

A Caregiver's Guide to Facilitating Language on the Autism Nature Trail



Skott Jones, Ph.D., CCC-SLP



Autism Nature Trail Stations

- Trailhead Pavilion
- Meadow Run and Climb
- Sensory Station
- Design Area
- Sunshine Slope
- Playful Path
- Music Circle
- Celebration Station
- Reflection Knoll

What is autism spectrum disorder?

- ◆ *Autism spectrum disorder* (ASD) is a neurodevelopmental disorder characterized by social communication difficulties and repetitive, restricted behavior patterns (American Psychiatric Association, 2013). The current estimated incidence of ASD is 1 in 68 children (Christensen et al., 2016). One of the core deficits observed in children with ASD is reduced or absent *joint attention*, which refers to sharing a mutual focus with someone else. Children with ASD have difficulty both initiating joint attention (e.g., pointing at something to get someone else to look), and responding to joint attention (e.g., looking where someone else is pointing). These difficulties have broad implications for language development, since caregivers frequently label new objects and actions for children under the assumption that they are sharing the same focus. However, this is not always the case. For example, a child with ASD may be staring at a squirrel in a tree while the caregiver labels an airplane; this leads to a mismatch between a novel word and its referent. In order to address these well-known deficits that can impact language development, it is critical to modify the caregiver-child interaction by using evidence-based strategies that follow in this guidebook.



What is the Autism Nature Trail?

- ◆ The *Autism Nature Trail* provides a safe and inclusive setting for visitors with ASD to experience nature in a way uniquely suited to them. The mile-long, self-paced trail loop is comprised of eight stations that address various sensory needs, three captivating features, and several specialized elements like cuddle swings, gliders, and “alone zones.” A tall stone marker is visible at the entrance to each station to provide consistency and predictability. Visitors can choose to engage with or bypass any single station, and there is also an optional return route halfway through the trail. Along the way, the trail’s twists and turns reveal opportunities for experiences that range from quiet engagement to exploration and adventure – all within a positive, non-threatening setting. These experiences allow visitors with ASD to enjoy the physical, emotional, and social benefits of being more fully engaged with nature. Research has supported the importance of such engagement, noting Chang and Chang’s (2010) findings of seven primary benefits of outdoor activities for children with ASD in the areas of social interaction, communication, behavior, emotion, cognition, sensitivity, and physical activity.

What is the difference between language, speech, and communication?

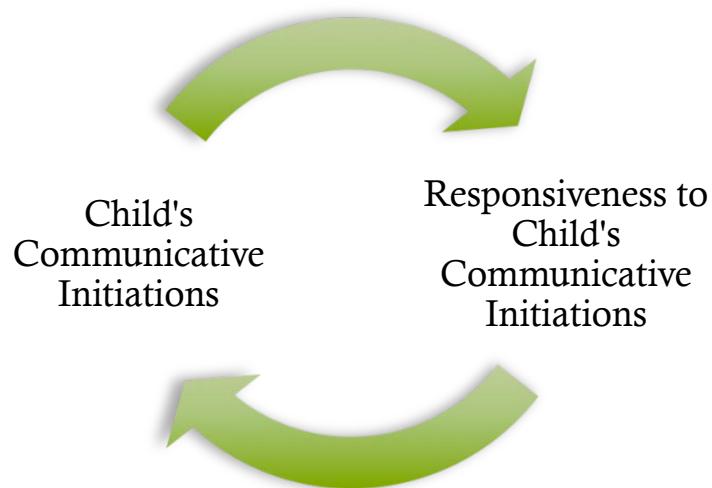
- ◆ **Language** refers to a socially shared system of symbols and rules used to communicate one's thoughts, wants, and needs. Language can be expressed in several different ways, one of which includes speech. Other ways to express language include signing, writing, and using a speech-generating device.
- ◆ **Speech** requires the coordination of the lungs, the voice, and the articulators (e.g., tongue, teeth, lips) to produce sounds, words, and sentences.
- ◆ **Communication** involves the sharing of information, which includes language by definition, but also consists of gestures (e.g., pointing, waving), vocalizations (e.g., grunting, moaning), and body language (e.g., pushing an object away). The earliest communicative functions observed for typically developing children are requests and comments. While children with ASD demonstrate requesting early on in development (Maljaars, Jansen, Noens, Scholte, & van Berckelaer-Onnes, 2011; Wetherby & Prutting, 1984), the function of commenting to others can remain impaired or even absent without targeted intervention.

