

# Comparisons of Pivotal Response Treatment (PRT) and Discrete Trial Training (DTT)

Amelia McClelland  
Summer, 2016

*Superheroes social skills training, Rethink Autism internet interventions, parent training, EBP classroom training, functional behavior assessment: An autism spectrum disorder, evidence based (EBP) training track for school psychologists*

US Office of Education Personnel Preparation Project: H325K120306

Principle Investigators:

William R. Jenson, PhD

Elaine Clark, PhD

John Davis, PhD

Grant Director

Julia Hood, PhD

University of Utah  
Department of Educational Psychology  
School Psychology Program

## **Introduction**

Autism Spectrum Disorder (ASD) is a category of developmental disabilities characterized by deficits in social emotional communication, sensory issues, restrictive and repetitive interests, and behavioral issues (Data & Statistics, 2016). Although ASD has been around for a long time it is becoming more predominant in today's society with one in 68 children being identified with ASDs as of 2016 according to the Center for Disease Control's Autism and Disabilities Monitoring Network. The prevalence rate has nearly doubled in the last 10 years.

ASD can affect male and female children, however, it is seen 4.5 times more in males. The ability level of people who have ASDs is varied. Some children and adults with ASDs are extremely high functioning and can adapt into modern society. Others require more supports, especially in the behavior and learning areas. Children with ASD frequently have comorbid diagnoses ranging from specific phobias (44%), attention deficit hyperactivity disorder (ADHD) (30%), depression (2-10%), obsessive compulsive disorder (OCD) (37.2%), and many more (Leyfer et al., 2006). These disorders can increase the likelihood that they may need further support.

ASD can be detected as early as 18 months. According to the CDC and most researchers the earlier that children are identified the better their outcomes. It is recommended to start intervention and supports as early as possible. These are often called evidence based early intervention procedures (EBEI).

One of the key areas of deficit for children with ASDs is in communication. This can be both functional communication (i.e., asking for toys, food, hugs) or emotional communication

(i.e., expressing emotions and feelings and or recognizing other's emotions). Because of this, providing early supports in these areas is key. According to the American Academy of Pediatrics, Applied Behavioral Analysis (ABA) is a "notable" treatment for ASD and is widely used. ABA is a method of teaching that utilizes discrete trial training (DTT), pivotal response training/teaching (PRT) and routines. (AAP: Recent Information Pertaining to Autism, n.d.) There are many methods and programs that fall under the umbrella of ABA.

### **Pivotal Response Treatment**

Pivotal Response Training (PRT) is "a method of systematically applying the scientific principles of applied behavioral analysis (ABA) to teach learners with autism spectrum disorders (ASD)" (Vismara, L.A. & Bogin, J. 2009). The technique of PRT can be attributed to Drs. Lynn and Robert Koegel of the University of California Santa Barbara Koegel Autism Center. According to Koegel, PRT is "used to teach language, decrease disruptive/self-stimulatory behavior, and increase social, communication, and academic skills" (Koegel Autism Center, 2014). PRT was originally developed in 1987 and currently the name pivotal response treatment is a registered trademark of the Koegel Autism Center. However, there are many other names for the same method, including pivotal response training, pivotal response therapy, pivotal response intervention, and even NLP.

Unlike many of the other more structured and adult directed methods of teaching, such as Discrete Trial Training (DTT), pivotal response training is a child directed, naturalistic teaching strategy. This means that many of the learning opportunities are determined by the child's interests, and the adult follows the child's lead during learning sessions. In this way, learning opportunities are created based on the child's interests during the session. PRT also emphasizes the use of natural

reinforcers. For example, if the learning opportunity is based on getting the child to ask for markers, the markers would become the natural reinforcer rather than providing contrived reinforcers such as edibles for a correct response. The Koegels and those who follow PRT believe natural reinforcers are a stronger form of reinforcement than contrived reinforcers (Koegel Autism Center: Pivotal Response Treatment, 2014).

According to the Koegel Autism Center's website there are over 200 peer reviewed journal articles and 30 books and manuals based on Pivotal Response Training. It is important to note that PRT requires a minimum of 25 hours per week to be fully successful. Therefore, it is often termed a 'lifestyle' as opposed to a teaching method. This also speaks to the fact that PRT does not need to be done solely by professional interventionists. In fact, it is often recommended that family members continue the process at home for generalization and to optimize its effects.

