



Research Brief

VIRGINIA TECH AUTISM CLINIC

Virginia Tech Autism Clinic

Dept of Psychology
Blacksburg, VA 24061
P: 540.231.6914
F: 540.231.3652
E: autism@vt.edu

Director:
Angela Scarpa, Ph.D.
www.psyc.vt.edu/centers/psc/clinics/autism/

Radford Autism Center

Radford University
Box 6961
Radford, VA 24142
P: 540.831.7273
F: 540.831.7669
E: l-adams@radford.edu

Director:
Lynn Adams, Ph.D.
www.radfordautism.org

Blue Ridge Autism Center

P: 540.777.1218
F: 540.777.1216
E: brac.1@juno.com

Director:
Angie Leonard
www.blueridgeautismcenter.com

New River Valley Autism Action Group

The feasibility of Pivotal Response Training for improving joint attention in children with autism

Natoshia Raishevich and Angela Scarpa

A Note from the Editor by Angela Scarpa, Ph.D.

The Virginia Tech Autism Clinic (VTAC) newsbrief was launched one year ago in December of 2005. Our purpose was "to provide parents, caregivers, and teachers in the New River Valley community with up to date information about ongoing treatment research relevant for children and adults with autism." We hope this newsletter serves as a useful platform for sharing the information that researchers have uncovered. To this end, we have so far produced four newsbriefs covering the gluten free/caesin free dietary intervention, omega-3 nutritional supplementation, importance of physician knowledge in early identification of autism spectrum disorders (ASDs), and now the use of behavioral techniques in improving the pivotal target of joint attention. We hope that parents and professionals have benefited from these discourses, and we urge you to seek further evidence-based information in your quest for the best services for your child.

The VTAC Research Unit plans to continue to review studies related to intervention research for ASDs. This past year, our newsletter has

been produced quarterly, but in the upcoming year we will move to a bi-annual newsletter. We will send out the newsbrief once in the Spring and once in the Fall. From everyone here at the VTAC Research Unit, we wish you and your families Happy Holidays and joy in the New Year.

Abstract: This is a summary of an article by Jones, Carr, and Feeley (2006), which documents a series of studies pertaining to the efficacy of Discrete Trial Training and Pivotal Response Training (PRT) for improving joint attention in children with autism. This treatment approach focuses on improving joint attention in didactic interactions, which may lead to global improvements in language and social functioning. The first study, which trained preschool teachers in PRT and discrete trial training, demonstrated notable efficacy. The second study examined parents trained in PRT in home and community settings. The third study examined additional dependent variables such as social interactions and language, as indicators of overall improvement in functioning. These studies provide growing support for the effectiveness and feasibility of applying PRT to real world settings. Implications of these findings will be discussed.

A treatment approach that targets joint attention may lead to improvements in social interactions and language development

Introduction: One of the core features of autism and other pervasive developmental disorders is failure to develop joint attention, which can be conceptualized as a shared attentional focus between two individuals (American Psychiatric Association, 2000). Moreover, the acquisition of joint attention may be related to the development of social and language skills, which are also considered primary deficit areas in children with autism (Moore & Dunham, 1995). Thus, behavioral treatments such as pivotal response training (PRT) can be used to target and improve joint attention in didactic interactions, which may, in turn, lead to global improvements for children with autism (Bakeman & Adamson, 1984; Schreibman, Stahmer, & Pierce, 1996).

Joint attention typically emerges as a social function between caregiver and infant during the first 9 to 15 months of life. During this time, two forms of joint attention may emerge. The first form pertains to a child's response to another person's joint attention directive. An example of this behavior is a child looking in the direction of another person's gaze. Secondly, the child also begins to direct another person towards a shared focus. This form of joint attention uses more advanced behaviors, such as a child looking at an object and then looking at an adult, and then back to the object of focus. As the child develops, joint attention may also include gestures, such as pointing at an object, and language cues (e.g., Look at that...). Thus, a treatment approach that targets joint attention may lead to improvements in social interactions and language development.