ASD and Language Development

- Given that nearly 50% of children with ASD are initially nonverbal yet develop into fluent speakers by age 8 (Wodka, Mathy, & Kalb, 2013), there is strong support for using evidence-based techniques to facilitate language. Additionally, only 25% of children with ASD never develop functional speech (Tager-Flusberg, Paul, & Lord, 2005). Use of facilitative language strategies has a long history dating back 40+ years (Schopler & Reichler, 1971), with more recent guidelines recommending that services occur in a play-based format using age-appropriate materials (Division for Early Childhood of the Council for Exceptional Children, 2014; Wolery & Hemmeter, 2011). Additionally, the Individuals with Disabilities Education Improvement Act of 2004 mandated that services for young children with special needs be implemented within typical, authentic learning experiences.

Transactional Model of Development

- For the purpose of this guidebook, a theory of child development called the *transactional model* (Sameroff, 1975) will be used. Briefly, this bidirectional model assumes that as children increase their communicative initiations, caregivers increase their responsiveness in terms of following the child's lead, and mapping their attention to the child's attention. This in turn results in even further increases in the children's initiations.



Zone of Proximal Development

- ◆ The five principles of facilitating language in children with ASD that follow are designed to increase both the child's initiations and the caregiver's responsiveness to such initiations. This is critical because research has found that the single most important prognostic indicator for young children with ASD is their language ability (Schreibman, 1988), with expressive language predicting positive long-term outcomes (Howlin, Goode, Hutton, & Rutter, 2004; Lord, Risi, & Pickles, 2004). These strategies also align with what Vygotsky (1978) termed the *zone of proximal development*, which is the difference between what a child can do with 100% independence and 100% assistance; this is where optimal learning is believed to occur.



Principle #1: Follow the Child's Lead

- ***Attentionally:*** Research indicates that it is best to comment on what holds the attention of children with ASD rather than to re-direct their attention to something else (McDuffie, Yoder, & Stone, 2005; Siller & Sigman, 2002). This child-centered technique is called “follow-in commenting”, and places no expectations or pressure on children to respond. For example, if a child spots a bird on a tree stump, you can simply comment, “You see a bird on that stump.” For children with restricted attention spans who focus on one particular object for a lengthy period of time, it may be necessary to re-direct their attention to ensure an adequate sampling of environmental stimuli. In this instance, a child’s known interests should guide the selection of another focal point. Overall, adopting the focus of attention of children with ASD (rather than re-directing it) is beneficial, and may motivate children to make more communicative attempts. This is important to monitor because children with ASD often elicit a more directive style of interaction from their caregivers (Wan, Green, Elsabbagh, Johnson, Charman, Plummer et al., 2015). By matching the focus of attention of children with ASD, it is believed to decrease the cognitive load required to process language (Perry, Carter, Messinger, Stone, Ivanescu, & Yoder, 2013).

Principle #1: Follow the Child's Lead

- ***Behaviorally***: Also called ***mirroring***, this technique involves imitating a child's physical behavior immediately after it occurs. Studies have shown many benefits for this strategy when used with children with ASD, including increased eye contact (Tiegerman & Primavera, 1984), increased positive affect (Harris, Handleman, & Fong, 1987), increased coordinated joint attention (Ingersoll & Schreibman, 2006; Lewy & Dawson, 1992), and increased responsiveness and attention to the caregiver (Dawson & Adams, 1984). Relevant to the Autism Nature Trail, one study found that imitating a child's physical behavior during outdoor play led to an increase of communicative gestures and words (Kashinath, Woods, & Goldstein, 2006).

Principle #1: Follow the Child's Lead

- *Linguistically*: Children with ASD who use language to communicate will likely comment on many things that they experience on the trail. It is best to honor the child's selected topic by making a relevant comment on the same topic or asking the child a follow-up question about it. It is not recommended to change a child's topic unless the child is perseverating and unable to talk about anything else. Try using both of the following two techniques to facilitate a child's language productions:
 - *Expansions*: Repeat the child's sentence and fill in any missing grammatical markers (e.g., "Tree fell." → "A tree fell there.")
 - *Extensions*: Repeat the child's utterance filling in any grammatical markers AND add one more piece of information or question (e.g., "Tree fell." → "A tree fell there. I wonder what happened." or "A tree fell there. What do you think happened?").