PRT is based on four pivotal learning variables (motivation, responding to multiple cues, self-management, and self-initiations). These learning variables have multiple components and may overlap when being taught. If a child cannot fully participate in the learning process (i.e., sit still, follow directions, etc.) then they will have a harder time mastering skills such as self-management or self-initiations. Therefore, it is important to focus on the first two pivotal learning variables (Motivation and responding to multiple cues) before trying to work on self-management or self-initiations. This does not mean they have to be done in a mutually exclusive manner. Once a child has a grasp of the basic components of the first two pivotal response variables they can learn the pivotal learning variables simultaneously.

Motivation starts by establishing the child's attention and eventually maintaining this attention for longer and longer periods of time. When working on motivation there is shared

control between the learner and the teacher, meaning there are moments when the adult needs to direct some learning opportunities or ask a question to elicit a response. It is important to vary tasks and responses from the child throughout PRT. This helps keep the child's attention, increase generalization, and increase the acquisition of new tasks/materials. During this phase it is also important to reinforce response attempts to keep the child's motivation until they are able to complete the response in its entirety (Vismara & Bogin, 2009).

Responding to multiple cues teaches the child how to discriminate between more than one stimulus. This involves varying the stimuli provided. This can be anything from using pictures, toys, and objects to teach labeling, or using many different pictures of the same object (e.g., cartoon car, picture of car, red car, blue car, etc.). Within this phase it is also important to increase the cues given to the child and or what actions or words are required in the child's response (i.e., big red car vs. car; Vismara & Bogin, 2009). Scheduling their reinforcement is also important. This means increasing the criteria required to receive a reinforcer so they learn to be able to do things without constant reinforcement and at a more intrinsic level.

Self-management is another important skill targeted in Pivotal Response Training. This skill should be taught later in the teaching process once the child has an understanding of the previous learning variables. As mentioned earlier, self-management requires basic skills and understanding of the learning process before one can truly begin to master this pivotal learning variable. However, you can still teach those simultaneously with self-management. The goal of this pivotal learning variable is to help the child monitor their own reinforcement and understanding of their behaviors. To accomplish this it is important to have clearly defined target behaviors for the child to work on. Next, determine at what specific intervals the child will be monitoring these target behaviors. This will change as they gradually increase their ability to

self-monitor. It is important that the child know how to discriminate between the desired behaviors and undesired behaviors before working on self-management (Vismara & Bogin, 2009).

The final pivotal learning variable is self-initiation. This is a more advanced skill, however, it can be very useful in everyday social interactions and in helping the child to navigate the social world. Self-initiations range from learning the basics of common social interactions (e.g., meeting someone for the first time, ordering at a restaurant, buying groceries, etc.) to learning to ask questions of others to increase a child's language and communication skills or problem solving abilities (Vismara & Bogin, 2009).

### **Applications and uses of PRT**

Pivotal Response Training can be used in a variety of settings which is one of the reasons it is such an appealing method of teaching. PRT can range from using the basic pivotal learning variables and techniques in a home or classroom setting to manualized and packaged treatment programs (Vismara & Bogin, 2009; STAR program, 2016; Autism Speaks: Early Start Denver Model, n.d.). Because the techniques and principals are so approachable PRT can be used by professionals as well as family members. This can help with consistency in learning and increasing the child's exposure to learning opportunities, especially at a young age when early intervention is key. When PRT is used in a classroom setting it is often combined with other teaching strategies or interventions (Reed, 2013). There are also several manualized treatment packages that utilize PRT teaching methods. The most common and well known are the Early Start Denver Model (ESDM) and Strategies for Teaching based on Autism Research (STAR). The ESDM is based in applied behavioral analysis and utilizes the procedures and techniques of