To date, there have been few studies that support the efficacy of

treatment geared towards improving joint attention. A case study by Warren et al. (1993), for example, indicated that a behavioral approach to joint attention skills training led to improvements in joint attention for one child with Down's Syndrome. Recently, a study using a multiple baseline design focused on teaching joint attention skills to 5 children with autism using PRT strategies (i.e., by using child-friendly materials, teaching difficult tasks in culmination with easier ones, and using natural rewards to positively reinforce target behavior) (Whalen & Schreibman, 2003). Both responding and initiating behaviors of joint attention were targeted in treatment. The follow-up data suggested that 4 out of 5 children demonstrated improvements in joint attention, with maintenance of gains persisting after three months.

In the context of research studies, the efficacy of PRT is promising. However, the feasibility of implementing PRT in real world settings is not fully understood. Thus, the purpose of the studies by Jones et al. (2006) was to systematically evaluate the effectiveness of PRT in real world settings. Moreover, the studies examined if the effects of PRT and joint attention training would generalize to other behaviors, such as language and social development. It should be noted that randomized controlled trials have yet to be conducted to assess the use of PRT in training joint attention. As such, the following studies are encouraging, but not conclusive. Future research using larger numbers of participants and more tightly controlled designs are needed in this field. Nonetheless, the following studies are strong for small-subject designs and the findings provide a good starting point.

Study 1: Intervention Effectiveness with Teachers

The first study employed a multiple baseline design to examine the effectiveness of PRT strategies (Koegal, Koegal, Harrower, & Carter, 1999) and discrete trial training (Lovaas, 1987) in improving joint attention skills of response and initiation. Five children between ages 2-3 who had diagnoses of autism, autistic-spectrum disorder, or pervasive developmental disorder-not otherwise specified, participated in this study. The children attended a special needs preschool for between 2 and 5 months before beginning the intervention. To be eligible for the study, children had to demonstrate basic skills in joint attention (e.g., looking up when name was called).

The intervention occurred in the classroom setting by teachers and teaching aides. The two joint attention skills were taught using toys that appeared to hold the child's interest and could be considered salient (e.g., lighting up or making noises). Each toy was rigged with a remote control device that the teacher could activate without touching it. After the children mastered joint attention with these toys, the intervention was expanded to include novel stimuli, which consisted of additional toys and pictures that were available at the preschool. Reliability data were collected from videotaped recordings of a subset of joint attention sessions that occurred in the classroom, and indicated good consistency across raters. The results indicated that while 5 participants exhibited 0%-40% (0-3 instances) of appropriate responses towards initiation of joint attention at baseline, all participants mastered both

initiations and responses towards joint attention. However, the number of sessions varied significantly among children before mastery was achieved (range: 19-78 sessions for responses, 26-157 session for initiations). After the children acquired mastery with the specified items, novel stimuli were incorporated into the intervention, which led to overall gains in performance during interaction with novel stimuli (range 11%-100%, M = 89%), and maintenance of initial gains with original stimuli (range 20%-100%, M = 91%).

Study 2: Clinical Extension with Parents

The purpose of the second study was to extend joint attention training to parents of children with autism and other pervasive developmental disorders. Moreover, the second study incorporated natural stimuli from the home setting (e.g., book reading routine) that are indicative of joint attention in children who are reaching their developmental milestones. Two children from the first study and their parents participated in this concurrent examination. Parents were first taught joint attention skills using the same toys used in study one. Once joint attention was mastered with these items, parents extended the training to include novel stimuli (e.g., pictures and toys), and finally, to include naturally occurring situations (e.g., bedtime routine) where joint attention would be likely to occur. Given that children were assumed to have previously acquired joint attention in the initial study, this second study was considered a clinical extension rather than an experiment. Parents recorded joint attention via self-reports, which was then coded for reliability by the first author. The reliability data

After the children acquired mastery with the specified items, novel stimuli were incorporated into the intervention, which led to overall gains in performance interaction with novel stimuli

indicated inter-rater agreement of 95% or higher for these cases.