Principle #2: Reinforce Any and All Communication Attempts

- In order to help children with ASD understand the power of communication, all attempts to communicate should be reinforced with natural consequences whenever possible. For example, if a child reaches for an object in one of the cases at the Sensory Station, the caregiver should quickly hand it to her. Recall that communication occurs *whenever* a child shares information. Sometimes this may be through the use of words for children with ASD who are verbal, but for other children it may be through eye gaze (e.g., staring at an object), gestures (e.g., pointing, reaching), vocalizations (e.g., laughing), signs, a speech-generating device, or even physical behavior used to manipulate others (e.g., pushing, pulling). Studies have shown that children with ASD make the most gains in language when caregivers respond quickly, consistently, and appropriately to all of the child's communicative signals (Spiker, Boyce, & Boyce, 2002; Yoder, Warren, McCathren, & Leew, 1998). The communicative signals of children with ASD may even include something called *echolalia*, which occurs when a child repeats someone else's speech. In fact, one study found that over 33% of echolalic utterances have a turntaking function, and 25% of them have some sort of commenting function (Prizant & Duchan, 1981).

Principle #2: Reinforce Any and All Communication Attempts

- In summary, the child's responsibility is to initiate an attentional or communicative lead, and the caregiver's job is to respond to it promptly and appropriately. This is important to note because decreased parental responsiveness with children with ASD may actually lead to delayed language development and joint attention (Ruble, McDuffie, King, & Lorenz, 2008; Siller & Sigman, 2002). That said, children with ASD do not always provide attentional or communicative leads that are easy to identify. In these cases, the caregiver should still respond as if all communication attempts are purposeful in order to help the child jointly attend. For example, a child may hear something on the trail and point to it reflexively (not for the caregiver's benefit), but the caregiver should still label the object accordingly and engage with the child as if it *was* intentional. Lastly, for children who are nonverbal but vocalize regularly without clear meaning, try imitating their vocalizations to positively reinforce the behavior.

Principle #3: Label New Objects and Actions

- During language development, children routinely rely on caregivers to label novel objects and actions in the surrounding environment. Labels are not only important in building a child's vocabulary, they also help to engage children with ASD. Research has found that using verbal labels during word learning can actually increase the attention span of children with ASD towards a novel object versus when labels are not provided (McDuffie, Yoder, & Stone, 2006).
- In general, children match the labels that they hear for novel objects and actions to what the caregiver is referencing. This means that the focus of attention between children and caregivers needs to be mutually shared. As stated earlier, this is not always the case for children with ASD. Be sure only to label objects or actions in which the child is attending rather than labeling something outside of their focus. Otherwise, an incorrect pairing is likely to occur between a word and what it refers to in the world (Baron-Cohen, Baldwin, & Crowson, 1997).

Principle #3: Label New Objects and Actions

- ◆ To enhance word learning on the Autism Nature Trail, here are some research-based guidelines for maintaining the attention of children with ASD:
 - ◆ Present only one object at a time.
 - ◆ Place objects near a child and encourage him/her to handle them.
 - ◆ Use child-friendly speech, which is brief in nature, simple, and higher pitched than normal.
 - ◆ Use clear gestures like pointing and offering.
 - ◆ Look towards objects being referenced.
 - ◆ Move objects to show their function.

(Leekam, Hunnisett, & Moore, 1998; Leekam, Lopez, & Moore, 2000)

Principle #4: Keep it Simple But Correct

- One of the best techniques to facilitate language in children with ASD is to demonstrate rich models without any request to imitate them. Models of language should be slightly *above* a child's current level of functioning. For children with ASD who are nonverbal, using 2-3 words is appropriate. For children with ASD who are using 2-3 words, using 4-6 words is appropriate. Most importantly, models should be fully grammatical. That means it should sound similar to how an adult speaks. Research has shown that using *telegraphic* speech, a type of speech consisting only of content words and omitting key grammatical markers like adjectives and articles, can actually slow language processing for children with ASD (Fernald & Hurtado, 2006; Kedar, Casasola, & Lust, 2006; Lew-Williams & Fernald, 2007), as well as result in lower language achievement (Venker, Bolt, Meyer, Sindberg, Ellis Weismer, & Tager-Flusberg, 2015). There is also evidence that children may imitate an adult's model more when it is fully grammatical than when telegraphic speech is used (Bredin-Oja & Fey, 2014).
- In summary, keep it simple but correct. For example, instead of saying, "Look big tree. We feel tree." → "Look at the big tree. We can feel the tree." Try using one or both of the following two techniques to facilitate language while labeling objects and actions:
 - Parallel talk:** describe what the child is doing (e.g., "You are smelling the pine cone.")
 - Self-talk:** describe what you are doing (e.g., "I am climbing the rock.")

