ability, and repetitive, stereotyped movements” (Carlson, 2007, p. 594). Individuals with autism disorder have markedly different social and emotional actions and reactions than non-autistic individuals. For example, many autistic children do not seem to care whether or not they get attention from their parents. ASD also has an affect on IQ. While 30% of individuals with autism have an average or gifted IQ, 70% are considered mentally retarded (Sarason & Sarason, 2002, p. 507).

The term “autism” is derived from the Greek word “autos”, which means “self”. In the 1940s, Leo Kanner, a doctor at Johns Hopkins University, began using the term to describe children whose behavior was socially and emotionally withdrawn. From then until the 1960s, many researchers and therapists believed that autism and schizophrenia were linked disorders. Initial treatments for autism included the use of LSD, electric shock, and behavior change techniques, which regularly relied on punishment and pain to change behaviors (Hirsch, 2009).

In order for an individual to be diagnosed with ASD, he or she must be several qualifications as stated in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). These include a qualitative impairment in social interaction and communication, restricted repetitive and stereotyped patterns of behaviors, interests, and activities, and delays in functioning. Diagnosis also requires that Rett’s Disorder and Childhood Disintegrative Disorder – which have similar symptoms – do not better account for the behaviors (American Psychiatric Association, 2000, p. 75).

Initially, researchers believed that ASD in children was the result of living in a home with cold, insensitive parents. The symptoms of children with ASD were similar to the symptoms of those who had experienced the German concentration camps in World War II. Because of this, the parents of autistic children often experienced blame and guilt. Thankfully, that view is no longer held, and most researchers and mental health professionals understand that ASD has biological origins (Carlson, 2007, p. 596-597).

### **Neurophysiological Features and Cognitive/Behavioral Symptoms**

There are several abnormalities in the brain activity of an autistic individual. In an experiment by Castelli, Frith, Happé, & Frith (2002), autistic and non-autistic individuals were asked to infer human-like motivations and reasoning on two triangles that interacted with each other in a video. These researchers performed functional imaging on the participants during the task, and saw marked differences between the two groups. For example, there was less activation in the superior temporal sulcus and medial pre-frontal cortex of autistic individuals than in the non-autistic individuals. In particular, the temporo-parietal junction of the superior temporal sulcus, which processes biological motion and mentalizing, had little to no functioning in the ASD participants. This lack of mental activity in autistic individuals, says Castelli (2002), implies that there is a disconnect between high- and low-order perceptual processes.

Several other areas of the brain are affected by autism. Research in 2001 by Pierce et al. (as cited in Carlson, 2007, p. 595) found little to no activity in the fusiform face area (FFA) of the fusiform gyrus of autistic adults looking at pictures of human faces. Non-autistic adults, however, had their largest increase in brain activity in the FFA while looking at pictures of faces. Further research (Grelotti et al., 2005) has concluded that decreased brain activity in the FFA of

autistic individuals is likely from a disinterest in human faces rather than a dysfunction of the FFA.

Another difference in brain functioning between autistic and non-autistic individuals lies in the mirror neurons. According to Oberman and Ramachandran (2007), the mirror neuron systems (MNSs) of the brain provide some of the best theories to connect neuro-anatomy and autistic behavior. While the exact roles of the MNSs are unclear, current research indicates that the systems do exist and are important to imitative behavior (Oberman & Ramachandran, 2007). Likewise, deficiencies in the MNSs may create autistic behaviors. “Dysfunctional simulation mechanisms may underlie the social and communicative deficits seen in individuals with autism spectrum disorders” (Oberman & Ramachandran, 2007). Until recently, it was thought that MNS deficiencies may reduce with age in individuals with ASD, but a current study (Enticott et al., 2012) found no effect of age on dysfunction of the MNS.

One characteristic symptom of autistic individuals is their inability to develop a Theory of Mind (Sarason & Sarason, 2002, p. 508). Theory of Mind refers to “the ability to attribute mental states such as desire, knowledge, and belief to oneself or other people as a way for explaining behavior” (Sarason & Sarason, 2002, p. 508). For example, research done by Baron-Cohen, Leslie, and Frith in 1985 found that most children knew that if Sally placed a marble in a basket and left the room, she would return to the room expecting the marble to be in the basket. Children understood that Sally would still look for her marble in the basket even if a second character, Anne, moved the marble to a box while Sally was out of the room. The children were able to understand Sally’s reasoning because they had developed a Theory of Mind. Both children and adults with autism usually failed to understand that Sally would still think the

marble was in the basket when she returned. Instead, they believed that Sally would look for the marble in the box, indicating that many adults with ASD have not developed a Theory of Mind.

