

**CLINICAL EDITOR:** This article offers developmental and clinical information for play therapists working with children with Autism Spectrum Disorder (ASD). The author proposes that, in order to facilitate integration of different parts of the brain, play therapists should have a basic understanding of the neuroscience behind ASD. To that end, helpful charts are provided.

# Neuroscience and Play Therapy

*Working to Help Children on the Autism Spectrum*

By Darci Feifer M.Ed., LCPC

Autism is a complex disorder affecting children in the social and communication arenas. Social and communication skills impact all aspects of life, making this spectrum disorder a very difficult one to remediate. There are many unanswered questions about Autism, complicating interventions even more. However, research has offered explanations of Autism's neurological underpinnings and may lead to a better understanding of appropriate interventions.

Intervention specialists with knowledge about "typical" brain development versus "Autistic" brain development can create optimal treatment plans that enhance the best use of a young brain's plasticity. Brain plasticity refers to the concept that "the brain does not yet have seated or fixed locations associated with specific functions the way an adult brain does" (Siegel, 2003, p. 35). Due to neural plasticity, there is an opportunity for a transfer of function of skills in order to help the child compensate for early deficits that may lead to future problems (Siegel, 2004; Akshoomoff, 2000; Dawson & Bernier, 2007). A developing brain can learn to reorganize itself early in life when synapses in a child's brain are at their peak, therefore, allowing for the best opportunity to select the "optimal neural pathways" (Eliot, 1999, p. 364) for language development. Helpful intervention strategies take advantage of specific learning windows to create pivotal learning foundations for children with autism to build upon. Early symptomology can then be examined through neurological and developmental lenses to create pivotal learning points and



Summary of Six Early Indicators and Affected Brain Regions

Category	Early Behaviors	Approximate Age of Typical Development	Primary Brain Regions	Long Term Impact Without Interventions
<b>Social Orienting</b>	Responding to changes in eye gaze	5 months	Limbic circuitry	Lack of eye contact Social isolation
	Response to name	5-7 months		
	Attending to people	3 months		Intense Interest in predictable objects (spinning toys)
	Attempt to locate human sounds around him/her	4 months		
<b>Joint Attention</b>	Matching mother's head turning towards an object	6-12 months	Interaction of limbic, temporal lobes and orbital frontal cortex	Difficulty learning from the environment and discerning relevant stimuli
	Sharing eye gaze	3 months		Ability to seek help and engage others in play
	Drawing another person's attention to share an experience	7 months		
<b>Emotional Responsiveness</b>	Social smiling	4-8 weeks	Basal ganglia	Relating emotions to specific events
	Imitation of facial expressions	Newborn	Amygdala – orbital frontal cortex	Empathy
	Social referencing	9-12 months	Frontal lobes	Inferring how one's own behavior causes emotional response in another
	Responds positively to soothing or cuddling	Newborn		"Reading" safety of situations based on emotional tone of another
	Attachment to caregivers	8 months		Ability to form secure relationships
<b>Motor Imitation</b>	Imitates actions such as waving	1 year	Limbic system, frontal regions and cerebellum interactions	Learning new behaviors through mimicking others
	Imitates behavior in a larger context	1-2 years		Generalizing new physical behaviors
<b>Face Processing</b>	Prefer human faces	Newborns	Right fusiform gyrus (occipital and temporal lobe)	"Reading " emotions of others
	Prefer to scan eye regions in face	2 months		Visually recognizing strangers vs. familiar people
	Face recognition	(Mother's face at birth)	Fusiform gyrus	
	Face differentiation	2 months	Temporal cortex	
<b>Communication</b>	Babble	12 months	Temporal lobes (Left- verbal, linguistic skills) (right-emotion and prosody)	Receptively process language
	Gesture (point, wave)	9-12 months		Expressively use language
	Single words	16 months		
	Spontaneous 2 words	24 months		

respond with developmentally appropriate interventions. One such intervention is play therapy. Play therapy can help create these bridges between sensation, motor behavior and cognition by integrating multiple brain regions.

There are six early developmental anomalies that point to a diagnosis of Autism:

- Social orienting (Dawson & Bernier, 2007; Kabot, Masi, & Segal, 2003; Landa & Garrett-Mayer, 2006)
- Joint attention (Dawson & Bernier, 2007; Kabot et al, 2003; Landa & Garret-Maye, 2006; Woods & Wetherby, 2003)
- Sensitivity to other's emotions (Dawson & Bernier, 2007)
- Delayed motor imitation (Dawson & Bernier, 2007; Landa & Garrett-Mayer, 2006)
- Face processing (Dawson & Bernier, 2007, Landa & Garrett-Mayer, 2006)
- Communication of needs (Chawarska & Volkmar, 2005; Landa & Garrett-Mayer, 2006; Woods & Wetherby, 2003).