PRT as part of a comprehensive early intervention program for children with Autism between 12-48 months (Autism Speaks: Early Start Denver Model, n.d.). This program was created by Sally Rogers, PhD. and Geraldine Dawson, PhD. The ESDM can be implemented by a treatment team as an intensive one-on-one intervention or in a group setting as long as therapists are certified through the ESDM program. Parents can also be trained in ESDM techniques and participate along with a treatment team. The average price of ESDM is \$5,560 per month per child as an individual program (Autism Speaks: Early Start Denver Model, n.d.). The STAR program is designed for a classroom setting. The aim of this program is to help those with autism excel in a classroom setting. STAR is manualized and comes with all the materials needed to administer the treatment program. There are three basic levels ranging from basic skills in verbal communication and following directions (Level 1), increasing language skills, play skills, and basic letter and number understanding (Level 2), to more academic focused interventions that work on expanding vocabulary, following complex routines, story recall, addition, and subtraction (Level 3). STAR is an affordable program for a special education classroom that is manualized and easily accessible to teachers. It also has components that allow it to be mapped on to individualized education plans (IEPs) easily (STAR, 2016).

### **Official PRT Training**

Pivotal Response Training is trademarked by the Koegel institute in UCSB and there is an official PRT training program (Koegel Autism Center: Pivotal Response Treatment, 2014). This program is a long distance learning program, allowing people from anywhere in the world to get certified. There are five levels of training that each individual can participate in depending on what services they plan to provide. The first level is a basic introduction to PRT including the research and methodology. The second level provides instruction on how to implement PRT

strategies. In this level PRT is used to teach basic skills such as first words and multiple word utterances. Level three provides information about generalization and how to use PRT for more than one child at a time. Level four is an advanced level that uses PRT to teach skills such as self-initiations, self-management, and facilitating social interactions. The fifth and final level is designed to teach participants to become PRT trainers, allowing them to teach others the skills they have learned. At each level participants must pass written exams and prove competence at the necessary skills through the use of videos. This training is highly comprehensive and can range from \$300-\$675 per level. The Koegel institute also provides a 15% discount for groups of 5 or more people as well as trainings for groups of teachers or schools (Koegel Autism Center: Pivotal Response Treatment, 2014).

## **Reviews of PRT**

The Koegels are not alone in their studies of PRT. There are many reviews and studies done by third party organizations that corroborate the efficacy of PRT. Some of the main reviews include: *Examining the Studies in Which the Pivotal Response Instruction is Used to Teach Social Skills* by Bozkus-Genc and Vuran in 2013, *Pivotal Response Treatment for Children with Autism Spectrum Disorder: A Systematic Review of Research Quality* by Cadogan et al. 2015, and *Effectiveness of Pivotal Response Training as a Behavioral Intervention for Young Children with Autism Spectrum Disorders* by Masiello in 2007. However, the most recent publication on PRT was a meta-analysis published in March of 2016: *Meta-Analysis of Pivotal Response Training for Children with Autism Spectrum Disorders* by Bozkus-Genc and Yucesoy-Ozcan.

This meta-analysis spanned the research on PRT from 1979-2012 and found 34 studies that met their criteria from 12 different journals. Criteria included being published between 1979

and 2012, being in English, having participants between 1-13 years old with a diagnosis of ASD, examining the effectiveness of PRT, having the effect of the independent variable shown in a line graph, and having at least one data point in baseline and intervention phases. Overall the authors of this meta-analysis found that most of the participants in these studies were solely diagnosed with ASD, male, and had a mean age of 4.8 years. Settings of studies included schools, clinics, and multi-location settings (i.e., a school and clinic, or school and home). PRT was administered most often as a one-on-one intervention, however 8.8% of the studies used a small group method and some did not disclose how PRT was administered. The actual interveners were most often professional clinicians (38.2%) followed by family members or caregivers (23.5%). There were also a few studies that had graduate students, peers, or multiple people administering PRT. The most frequently targeted skills were communication and interaction skills. Other targeted skills include social skills, play skill, and academic skills. Only half of the studies looked at PRT's ability to generalize to other settings and less than half of the studies measured treatment integrity, maintenance, and social validity (Bozkus-Genc and Yucesoy-Ozcan, 2016).

Bozkus-Genc and Yucesoy-Ozcan (2016) found an increased awareness in PRT since 2000. Using three different effect size calculations, percentage non-overlapping data (PND), percentage of non-overlapping corrected data (PNCD), and percentage of data points exceeding the median (PEM), they found that PRT ranged from questionable to highly effective. Those using PND found PRT to be fairly equally distributed between highly effective, fairly effective, and questionable. Those studies that were questionable were looking at PRT to teach play and social skills. As for those studies using PNCD, the majority of studies found PRT to be highly effective. Those that fell in the questionable category were also looking at play skill. The studies

using PEM found PRT to be overwhelmingly in the highly effective category with only 3 out of the 34 studies falling in the questionable category. Overall, the studies found PRT to be an effective technique for teaching many different skills to children with an autism spectrum diagnosis.