Restricted and repetitive behaviors (RRBs) include a set of behaviors that are central to individuals with ASD. RRBs “form a class of behaviors characterized by high frequency, repetition in an invariant manner, and desire for sameness in the environment” (Leekam, Prior, & Uljarevic, 2011). Examples of RRBs include constantly picking at something, spinning the wheel of a toy car over and over, or drawing circles for upwards of an hour. While there is evidence that RRBs decrease with age, there is little research on interventions and interaction factors for RRBs (Leekam et al., 2011).

### **Treatment Options**

Although several forms of treatment for the symptoms of ASD have emerged in the past decades, differential responsiveness for the individuals with ASD demands further research into treatment options (Sherer & Schreibman, 2005). Initial therapies in the 1940s and 1950s centered around punishment for unwanted behaviors and sometimes included pain. These techniques have been largely abandoned for treatment plans that includes a form of behavior therapy with the addition of other necessary treatments. These other treatments could include medicine, diet changes, music therapy, art therapy, or animal therapy (Hirsch, 2009).

One of the most widely-used forms of behavior therapy for individuals with ASD is Applied Behavior Analysis (ABA). Behavior analysis grew to prominence in the field of psychology from the work of B. F. Skinner in the 1930s (Green, Taylor, Luce, & Krantz, 2012).

ABA uses careful behavioral observation and positive reinforcement or prompting to teach each step of a behavior. A child’s behavior is reinforced with a reward

when he or she performs each of the steps correctly. Undesirable behaviors, or those that interfere learning and social skills, are watched closely. The goal is to determine what happens to trigger a behavior, and what happens after that behavior that seems to reinforce the behavior. The idea is to remove these triggers and reinforcers from the child's environment. New reinforcers are then used to teach the child a different behavior in response to the same trigger (Healing Thresholds, 2012).

ABA has shown itself to be very helpful in teaching individuals with ASD “learn specific skills, such as how to communicate, develop relationships, play, care for themselves, learn in school, succeed at work, and participate fully and productively in family and community activities, regardless of their age” (Green et al., 2012). Because of its high effectiveness, ABA has helped individuals with ASD to function both personally and in society and it remains one of the most popular and well-researched forms of therapy for ASD (Healing Thresholds, 2012).

Although ABA is the most widely used treatment for ASD individuals, other treatment programs are gaining attention for their effectiveness. One such program is The Son-Rise Program. The Son-Rise Program and ABA take strongly different approaches to treatment. For example, ABA focuses on the behaviors, attempting to correct them with structure, requests, and repetitious activities designed to remove RRBs and eventually perform socially desired behaviors. In contrast, The Son-Rise Program focuses mainly on the social aspect of ASD. Children in treatment are encouraged to be spontaneous and use their imagination. The therapists, which are often the parents, join

in RRBs with the child and encourage excitement throughout even mundane activities (The Option Institute & Fellowship, 2008).

The role of medication in ASD treatment has largely been to improve the effectiveness of behavior therapy. It is possible that individuals with ASD are deficient in certain vitamins and minerals. Two of the most commonly taken supplements for ASD individuals are magnesium and Vitamin B. Specific diets may also be implemented to improve the well being of the individual (Mousain-Bosc et al., 2006).

### **Implications for Future Research**

Despite the tremendous research on ASD in previous decades, there is still much to learn about the disorder. Treatment options like The Son-Rise Program need stronger empirical validation if they are to become more widely accepted. A more thorough investigation of the differences between The Son-Rise Program and ABA would help parents decide which approach is best for their child. More research towards understanding the roles and deficiencies of specific vitamins and minerals would help determine appropriate diets for individuals with ASD.

From a neurophysiological standpoint, there is still much to uncover about cognitive functions that relate to autism. Current research shows that systems of mirror neurons are deficient in ASD individuals. Research towards understanding where these systems are located and what strengthens them would benefit many living with ASD. In the future, therapeutic activities could be oriented around a knowledge of which stimuli and behaviors strengthen the MNSs. The MNSs create one of the most promising areas of research in the study of ASD (Oberman & Ramachandran, 2007).