To facilitate integration of the different parts of the brain, play therapists should have a basic understanding of the neuroscience behind these symptoms. Knowing which areas of the brain are responsible for certain behaviors may help determine what other difficulties might arise because they are also affiliated with similar neural circuitry. Dawson and Bernier (2007) suggest as understanding of brain functions and brain circuitry expands, "our interventions can become more targeted and focused" (p.45). Understanding brain functions can also help practitioners understand autism's complex abnormalities which are not purely behaviorally based. These can be viewed as a developmental reaction due to an "atypical cognitive style" caused by differences in the brain circuitry (Baron-Cohen & Belmonte, 2005, p.116). Many early symptoms of an autism spectrum disorder intertwine to build later skills. Joint attention and motor imitation work in conjunction to establish both pre verbal and verbal skills. For instance, by identifying brain regions affected in ASD we can in turn identify pathways for remediation (Rippon, Brock, Brown, & Boucher, 2007). One example is the pairing of visual stimuli with auditory communication in order to facilitate a process of transferring from an auditory-mode (a weakness for many children with ASD) to a visual processing task. If this type of intervention is done early, while the brain has greater plasticity, it can create pathways for future learning and allow interventionists to "reset the growth curve in a more optimal way" (Landa & Garrett-Mayer, 2006, p. 635).

Here is where the "power of play" can be helpful to infants, toddlers and preschoolers who have symptomology commensurate with children on the Autism Spectrum. For typically developing children play is a natural medium to explore the world. Play and all the experiences encapsulated in it help teach important pivotal skills such as turn taking, emotional responsiveness, problem solving, communicating, social

referencing (the ability to "read" a situation and respond to it) and imitation. Since these skills are associated with early brain development, they should be explicitly taught during the toddler and preschool years if the child is not self-initiating the development of these skills. Siegel (2003) sums this thought up best claiming, "teaching a child with autism to "play" is tantamount to teaching the child with autism how to learn" (p. 238). Perhaps knowing developmentally where the child's play is, an intentional "play plan" can be developed that correlates key pivotal play behaviors with specific areas of the brain that need "jump-starting".

Category	Sample Play Activities for Toddlers 1-3 Years
Social Orienting	Place a large squishy ball on your head and pick a loud silly word (i.e. ACHOO). Sitting across child but within arm's distance, put ball on your head and loudly say word as you throw ball off your head and onto child's lap. As child orients (shown by eye gaze) replay activity, keep ball in same place so child can begin to initiate game. As child becomes comfortable with play sequence and initiates game (by gestures/verbalizations) other games are added.
Joint Attention	Follow child around play area and parallel play in whatever activity child is engaged. If child likes trains, imitate child's play with brief interspersions of "train to train" crashes. Offer short commentaries about joint interaction "I will drive my train too."
Emotional Responsiveness	Use very animated voice and facial expressions when interacting with toddler. Stay physically close (as close as child will tolerate). Books with baby face pictures are helpful to look at and imitate
Motor Imitation	Use child preferences in activities/toys to engage in imitation of child. Add to child's activities interest is shown in your interactions.
Face Processing	When playing with dolls, puppets and stuffed animals point out different facial features (e.g. Mickey's, child's and therapist's nose). Use child's name. Create a photo album of faces of people child knows. Enlarge pictures making a Velcro puzzle matching activity.
Communication	Connect single words clearly to object or action to which it refers. Once child has 50 single words (Williams, 2008) use 2-3 word chunks. Using visual cues (pictures, actual object, sign language) along with verbal language encourages language development.

Empirically validated methodologies have emerged that address core developmental areas. These approaches have characteristics similar to those of child-centered play therapy; the foremost is following the child's lead as well as developing attachments to a significant adult (Naber, Bakermans-Kranenburg, van IJzendoorn et al., 2008). Other components of successful approaches include providing interventions in natural settings for play opportunities (Jordan, 2003) and the use of intrinsically related rewards for desired social interactions (Koegal, Koegal, Freedon, & Gengoux, 2008). Intrinsically related rewards may include engaging toddlers in playing with the object they are most interested in and in physical touch such as tickling or a game of chase. There are multiple ways to engage these young children; the central focus of all engagement needs to be on each child's social, emotional and developmental level. Another important feature when designing child-led targeted play is to respect the child's need for routines. Toddlers will let adults know when they are ready to alter the routine play activity by following a lead or simply tolerating the change. Practitioners should create an environment that is toddler friendly in that children can reach many toys, but it is also helpful to put some favorite toys just a little beyond reach to encourage children to communicate their desires.