Although the results of this meta-analysis were positive it is important to take into account the limitations of the current research and what needs to be explored in future studies. Bozkus-Genc and Yucesoy-Ozcan (2016) only included cases that were single case designs for their meta-analysis. Therefore, any research done as a group design was excluded and could have altered their findings. Although effect sizes were calculated they were not assessed based on the quality of the studies. As with many single case research designs, most of the studies examined had limited numbers of participants which resulted in reduced power and external validity. Single case research is an important avenue for studying many areas, however, there are fewer forms of statistical analysis and research with purely descriptive statistics are often seen as limited. Bozkus-Genc and Yucesoy-Ozcan (2016) also noted that social validity may have been affected if the skills being targeted were core deficits for those individual children. They recommended noting that in future studies as well as looking into the use of multiple settings and interveners to combat overselectivity and difficulty with generalization.

### **Limitations and Future Directions**

The current research suggests the need for more research pertaining to PRT (Bozkus-Genc and Yucesoy-Ozcan, 2016; Suhrheinrich et al., 2013; and Reed, 2013 dissertation). Some of the key areas for future research expressed by Bozkus-Genc and Yucesoy-Ozcan (2016) include treatment integrity, social validity, generalizability and maintenance. Future research

should be done using group designs as opposed to single case research to increase the body of research and allow for more in depth statistical analysis. Another area that should be looked at is whether or not there is a relationship between quality of instruction and the overall effectiveness of PRT. Suhrheinrich et al. (2013) and Reed (2013 dissertation) suggest looking at how PRT compares to other similar interventions such as incidental teaching or basic discrete trial training. Another area that needs further study is the use of PRT in applied settings, as most of the available research is done in clinics or by graduate students and trained clinicians not general teachers or parents. They also suggest doing more longitudinal designs to see the long term and maintenance effects of PRT. Suhrheinrich et al. (2013) stressed the importance of greater adherence to treatment fidelity in future research.

Although PRT has been shown to be effective in multiple settings and with multiple skills (Bozkus-Genc and Yucesoy-Ozcan, 2016; Suhrheinrich et al., 2013; and Reed, 2013 dissertation) there are some overall limitations to the technique. One limitation is being able to provide one-on-one interventions. PRT was originally designed to be provided one-on-one, however, this is not always feasible in most settings where PRT might be needed (e.g., a school) (Reed, 2013 dissertation). Studies show that the areas that are most difficult for teachers to implement are turn taking and responding to multiple cues (Suhrheinrich, J. et al. 2013; Reed 2013 dissertation). This may be due to overselectivity or lack of understanding surrounding at what developmental age neurotypical children begin to respond to multiple cues (Reed et al., 2013). As mentioned earlier, PRT is often used in a classroom setting. Some studies found it effective in this setting and others did not (Bozkus-Genc and Yucesoy-Ozcan, 2016; Suhrheinrich et al., 2013; and Reed, 2013 dissertation). It is difficult to know what parts of PRT are most effective and how any modifications made in a classroom might affect PRT's effectiveness. It may also be important to

note that in a classroom setting teachers often combine multiple evidence based practices, including PRT. This may also change PRT's effectiveness and should be researched further (Suhrheinrich, J. et al. 2013; Reed 2013 dissertation).

## **Pros and Cons**

As with any program PRT has its pros and cons. PRT is a very useful technique for teaching a plethora of different skills to children with ASD. PRT is empirically supported by numerous institutions and research studies (Bozkus-Genc and Yucesoy-Ozcan, 2016; Koegel Autism Center, 2014; Vismara & Bogin, 2009). Some of the many qualities that make PRT so appealing include its child driven and naturalistic style that allows those implementing the program to adapt to the individual children they work with in a variety of settings and on a more personal level for that child. Another quality of PRT is the fact that it can be used in multiple settings and generally does not require extensive training (Autism Speaks: Early Start Denver Model, n.d.; STAR program, 2016). Because PRT has behavioral supports and promotes positive praise and interactions it is a popular choice for those working with ASD populations.