Principle #5: Use Prompts and Communicative Temptations

- As stated earlier, the caregiver's job is to respond quickly and appropriately to a child's communicative signals. Caregivers can also help a child achieve a higher level of response by using prompts or cues. Direct prompts have shown to be most effective when used with individuals with ASD whose language skills are less than would be seen in a typically developing 2-year-old (Yoder, Kaiser, & Goldstein, 1995). Some of the most effective prompts to use with children with ASD include the following:
 - Time delay:*** When labeling a novel object or action, commenting about something you see or hear, or asking a child a question, allow 5 seconds of silence as a prompt that you are waiting for a response. Sometimes the child may imitate what you said, and other times the child may respond to it with something related. Allowing for silence may seem uncomfortable at first, as researchers have found that almost 75% of all errors made by caregivers who were taught language strategies involved not allowing sufficient time for children to respond (Gillet & LeBlanc, 2007). Studies have found many benefits to using a time delay for children with ASD, such as increased spontaneous speech productions, and use of communicative gestures and words in an outdoor setting (Charlop & Walsh, 1986; Kashinath et al., 2006).

Principle #5: Use Prompts and Communicative Temptations

- ◆ ***Gestures:*** A gestural prompt can be used to facilitate a child's participation during an activity. Gestures may include pointing, shrugging with open palms as if waiting for a child's decision, motioning to come closer, and reaching. When asking a child a question and there is no response, you can either provide a gesture pointing towards the relevant object or action, or shrug as if you are waiting for the child's response. Gestures are only effective if a child is looking towards the gesturer, so these should be reserved for when a child is jointly engaged with the caregiver.
- ◆ ***Verbalizations:*** For children with ASD with sufficient comprehension, words and sentences can be used as a prompt to communicate. Simple verbal requests can appear in the form of questions such as, "What should we do now" and, "What do you see?", or comments such as "I wonder what you hear," and "I bet you want to walk on that log." Comments offer a nice invitation to the child to participate without any expectation to respond, whereas questions place more pressure on the listener. Try to balance both comments and questions when using verbal prompts to avoid overwhelming children with ASD with a series of questions.

Principle #5: Use Prompts and Communicative Temptations

- ***Communicative temptations:*** The goal of a communicative temptation is to “tempt” the child to express some kind of request in the modality of his choice (e.g., gestures, words, vocalizations). One way of introducing a communicative temptation is to place a preferred object out of reach but in sight. Another strategy is to establish a predictable routine (e.g., rolling a ball back and forth), and then playfully violate that routine (e.g., holding the ball instead of rolling it back) to motivate the child to communicate. On the Autism Nature Trail, there are ample opportunities to tempt children with ASD to communicate by gently interrupting an established routine or pattern. As mentioned earlier, all communication attempts should be responded to quickly and appropriately with natural consequences. Depending on the level of functioning, caregivers can nudge children to a higher level of response by waiting for something more advanced (e.g., if a child is already using words, not responding to a gesture). Throughout this guidebook, examples of communicative temptations are provided at each station. Try to tailor communicative temptations based on the child’s interests, learning styles, and tolerance levels.

Checking In...

Ask children to point to one of the faces below or to verbally express how they are feeling before starting the trail.



Station #1: Trailhead Pavilion



- ◆ This station serves as both the entry and exit for the Autism Nature Trail. On the entrance side, visitors can enjoy a soothing waterfall feature, and browse the informational resources available.
- ◆ **Suggested nouns:** start, beginning, trail, pavilion, roof, chimney, cairn, fountain, water, waterfall, trough, bucket, treasure
- ◆ **Suggested verbs:** begin, feel, walk, touch, splash, spill, collect
- ◆ **Suggested descriptives:** dry, wet, rough, smooth, little, big, ready
- ◆ **Communicative temptation:** Collect and spill/splash some of the water 2-3 times, then interrupt the routine and use a prompt. Some examples of prompts:
 - ◆ **Gestural:** Turn towards the child and shrug with your hands turned up.
 - ◆ **Time delay:** Wait 5 seconds for any communicative attempt.
 - ◆ **Verbal:** Say, “What now?”