With the increasing knowledge of ASD and its treatment options comes a greater capacity for improvement in the lives of ASD individuals. Differing types of therapy provide the opportunity for unique treatment plans for each person. The added dimensions of supplements and diet allow for customizable treatment plans based on factors such as age, IQ, and deficiencies. A growth of knowledge in all of these areas points to a promising future for individuals with ASD.

### References

- American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4<sup>th</sup> ed.) Washington, DC: American Psychiatric Association.
- Baron-Cohen, S., Leslie, A. M., Frith, U. (1985). Does the autistic child have a “theory of mind”? *Cognition*, 21. 37-46. Retrieved from: [rucss.rutgers.edu/~aleslie/Baron-Cohen%20Leslie%20&%20Frith%201985.pdf](http://rucss.rutgers.edu/~aleslie/Baron-Cohen%20Leslie%20&%20Frith%201985.pdf)
- Carlson, N. R. (2007). *Physiology of Behavior* (9th ed.). United States of America: Pearson Education, Inc.
- Castelli, F., Frith, C., Happé, F., Frith, U. (2002). Autism, Asperger syndrome and brain mechanisms for the attribution of mental states to animated shapes. *Oxford University Press*, 125(8), 1839-1849. doi: 10.1093/brain/awf189
- Green, G., Taylor, B., Luce, S., Krantz, P. (2012). *Applied behavior analysis*. Retrieved from [www.autismspeaks.org/what-autism/treatment/applied-behavioral-analysis-aba](http://www.autismspeaks.org/what-autism/treatment/applied-behavioral-analysis-aba)
- Enticott, P. G., Kennedy, H. A., Rinehart, N. J., Tonge B. J., Bradshaw, J. L., Taffe, J. R., Daskalakis, Z. J., Fitzgerald, P. B. (2012). Mirror neuron activity associated with social impairments but not age in autism spectrum disorder. *Biological Psychiatry*, 71(5), 427-433. doi: 10.1016/j.biopsych.2011.09.001
- Healing Thresholds. (2012). *Applied behavior analysis for children with autism*. Retrieved from [autism.healingthresholds.com/therapy/applied-behavior-analysis-aba](http://autism.healingthresholds.com/therapy/applied-behavior-analysis-aba)
- Hirsch, D. (2009). *History of Autism*. Retrieved from [www.webmd.com/brain/autism/history-of-autism](http://www.webmd.com/brain/autism/history-of-autism)

- Leekam, S. R., Prior, M. R., Uljarevic, M. (2011). Restricted and repetitive behaviors in autism spectrum disorders: A review of research in the last decade. *Psychological Bulletin*, 137(4), 562-593. doi: 10.1037/a0023341
- Mousain-Bosc, M., Roche, M., Polge, A., Pradal-Prat, D., Rapin, J., Bali, J. P. (2006). Improvement of neurobehavioral disorders in children supplement with magnesium-vitamin B6. [Abstract]. *Magnesium Research*, 19(1), 53-62. Retrieved from [www.jle.com/en/revues/bio\\_rech/mrh/e-docs/00/04/18/F2/resume.md](http://www.jle.com/en/revues/bio_rech/mrh/e-docs/00/04/18/F2/resume.md)
- Oberman, L. M., & Ramachandran, V. S. (2007). The simulating social mind: The role of the mirror neuron system and *simulation* in the social and communicative deficits of autism spectrum disorders. *Psychological Bulletin*, 133(2), p. 310-327. Retrieved from [web.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=9acf75c2-ac50-4fee-9af7-1a2594e90e4a%40sessionmgr4&vid=2&hid=18](http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=9acf75c2-ac50-4fee-9af7-1a2594e90e4a%40sessionmgr4&vid=2&hid=18)
- The Option Institute & Fellowship. (2008). *The Son-Rise Program® versus ABA*. Retrieved from [www.autismtreatmentcenter.org/information/son-rise\\_and\\_aba.php](http://www.autismtreatmentcenter.org/information/son-rise_and_aba.php)
- Sarason, I. G., & Saraon, B. R. (2002). *Abnormal psychology: the problem of maladaptive behavior*. Upper Saddle Rivery, New Jersey: Pearson Education, Inc.
- Sherer, M. R., Schreibman, L. (2005). Individual behavior profiles and predictors of treatment effectiveness for children with autism. *Journal of Consulting and Clinical Psychology*, 73(3), 525-528. doi: 10.1037/0022-006X.73.3.525