However, PRT has cons as well. For one, there are skills that may be hard to teach using such a child directed approach including skills that the child may need to learn but does not find particularly appealing. Some children do not do well in such an unstructured setting and require a more structured format for learning, such as Discrete Trail Training (DTT). As the research indicates there needs to be more research on the components of PRT in order to understand the implications of adaptations and modifications (Reed, 2013). The research also indicates that PRT can be difficult to implement as the sole program in a classroom setting (Suhrheinrich et al.,

2013) and that families going through difficult times or with high levels of stress may have more trouble with PRT than others.

### **Discrete Trial Training**

Another technique used in similar settings as PRT is DTT. According to the National Professional Development Center on Autism Spectrum Disorders DTT is “a one-to-one instructional approach used to teach skills in a planned, controlled, and systematic manner.” DTT, like PRT, has its roots in ABA and uses techniques such as monitoring antecedents and consequences and positive praise. One of the key features of DTT is collecting data. Those who use DTT believe that the meticulous data collection procedures are essential for determining treatment goals, success, and need for modification. Another feature of DTT is the distinct beginning and ending of each individual trial as opposed to general learning opportunities based on the child’s choices. When using DTT the administrator determines the skills that are going to be worked on and sets the learning environment up in a specific way to accomplish these goals. Usually the child sits at a desk or chair next to the administrator and the tools used as stimuli are placed between them and within the reach of the child. All other distracting items should be removed. After each learning opportunity or trial the child is rewarded for correct responses before the next trial begins. This technique has been found effective with early childhood and elementary aged populations (Borgin, 2008).

### **Applications of DTT**

DTT can be used for a variety of applications. It has been found effective for teaching communication and language skills, social skills, academic skills, decreasing problem behavior, and teaching skill acquisition (Borgin, 2008). One of the most common uses for DTT is to teach

learning readiness skills such as being able to sit still, look at the instructor, be quiet, and follow directions. Another common application for DTT is teaching preverbal communication skills such as requesting and labeling items. Teaching pre-academic skills from identifying and labeling colors and shapes to letters and numbers can also be done with DTT (Borgin, 2008). Because DTT is designed as a one-on-one technique some classrooms can use DTT as part of their learning routines depending on their staff to student ratio. However, this is only feasible in classrooms that have a high student to teacher ratio such as special education classrooms with multiple paraprofessionals. It can also be used in the home to augment other treatment methods. Rethink Autism, a web based program designed to help teachers and parents work with children who have ASD, has 7 videos that describe DTT and aid in learning how to implement DTT in the home or school setting. Often times, as with PRT, DTT is used alongside other treatment techniques.

## **Pros and Cons**

DTT has pros and cons as a teaching technique. One of the key features of DTT that makes it so appealing is its emphasis on data collection. Collecting data continually helps to visualize the outcomes of the interventions. By collecting data the treatment team can adjust their approaches to treatment and see the actual outcomes of their work. This data collection also aligns well with the principals of ABA therapy which, according to the American Academy of Pediatrics, is an evidence based practice for use with ASD (AAP: Recent Information Pertaining to Autism, n.d.). DTT is particularly helpful in the sense that it allows the breakdown of tasks into individual steps when necessary to help target specific deficits (Schreibman et al. 2015). Although there are many positive aspects and reasons to use DTT there are some limitations and criticisms as well. Some people believe that DTT is too structured and prefer a more naturalistic

technique like PRT or incidental teaching. Their argument is the discrete trials create a robotic and unnatural feel to the treatment. Another criticism of DTT is that some children may fail to generalize the skills they learn across multiple settings or create an over dependence on prompts (Schreibman et al. 2015). To combat those criticisms the research suggests using DTT in multiple settings and with varied stimuli and administrators for generalization. In order to combat dependence on prompts prompt fading should be used. Rethink Autism has videos that explain how to help with generalization and fading prompts.