Station #2: Sensory Station



- ◆ This station is designed to captivate all of a visitor's senses in a quiet and individualized manner. Visitors should be encouraged to handle the many available artifacts, and to become aware of the surrounding sounds in the forest.
- ◆ For visitors with ASD who use language to communicate, try modeling simple sentence building scripts using a verb, descriptive, and noun ("I see a white bone....", "I hear a loud woodpecker...", "I feel fuzzy moss...", "I smell fresh grass...").
- ◆ ***Suggested nouns:*** hut, leaf, acorn, moss, pinecone, kaleidoscope, fur, bark, raintstick, fossil, bone, bird, eggshell
- ◆ ***Suggested verbs:*** look, shake, see, hear, feel, touch, balance, listen, sing
- ◆ ***Suggested descriptives:*** colors of objects, smooth, rough, round, little, big, furry, fuzzy
- ◆ ***Communicative temptation:*** Shake the raintstick 2-3 times, then interrupt the routine and use a gestural, verbal, or time delay prompt.

Station #3: Sunshine Slope



- ◆ This station introduces visitors to an easy maze in a sun-filled, natural opening in the woods. Be sure to take advantage of the viewing platform at the top to peer more deeply into the woods.
- ◆ *Suggested nouns:* mound, log, boulder, bench, swing, sculpture, slope, path, stump
- ◆ *Suggested verbs:* walk, jog, run, jump, hop, swing, sit
- ◆ *Suggested descriptives:* colors, low, high, little, big, smooth, rough, alone
- ◆ *Communicative temptation:* Gently push children on the swing 2-3 times, then interrupt the routine by not releasing the swing, and use a gestural, verbal, or time delay prompt.

Station #4: Music Circle



- ◆ This station sits within a circular grove of pines. Encourage visitors to experiment with the different nature-inspired instruments, all of which were selected for their soothing low earth tones. Instruments can even be played collaboratively with other nearby visitors.
- ◆ *Suggested nouns:* music, sound, circle, instrument, marimba, rainstick, xylophone, chimes, drum, beat, rhythm, bench, stage, silence
- ◆ *Suggested verbs:* play, tap, shake, sing, listen, hear, hang, strike
- ◆ *Suggested descriptives:* soft, loud, pretty, soothing, low, high
- ◆ *Communicative temptation:* Play a musical instrument 2-3 times that the visitor is most interested in, then interrupt the routine by not playing it, and use a gestural, verbal, or time delay prompt.

Station #5: Reflection Knoll



- ◆ This station offers a peaceful setting under a canopy of trees for visitors to reflect about the natural world. Visitors can take advantage of the nearby cuddle swings, gliders, and “alone zones” to encourage a sense of well-being, security, and safety. Note: after this station, there is an optional bypass to return to the Trailhead Pavilion for visitors not wishing to explore the trail further.
- ◆ ***Suggested nouns:*** silence, boulder, stump, engraving, handprint
- ◆ ***Suggested verbs:*** rest, listen, hear, think, sit, stand, balance, feel, squat
- ◆ ***Suggested descriptives:*** quiet, wet, dry, peaceful, alone
- ◆ ***Communicative temptation:*** For children who can tolerate touch, place one of their hands on the handprint 2-3 times, then interrupt the routine by holding their hand away from the rock, and use a gestural, verbal, or time delay prompt.

Station #6: Meadow Run and Climb



- ◆ This station provides a dedicated space for a variety of physical activities including running, jumping, climbing, balancing, and testing strength, coordination, flexibility, and confidence. Visitors can enjoy the beautiful native plantings as well as a gently challenging obstacle course.
- ◆ *Suggested nouns:* meadow, flower, mound, path, obstacle course, maze, bench, log, post, boulder, rope, net, stool, stump, mountain, peak
- ◆ *Suggested verbs:* jump, hop, climb, run, tiptoe, step, skip, balance
- ◆ *Suggested descriptives:* colors, fun, low, high, little, big
- ◆ *Communicative temptation:* Help children walk on the rope for 2-3 steps, then interrupt the routine by not letting them take any further steps, and use a gestural, verbal, or time delay prompt.