The results of this second study indicated that neither of the two children exhibited joint attention during the baseline, but did show improvements during the second baseline, which occurred simultaneously with the implementation of study 1.

Generally, the children learned to respond and initiate in less sessions with their parents than they had previously taken to learn such skills with their teachers in study 1. For example, one child mastered joint attention response in 19 sessions (compared to 52 sessions in study 1) and mastered responding in the context of novel situations only after 12 more sessions. The child mastered initiating skills after 36 sessions (compared to 99 sessions in study 1) and mastered initiating with novel routines after 18 additional sessions.

Study 3: Collateral Changes and Social Validity

For the last study in this series, several additional dependent measures were explored in order to gauge overall improvements beyond joint attention. Most notably, changes in social behavior and language were monitored. Each joint attention session in studies 1 and 2 monitored the occurrence of vocalizations, which were operationalized as definable words, proper nouns, or phonemes. To track changes of social development, two measures were used to assess factors such as interest, communicativeness, happiness, relationships, and appearing like a typically developing child. Overall, the results indicated increasing language production simultaneously with increasing skills of joint attention. Moreover, social interactions appeared to improve

during post-intervention, as children appeared happier, more interested in interacting, more communicative, and generally having a better relationship with their mothers. The children were also rated as appearing more like a typically developing child during post-intervention.

Discussion: Overall, the series of studies indicate that behavioral modification of joint attention, using PRT and discrete-trial training, may be effective for improving joint attention capacity in children with pervasive developmental disorders in both school and home settings. Moreover, the results of these interventions appear to generalize to broader improvements in communication and social skills in children with autism. Thus, the overall findings are promising in terms of the feasibility and effectiveness of PRT for joint-attention training. However, the studies are limited in that they are largely case studies and future research would benefit from including larger sample sizes, randomized controlled trials, and stricter methodological design (e.g., not running two separate interventions concurrently). However, the multiple baseline design employed in these studies demonstrated good qualitative data for the progress of each child, and supports the importance of monitoring in a clinical, home, and school setting. Additional studies in other settings may be beneficial (e.g., primary care). Lastly, attention to prompt assessment should also be a focus of future research as interventions are likely to be more successful if children are identified at an early age.

The results of these interventions appear to generalize to broader improvements in communication and social skills in children with autism

References

- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC.
- Bakemen, R., & Adamson, L. (1984). Coordinating attention to people and objects in mother-infant and peer-infant interaction. *Child Development, 55*, 1278-1289.
- Jones, E. A., Carr, E. G., & Feeley, K. M. (2006). Multiple effects of joint attention intervention for children with autism. *Behavior Modification, 30*(6), 782-834.
- Koegel, L. K., Koegal, R. L., Harrower, J. K., & Carter, C. M. (1999). Pivotal response intervention I: Overview of approach. *Journal of the Association for Persons with Severe Handicaps, 24*, 174-185.
- Lovaas, O. I. (1987). Behavioral treatment and normal educational functioning in youth autistic children. *Journal of Consulting and Clinical Psychology, 55*, 3-9.
- Moore, C., & Dunham, P. (Eds.). (1995). *Joint attention: Its origins and role in development*. Hillsdale, NJ: Lawrence Erlbaum.
- Schreibman, L., Stahmer, A. C., & Pierce, K. L. (1996). Alternative applications of pivotal response training: Teaching symbolic play and social interaction skills. In R. L. Koegal & G. Dunlap (Eds.), *Positive behavioral support: Including people with difficult behavior in the community*. Baltimore: Paul H. Brookes.
- Warren, S. F., Yoder, P. J., Gazdag, G., Kim, K., & Jones, H. (1993). Facilitating prelinguistic communication skills in young children with developmental delay. *Journal of Speech and Hearing Research, 36*, 83-97.
- Whalen, C., & Schreibman, L. (2003). Joint attention training for children with autism using behavior modification procedures. *Journal of Child Psychology and Psychiatry, 44*, 456-468.