### **Comparison of PRT and DTT**

Mahammadzaheri, Koegel, Rezaee, and Rafiee (2014) attempted to look at the difference between PRT and a structured ABA technique in order to see which had better results. The key features of their PRT intervention included the use of natural reinforcers and child choice for activities. They mixed mastered skills with the target behaviors they were attempting to teach and rewarded all attempts. As for the ABA intervention it was not expressly defined as DTT, however, the description of the procedures are aligned with the DTT technique. For the DTT intervention they used favorite toys and foods for reinforcers and the teacher determined the tasks prior to each session as opposed to being child driven. They worked exclusively on learning the target behaviors and used a shaping paradigm for reinforcement. Participants received a total of 24 hours of services (either PRT or DTT) over the course of 3 months for sixty minutes 2 times a week. Overall Mahammadzaheri et al. (2014) found that PRT had better results for learning the target behaviors than DTT. There were many speculations as to why this might be. One possible explanation is that the natural reinforcers used in the PRT process were stronger reinforcers than the contrived toys and foods. Another explanation was that the PRT

condition used a mix of mastered and target behaviors allowing participants a larger opportunity for successes.

PRT and DTT have many similarities. They are both based on ABA techniques and are used for many of the same reasons from teaching communication/language skills and social skills to decreasing inappropriate behaviors and teaching academic skills. Both techniques are shown to be effective with similar age groups (Mahammadzaheri et al. 2014). The biggest difference between the two is how tasks and trials are determined. In PRT the child directs the flow of learning and the reinforcement is natural to the situation at hand. Often times PRT is described as being play based (Mahammadzaheri et al. 2014), whereas DTT is more structured and adult driven with distinct beginnings and endings for each trial. Although this structure can be extremely useful when breaking down the steps for acquiring a skill Mahammadzaheri et al. (2014) found that PRT may be more effective for learning general target behaviors.

### **Other similar techniques**

Pivotal Response Treatment and Discrete Trial Training are not the only techniques used to teach children with ASDs. There are a few more techniques that are similar, such as incidental teaching, loosely structured training, and free operant instruction. The most common of these three is incidental teaching. Incidental teaching involves setting up the learning environment to encourage child initiation of activities. Like PRT, incidental teaching follows the child's choice and teaches based on the things they choose to do. For example, if a child decides to color the adult would put the markers out of reach but in sight of the child to teach the child how to request items. This differs from PRT in the sense that incidental teaching does not have specific principals or learning variables. Incidental teaching can be used as the occasion arises and as a

supplement to other treatments. Often incidental teaching is used alongside DTT to augment the child's learning (Smith et al., 2002). Incidental teaching is helpful for strengthening existing adaptive behaviors and can be easily used in clinics, schools, and homes. Rethink Autism has two training modules dedicated to incidental teaching in their program (incidental teaching and incidental teaching for expanding language).

Loosely structured training is a less defined method than Discrete Trial Training. There is more flexibility in the tasks being selected and it often uses some form of peer models and/or behavioral skills training. Loosely structured training is easier to use in a group setting than DTT because the minimal structure allows for less defined trials and the opportunity for multiple participants (Smith and Magyar, 2002). Because loosely structured training includes peer models it is often used alongside DTT to enhance play and communication skills, social interaction, and labeling or requesting in a partner or group format. In contrast, free operant instruction has no set format or systematic instruction method. The key concept is to "catch them being good" (Smith and Magyar, 2002). This method uses praise and discouragement to shape a child's behaviors and to help strengthen existing adaptive behaviors.

## **Conclusion**

Research shows that when working with children who have an ASD it is important to have intensive interventions (CDC: Data & Statistics, 2016). This usually means upwards of 20 hours of services a week. The CDC and the Academy of Pediatrics endorse ABA therapy as an evidence based practice to be used with this population. Both PRT and DTT have their roots in ABA (Vismara, & Bogin, 2009; Borgin, 2008) and are often used in packaged programs designed for use with ASD (Vismara & Bogin, 2009; STAR program, 2016; Autism Speaks:

Early Start Denver Model, n.d.). PRT, DTT, incidental teaching, loosely structured training, and free operant instruction are all commonly used techniques when working with ASD populations. They each have been shown to be effective methods of teaching skills from learning readiness and skill acquisition to communication skills and even academics.

In the end the most important thing is to make sure the child is getting the most support and learning opportunities as possible. Therefore, many times families use a mix of techniques to support their child's learning. This might include a structured program such as ESDM or STAR in the educational setting, DTT style supports with an ABA therapist, and incidental teaching or PRT based techniques being used in the home with the family.