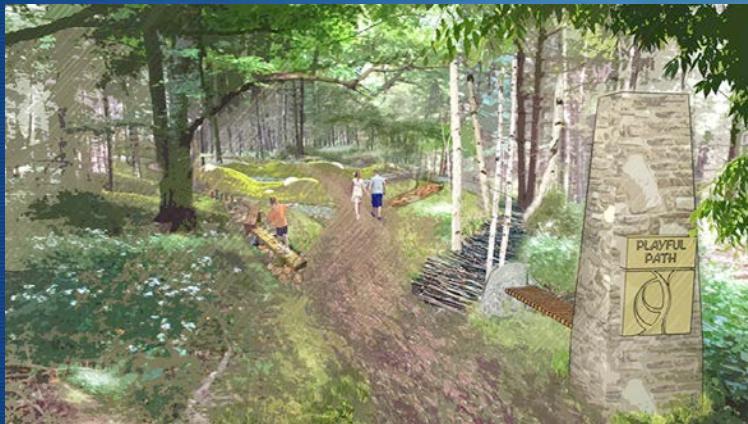
Station #7: Design Area



- ◆ This station taps into a visitor's ability to manipulate natural materials from the trail. The unique hands-on component encourages the imagination and critical thinking to create patterns, structures, and little worlds.
- ◆ *Suggested nouns:* bin, shed, structure, bench, shovel, bucket, sand, rocks, mulch, pile, building, tower
- ◆ *Suggested verbs:* create, dig, stack, build, knock (down)
- ◆ *Suggested descriptives:* numbers, colors, little, medium, large, short, tall, low, high
- ◆ *Communicative temptation:* Dig up some sand and pour it out 2-3 times, then interrupt the routine by holding the shovel in the sand, and use a gestural, verbal, or time delay prompt.

TRANSITION:
At this point, let children know that there is only one more station left, and then the trail is finished.

Station #8: Playful Path



- ◆ This station honors the special joy of being in the woods. There is even a word in German for such a feeling: *waldeinsamkeit*! Visitors can explore all of the twisting paths, each of which is covered in a different natural surface material.
- ◆ ***Suggested nouns:*** stump, trail, path, rocks, stone, sand, leaves, chips
- ◆ ***Suggested verbs:*** play, jump, hop, balance, walk, run, skip, zigzag
- ◆ ***Suggested descriptives:*** playful, fun, squishy, smooth, rough, little, big
- ◆ ***Communicative temptation:*** Help a child hop onto 2-3 of the tree stumps, then interrupt the routine by gently holding her back, and use a gestural, verbal, or time delay prompt.

Station #9: Celebration Station



- ◆ This cooperative station marks the end of the Autism Nature Trail. At this point, encourage visitors to deposit any found treasures from the trail, and to share their thoughts and feelings about the trail by writing or drawing on the boards. The central message of the Celebration Station is “I was here and I have a *voice*.”
- ◆ *Suggested nouns:* end, trail, board, collection, chalk, markers, bucket, treasure
- ◆ *Suggested verbs:* celebrate, share, draw, write, color, collect, finish, feel
- ◆ *Suggested descriptives:* colors, little, big, numbers
- ◆ *Communicative temptation:* Using a marker, draw 2-3 shapes on the board, then interrupt the routine by holding the marker up to the board, and use a gestural, verbal, or time delay prompt.

Checking In...

Ask children to point to one of the faces below or to verbally express how they are feeling before leaving the trail.



References

- ◆ American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- ◆ Baron-Cohen, S., Baldwin, D., & Crowson, M. (1997). Do children with autism use the speaker's direction of gaze strategy to crack the code of language? *Child Development*, 68, 48-57.
- ◆ Bredin-Oja, S. L., & Fey, M. E. (2014). Children's responses to telegraphic and grammatically complete prompts to imitate. *American Journal of Speech-Language Pathology*, 23, 15-26.
- ◆ Chang, Y., & Chang, C. (2010). The benefits of outdoor activities for children with autism. 16th International Symposium on Society and Resource Management, Corpus Christi, TX, June.
- ◆ Charlop, M. H., & Walsh, M. E. (1986). Increasing autistic children's spontaneous verbalizations of affection: An assessment of time delay and peer modeling procedures. *Journal of Applied Behavior Analysis*, 19, 307-314.
- ◆ Christensen, D. L., Baio, J., Braun, K. V. N., Bilder, D., Charles, J., Constantino, J. N.,...Yargin-Allsopp, M. (2016). Prevalence of autism spectrum disorders-autism and developmental disabilities monitoring network, 11 sites, United States, 2012. *The Morbidity and Mortality Weekly Report Surveillance Summaries*, 65, 1-23.
- ◆ Dawson, G., & Adams, A. (1984). Imitation and social responsiveness in autistic children. *Journal of Abnormal Child Psychology*, 12, 209-225.
- ◆ Division for Early Childhood of the Council for Exceptional Children. (2014). DEC recommended practices in early intervention/early childhood special education. Retrieved from <http://www.dec-sped.org/recommendedpractices>
- ◆ Fernald, A., & Hurtado, N. (2006). Names in frames: Infants interpret words in sentence frames faster than words in isolation. *Developmental Science*, 9, F33-F40.
- ◆ Gillett, J. N., & LeBlanc, L. A. (2007). Parent-implemented natural language paradigm to increase language and play in children with ASD. *Research in ASD Spectrum Disorders*, 1, 247-255.