Developmentally appropriate play therapy is a valuable intervention that can help young children with ASD learn pivotal skills. If these skills were emphasized during optimal periods of neural plasticity the developing brain can create more optimal bridges for future learning.

## References

- Akshoomoff, N. (2000). Neurological underpinnings of autism. In A.M. Wetherby & B.M. Prizant (Eds.), *Autism spectrum disorders: Vol. 9. A transactional developmental perspective* (pp. 167-190). Baltimore: Paul H. Brookes Publish Co.
- Baron-Cohen, S. & Belmonte, M. K. (2005). Autism: A window onto the development of the social and analytic brain. *Annual Review of Neuroscience*, 28, 109-126.
- Chawarska, K. & Volkmar, F. R. (2005). Autism in infancy and early childhood. In F.R. Volkmar, R. Paul, A. Klin, & D. Cohen (Eds.), *Handbook of autism and pervasive developmental disorder: Vol.1. Diagnosis, development, neurobiology, and behavior* (3rd ed., pp. 223-246). Hoboken, NJ: John Wiley & Sons.
- Dawson, G. & Bernier, R. (2007). Development of social brain circuitry in autism. In D. Coch, G. Dawson, & K. W. Fischer (Eds.), *Human behavior, learning, and the developing brain* (pp. 28-55). New York: Guilford Press.
- Eliot, L. (1999). *What's going on in there: How the brain and mind develop in the first five years of life*. New York: Bantam Press.
- Kabot, S., Masi, W. & Segal, M. (2003). Advances in the diagnosis and treatment of autism spectrum disorders. *Professional Psychology: Research and Practice*, 34(1), 26-33.
- Koegel, L. K., Koegel, R. L., Fredeen, R. M., & Gengoux, G. W. (2008). Naturalistic behavioral approaches to treatment. In K. Chawarska, A. Klin, & F. R. Volkmar (Eds.), *Autism spectrum disorders in infants and toddlers* (pp. 207-242). New York: Guilford Press.
- Jordan, R. (2003). Social play and autistic spectrum disorders: A perspective on theory, implications and educational approaches. *Autism*, 7(4), 347-360.
- Landa, R. & Garrett-Mayer, E. (2006). Development in infants with autism spectrum disorders: A prospective study. *Journal of Child Psychology and Psychiatry*, 47(6) 629-638.
- Naber, F. B. A., Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., Swinkels, S. H. N., Buitelaar, J. K., Dietz, C., van Daalen, E. & van Engeland, H. (2008). Play behavior and attachment in toddlers with autism. *Journal of Autism and Developmental Disabilities*, 38, 857-866.
- Rippon, G., Brock, J., Brown, C., & Boucher, J. (2007). Disordered connectivity in the autistic brain: Challenges for the 'new psychophysiology'. *International Journal of Psychophysiology*, 63(2), 164-172.
- Siegel, B. (2003). *Helping children with autism learn: Treatment approaches for parents and professionals*. New York; Oxford University Press.
- Williams, D. L. (2008). What neuroscience has taught us about autism: Implications for early intervention. *Journal of Zero to Three: National Center for Infants, Toddlers, and Families*, 28(4), 11-17.
- Woods, J. J. & Wetherby, A. M. (2003). Early identification of and intervention for infants and toddlers who are at risk for autism spectrum disorder. *Language, Speech and Hearing Services in Schools*, 34,180-193.



# Success

*The Social and Emotional Competence Game*

Have fun teaching empathy, communication skills, self-awareness, social awareness, relationship skills, self-management and responsible decision making.

Used by Speech and Language Therapists, Play Therapists, Teachers and Counselors with children age six years and older.

*Social and Emotional Competence Game Cards for ADHD, Asperger's & Bipolar Disorder*

Use with the board game or as a stand alone card game. The cards effectively educate players about a specific disorder and provide skills for managing it. Developed by Child Psychologist Gary Yorke, Ph.D.

Enter Coupon Code: **A4PT** and save 10%

available at:



**childtherapytoys.com**