References:

American Academy of Pediatrics: Recent Information Pertaining to Autism. (n.d.). Retrieved from <https://www.aap.org/en-us/about-the-aap/Committees-Councils-Sections/Council-on-Children-with-Disabilities/Pages/Recent-Information.aspx>

Autism Speaks: Recent Information Pertaining to Autism. (n.d.). Retrieved from <https://www.aap.org/en-us/about-the-aap/Committees-Councils-Sections/Council-on-Children-with-Disabilities/Pages/Recent-Information.aspx>

Bogin, J., Sullivan, L., Rogers, S., & Stabel, A. (2010). *Steps for implementation: Discrete trial training*. Sacramento, CA: The National Professional Development Center on Autism Spectrum Disorders, The M.I.N.D. Institute, The University of California at Davis School of Medicine

Bozkus-Genc, G., & Yucesoy-Ozakan, S. (2016) *Meta-analysis of pivotal response training for children with autism spectrum disorder*. *Education and Training in Autism and Developmental Disabilities*, 51(1), 13-26.

Centers for Disease Control: Data & Statistics. (2016). Retrieved from <http://www.cdc.gov/ncbddd/autism/data.html>

Green, G. *Early behavioral intervention for autism: What does research tell us?* Choosing an Effective Treatment, Ch. 3 29-43

Koegel Autism Research Centers website: The Gevirtz School (GGSE) - UC Santa Barbara. (2014). Retrieved from <http://education.ucsb.edu/autism/pivotal-response-treatment>

Leyfer, O. T., Folstein, S. E., Bacalman, S., Davis, N. O., Dinh, E., Morgan, J., Lainhart, J. E. (2006). Comorbid Psychiatric Disorders in Children with Autism: Interview

- Development and Rates of Disorders. *J Autism Dev Disord Journal of Autism and Developmental Disorders*, 36(7), 849-861. doi:10.1007/s10803-006-0123-0
- Mohammadzaheri, F., Koegel, L. L., Rezaee, M., & Rafiee, S. (2014). *A randomized clinical trial comparison between pivotal response treatment (PRT) and structured applied behavior analysis (ABA) intervention for children with autism*. *Journal Of Autism & Developmental Disorders*, 44(11), 2769-2777.
- Reed, S. R. (2013). *Adapting individual components of pivotal response training for the classroom: Using basic research to inform practice*. Dissertation Abstracts International, 74,
- Schreibman, L., Dawson, G., Stahmer, A. C., Landa, R., Rogers, S. J., McGee, G. G., Kasari, C., Ingersoll, B., Kaiser, A. P., Bruinsma, Y., McNernery, E., Wetherby, A., Halladay, A. (2015). *Naturalistic developmental behavioral interventions: empirically validated treatments for autism spectrum disorder*. *Journal of Autism and Developmental Disorders*, 45, 2411-2428
- Smith, T., Magyar, C., & Arnold-Saritepe, A. (2002). Autism spectrum disorder. In D. T. Marsh, M. A. Fristad, D. T. Marsh, M. A. Fristad (Eds.) , *Handbook of serious emotional disturbance in children and adolescents* (pp. 131-148). Hoboken, NJ, US: John Wiley & Sons Inc.
- Smith, T. & Magyar, C. (2002). *Behavioral Assessment and Treatment*.
- STAR Program: Second Edition. (2016). Retrieved from <http://starautismsupport.com/star-program-second-edition>
- Suhrheinrich, J., Stahmer, A. C., Reed, S., Schreibman, L., Reisinger, E., & Mandell, D. (2013). *Implementation challenges in translating pivotal response training into community*

*settings*. Journal Of Autism And Developmental Disorders, 43(12), 2970-2976.

doi:10.1007/s10803-013-1826-7

The Early Start Denver Model (ESDM). (n.d.). Retrieved August 15, 2016, from

<https://www.autismspeaks.org/what-autism/treatment/early-start-denver-model-esdm>

Vismara, L.A., & Bogin, J. (2009). *Steps for implementation: Pivotal response training*.

Sacramento, CA: The National Professional Development Center on Autism Spectrum

Disorders, The M.I.N.D. Institute, The University of California at Davis School of

Medicine.