References

- ◆ Harris, S. L., Handleman, J. S., & Fong, P. L. (1987). Imitation of self-stimulation: Impact on the autistic child's behavior and affect. *Child and Family Behavior Therapy*, 9, 1-21.
- ◆ Howlin, P., Goode, S., Hutton, J., & Rutter, M. (2004). Adult outcomes for children with autism. *Journal of Child Psychology and Psychiatry*, 45, 212-229.
- ◆ Individuals with Disabilities Education Improvement Act of 2004, Pub. L. No. 108-446, § 118 Stat. 2647 (2004).
- ◆ Ingersoll, B., & Schreibman, L. (2006). Teaching reciprocal imitation skills to young children with autism using a naturalistic behavioral approach: Effects on language, pretend play, and joint attention. *Journal of Autism and Developmental Disorders*, 36, 487-505.
- ◆ Kashinath, S., Woods, J., & Goldstein, H. (2006). Enhancing generalized teaching strategy use in daily routines by parents of children with autism. *Journal of Speech, Language, Hearing Research*, 49, 466-485.
- ◆ Kedar, Y., Casasola, M., & Lust, B. (2006). Getting there faster: 18- and 24-month-old infants' use of function words to determine reference. *Child Development*, 77, 325-338.
- ◆ Leekam, S. R., Hunnissett, E., & Moore, C. (1998). Targets and cues: gaze-following in children with autism. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 39, 951-962.
- ◆ Leekam, S. R., Lopez, B., & Moore, C. (2000). Attention and joint attention in preschool children with autism. *Developmental Psychology*, 36, 261-273.
- ◆ Lew-Williams, C., & Fernald, A. (2007). Young children learning Spanish make rapid use of grammatical gender in spoken word recognition. *Psychological Science*, 18, 193-198.
- ◆ Lewy, A., & Dawson, G. (1992). Social stimulation and joint attention deficits in young autistic children. *Journal of Abnormal Child Psychology*, 20, 555-566.

References

- Lord, C., Risi, S., & Pickles, A. (2004). Trajectory of language development in autistic spectrum disorders. In M. L. Rice & S. F. Warren (Eds.), *Developmental language disorders: From phenotypes to etiologies* (pp. 1-38). Mahwah, NJ: Erlbaum.
- Maljaars, J., Noens, I., Jansen, R., Scholte, E., & van Berckelaer-Onnes, I. (2011). Intentional communication with nonverbal and verbal low-functioning children with autism. *Journal of Communication Disorders*, 44, 601-614.
- McDuffie, A., Yoder, P., & Stone, W. (2005). Prelinguistic predictors of vocabulary in young children with autism spectrum disorders. *Journal of Speech, Language, and Hearing Research*, 48, 1080-1097.
- McDuffie, A., Yoder, P., & Stone, W. (2006). Labels increase attention to novel objects in children with autism and comprehension-matched children with typical development. *Autism*, 10, 288-301.
- Perryman, T. Y., Carter, A. S., Messinger, D. S., Stone, W. L., Ivanescu, A. E., & Yoder, P. J. (2013). Brief report: parental child-directed speech as a predictor of receptive language in children with autism symptomatology. *Journal of Autism and Developmental Disorders*, 43, 1983-1987.
- Prizant, B. M., & Duchan, J. (1981). The functions of immediate echolalia in autistic children. *Journal of Speech and Hearing Disorders*, 46, 241-249.
- Ruble, L., McDuffie, A., King, A. S., & Lorenz, D. (2008). Caregiver responsiveness and social interaction behaviors of young children with autism. *Topics in Early Childhood Special Education*, 28, 158-170.
- Sameroff, A. (1975). Transactional models in early social relations. *Human Development*, 18, 65-79.
- Schopler, E., & Reichler, R. J. (1971). Parents as co-therapists in the treatment of psychotic children. *Journal of Autism and Childhood Schizophrenia*, 1, 87-102.

References

- ◆ Schreibman, L. (1988). *Autism*. Newbury Park, CA: Sage.
- ◆ Siller, M., & Sigman, M. (2002). The behaviors of parents of children with autism predict the subsequent development of their children's communication. *Journal of Autism and Developmental Disorders*, 32, 77-89.
- ◆ Spiker, D., Boyce, G., & Boyce, L. (2002). Parent-child interactions when young children have disabilities. *International Review of Research in Mental Retardation*, 25, 35-70.
- ◆ Tager-Flusberg, H., Paul, R., & Lord, C. (2005). Language and communication in autism. In F. R. Volkmar, R. Paul, A. Klin, & D. Cohen (Eds.), *Handbook of autism and pervasive developmental disorders. Volume I: Diagnosis, development, neurobiology, and behavior* (3rd ed.) (pp. 335-364). Hoboken, NJ: Wiley.
- ◆ Tiegerman, E., & Primavera, L. H. (1984). Imitating the autistic child: Facilitating communicative gaze behavior. *Journal of Autism and Developmental Disorders*, 14, 27-38.
- ◆ Venker, C. E., Bolt, D. M., Meyer, A., Sindberg, H., Ellis Weismer, S., & Tager-Flusberg, H. (2015). Parent telegraphic speech use and spoken language in preschoolers with ASD. *Journal of Speech, Language, and Hearing Research*, 58, 1733-1746.
- ◆ Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- ◆ Wan, M. W., Green, J., Elsabbagh, M., Johnson, M. H., Charman, T., Plummer, F., & the BASIS Team (2012). Parent-infant interaction in infant siblings at risk of autism: a controlled observational study. *Research in Developmental Disabilities*, 33, 924-932.
- ◆ Wetherby, A. M., & Prutting, C. (1984). Profiles of communicative and cognitive-social abilities in autistic children. *Journal of Speech and Hearing Research*, 27, 364-377.
- ◆ Wodka E., Mathey, P., & Kalb, L. (2013). Predictors of phrase and fluent speech in children with autism and severe language delay. *Pediatrics*, 131, 1-7.

References

- ◆ Wolery, M., & Hemmeter, M. L. (2011). Classroom instruction: Background, assumptions, and challenges. *Journal of Early Intervention, 33*, 371-380.
- ◆ Yoder, P. J., Kaiser, A. P., & Goldstein, H. (1995). An exploratory comparison of milieu teaching and responsive interaction in classroom applications. *Journal of Early Intervention, 19*, 218–242.
- ◆ Yoder, P., Warren, S., McCathren, R., & Leew, S. (1998). Does social responsiveness facilitate communication development in very young children with developmental disabilities? In A. Wetherby, S. Warren, & J. Reichle (Eds.), *Transitions in prelinguistic communication* (Vol. 7, pp. 39–58). Baltimore: Brookes.

Advisory Panel for the Autism Nature Trail

- ◆ Gail Serventi, M.A., CCC-SLP, Advisory Panel Chair
- ◆ Loren Penman, M.Ed., C.A.S., Educational Administration
- ◆ Susan Herrnstein
- ◆ Lori Book, Ph.D.
- ◆ Terrel Book, M.A., CCC-SLP
- ◆ Julie Brockelhurst-Woods, M.Ed, OT/L
- ◆ Amie Germain, MOT, OTR/L
- ◆ Jen Hackett, M.S., Special Education
- ◆ Christine Hoenig, M.A., CCC-SLP
- ◆ Carol Ivsan, M.A., CCC-Au.D.
- ◆ Skott Jones, Ph.D., CCC-SLP
- ◆ Diane Long, Ed.D., MOTR/L
- ◆ Cheryl Lynch, M.A., CCC-SLP
- ◆ Alyce Sherwood, M.A., CCC-SLP
- ◆ Peggy Siebers, M.S., PT/L
- ◆ Bethanie Swartz, M.A., OT/L

About the Author



Dr. Skott Jones is an Associate Professor in the Department of Speech-Language Pathology and Audiology at Ithaca College. He specializes in child language development, child language disorders, and autism. Dr. Jones is a certified and licensed speech-language pathologist. Contact him at sejones@ithaca.edu.